PUBLIC UTILITIES COMMISSION

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February 12, 2016   Advice Letter PG&E 3668-G/4765-E
                                                 Supplemental PG&E 3668-G-A/4765-E-A

Erik Jacobson
Director, Regulatory Relations
c/o Megan Lawson
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77 Beale Street, Mail Code B10C
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Subject: Request for Authority for Retail Products Platform (RPP) Pilot within PG&E's
          Residential Energy Efficiency Plug-Load and Appliances Sub-Program

Dear Mr. Jacobson:

After lengthy analysis, the Energy Division has determined PG&E's Advice Letter 3668-G/4765-E
("Request for Authority for Retail Products Platform [RPP] Pilot within PG&E's Residential Energy
Efficiency Plug-Load and Appliances Sub-Program) is approved, effective February 12, 2016.

On December 24, 2015, PG&E filed Advice Letter 3668-G/4765-E, seeking Commission approval of a
new Retail Products Platform (RPP) pilot program within its Energy Efficiency Plug-Load and
Appliances Sub-Program. PG&E describes the pilot as a "strategic market transformation effort designed
to create long-lasting, sustainable changes in the functioning of product-specific markets by reducing
market barriers to the adoption of energy efficient plug-load and appliances."

The advice letter filing concludes more than two years of program planning, during which time PG&E
and Commission staff worked together to shape the RPP pilot described in the Advice Letter based on
phase 1 pilot results and broader market transformation guidance. In approving the Advice Letter, this
disposition details protests filed (and later withdrawn) by The Utility Reform Network (TURN) and the
Office of Ratepayer Advocates (ORA), as well as clarifies recent Commission ex-ante work paper review
of the RPP pilot and PG&E's Supplemental Advice Letter Filing of February 10, 2016, in response to
that direction.

Protests

On January 13, 2016, The Utility Reform Network (TURN) and the Commission's Office of Ratepayer
Advocates (ORA) filed separate protests of the Advice, each of which described their specific and
respective support of the pilot effort so long as a number of specific revisions were made and certain
requirements were established.

TURN's filed protest and withdrawal

In its protest, TURN asked that the Commission:

- require PG&E to bolster net-to-gross ratios through contractual provisions with participating retailers related to the timeliness of their implementation of the retailer marketing plan, as recommended in the Phase 1 RPP pilot evaluation, and

- direct the other IOUs to submit Advice Letters clarifying their plans to participate in the ENERGY STAR RPP and coordinate their efforts with PG&E.

In the aftermath of its protest, TURN worked with PG&E to ensure that contractual provisions related to the timeliness of retailer marketing plans are in place. In its reply, PG&E highlights these contractual provisions and notes that retailers are required to submit plans within 30 days of pilot implementation and begin activities described in those plans within 90 days of pilot implementation, with PG&E working to encourage retailer deployment of these plans even sooner.

Additionally, TURN reviewed the program theory with PG&E as it relates to engagement on the part of the other California IOUs. The pilot program theory posits that should the RPP intervention succeed in its early stages, other IOUs will have an interest in and be encouraged to participate as the market transforms. Consequently, the Commission will not order the other IOUs to participate at this time, seeing greater value in allowing the pilot to proceed as designed in order to fully test the market transformation theory. To this end, PG&E will track pilot performance, in collaboration with Commission staff, and share ongoing results with a broad set of stakeholders in order to facilitate engagement on the part of the other IOUs at a future date.

Satisfied with PG&E's reply to its protest, filed on January 21, 2016, TURN withdrew its protest on January 21, 2016.

ORA's filed protest and withdrawal

In its protest, ORA asked that:

- PG&E propose minimum performance standards (e.g. minimum high efficiency sales lift) required for retailers to continue in the RPP program and an appropriate time scale (e.g. annual) for evaluating whether minimum performance standards have been met and continue to be met through the duration of the four-year pilot, in an effort to reduce free-ridership, and

- The Commission requires PG&E to file an annual Tier 1 advice letter demonstrating that the program is meeting the performance metrics PG&E has proposed and is on track to achieve its objectives prior to approving funding for years two, three and four.

In the aftermath of its protest, ORA worked with PG&E to ensure that a framework to support performance metrics based on sales of high efficiency units is in place. As noted by PG&E in its reply, once retailer contracts are signed, PG&E will have access to retailer sales data and be responsible for reviewing retailer marketing plans, which will include sales forecasts by which pilot performance may be judged:

> "The aggregated sales data will supply critical information needed for PG&E to create appropriate sales targets to track the progress of RPP...Retailers who are not compliant with the participation agreement requirements will be notified that they need to comply with agreement provisions within a probationary period. Those that fail to comply with participation agreement requirements will be terminated from the program".[1]

Additionally, PG&E stated that it "did not object" to a requirement of filing a Tier 1 Advice Letter prior to each of the second, third and fourth years of the pilot in order to receive budgetary approval for the following year. It is clear that ORA's desire was not limited to PG&E noting that it did not object to such a filing, but more broadly asked that PG&E actually file these advice letters as a matter of course as a means of safeguarding ratepayer funds based on accurate estimates of pilot performance to date. To that end, Commission staff will work with PG&E to track pilot performance and share ongoing results with a broad set of stakeholders in order to enable adequate pilot review and sound advice letter filings.

Satisfied with PG&E's reply to its protest, filed on January 21, 2016, ORA withdrew its protest on January 22, 2016.

Commission ex-ante review and Supplemental Advice Letter Filing

On November 6, 2015, PG&E submitted to Commission staff the engineering work paper for the RPP effort. The work paper described energy savings estimates for each of the product categories to be targeted by the RPP effort based on measure and program assumptions such as unit energy savings and free-ridership.

In its work paper disposition, posted on December 15, 2015, Commission staff denied the inclusion of two measures – freezers and sound bars – in the RPP program, as these measures had zero incremental costs and were consequently not allowed to receive ratepayer-funded incentives based on Commission policy. The disposition noted that these measures require a more specific justification for inclusion, including new evidence as to why PG&E should be allowed to offer incentives for measures with zero incremental cost. Additionally, the disposition stated that PG&E must "provide evidence that the proposed inclusion has a likelihood of success based on real market experience", all of which must be reflected in a future work paper revision, in order for these measures to considered for inclusion at some future date.

In its Supplemental filing (AL 3668-G-A/4765-E-A), filed February 10, 2016, PG&E responds specifically to Commission staff's ex ante review and outlines the research that it will conduct in 2016 to revise the RPP work paper. PG&E will conduct:

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[1] PG&E's Reply to Protests of Advice Letter 3668-G/4765-E from the Office of Ratepayer Advocates and The Utility Reform Network, January 21, 2016, pg. 3.

- product-specific market barrier research on all six product categories. This research will include information non-cost market barriers and evidence that they are best-addressed by providing incentives to retailers via the RPP

- research to demonstrate that EnergyStar-certified products (sound bars, air cleaners and freezers) proposed for inclusion in RPP are more efficient than non-EnergyStar-certified products

- research on baseline conditions to augment and support the standard practice baseline for both electric and gas dryers, and

- research to support estimations of unit-energy-savings (UES) for sound bars, including typical baseline assumptions for modal power draw, operating hours and usage profile.

All research described in the Supplemental filing is due to Commission staff by December 30, 2016. PG&E acknowledges that absent this additional information, RPP support for the measures in question and addressed in this research will be reconsidered and will be discontinued in future program years.

PG&E will work with Commission staff through 2016 to develop research plans specific to each of these research projects in order to revise the RPP work paper as directed in the initial disposition, which does not allow for savings claims from these excluded measures until such issues are resolved.

Accordingly, PG&E's Advice Letter 3668-G/4765-E ("Request for Authority for Retail Products Platform [RPP] Pilot within PG&E's Residential Energy Efficiency Plug-Load and Appliances Sub-Program) is approved, effective February 12, 2016.

Please contact Peter Franzese of the Energy Division staff at 415-703-1926 peter.franzese@cpuc.ca.gov if you have any questions.

Sincerely,

Edward Randolph
Director, Energy Division

cc: Alexander Cole, Office of Ratepayer Advocates
Hazlyn Fortune, CPUC
Hayley Goodson, The Utility Reform Network
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December 24, 2015

Advice 3668-G/4765-E
(Pacific Gas and Electric Company ID U 39 M)

Public Utilities Commission of the State of California

Subject: **Request For Authority for Retail Products Platform (RPP) Pilot within PG&E's Residential Energy Efficiency Plug-Load and Appliances Sub-Program**

Purpose

Pacific Gas and Electric Company (PG&E) requests approval of a Retail Products Platform (RPP) pilot, a strategic market transformation effort designed to create long-lasting, sustainable changes in the functioning of product-specific markets by reducing barriers to the adoption of energy efficient plug-load and appliances. PG&E designed this pilot to conform to the guidance provided by two key whitepapers commissioned by the CPUC.[1] This advice letter (AL) requests authority to conduct a four-year RPP pilot under the PG&E Residential Energy Efficiency (EE) Plug-Load and Appliances (PLA) sub-program using existing budget. PG&E anticipates the four-year pilot to transition into a ten-year subprogram.

The proposed RPP pilot is part of a wider effort, the ENERGY STAR Retail Products Platform (ESRPP), undertaken in conjunction with program administrators (PAs)[2] across the country and sponsored by the U.S. Environmental Protection Agency (EPA), to address plug load growth. The ESRPP makes it possible to gain the scale needed to attract national retailers to participate and effect market transformation in the consumer electronics and appliance markets. The effort will benefit California rate payers by curtailing the growth of plug load within the state. In the long-term, the RPP design is

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[1] Keating, Ken (2014): Guidance on Designing and Implementing Energy Efficiency Market Transformation Initiatives. Prahl, Ralph and Keating, Ken (2014): Guidance on Designing and Implementing Energy Efficiency Market Transformation Initiatives.

[2] Program Administrators interested in participating in the ENERGY STAR Retail Products Platform include Pacific Gas and Electric Company, Southern California Edison, Southern California Gas Company, San Diego Gas & Electric Company, Sacramento Municipal Utility District, Xcel Energy, Eversource Connecticut, UIL Holdings, DC Sustainable Energy Utility, Northwest Energy Efficiency Alliance, Baltimore Gas and Electric Company, Southern Maryland Electric Cooperative, Pepco, DTE Energy, Con Ed, Efficiency Vermont and Focus on Energy.

expected to increase the cost effectiveness of the EE PLA portfolio for selected product categories where sales can be influenced significantly by retailer decisions regarding the merchandise they stock and promote.

The success of ESRPP depends upon simultaneous engagement by multiple PAs in multiple states representing a significant retail customer base.   PG&E's participation at program launch, slated for March 1, 2016, is critical to demonstrate the potential for a multi-state effort to address plug-loads. Therefore, PG&E is seeking expedited approval for this pilot in order to launch March 1, 2016. The four-year pilot period is proposed as it is a sufficient period to evaluate market impacts to determine if the RPP should be extended for a longer timeframe. Evaluation of the pilot will occur on a yearly basis to mitigate risk.

PG&E proposes to claim ex ante savings for those RPP measures approved by the Energy Division's ex ante review team in the RPP workpaper at the time of the RPP pilot launch, March 1, 2016. PG&E is in the process of responding to requests for further information contained in the RPP workpaper disposition and is revising the workpaper.[3]   For any RPP measures not approved for ex-ante savings by the time of pilot launch, PG&E requests authority to include these measures as part of the pilot, and claim savings subject to an ex post evaluation, or ex-ante starting at the point any additional measures are approved. PG&E requests that all RPP measures be added to the deemed "Uncertain Measure List," so that all ex ante values will be verified on an annual basis.

Background

Savings Potential and Challenges for the Plug Load and Appliance Markets
One of the goals of the California Long-term Energy Efficiency Strategic Plan is to "develop comprehensive, innovative initiatives to reverse the growth of plug load energy consumption" in California[4]. The RPP pilot will help meet this challenge. The pilot design includes working collaboratively with utilities across the U.S. to address plug load growth in the residential sector nationally. The U.S. Department of Energy's Energy Information Administration (DOE/EIA) estimated that "other" or "miscellaneous plug load" electricity consumption, when combined with consumption by televisions and office equipment, will represent 29% of U.S. residential annual electricity consumption in 2006 and will grow to approximately 36% in 2020. DOE/EIA forecasted that the "plug load" annual consumption will increase by 31% over the same period, on a per household basis (DOE Study, 2008).

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[3] See PGECOAPP128r0_RetailProductsPlatform_15Dec2015. The disposition calls for PG&E to propose research for estimating baseline energy use and usage profiles for room air cleaners and soundbars, and baseline assumptions for clothes dryers. In a follow-on conversation with the Energy Division ex ante review team on December 22, 2015, additional documentation was requested to support the use of incentives for measures with zero incremental cost.

[4] California Energy Efficinecy Strategic Plan, January 2011 Update, Section 2, page 21

Because plug loads represent a significant proportion of residential electricity consumption, reducing plug load energy consumption is a critical step to achieve California's residential Zero Net Energy (ZNE) goals. The 2012 ZNE Technical Feasibility Report stated that "minimizing plug loads will be critical to meeting ZNE goals"[5], and recommended that utilities "continue equipment efficiency incentive programs" and "aggressively promote equipment efficiency regulations at the state and federal level[6]."

RPP addresses specific opportunities and challenges at the national, state and programmatic level. Energy savings opportunities in many plug load categories cannot be addressed effectively by traditional downstream rebate programs. First, the energy savings per unit are relatively small, though energy savings across the entire category can be significant. Hence, the incentive per unit will typically be relatively small. Second, new plug-load products are introduced on a rapid development basis, requiring quicker and more nimble intervention strategies to address new products. Third, due to modest per-unit energy savings, typical downstream incentives increasingly are not cost effective and therefore are not offered for most appliances. Fourth, downstream incentives for appliances and electronics can be time consuming and confusing for end-use customers, and the redemption processes can present a barrier to purchasing energy efficient appliances.[7]

Since the costs of the RPP pilot are front-loaded, PG&E forecasts costs will decline over time while energy savings will grow over time. Consequently, cost effectiveness of the longer-term market transformation effort is forecast to improve over time. Using the ED-approved net-to-gross ratios[8], the cumulative TRC for the four-year pilot is estimated by the E3 Calculator to be 0.57. Assuming that the program runs for ten years, the cumulative TRC is estimated to reach 1.75. This difference between the estimated shorter- and longer-term TRCs is consistent with the principles that underlie market transformation programs: the TRC is based on the cumulative lifecycle benefits and the cumulative program costs over the life of the program. The pilot's TRC and other key measure parameters will be re-estimated using the most recent data on a yearly basis.

RPP Pilot Program Model Theory and Rationale
A detailed RPP Pilot Program Theory and Logic Model is provided in Appendix A, attached. In short, the RPP model focuses on a portfolio of consumer energy efficient products with relatively small incentives paid to the retailer for each unit sold. This

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[5] The Technical Feasibility of Zero Net Energy Buildings in California, Final Report | December 31, 2012 | Arup North America Ltd, page 8

[6] IBID, page 51

[7] "End of Perspective Rebate Forms? Massachusetts Moves Upstream," Rishi Sondhi and Nathan Strong, Northeast Utilities and Gabe Arnold, Optimal Energy. 2014 ACEEE Summer Study on Energy Efficiency in Buildings.

[8] See WORKPAPER DISPOSITION FOR PGECOAPP128 Revision 0 Retail Products Platform California Public Utilities Commission, Energy Division December 15, 2015

model is intended to incentivize retailers to participate by reducing market barriers to stocking and selling more energy efficient electronics and appliances and to mitigate the significant costs associated with changing appliance product mixes in stores, providing more sales floor space for energy efficient models, revising marketing to reflect new energy efficient electronics and appliances, updating pricing strategies and training staff to sell the most efficient models.

The retail channel is ideally suited to reduce plug load by transforming the consumer electronics and appliances markets and leveraging the influential ENERGY STAR brand.   The RPP logic model theorizes that the combination of incentives and engagement will motivate retailers to promote, stock, and demand more energy efficient models of home appliances and consumer electronics from manufacturers in targeted product categories. As manufacturers experience greater demand for energy efficient models from retailers, they will change their manufacturing processes.

RPP Trial
The proposed four-year RPP pilot is informed by the phase one RPP trial operated through the PG&E Emerging Technologies Program from November, 2013 through December, 2014. PG&E conducted this small-scale trial of the RPP pilot ("phase one") jointly with the Sacramento Municipal Utility District (SMUD) and the Northwest Energy Efficiency Alliance (NEEA) in collaboration with a single retailer chain. The goals of the trial were to examine foundational operational and evaluation questions – how to implement and administer RPP in a cost-effective manner, and how to evaluate RPP over the short-, mid-, and long-terms by applying and testing an array of different evaluation methods.

An evaluation of the trial was conducted and detailed findings are in the final report attached to this Advice Letter as Appendix B. The findings of the phase one evaluation underscore the importance of a larger scale RPP pilot in order to affect retailer and manufacturer decisions and behaviors over a longer term. These early findings are a primary reason for the proposed longer timeframe and larger scale of the RPP pilot. As discussed below, the evaluation also provided detailed recommendations that PG&E incorporated into the RPP pilot to improve the design, delivery, and evaluation.

RPP Pilot Development
PG&E's RPP pilot incorporates and improves upon the structure and learnings from the phase one RPP trial and an earlier Business and Consumer Electronics (BCE) program conducted by PG&E in 2010-2012. The RPP pilot includes four retailer chains at the March 1 scheduled launch — Home Depot, Best Buy, Sears and Kmart.[9] PG&E anticipates expanding the pilot to additional retailers and national appliance purchasing groups representing individual retailers in 2017 to help increase the scale of RPP and to

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[9] Retailers Sears and Kmart operate under the parent company Sears Holding.

drive greater change in the plug load and appliance markets[10]. In order to keep the pilot scale manageable, six product categories (air cleaners, sound bars, room air conditioning units, freezers, gas clothes dryers and electric clothes dryers) are proposed to be tested initially.[11] Throughout the pilot, the addition of more product categories will be carefully considered to maintain the manageable scale that a pilot requires, while ensuring flexibility to allow the RPP pilot to capture new opportunities and new product categories, as they arise. PG&E anticipates that the incentives for product categories will be consistent for all retailer participants, even if one retailer may develop a lead in sales of some incentivized products. Any large lead in energy efficient product share gained in the short-term by one retailer is expected to drive other participants to follow quickly. RPP would not want to drive away or penalize those high-performing retailers that take fast action to sell efficient products through uneven eligibility for incentives. More information about the product categories is provided below. In addition, the details of the current RPP pilot description, design, and theory and logic model are incorporated in both Appendix A, the RPP Program Theory and Logic Model document, and in a companion document, Appendix C, RPP Product Introduction and Transition Guidance.

Product Selection
Over 40 products were considered and six were selected for the RPP pilot: air cleaners, sound bars, room air conditioning units, freezers, gas clothes dryers and electric clothes dryers. Products were considered for inclusion in the pilot if they had existing ENERGY STAR specifications, were not incentivized in an existing downstream program, had potential for market transformation and are of interest to national retailers. The products were selected with the goal of creating a balance between testing across a breadth of product categories and limiting risk by selecting a limited number for the pilot launch. The product mix is expected to change over the course of the four-year pilot to adjust to national partnership needs and product market evolution. The RPP Product Transition and Introduction Guidance document, Appendix C, lists product selection criteria in detail and further describes the product transition process. The product selection strategy for the first group of products was to choose products that could:

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[10] Retailers Costco Wholesale, Lowe's, Target, Walmart and national buying groups representing individual retailers are targeted to join RPP in 2017. RPP is adding retailers in a phased approach to minimize risk and capture learnings from the new phase before moving forward. The phased approach to adding new retailers also allows for the lengthy process of recruiting and signing agreements with large retail chains.

[11] The Phase 1 RPP Trial, running from November 2013 to December 2014, included the following product categories: Air Cleaners, DVD-Blue-Ray Players, and Home Theater-in-a-box/Sound bars, Freezers, Refrigerators and Room Air Conditioners. RPP chose not to move forward with DVD-Blue Ray Players (due to stagnant market demand) or with Refrigerators (due to existing downstream incentives offered in this product category). Electric and Gas Clothes Dryers were added to the product mix for multiple reasons including: lack of existing downstream incentive, new ENERGY STAR specification, and interest from participating retailers.

1. Provide program sponsors with an ample opportunity to reduce product unit energy consumption (UEC) and achieve large energy savings in aggregate, based on existing UEC calculation methods
2. Be a designated ENERGY STAR product with transparent test methods and performance criteria
3. Have available historic sales or shipment data from industry sources such as CEA, AHAM, NPD and/or AHRI
4. Have widespread residential applicability, demonstrated participation interest from national retailers and retail sales that are forecast to be substantial based on regional potential studies (as applicable)
5. Have an efficient product (measure case) market share less than 35% in order to reduce free ridership.
6. Have a clear opportunity to either update an existing State or Federal standard or result in the creation of a new standard.

Soundbars, for example, are a high growth product category, with limited per unit savings, well positioned for operationalizing transition from Basic to Advanced Tier of Energy Star. Air cleaners offer small unit sales, but high per unit energy savings. Room air conditioning units have a new specification with no existing models certified, positioned to influence retailer stocking plans for 2016. The appliances selected offer an opportunity for retailer engagement. Freezers have not been offered through downstream programs and clothes dryers is a new ENERGY STAR product category with potential for significant savings in the Advanced Tier category with Heat Pump technology as seen in the European market.

RPP Pilot A National Effort with Support from EPA, Retailers, and NEEA
PG&E has worked collaboratively with the ENERGY STAR team from EPA on the ESRPP as well as other PAs from across the nation to obtain the scale needed to engage large retailers to participate in a long-term test of the RPP model. This collaborative effort of PG&E, the EPA, and other PAs in California and across the nation, has contributed to the current RPP design and has an organized effort to collaborate on future research, evaluation and the ongoing implementation and improvement of RPP. Letters of support for RPP from EPA, NEEA, Retail Action Council (RAC), and NRDC are included in Appendix D.

This national, coordinated ESRPP effort leverages resources and similar objectives, removes duplication of effort and redundancy across neighboring service territories, streamlines operations and reduces costs, and allows retailers and utilities to focus limited resources on effective local differentiation and program delivery. This national effort is unique, based on the scalability that comes with consistent program design including product categories, specifications, data requirements, and midstream delivery. EPA's briefing document about the national ESRPP effort is provided in Appendix E, attached.

Proposed Evaluation Plan

The evaluation plan for the 2016-2019 RPP pilot proposes to use a theory-driven evaluation framework, including process and impact evaluation. The evaluation plan differs from the approaches used for traditional resource acquisition programs such as downstream rebates. The plan uses the key leading indicators, which are provided in Appendix F, as a guide. PG&E anticipates holding regular meetings with CPUC staff to monitor and review pilot progress, best practices and lessons learned for any adjustments or other actions needed in a timely manner during the pilot period.[12]

PG&E will receive historical and ongoing sales data from all participating retailers and collect anonymized sales data through a third-party vendor. PG&E will engage in the following activities: review each participating Retailer Implementation Plan, conduct field team verification of implementation plan activities, conduct RPP program staff interviews, execute customer, product-specific barrier research, and perform other program management and implementation data reviews. Further, PG&E will conduct manufacturer interviews on current and historical retailer purchasing trends, retailer buying practices and forecasts of production of energy efficient products. The significant amount of data collection and market barrier research detailed in the Evaluation Plan provided in Appendix G will allow PG&E not only to evaluate the pilot, but to answer questions about the ability of the RPP model to reduce plug load over time.

Supporting documentation for the proposed evaluation of the RPP pilot is included in the appendices of this Advice Letter as follows:

* Final RPP Pilot Evaluation Plan[13]-Appendix G
* Draft RPP Pilot Evaluation Q&A Document-Appendix H

Research and evaluation efforts for the RPP pilot will be conducted as part of the Energy Division's EM&V processes; draft and final research and evaluation findings and recommendations will be made publicly available. PG&E anticipates holding quarterly RPP pilot check-in meetings with Energy Division and the other California utilities. PG&E proposes that the RPP pilot evaluation be completed six months before the end of the proposed four-year pilot, with yearly refreshes to estimates of key parameters including net-to-gross ratios and unit energy savings. The evaluation and yearly updates will ensure that, in the event that the CPUC approves a RPP subprogram, the implementation of the RPP model, with any needed revisions, will continue without interruption for the retailer participants and the long-term market transformation process will continue smoothly.

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[12] Appendix F, RPP Pilot Metrics and Targets includes the details of the proposed RPP pilot project key leading indicators and targets for those indicators.

[13] The draft RPP Evaluation Plan was submitted to the CPUC for review on October 16, 2015 and presented at a public webinar on October 28, 2015.

RPP Pilot Measures Ex Ante Savings
Throughout 2014 and 2015, PG&E worked closely with the California Technical Forum (Cal TF)[14] to develop an RPP workpaper that included deemed ex ante savings estimates for each of the product categories. PG&E engaged extensively with the Cal TF on the methodologies for estimating key product-specific parameters (including estimates of incremental measure costs, short, medium, and long-term estimates of net-to-gross values, and unit energy savings), and the values resulting from the application of these methodologies.

PG&E subsequently submitted a workpaper to Energy Division for ex ante review on November 6, 2015. Energy Division's December 15, 2015 disposition requested more information on certain parameter estimates, including baseline energy use and usage profiles for air cleaners and soundbars. The disposition also requested further information to support the use of incentives for measures with zero incremental cost. PG&E is in the process of responding to requests for further information contained in the RPP workpaper disposition and revising the workpaper.

PG&E requests approval to provide incentives for the full set of measures shown in Table 1, to ensure consistency in the national launch of the RPP March 1.

PG&E proposes to claim ex ante savings for those RPP measures approved by the Energy Division's ex ante review team in the RPP workpaper at the time of the RPP pilot launch, March 1. For any RPP measures not approved for ex-ante savings by the time of pilot launch, PG&E requests authority to include these measures in the pilot, and claim savings subject to an ex post evaluation, or ex-ante starting at the point any additional measures are approved. PG&E requests that all RPP measures be added to the deemed "Uncertain Measure List," so that all ex ante values will be verified.

The proposed initial set of product categories, qualifying tier levels and incentive levels for the RPP pilot are shown below in Table 2. These products and specifications were established via collaboration with the EPA and other national PAs, and using Appendix C, Product Introduction and Transition Guidance.

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[14] The Cal TF is a collaborative panel of experts who use independent professional judgment and a transparent, technically robust process to review and issue technical information related to California's integrated demand side management portfolio.

Table 1: Proposed Initial Product Categories, Tiers and Incentives

Product Category	Standard or Specification*		Unit Incentive
Sound Bars	Basic Tier	ENERGY STAR +15%	$10
	Advanced Tier	ENERGY STAR +50%	$20
Air Cleaners	Basic Tier	ENERGY STAR	$20
	Advanced Tier	ENERGY STAR +30%	$30
Freezers	Basic Tier	ENERGY STAR	$20
	Advanced Tier	ENERGY STAR +5%	$50
Room Air Conditioners	Basic Tier	ENERGY STAR	$20
	Advanced Tier	Not Yet Applicable	N/A
Electric Clothes Dryers	Basic Tier	ENERGY STAR	$50
	Advanced Tier	ENERGY STAR Emerging Tech Award	$250
Gas Clothes Dryers	Basic Tier	ENERGY STAR	$50
	Advanced Tier	Not Yet Applicable	N/A

* ENERGY STAR levels are the versions effective as of 1/1/2016.

Pilot Project Criteria Information
In Section 4.3.1 of D.09-09-047, the CPUC established ten requirements for a pilot proposal. These requirements are addressed below.

1. *A specific statement of the concern, gap, or problem that the pilot seeks to address and the likelihood that the issue can be addressed cost-effectively through utility programs*

The RPP pilot will help meet the goal stated in the California Long-term Energy Efficiency Strategic Plan to "develop comprehensive, innovative initiatives to reverse the

growth of plug load energy consumption." The RPP pilot is a market transformation program with a cumulative TRC over the initial four-year pilot estimated by the E3 Calculator at a value of 0.57. However, over the ten-year life of the program, the cumulative TRC is estimated to be 1.75.[15] More information on the gap addressed by the RPP pilot is in section "3.1: Program Rationale" in the Program Theory and Logic Model, Appendix A.

2. Whether and how the pilot will address a Strategic Plan goal or strategy and market transformation

As discussed in detail in Appendix A, the RPP Program Theory and Logic Model, the proposed RPP pilot uses a market transformation program design to address Strategic Plan Residential Sector Goal 3 – Develop comprehensive, innovative initiatives to reverse the growth of plug load energy consumption through technological and behavioral solutions.

3. Specific goals, objectives and end points for the project

Please see the attached Appendix F, RPP Pilot Metrics and Targets, for the details of the specific goals and objectives of the proposed RPP pilot project. Key leading indicator metrics and related targets are proposed and will be finalized together with the CPUC Staff.

The key leading indicators and targets will be used quarterly to monitor and review pilot progress and inform plans for any adjustments or other necessary actions in a timely manner during the pilot period.

4. New and innovative design, partnerships, concepts or measure mixes that have not yet been tested or employed

The RPP is an innovative collaboration between program administrators and retailers to create long term market transformation in the residential plug load and appliance market. The pilot leverages national coordination to reach scale to move end-user purchases of products in targeted plug load and appliance categories toward more efficient models. Unlike typical measures in PG&E's energy efficiency measure portfolio that are characterized as resource acquisition (RA) programs, the RPP pilot is characterized as a market transformation (MT) program. PG&E designed this pilot to conform to the guidance provided by two key whitepapers commissioned by the CPUC.[16] The objective of the RPP pilot is to accomplish long-term sustainable changes

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[15] The TRC is less than one in the initial pilot period due to the use of the short-term net-to-gross ratios (NTGRs). Over the life of the 10-year RPP Program, both the NTGRs and market effects are expected to increase leading to a TRC that reaches 1.72.

[16] Keating, Ken (2014): Guidance on Designing and Implementing Energy Efficiency Market Transformation Initiatives. Prahl, Ralph and Keating, Ken (2014): Guidance on Designing and Implementing Energy Efficiency Market Transformation Initiatives.

in the business practices of key market actors that will result in consumers adopting more efficient plug load and appliance products and to influence the supply chain to provide more efficient models over time.

5. A clear budget and timeframe to complete the project and obtain results within a portfolio cycle - pilot projects should not be continuations of programs from previous portfolios

PG&E proposes to use funding for this pilot in the existing Residential EE Program budget. PG&E will monitor RPP progress through quarterly reviews with CPUC staff. Updates to key product-level parameters will be made on a yearly basis as recommended by Cal TF. Updates may result from the Rolling Portfolio Business Plan process that will start in 2016. The incentive levels and products may be modified during the pilot period based on the market response to the pilot.

This RPP pilot forecast assumes that, after the first year of intervention with four retailer participants, three to four additional retailers will be added to increase the scale of the effort and enable market transformational effects. PG&E has the option to end the pilot during the four year period. Decreases or increases to this forecast may result from the addition and/or sunsetting of product categories into and out of RPP, in accordance with the RPP Product Introduction and Transition process found in Appendix C.

Table 2: RPP Funding Forecast

Year	Incentives	Direct Implementation, Administration and Marketing	Total
2016	$1,250,000	$900,000	$2,150,000
2017	$3,150,000	$1,100,000	$4,250,000
2018	$3,662,500	$1,250,000	$4,912,500
2019	$4,165,875	$1,400,000	$5,565,875
		4-Year Total	$16,878,375

6. Information on relevant baselines metrics or a plan to develop baseline information against which the project outcomes can be measured

Please see the attached Appendix H, the Draft RPP Pilot Evaluation Plan, for the details of the plan to develop baseline information against which the project outcomes can be measured.

7. Program performance metrics

Please see the attached Appendix G, RPP Pilot Metrics and Targets, for the details of the proposed RPP pilot project key leading indicators and targets for those indicators. These indicators and targets will be finalized and revised as needed through input and discussion with CPUC Staff.

8. Methodologies to test the cost-effectiveness of the project

Please see the attached Appendix G, the Draft RPP Pilot Evaluation Plan, for the details of the methodology to test the cost-effectiveness of the pilot.

9. A proposed EM&V plan

Please see the attached Appendix G, the RPP Pilot Evaluation Plan, which was submitted to Energy Division on December 16, 2015 after a period of public review.

10. A concrete strategy to identify and disseminate best practices and lessons learned from the pilot to all California utilities and to transfer those practices to resource programs, as well as a schedule and plan to expand the pilot to utility and hopefully statewide usage.

PG&E proposes to hold quarterly RPP pilot check-in meetings with CPUC staff, consultants and the other California utilities. PG&E proposes that the RPP pilot evaluation completed six months before the end of the proposed four-year period. This would ensure that if the CPUC approves a long-term RPP subprogram, the implementation of the RPP model, with any needed revisions, will continue without interruption.

Protests

Anyone wishing to protest this filing may do so by letter sent via U.S. mail, facsimile or E-mail, no later than January 13, 2016, which is 20 days after the date of this filing. Protests must be submitted to:

> CPUC Energy Division
> ED Tariff Unit
> 505 Van Ness Avenue, 4th Floor
> San Francisco, California 94102
>
> Facsimile: (415) 703-2200
> E-mail: EDTariffUnit@cpuc.ca.gov

Copies of protests also should be mailed to the attention of the Director, Energy Division, Room 4004, at the address shown above.

The protest shall also be sent to PG&E either via E-mail or U.S. mail (or by facsimile, if possible) at the address shown below on the same date it is mailed or delivered to the Commission:

> Erik Jacobson
> Director, Regulatory Relations
> c/o Megan Lawson
> Pacific Gas and Electric Company
> 77 Beale Street, Mail Code B10C
> P.O. Box 770000
> San Francisco, California 94177
>
> Facsimile: (415) 973-7226
> E-mail: PGETariffs@pge.com

Any person (including individuals, groups, or organizations) may protest or respond to an advice letter (General Order 96-B, Section 7.4). The protest shall contain the following information: specification of the advice letter protested; grounds for the protest; supporting factual information or legal argument; name, telephone number, postal address, and (where appropriate) e-mail address of the protestant; and statement that the protest was sent to the utility no later than the day on which the protest was submitted to the reviewing Industry Division (General Order 96-B, Section 3.11).

Effective Date

PG&E requests that this Tier 2 advice filing become effective on regular notice, January 23, 2016, which is 30 calendar days after the date of filing.

Notice

In accordance with General Order 96-B, Section IV, a copy of this advice letter is being sent electronically and via U.S. mail to parties shown on the attached list and the parties on the service list for R.13-11-005. Address changes to the General Order 96-B service list should be directed to PG&E at email address PGETariffs@pge.com. For changes to

any other service list, please contact the Commission's Process Office at (415) 703-2021 or at Process_Office@cpuc.ca.gov.   Send all electronic approvals to PGETariffs@pge.com.   Advice letter filings can also be accessed electronically at: http://www.pge.com/tariffs/.

_____/S/_____
Erik Jacobson
Director, Regulatory Relations

Attachments

cc: Service List R.13-11-005

CALIFORNIA PUBLIC UTILITIES COMMISSION
ADVICE LETTER FILING SUMMARY
ENERGY UTILITY

MUST BE COMPLETED BY UTILITY (Attach additional pages as needed)

Company name/CPUC Utility No. **Pacific Gas and Electric Company (ID U39 M)**

Utility type:	Contact Person: <u>Kingsley Cheng</u>
☑ ELC ☑ GAS	Phone #: <u>(415) 973-5265</u>
☐ PLC ☐ HEAT ☐ WATER	E-mail: <u>k2c0@pge.com and PGETariffs@pge.com</u>

EXPLANATION OF UTILITY TYPE	(Date Filed/ Received Stamp by CPUC)
ELC = Electric GAS = Gas PLC = Pipeline HEAT = Heat WATER = Water	

Advice Letter (AL) #: **3668-G/4765-E**   **Tier: 2**

Subject of AL: **Request For Authority for Retail Products Platform (RPP) Pilot within PG&E's Residential Energy Efficiency Plug-Load and Appliances Sub-Program**

Keywords (choose from CPUC listing): <u>Energy Efficiency</u>

AL filing type: ☐ Monthly ☐ Quarterly ☐ Annual ☑ One-Time ☐ Other _____

If AL filed in compliance with a Commission order, indicate relevant Decision/Resolution #: <u>N/A</u>

Does AL replace a withdrawn or rejected AL? If so, identify the prior AL: <u>No</u>

Summarize differences between the AL and the prior withdrawn or rejected AL: _____

Is AL requesting confidential treatment? If so, what information is the utility seeking confidential treatment for: <u>No</u>

Confidential information will be made available to those who have executed a nondisclosure agreement: <u>N/A</u>

Name(s) and contact information of the person(s) who will provide the nondisclosure agreement and access to the confidential information: _____

Resolution Required? ☐Yes ☑No

Requested effective date: **<u>January 23, 2016</u>**   No. of tariff sheets: <u>N/A</u>

Estimated system annual revenue effect (%): <u>N/A</u>

Estimated system average rate effect (%): <u>N/A</u>

When rates are affected by AL, include attachment in AL showing average rate effects on customer classes (residential, small commercial, large C/I, agricultural, lighting).

Tariff schedules affected: <u>N/A</u>

Service affected and changes proposed: <u>N/A</u>

Pending advice letters that revise the same tariff sheets: <u>N/A</u>

Protests, dispositions, and all other correspondence regarding this AL are due no later than 20 days after the date of this filing, unless otherwise authorized by the Commission, and shall be sent to:

California Public Utilities Commission	**Pacific Gas and Electric Company**
Energy Division	**Attn: Erik Jacobson**
EDTariffUnit	**Director, Regulatory Relations**
505 Van Ness Ave., 4th Flr.	**c/o Megan Lawson**
San Francisco, CA 94102	**77 Beale Street, Mail Code B10C**
E-mail: EDTariffUnit@cpuc.ca.gov	**P.O. Box 770000**
	San Francisco, CA 94177
	E-mail: PGETariffs@pge.com

Appendix A

Program Theory and Logic Model for the PG&E 2016 Retail Product Platform (RPP) Program

Program Theory and Logic Model for the PG&E 2016 Retail Product Platform (RPP) Program

December 20, 2015

Contents

Tables

Figures

1. Introduction

On November 1, 2013, a trial run (the Trial) of the Retail Plug Load Portfolio (RPP) Program concept was launched by PG&E in collaboration with one retailer. The Trial, which ended in December 2014, is the first test of an innovative intervention designed to address the problem of growing plug load at the retail store level. If successful, the Trial would be scaled up to involve additional retailers and perhaps additional product categories. The purpose of this document is to provide the overarching logic and underlying social/economic theories that serve as the foundation of the RPP Program concept. A separate document is available from PG&E that provides the details of the Trial which is smaller in scope due to its short duration.

The logic model in Figure 2 and the underlying social/economic theories are intended to serve as a single source of reference for the foundational components of the RPP Program including the activities, outputs, short-term outcomes, mid-term outcomes and long-term outcomes and the market barriers faced by the retailers and their customers. We also describe the various strategies that are designed to achieve the energy and demand goals. Next, we characterize and assess the various markets targeted by the RPP. This is important since a program like the RPP has never been attempted in California and, as a result, a comprehensive understanding of the structure and functioning of the many markets addressed by the RPP has never been done. Note that this document will only provide a high level characterization based on secondary data. Eventually, the collection of additional primary data can complete the picture. This characterization is followed by the logic model that illustrates a set of interrelated RPP activities that combine to produce a variety of outputs that in turn lead to key short-, mid- and long-term outcomes. Also described in this section is an analysis that attempts to link the rationale and strategies of the RPP Program to the relevant social science literature. Here, we also describe the various positive and negative external factors that might also influence the design, delivery and expected outcomes and the relationship of the RPP Program to the activities being carried out by the other PG&E programs. This section is followed by a list of potential indicators that could be used in testing hypotheses regarding key cause and effect relationships identified in the logic model. The final component identifies what we consider to be the most important researchable issues that the PG&E team will address via process evaluations and market assessments. This component also identifies researchable issues that the ED may address in upcoming impact evaluations.

When conducting this program theory and logic model analysis, the following activities were performed:

- Document reviews

- Discussion with program staff to help define the logic model elements (these included identification of key program inputs, activities, market actors, outputs, outcomes, potential external influences, and other RPP segment interactions)

- Logic model diagram construction – entailing transposition of key logic model elements into a series of boxes or circles and arrows to identify preliminary logical relationships among the elements

- Identification of barriers and context development

- Identification of potential program measurement indicators

- Follow-up discussions and feedback from program staff on an early version of the program description, relationship to goals, logic model, and indicators to help correct and refine the draft logic model

This analysis takes this logic model of the program and examines the program theory and logic in the context of the experience of other similar programs and potentially relevant social science theory. Key activities performed in developing the program theory analysis included:

- Review of articles and proceedings to identify other potentially similar programs

- Review of recent evaluations of these other programs

- Review of social science literature pertinent to key theory inherent or explicitly incorporated in the program design

- Identification of researchable issues and recommendations

Finally, this document was completed on 6/26/2015 and will be used as an important guide in future market assessments, process and impact evaluations. PG&E recognizes that this logic model and program theory might change as the importance of current elements change over time and as new components are added to the design and delivery of the RPP Program. In short, this is a living document but this 6/26/2015 version will be retained as a historical log.

An evaluation that is driven by the underlying theory of why program activities are expected to create specified outputs and outcomes is one that is clear, systematic, and can lead to cost-effective determination of program effectiveness. According to Chen (1990),

> ....specifying the underlying theory of a program within the evaluation allows that theory to be tested in a way that reveals whether program failure results from implementation failure or theory failure. Program theory clarifies the connections between a program's operations and its effects, and thus helps the evaluator to find either positive or negative effects that otherwise might not be anticipated. It also can be used to specify intermediate effects of a program that might become evident and measurable before final outcomes can be manifested, which can provide opportunities for early program assessment in time for corrective action by program implementers. (p. 29)

A theory-driven approach is particularly useful when a new approach is being undertaken since many of the cause and effects relationships might be relatively untested and implementation problems more numerous. This is the case with the RPP Program which has abandoned the traditional program approach and embraced a mid-market intervention that focuses on a portfolio of efficient measures. Most importantly, the RPP theory and logic model will provide a framework for providing on-going feedback with respect to a wide variety of performance indicators. Regularly providing such information to program managers can allow them to make mid-course corrections in the design and/or delivery of the program activities. The RPP theory and logic model will also be used to identify high priority research issues, such as the effectiveness of a key component or additional market research, which can also inform the design and delivery of the RPP activities. A more thorough discussion of program theory and logic

models can be found in Chapter 4 of the *California Evaluation Framework* (The TecMarket Works Team, 2004).

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3. RPP Program

3.1. Program Rationale

The rationale for the RPP Program begins with recognizing four important facts. First, while after decades of energy efficiency programs tremendous energy savings have been achieved, the remaining energy savings opportunities such as those associated with plug loads have relatively low per-unit energy savings. Typical downstream incentives may not be effective for electronics and appliances that have relatively small incremental savings; a small rebate to the customer will not influence the customer's decision. As administrative costs become burdensome, acceptable TRCs for individual product measures become elusive. However, f*or the retailer*, the small incentive may be equal to or greater than the gross profit margin on the purchase. Gross profit expressed in percentage terms as gross margins, for appliance and consumer electronics stores are also among the lowest[1] in the retail industry. This can significantly influence the retailer's promotional efforts. Furthermore, the total incentive budgets for an individual measure may be too small to motivate a retailer or manufacturer to participate. Economic benefits resulting from RPP Program Retail must accrue to retailers as well as to PG&E customers in order for the program to work.

Second, the savings potential within the plug load category is large and growing. Navigant Consulting, Inc. (2013)[2] noted:

> There are many new Appliance Plug measures that are coming into the market and modeled in this study. The results show that these new appliance plug measures [computers, power strips, vending machine controllers, TVs, clothes washers, dishwashers] have a significant impact on energy savings potential and make up nearly a quarter of the [market] potential savings in 2020. (p. 138)

In addition, the U.S. Department of Energy's Energy Information Administration (DOE/EIA) estimated that "other" electricity consumption combined with televisions and office equipment, represented about 29% of U.S. residential annual electricity consumption in 2006 and will grow to approximately 36% in 2020. EIA forecasts that the "plug load" annual consumption will increase by 31% over the same period, on a per household basis (DOE Study, 2008).

Third, the retail channel plays a critical role in delivering both traditional and emerging energy efficiency products within the plug load category. Navitas (2013) noted that:

> In the U.S., there are well over $250 Billion in annual sales of energy consuming products and energy reducing products sold through the retail channel. Retailers in this sector assort hundreds of thousands of different items. These product assortments include many of the over 15,000 ENERGY STAR certified products spanning more than 60 product

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[1] Gross profit, expressed in percentage terms as gross margin, is the difference between net revenue and the cost of goods sold, divided by revenue, expressed as a percentage (http://www.census.gov/retail/index.html#arts). Gross margin is just the percentage of the selling price that is profit.

[2] Note that there are other plug loads that were not specifically addressed in the Potential Study such as air cleaners, stereos, DVD/Blue-Ray players and home-theatre-in-a-box).

categories. Retailers and utilities share customers in local markets and have common interests in satisfying the needs of these mutual customers.

In 2011, energy efficiency program sponsors (EEPS) in the United States invested over $7 Billion to increase energy efficiency in homes and businesses. Almost $2 Billion[1] of these budgets were directed by EEPS towards energy efficient products sold through retail channels. The retail channel has been effective in delivering energy efficient products to residential customers and reducing energy consumption in homes throughout the service territories of U.S. utilities.

Because of the success of energy efficiency programs over the past two decades, energy consuming devices are significantly more efficient than in the past. Continued growth in electricity and natural gas use, however, still justifies utility incentive programs.

Going forward, lower incremental energy savings in traditional energy efficiency areas like lighting and major appliances shift focus to new product categories. This change in focus necessitates a recalibration of how EEPS design programs and implement them through retail channels in order to correspondingly reduce costs and improve effectiveness. (p. 1)[3]

In addition, annual per store traffic for large retailers' stores is quite high, as shown in Figure 1.

Figure 1: Average Annual Traffic Per Store, by Retailer
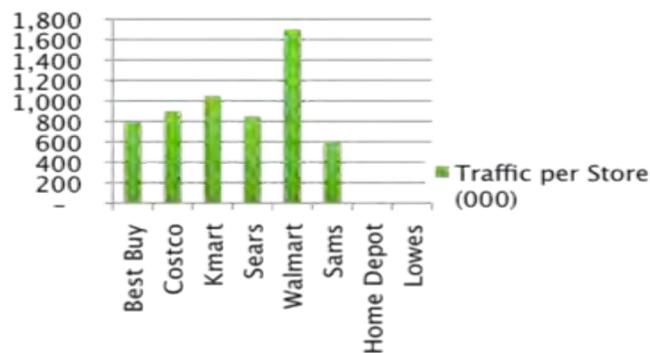
More than $10 Billion of energy-related consumer products sold through retailers in PG&E's service territory. McKinsey (Granade 2009) estimates that products sold through this channel may account for nearly 30 percent of the future energy savings potential. Furthermore, large retailers have prominent on-line platforms with which to connect to prospective customers.

Fourth, working with retailers to promote energy efficient plug loads yields benefits for retailers, utilities and their customers. Basic benefits to the retailer include incremental revenue from incentives, increased sales of energy efficient products, and higher store traffic. While the benefits to retailers are increased profits, the benefits to the utility and its customers are captured in the various benefit-cost tests contained in the Standard Practice Manual. Utility incentives are

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[3] That is, the RPP Program focuses on capturing plug load savings at the product category level, which would not be cost-effective if delivered through a traditional downstream program.

attractive to a retailer if program participation costs do not subtract substantially from their revenues or add more to their overhead costs than can be covered through incentives. One option for increasing the size of the total incentive pool and increasing the economic benefits for a retailer is collaboration with other utilities such as SMUD and regional bodies such as NEEA.

Based on the recognition of these four facts, the RPP Program focuses on a portfolio of consumer energy efficiency measures that are delivered through the retail channel partners. The retail channel, particularly large retailers[4] who are significant players in this channel, is ideally suited to assist PG&E and its partners in transforming the market for the most energy efficient products. The advantages of such a mid-stream program are:

- Incentives are attractive to retailers,
- The utility total costs are minimized[5],
- Such programs are often tied to ENERGY STAR branding,
- Mid-stream models enable EEPS to take advantages of retailer's marketing strengths and ability to shape the customer experience.
- Such programs can influence manufacturer's product features when retailers select their product assortments[6].

Drexler (2013) underscored the importance of midstream interventions:

> The goal of midstream programs is to transform markets by motivating retailers to stock and sell qualifying high-efficiency products. It stands to reason then that successful midstream programs can rapidly transform markets because retailers that are effective at moving high efficiency products off the shelves can quickly saturate markets. In turn, utilities will need to provide incentives for more-efficient technologies in step with market changes to sustain their programs.

Peters et al. (2010) agrees and adds:

> Success in transforming the electronics market will require careful consideration of the unique elements of each product's supply chain. It will be further expanded if program managers strive towards goals that have not typically been part of a utility program strategy: coordinating with other utilities and programs to develop programs that apply to as broad a geographic territory as possible; being flexible enough to allow the program to

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[4] Best Buy, Costco, Home Depot, Lowes, Sears Holdings and Walmart Corporation: these retailers have more than 50% market share of any energy consuming product category (Appliances, Consumer Electronics, HVAC and Lighting)

[5] For example, one rebate check is prepared once each month to each participating retailer rather the thousands of rebate checked prepared to thousands of end users.

[6] Misra (2008) notes that assortment planning, where retailers decides which products to place on their store shelves, is one of the most fundamental decisions in retailing. Consumers view the assortment as an important category management service output that drives their decisions on where to shop (Kok and Fisher [2007]). Consistent with this view, in a recent meta-analysis, Pan and Zinkhan [2006] reviewed 14 papers all concluding that assortments are an important driver for consumers' purchase decisions. A recent survey by Nielsen found that store assortment is the second most important factor driving consumers' decisions (Nielsen, Dec 17, 2007). Moreover, category managers believe that their assortments are important competitive tools that allow them to differentiate.

evolve at the same rapid pace as the products; and working closely with manufacturers to involve them in setting energy efficiency targets and designing the program processes (p. IV).

3.2. RPP Program Description

In response to these facts, PG&E has developed and launched the Retail Plug-Load Portfolio (RPP) Program. The RPP Program uses a mid-stream design to influence retailers to stock and sell more energy efficient models of home appliances and consumer electronics in targeted product categories. Because it targets primarily retailers and manufacturers and works closely with ENERGY STAR and codes and standards in setting specifications, it is considered to be a market transformation (MT) program7. Furthermore, because the RPP Program emphasizes a thorough consideration of which specific markets have leverage points that will yield to market transformation, and then promotes the development of systematic but flexible long-term strategies for influencing those leverage points, it is referred to as a targeted market transformation initiative (Prahl, 2014). Retailers are paid per-unit incentives for every program-qualified model that they sell during the program period. Program-qualified models are typically models that meet or exceed the minimum ENERGY STAR specification in each product category. By increasing the sales of energy efficient models over less efficient models, the RPP Program will generate gross energy and demand savings in the short- and mid-term through participating retailers while transforming the overall market towards higher efficiency in the long-term. The broader RPP Program strategy is discussed in detail in the PG&E document *Retail Plug-Load Portfolio Trial Plan.*[8]

The Phase I Trial focused exclusively on brick-and-mortar stores. While online sales are increasing, they now constitute only about 7% of all U.S. retail sales (U.S. Census Bureau, Annual Retail Trade Survey, 2014). Clearly customers still prefer to shop in stores (ATKearney, 2015; Lesonsky, 2014). However, for electronics and appliance stores (NAICS Code 443), the current share is approximately 1.2%. Figure 2 shows the e-commerce share of all retail sales for electronics and appliance stores (NAICS 443) versus the e-commerce share of all retail sales for all retailers (all NAICS).

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[7] "Market transformation is long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where *continuation of the same* publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market." D.09-09-047 at 89

[8] Navitas. 2013. *PG&E Retail Plug-Load Portfolio (RPP) Trial Plan*. Prepared for PG&E by Navitas.

Figure 2. E-Commerce Share of Electronics and Appliance Retail Sales (NAICS 443)
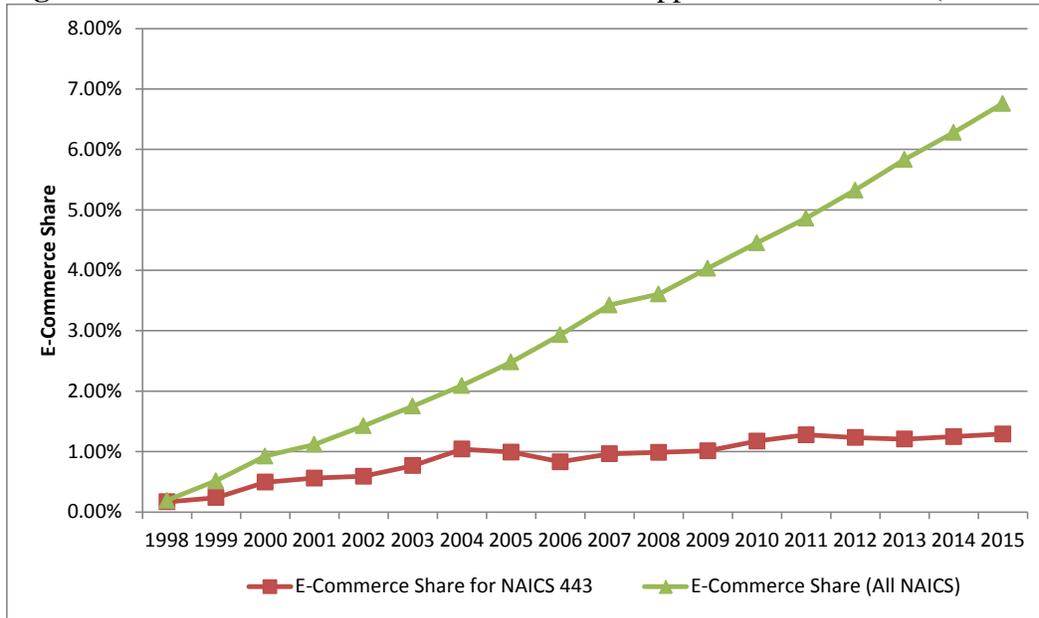
However, within the electronics and appliance stores, the e-commerce sales for the former are estimated by Navitas (personal communication, July 7, 2015) and Brown (2015) to be approximately 20%. For appliances, nearly all of the sales are treated as going through brick-and-mortar stores. The savings potential discussion (Section 3.2.1) takes this into account.

The RPP Program was tested with a single participating retailer in a limited number of stores in the PG&E service territory in a trial that took place from November 2013 to December 2014. The 2013-2014 Phase I Trial incented six product categories, including: (1) air cleaners, (2) DVD/Blu-Ray players, (3) home theaters-in-a-box (HTIBs), (4) freezers, (5) refrigerators, and (6) room air conditioners.

The 2016 Phase II RPP Pilot is being expanded to include Sears Holdings, Home Depot and Best Buy with more retailers expected to be added over the next several years. Table 1 presents the number of stores in the PG&E service territory for each of these participating retailers.

Table 1. Participating Retailer Stores in the PG&E Service Territory

Retailer	Number of Stores
Home Depot	98
Best Buy	42
Sears Holdings (Kmart and Sears)	74
Total	214

The next question is, for each product category, what portion of all sales in the entire market is represented by the four participating retailers versus the nonparticipating retailers. Table 2 presents these market shares by product category.

Table 2. Market Shares of All Sales, by Product Category, by Participating and Nonparticipating Retailers

Products	Sears Holdings (Kmart & Sears)	Best Buy	Home Depot	Total Market Share of 4 Participating Retailers	Remaining Market Share of Non-participating Retailers
Room Air Conditioners	21.0%	8.0%	12.0%	40.5%	59.5%
Sound bars	2.5%	30.0%	0.0%	32.5%	67.2%
Air Cleaners	10.5%	3.0%	10.0%	23.5%	76.5%
Food Freezers	26.0%	7.0%	16.0%	49.0%	51.4%
Gas Dryers	25.3%	10.0%	20.0%	55.3%	44.8%
Electric Dryers	25.3%	10.0%	20.0%	55.3%	44.8%

The Program is expected to launch in the first quarter of 2016. Table 3 presents the six targeted product categories for 2016 RPP Program Trial, the draft efficiency specifications and incentives.

Table 3. 2016 RPP Program Product Categories and Draft Efficiency Specifications and Incentives

Product Category	Standard or Specification*		Unit Incentive
Sound Bars	Basic Tier	ENERGY STAR +15%	$10
	Advanced Tier	ENERGY STAR +50%	$20
Air Cleaners	Basic Tier	ENERGY STAR	$20
	Advanced Tier	ENERGY STAR +30%	$30
Freezers	Basic Tier	ENERGY STAR	$20
	Advanced Tier	ENERGY STAR +5%	$50
Room Air Conditioners	Basic Tier	ENERGY STAR	$20
	Advanced Tier	Not Yet Applicable	N/A
Electric Clothes Dryers	Basic Tier	ENERGY STAR	$50
	Advanced Tier	ENERGY STAR Emerging Tech Award	$250
Gas Clothes Dryers	Basic Tier	ENERGY STAR	$50
	Advanced Tier	Not Yet Applicable	N/A

* ENERGY STAR levels are the versions effective as of 1/1/2016.

The RPP Program is designed to eventually add other measures, such as refrigerators, as well as other utilities and partners.

It is important to note that while the RPP Program promotes six specific product categories, they can be grouped into two, major appliances and consumer electronics and the technological change for the former is much slower than the latter. Peters et al. (2010) notes:

> Consumer electronics products change continuously. As soon as one product is designed, the next product design process begins, and manufacturers note energy efficiency often improves in each successive model. Programs thus need to reevaluate energy efficiency targets and the levels at which incentives are provided to ensure that only the most efficient products qualify. For example, a set-top box manufacturer suggested efficiency standards for set-top boxes should be tightened every one or two years. (p.45)

The major appliance market moves much more slowly simply because many efficiency improvements have already been made and the measure lives are much longer. Ultimately, each product category has its own technical challenges, development timeline, supply chain, end-users, barriers, and opportunities. Although there are similarities across product types, programs should treat each product individually when designing an implementation strategy. It is not advisable to treat a diverse portfolio of product categories as if a single strategy can address this collection of unique challenges.

In summary, the RPP Program is a holistic, multi-product, multi-year intervention that uses retailer engagement to increase the demand and supply[1] of more energy efficient appliance and consumer electronic products. Retailers have been chosen as the point of intervention because of their ability to impact the entire value chain. Retailers work with manufacturers early in product development to determine feature sets and consumer demands and finish the value chain when they sell the products to the end customers in a space where they shop on a regular basis. A retailer's ability to drive these multiple points makes them one of the more effective market actors in the creation of sustainable market effects. This approach also allows retailers to do what they do best: sell program-qualified products using their own proven strategies.

3.2.1. Program Savings Potential and RPP Program Objectives
Two types of savings potential, *technical* and *market* were estimated.

3.2.1.1.   Technical Potential
Technical potential is calculated on a per-measure basis, as the product of the first-year annual savings per program-qualified unit and the quantity of expected units to be sold in each year in the PG&E service territory from 2016 through 2025. The assumption is that all units sold over the next 15 years are program-qualified[9]. This sets the upper limit of gross savings. Table 4 presents the maximum market level potential for each product category.

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[9] The savings extend past the end the of ten-year RPP Program since it is assumed that the retailers' assortment and promotion of the more energy efficient models have become business as usual and will continue for at least an another five years.

Table 4. 2016-2025 Maximum Market-Level Potential, by Product Category

Product	Maximum Market-Level First-Year Annual Potential (GWH)	Maximum Market-Level First-Year Annual Potential (Decatherm)
Electric Clothes Dryers	208.8	
Air Cleaners	171.0	
Sound Bars +50%	101.5	
Room Air Conditioners	24.8	
Freezers	18.1	
Gas Clothes Dryers		1,123,613.91
Total	524.3	1,123,613.91

3.2.1.2.   Market Potential

The final output of the potential study is a market potential analysis, which calculates the energy efficiency savings that could be expected in response to specific levels of incentives and assumptions about market influences and barriers under the condition that the total RPP Program portfolio has a TRC greater than 1.0. All components of market potential are a subset of economic potential[10]. Some studies also refer to this as "maximum achievable potential." Market potential is used to establish the goals for the RPP Program. The overall market potential by product category is presented in Table 5.

Table 5. Market Potential 2016-2025, by Product Category

Product Categories	Net First-Year Annual GWH Savings	Net First-Year Annual Decatherm Savings
Electric Clothes Dryers	36.69	
Air Cleaners	28.39	
Sound Bars	15.96	
Room Air Conditioners	12.78	
Freezers	2.55	
Gas Clothes Dryers		206,515
Total	96.38	206,515

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[10] Using the results of the technical potential analysis, the economic potential is calculated as the total energy efficiency potential available when limited to only cost-effective measures. All components of economic potential are a subset of technical potential. We did not attempt to estimate economic potential.

3.2.2. Program Objectives

The program objectives for the RPP Program fall into two categories: (1) performance objectives and (2) operational or process objectives. The *performance objectives* are those objectives that will be used to assess the performance of the pilot to ensure it is meeting expectations and is on-track to succeed as a program. The performance objectives will be carefully tracked over the life of the CA RPP Pilot, and will be reported to the CPUC-ED and Program Administrators in an ongoing manner to ensure that the regulators are able to stay abreast of the Pilot's implementation and progress.[11] The final list of performance objectives were still under development at the time of the drafting of this plan, and will be included in the RPP *Advice Letter* being submitted to the CPUC-ED in October 2015.

The *operational objectives* are aimed at building a robust infrastructure for program implementation and evaluation that could support the scaling up of the RPP program concept from a pilot to a multi-year program. The operational objectives are listed below:

- Retailers develop acceptable implementation plan to sell targeted products
- Retailers faithfully implement approved implementation plans
- Implement activities A, C, D, and T denoted in the logic model that lead to expected outputs B, G, F, E, and U (see Figure 3)
- Establish retailer data collection requirements
- Establish data processing and analysis methodology
- Identify variables that should be tracked by the RPP Program
- Determine appropriate incentive levels
- Establish a timely quality control review of retailer sales and incentive payments
- Continue building relationships with other program partners such as SMUD, NEEA, and other utilities for future partnerships

3.3. Overarching Theory

The fundamental program theory is that, with the right combination of incentives and engagement, market barriers for both retailers and consumers and eventually manufacturers can be reduced[12].

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[11] Different means of communicating progress towards the performance objectives are being considered, but current thoughts are that this effort may involve the development of a dashboard ED members and other relevant stakeholders can access real-time to observe and assess progress towards meeting the objectives.

[12] Note that the RPP is not a lift program, which pays an incentive only for the number of units sold that is greater than the forecasted number of units that would have been sold normally. That is, incentives are paid only for the incremental, or net, units above this baseline forecast. Rather, an incentive will be paid for every program qualified unit. This is no different than any other standard utility rebate program which pays an incentive for every qualified measure, e.g., a refrigerator. Some portion of program participants are always freeriders, something determined as part of an ex post evaluation. To mitigate the risk of high freeridership, program designers must decide to promote those energy efficient measures that have relatively low sales and market shares within a given retailer and use less energy use cost more than the standard efficient units.

A number of market barriers, faced by the retailers, the manufacturers and customers, are addressed by the RPP. We begin by noting that a market is determined by both supply and demand characteristics. Retailers can offer products that are not demanded at the price, quality, or other associated characteristics offered. Demanders can seek, or more passively hope for, products and services that they cannot find, or cannot find at the price, quality, etc., they require. Thus, some of these barriers affect the demand for energy efficient measures while others affect the supply of these measures. To the extent that these barriers are present, the supply of and demand for these products will be suboptimal. Each retailer is required to develop an implementation plan that employs a number of strategies that have been shown in the past to increase sales. These plans will no doubt vary in terms of the effort devoted to advertising, promotion, placement and assortment of program-qualified products. For example some plans might focus more on changing assortment and less on consumer education and sales staff training. Below, we list the potential market barriers that could possibly be addressed in these plans.

Supply-side market barriers (manufacturers, distributors, and suppliers of residential energy-using equipment) include:

- Manufacturers may be uncertain about the response of customers to their new products or retailers might be reluctant to promote products for which their performance is uncertain. To the extent that this is a problem, the supply of these products at reasonable prices will be suboptimal

- Products and services may be unavailable because manufacturers, distributors, and service providers have difficulty accurately predicting customer demand for their products/services, and may respond to this uncertainty in a risk-adverse manner, thereby limiting the availability of their products/services. Often this unavailability is associated with new products/services and the uncertainty of market response. Or, they might not perceive sufficient demand for energy efficiency and new energy technologies in multifamily buildings.

- Lack of information and awareness among upstream market actors regarding the benefits of energy efficient equipment.

Market infrastructure barriers include:

- Low levels of awareness and knowledge regarding product specifications or differentiation regarding efficiency levels among retail merchandizers.

- Limited experience with energy efficient equipment.

- Perception of risk with stocking or installing efficient appliances when customer demand or product quality has yet to be proven (uncertainty about product performance and profit potential).

- Undervaluing energy efficiency and sustainability and their impact on economic development, denial of climate change, and low sense of urgency regarding adoption of energy efficient technologies.

- Information or search costs. Specifically, the lack of expertise among equipment sales staff due to the lack of energy efficiency training opportunities.

- Institutional policies and practices might prevent some retailers from shifting their assortment to the more energy efficient products simply because they never have. Energy use is not always an attribute that retail merchandizers consider when buying products from manufacturers.

- Lack of differentiated product marketing by retailers to motivate customers to make more efficient purchasing choices.

- Market lacks experience in determining the best way to create a profitable long-term business model

Demand-side market barriers include:

- Customers often unaware and lack knowledge and understanding of energy-efficient products and services

- Information costs associated with understanding the energy related features and associated benefits of energy-efficient technologies and services.

- Because energy efficiency is rarely valued by the customer more than the requested functionality, efficient models do not always receive consumer attention.

- Sometimes the energy-efficiency attributes of a product or service may not be packaged with other features customers desire. For example, some energy-efficient options may only be available on high-end products, such as on high-end or large refrigerators.

- Many customers and some businesses in the distribution chain are uncertain about the performance of energy-efficient products and services, and may not trust the performance claims made by manufacturers and vendors. Many customers also have difficulty assessing the value of energy efficiency as an investment, because the costs are paid upfront but the less certain benefits accrue over time.

- Incremental costs may be higher for the more efficient models.

- Resistance to new or innovative technologies

It is certainly possible that the market barriers faced by consumers, retailers and manufacturers with respect to the six RPP product categories might vary by product category (Peters et al., 2010). Or, it is possible that the market barriers might be similar within sub-groups such as large appliances, consumer electronics and room air conditioners and room air cleaners. To address this issue, we recommend conducting a market characterization study during 2016 that would, among other things, collect data from the relevant market actors regarding their assessment of the magnitude of these market barriers and the extent to which they might vary across products. The results of this study will be shared with participating retailers so that they can better understand the relevant barriers to selling program-qualified products and adjust their marketing plans accordingly.

As a result of overcoming these market barriers, it is hypothesized that retailers will increase their sales of more energy efficient models (models that meet and/or exceed ENERGY STAR

specifications) than they would have absent the program, thereby generating energy savings, and with sustained engagement, transforming the retail channel market in delivering energy efficient plug load products and appliances[13].

In the short term, the Program is intended to motivate participating retailers to promote and sell more efficient models. Over time, other retailers, investor-owned utilities (IOUs), and administrators outside of PG&E's service territory (e.g., other investor-owned utilities, municipal utilities such as SMUD, and regional bodies, such as NEEA) are expected to collaborate in this effort to regularly demand, stock, assort and promote the most efficient models available. This will be necessary because the markets for these types of products are complex and world-wide and it may be difficult for a single utility or state to influence the market forces enough to affect how manufacturers and mid-stream players act. It will take participation by a large number of outlets to affect the market. Peters et al. (2010) underscored this fundamental program design principle:

> Manufacturers design and market products for a national, even international market. They are already faced with country-specific requirements and strongly dislike "patchwork" requirements. In fact, many manufacturers stated they were unlikely to comply with energy efficiency program requirements that apply at municipal levels. Thus, programs will have the greatest impact on the electronics market if they coordinate with one another in setting energy efficiency targets, incentive levels, and program participation requirements. (p. 45)

How will these efforts eventually lead to a sustainable shift in the supply and demand of energy efficiency products? Each retailer has a profit maximization function for each product, the key inputs of which include cost, price, price elasticity and sales volume. While we do not, and cannot know, the specifics of these functional forms, we understand that there are a number of factors that would cause a retailer to promote, stock and assort efficient products, even those that that have profit margins smaller than other competing models. The first is that efforts of the retailers are expected to increase the demand for efficient products leading to higher volume sales and higher profits. The second is the value associated with being an Energy Star partner. A retailer's only objective is to maximize corporate profit. However, if being an Energy Star partner can increase store traffic and customer loyalty, they can increase sales of all items throughout their stores, even though they might be selling some energy efficient products that have smaller profit margins. The third mechanism is to restrict what retailers can sell through the adoption of mandatory energy efficiency standards. Over the ten-year program period, retailers are expected to learn that, even without incentives, profit maximization is not inconsistent with the routine promotion, stocking and assortment of energy efficient products.

With respect to nonparticipating retailers, there is some uncertainty about how they will respond to the participating retailers' emphasis on the promotion, pricing, product placement and assortment of program-qualified products. They could respond by holding sales of standard efficient models which, if price were the only concern of the typical consumer, could reduce the program-qualified share for participating retailers and the overall market. On the other hand, nonparticipating retailers could respond by trying to compete by promoting the same efficient models as participating retailers. Or,

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[13] While the trial is focused exclusively on the brick and mortar stores at three major retailers, the focus of the scaled-up RPP could be multi-channel.

they might choose to join the RPP Program and take advantage of the incentives, an outcome which for now seems most likely. Evaluators will monitor the PQS for participating retailers and nonparticipating retailers to assess these complex market dynamics. Ultimately, the PQS for participating retailers must increase and, if market effects are to be claimable by any given program administrator, the PQS at the market level must also increase and be attributable to some extent to the combined efforts of all program administrators.

That the RPP Program is a regional program presents unique challenges. Peters (2010) goes on to note that: "Successful intervention by utilities and government agencies will require new strategies, exceptional adaptability, and unprecedented cooperation among efficiency organizations (p. 2)."

While PG&E has worked with many of the retailers targeted by this program for participation, most recently in the Upstream Lighting Program, and most are ENERGY STAR Partners, there is a continued focus on prioritizing retailer relationships, an objective that was underscored by KEMA (2013) which recommended the following: "Maintain retailer relationships. Retailers are a key player in the supply chain for most plug load products. Thus, programs should seek to build long-term relationships with retailers and design program elements with the retailer's business case in mind."

Thus, an essential element of RPP Program success is effective collaboration between the Energy efficiency program sponsors (EEPS)[14] and retailers. The general framework for this utility/regional body-retailer cooperation is consistent with the guidelines set forth in *Partnerships in Energy Efficiency with Retailers (PEER) Guidance: Retailer Guidance for Streamlining ENERGY STAR® Partner Collaborations on Energy Efficiency Programs* (PEER Guidance).

PEER Guidance was been inspired by the ongoing dialogue at the ENERGY STAR Products Partner Meetings over the last three years and informed by subsequent working meetings of the ENERGY STAR Retail Action Council (RAC). The RAC's goal for the guidance is to make energy efficiency incentive programs as cost-effective and productive as possible for EEPS and retailers, to institutionalize lessons learned and best practices developed through EEPS/retailer collaborations, and to mitigate common operational and administrative barriers to these co-promotional efforts.

The PEER Guidance has been developed utilizing the energy efficiency program knowledge, retailing experience, and business capabilities of team members. RAC members have collected information from their marketing, merchandising, legal, IT, finance, and retail operations departments and delivered documentation benchmarking existing vendor management processes, policies, and guidelines. EEPS also provided important input to development of the Guidance document. Pacific Gas & Electric, Northwest Energy Efficiency Alliance (NEEA), Southern California Edison, National Grid, Progress Energy, the Western Regional Utility Network (WRUN), Northeast Energy Efficiency Partnership (NEEP), the Strategic Partnerships of Utilities and Retailers (SPUR) and their program implementation contractors have shared program plans, implementation requirements,

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[14] EEPS includes both utilities and regional bodies such as NEEA. These are also referred to as program administrators (PAs)

regulatory considerations, and lessons learned from successful programs. These various inputs and examples have been organized by the RAC into relevant and actionable best practices to improve energy efficiency program partnerships.

PEER Guidance is intended to assist EEPS in understanding retailing practices and to provide recommendations for streamlining efficiency programs executed in the retail channel. Although comprehensive in scope, this guidance does not contain an exhaustive list. It covers topics that are common among major retailers having significant "brick and mortar" store presence in utilities' service territories. The guidance document is broken into three sections areas covering steps for effective program design and implementation. These sections are:

- Establishing Working Relationships
    - o Understanding the Business of Retail
    - o Retail and Program Sponsor Agreements
    - o Data Policies
    - o Account Management
- Collaborating for Program Design
    - o Timing and Calendars
- Aligning for Successful and Cost Effective Implementation
    - o Retail Operations – Training, Promotion, Visual Merchandising and Contracted Labor

Working with manufacturers is also a critical component of any mid-stream program. Peters (2010) notes:

> Manufacturers praise ENERGY STAR for its inclusive specification development process and nearly all interviewees were interested in working with utilities to promote energy-efficient products. Programs should draw on manufacturers' expertise and leverage their distribution channels. (p. 45)

In conclusion, in the current environment where plug load energy consumption is growing, low hanging fruit for energy savings are diminishing, and regulatory scrutiny is intensifying, the RPP Program offers a number of advantages:

- Aggregation – Applies PG&E's considerable resources and experience to a portfolio of measures, reducing administrative costs over a single product category-based approach and creating a more attractive financial value proposition for retailers.
- Collaboration and Negotiation – Brings PG&E and retailers together during critical retailer planning periods to determine energy efficient product assortments and program options.
- Transformation – Promotes retailer behavior change towards energy efficiency, while acquiring energy savings by changing product (and potentially facility) energy profiles. Shapes the market while interacting at multiple organizational levels to elevate of energy

efficiency as an enterprise-wide initiative.

4. The RPP Program Logic Model

Details regarding interrelated program activities engaged in by all participating retailers and how they combine to produce the hypothesized outputs, short-term outcomes, mid-term outcomes and long-term outcomes are provided in the logic model in Figure 3. Because the underlying program theory requires the participation of multiple program administrators in order to achieve the ultimate long-term objectives of transforming the markets for multiple products, the logic model is referred to as the *multi-region (MR) RPP Program* logic model.

The MR RPP Program logic model contains five program activities, five outputs, five short-term outcomes, six mid-term outcomes, and five long-term outcomes as well as their hypothesized cause and effect relationships represented by the 27 linkages. Each activity in the logic model is assigned a letter and each link is assigned a number. These letters and numbers are for ease of reference and do not indicate a sequence of activities. Finally, the potential performance indicators for each activity in this logic model are presented in the following section.

Through in-depth discussions with program staff, we learned why they thought the particular set of activities would lead to certain outputs and outcomes. In addition, literature in the following social science arenas was reviewed as part of assessing the program theory for the MR RPP Program: marketing, retail analytics, retail merchandising, consumer behavior, social marketing, network science, communications, training, economics, and the diffusion of innovations. Theories that were found to be especially relevant are discussed below, with the theory discussion broken out by the key program activities presented in the logic model diagram. Particular attention was placed on those theories that may provide some suggestions for program refinement.

The discussion below is organized by program activities and their causal links to short-term, mid-term and long-term outcomes. In this way the reader can focus on specific program intervention activities and whether comparative program findings and/or theory literature provides support for the program theory or suggest concerns that might need to be tested in evaluation or addressed in future program refinement activities.

4.1. Inputs

The inputs for this program consist of an annual budget, trade ally and contractor expertise, MR RPP Program Administrator staff and related project-specific expertise, MR RPP Program Administrator credibility and relationships with key stakeholders, policy makers, market knowledge, relationships between this program and other program administrators in California, the region and nationally.

4.2. Activities and Outputs (A, B, C, D, E, F, G, H, T and U)

This section describes the activities that PG&E and its utility partners (collectively referred to as program administrators or PAs) as well as participating program retailers will engage in as part of the MR RPP. Additionally, this section describes the outputs that are expected to result eventually from these activities.

Figure 3. MR RPP Program Logic Model

Activities

A. Program Administrators (PAs) characterize markets and estimate savings potential for candidate products

B. PAs contact other potential PAs regarding collaboration in Program delivery

D. Participating PAs determine which retailers to recruit

E. Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.

T. PAs participate in meetings with and provide market data to staff of Energy Star and Code and Standards Programs regarding targeted product categories

Outputs

C. Additional PAs recruited

H. Retailers implement plans employing various strategies and update as necessary.

G. PAs approve retailer marketing plans including sales forecasts of program-qualified models within each product category.

F. Signed contracts between PAs and retailers (including both new retailers (Link 5) and returning retailers (Link 12).

U. PAs provide input on proposed energy efficient model specifications to staff of Energy Star and Code and Standards Programs

L. Increased participating retailer engagement

Short-Term Outcomes (1-2 Years)

I. Short-term and mid-term reductions in customer market barriers to purchase products that are more energy efficient

J. Increased sales of energy efficient models within targeted product categories

K. Retailers receive incentives from PAs

Mid-Term Outcomes (3-6 Years)

M. Increased share of efficient models sold in targeted product categories among participating retailers

N. Increased share of efficient models sold in targeted product categories among nonparticipating retailers.

O. Increased demand experienced by manufacturers for more efficient models in targeted product categories.

P. Short-, mid-, and long-term energy and demand savings and other environmental and non-energy impacts.

V. In the mid-term and/or long-term, more stringent mandatory and voluntary standards are adopted

Long-Term Outcomes (7-10 Years)

Q. Manufacturers increase production of the efficient models in targeted product categories

R. Permanent change in the availability of efficient models in targeted product categories among participating and nonparticipating retailers

S. Increase in market share of efficient models in targeted product categories

Sample of External Influences: Broad economic conditions, market events, cost of energy, federal standards, Energy Star, perceived need for conservation, etc. Factors can influence program at all levels and time frames.

21

A. PAs characterize markets and estimate savings potential for candidate products

PAs characterize the market for each candidate product, which includes understanding the annual sales in their respective service territories, the sales volume of participating and nonparticipating retailers, the number and size of each manufacturer, the nature of the retail supply chain, the currently estimated market share, and the estimated gross savings.

B. PAs contact other potential PAs regarding collaboration in program delivery

PAs reach out to other potential PAs regarding the delivery and implementation of the MR RPP. The current PAs include such organizations as the California IOUs (PG&E, SCE, SoCal Gas, and SDG&E), municipal California utilities (SMUD, LADWP, etc.), and other regional utilities or utility alliances such as NEEA, the Potomac Electric Power Company (Pepco), and Baltimore Gas & Electric.

C. Additional PAs recruited

Other PAs interested in partnering in the delivery and implementation of the MR RPP indicate their willingness to do so and formally sign a contract which specifies incentive levels, retailer reporting requirements, payment frequency, and roles and responsibilities of PAs, and participating retailers.

D. Participating PAs determine which retailers to recruit

Participating PAs assess potential retailers to recruit into the MR RPP. Retailers will be evaluated for inclusion in the MR RPP based on a variety of factors such as:

- Product offerings
- Energy savings potential
- Previous working relationships with PG&E and/or partner utilities

E. PAs and identified retailers target product categories with energy savings potential

PAs and retailers who have been recruited into the program identify product categories with energy savings potential. Key factors in identifying product categories with high energy-savings potential include the following:

- Category sales volume
- Range of energy consumption values within the category
- ENERGY STAR market share within the category
- Opportunities to introduce ENERGY STAR or new ENERGY STAR Specifications to retailer product offering.

T. PAs participate in meetings with and provide market data to staff of Energy Star and Code and Standards Programs regarding targeted product categories

There are three ways for utilities to get involved with standards:

- First, when there is no set standard for a product but a market exists, a utility can work with regulators to negotiate a market-sourced baseline and run programs that support the

adoption of more efficient products by households. The utility can claim the incremental energy saving from utility run programs referenced against the market-sourced baseline.

- Second, utilities can work between final rule making and effective date of a new standard to help accelerate market adoption of high efficiency products and secure energy savings through a market transformation effort. In this approach, the new standard becomes the baseline and utilities can focus the market by incenting the purchase of higher than minimum efficiency products. In some cases, readily available high efficiency products will not pass cost-effectiveness tests and the utility will need to work with the product manufacturers.
- A third, and less common, approach is for utilities to work with a state agency, such as a standard setting energy office, to develop a standard for a product that is not federally covered. A recent example of this approach is the creation of new energy efficiency standards for color televisions in California.

The MR RPP will employ the second and third approaches and engage in such activities as:

- Holding meetings and working groups to target products ripe for new standards, and
- Increasing the market share of high efficiency products through incentives.

Throughout the MR RPP, representatives of all the PAs will participate in meetings with and provide market data to staff of Energy Star and Code and Standards Programs regarding targeted product categories (see *Retail Products Platform (RPP)Product Introduction and Transition Guidance* for more details).

F. PAs determine incentive levels for program-qualified models within each product category, present them to retailers and sign contracts

PAs work with retailers to determine incentive levels for each program-qualified model sold[15]. Productive negotiations with retailers will be contingent on transparency and open communication between the utilities and retailers regarding retailer baseline conditions, utility savings potential, incentive availability, incentive calculation methods, the need for an effective marketing plan, and utility expectations of retailers. The program cost-effectiveness implications of incentive amounts will also be a major factor in the negotiation of retailer incentive levels. PAs formally enter into contractual relationships with the retailers. In the contract, among other things, PAs agree to pay retailers the agreed-upon incentive amounts for the sales of program-qualified models within each product category and to develop an effective marketing plan.

G. PAs approve retailer marketing plans including sales forecasts of program-qualifying models within selected product categories.

Because the MR RPP does not prescribe any *single* strategy and tactics for retailers to sell program-qualified products, the contents of an individual retailer's plan may vary substantially

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[15] These incentives may be used by retailers in a manner they see fit. For example, incentives may be used to lower prices of the most energy efficient products to increase sales volume, reduce market barriers, promote energy efficient products through point-of-purchase and/or product placement activities, or to treat it as profit to mitigate risks of participating in the program.

from other retailers' plans and include a mix of strategies and tactics. The potential strategies could include the following:

- Changes in product assortment
- Changes in product placement
- Increased advertising and price promotion of specific energy efficient products
- Training sales staff
- General customer education about the benefits of energy efficiency

H. Retailers implement plans employing various strategies and update as necessary.

Retailers participating in the MR RPP implement their agreed-upon marketing plans with the goal of increasing the sales of program-qualified models within each product category and thereby producing energy and demand savings and environmental benefits.

A good faith implementation of the marketing plan reflects retailer willingness to overcome key market barriers such as: 1) low levels of awareness and knowledge among retail merchandizers regarding product specifications or differentiation regarding efficiency levels, and 2) products and services may be unavailable because manufacturers, distributors, and service providers have difficulty accurately predicting customer demand for their products/services, and may respond to this uncertainty in a risk-adverse manner, thereby limiting the availability of their products/services.

By working with the MR RPP implementers, retailers will become more aware of the fact that energy use is an important attribute of the different models that they sell. They might also be more willing to deviate from traditional buying and product placement practices and change the assortment and placement of the more energy efficient models, thereby increasing customer exposure to these products. Retailers could also make a greater effort to actively educate customers regarding the energy efficient products through in-store promotions using point-of-purchase advertising, in-store broadcasts, and sales staff training and to reduce prices. Depending on the strategies employed, one short-term outcome is that market barriers faced by customers will be reduced.

U. PAs provide input on proposed energy efficient model specifications to staff of Energy Star and Code and Standards Programs.

Throughout the MR RPP, the PAs will engage in such activities as:

- Developing technical reports on the feasibility, costs, and benefits of candidate technologies for standards consideration,
- Developing standards testing practices and evaluation tools, and
- Providing expert witness testimony in regulatory hearings and assisting with consumer and regulator education efforts.

See *Retail Products Platform (RPP)Product Introduction and Transition Guidance* for more details.

4.3. Short-Term Outcomes (I, J, K, L, and P)

I. Short-term reduction in customer market barriers to purchase products that are more energy efficient.

Depending on the strategies retailers choose to pursue, one short-term outcome of the program may be an increase in awareness, knowledge, attitude, and behavior (AKA-B) of the participating retailer's customers with respect to more energy efficient products. This will likely be the case if retailers pursue program strategies that explicitly target customer AKA-B. Examples of these strategies include increased promotion of energy efficient products, sales staff education, and general customer education about the benefits of energy efficiency. A secondary outcome of any retailer strategy that targets customer AKA-B could be increased customer awareness of programs offered by PAs.

Note that retailers are not required to implement program strategies that explicitly target customer AKA-B. As noted earlier, retailers may choose to instead focus on "behind the scenes" strategies such as changes in product assortment or product price reductions, which will reduce the information/search and first-cost barriers for customers. If retailers choose to implement only "behind the scenes" strategies, a change in customer AKA-B towards more energy efficient products *would not* necessarily be an expected program outcome.

J. Increased sales of energy efficient models within targeted product categories

Whether retailers choose to pursue strategies that target customer AKA-B or "behind the scenes" strategies such as product assortment or product price reductions, or some combination of these, an expected short-term outcome of the RPP Program is that customers will purchase more energy efficient products at participating retailers than they did before the program.

K. Retailers receive incentives from PAs

For each program-qualified model sold, the retailer will receive an incentive, which will improve their profit margin.

L. Increased retailer engagement

Incentives to retailers will keep them engaged in the faithful implementation of their strategic marketing plans.

P. Short-term energy and demand savings and other environmental and non-energy benefits[16]

The purchase of these program-qualifying products will result in energy and demand savings for PAs as well as associated environmental benefits such as reductions in CO_2 and carbon and other non-energy benefits such as increased customer comfort.

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[16] Outcome **P** is counted three times as a short-term, mid-term and long-term outcome. Outcome **V** is counted twice as a mid-term and long-term outcome

4.4. Mid-Term Outcomes (I. M, N, O, P, and V)

I. Mid-term reductions in customer market barriers to purchase products that are more energy efficient. As retailers change their assortment in the mid-term combined with the advertising and promotion activities initiated in the short-run, further reductions in market barriers will occur.

M. Increased share of efficient models sold in targeted product categories among participating retailers.

Over time, through customer purchases of more energy efficient products at their stores, participating retailers will increase their sales and market share of program-qualified models within each product category.

Although not explicitly illustrated in the logic model, it is also possible that the success of these participating stores might motivate merchandizers/buys for participating retailers to change the assortment of all their stores in region/states outside of the service territories served by PAs resulting in an increase in their regional or national market share of program-qualified models within each product category. This would be expected for any participating retailers who make assortment decisions at a regional (or even national) level instead of assorting high-efficiency products at only the participating store locations within PA service territories.

N. Increased share of efficient models sold in targeted product categories among nonparticipating retailers.

The success of participating retailers in selling these more efficient products could motivate nonparticipating retailers to adopt similar marketing strategies even though they would not receive any incentives. That is, non-participating retailers might adopt some of the same marketing strategies used by participating stores as a way of increasing sales and profits.

O. **Increased demand experienced by manufacturers for more efficient models in targeted product categories**.

P. Mid-term energy and demand savings and other environmental and non-energy benefits
The purchase of these program-qualifying products will result in energy and demand savings for PAs as well as associated environmental and other non-energy benefits such as reductions in CO_2 and carbon and other non-energy benefits such as increased customer comfort.

V. **In the mid-term, more stringent mandatory and voluntary standards are adopted**
In the mid-term, it is also possible that PAs will participate in C&S and Energy Star meetings (Activity **T**) and provide evidence of increasing market shares for targeted products (due to the combined efforts of participating and nonparticipating retailers) to support more stringent mandatory and voluntary standards (Output **U**) leading to the eventual adoption of more stringent

mandatory and voluntary standards (Mid-Term Outcome **V**[17]). Increased market shares of targeted products or the adoption of efficiency standards for one or more of these targeted products causes manufacturers to increase production of efficient models leading eventually to long-term, sustainable energy and demand savings and environmental and other non-energy benefits. See *Retail Products Platform (RPP)Product Introduction and Transition Guidance* for more details.

4.5. Long-Term Outcomes (Q, R, S, P and V)

The increase in the sales of program-qualifying products and their share of all products sold within a given product category at the regional/national level will eventually be sufficient to shift the demand curve for the *program-qualifying products*. In response, manufacturers will shift production (perhaps permanently) to these more efficient targeted products. This will result in an increase in the market share of more energy efficient products among participating and nonparticipating retailers leading to an increase (perhaps permanent) in the availability of more energy efficient products among participating and nonparticipating retailers and eventually to long-term, sustainable energy and demand savings as well as environmental and other non-energy benefits.

4.6. Emerging Technologies

In addition, the RPP Pilot will regularly interact with the California Statewide Emerging Technology Program, EPIC Program and other regional/national RD&D programs in order to be informed about promising technologies that are commercially available but have very small market share. Such technologies will be regularly reviewed and considered for inclusion in the RPP Pilot.

4.7. External Influences

There is wide variety of external factors that can also influence the program at all levels and time frames. These factors include:

- Existing awareness of PG&E among market actors
- ENERGY STAR® policies and requirements
- Changes in political priorities
  - Codes and standards
  - State and local action & requirements (including local energy commissions)
- Weather and associated impacts on customer actions and energy bills
- Broad economic conditions that affect capital investment and energy costs (rapidly changing economic conditions)
  - Energy prices and regulation (changes in fuel and energy prices)
  - Perceptions of the value of being "green"
- Costs, performance and availability of more efficient technologies
- Competition
  - Competition among target market actors and contractors that affect willingness to promote energy efficiency

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[17] Outcome **V** could occur in the mid-term or long-term. This is illustrated in the logic model by allowing Outcome **V** to straddle the mid-term and long-term periods.

- o Other service organizations investments and commitments to energy efficiency
- Competing demands for capital and resources
  - o Internal – demand-side customers competing priorities
  - o External – broad market and demand for provisions and supply of technologies and services
- Activities of non-PG&E funding public and institutional energy efficient programs
  - o Awareness of and enthusiasm for ENERGY STAR®
  - o Other utility programs promoting and providing incentives for energy efficiency
- Knowledge, and awareness of climate change and actions that can be taken to mitigate or adapt to climate change

The research designs should attempt to control for these external factors so that any impacts of the RPP Pilot can be observed.

5. Market Characterization

To better understand the context within which the RPP Program will be operating, we present a brief characterization of the consumer electronics and appliance markets. A market is defined as:

> . . an institution or mechanism that brings together buyers and sellers into contact. A market system conveys the decisions made by buyers and sellers of products and resources. The decisions made on each side of the market determine a set of product and resource prices that guide resource owners, entrepreneurs, and consumers as they make and revise their choices an pursue their self-interest. (McConnell et al., 2009).

Market characterization can generally be defined as a qualitative assessment of the structure and functioning of a market, the primary purpose of which is to understand how the market operates in order to be able to effectively change the way in which the market functions.

A complete taxonomy of all the elements that might be needed in a market characterization is beyond the scope of this project. What is known about a market should first be explored via secondary research. Next, the design of the market characterization study should then be based on the findings from the secondary research. The research should be constructed so that together, the secondary and primary research should ensure an understanding of the current market structure and operation. Previous work in California provides some guidance on this issue. For example, a white paper prepared in 1998 under the direction of the California Board for Energy Efficiency listed the following types of information that should be considered in designing a market characterization or baseline study: [18]

a. A summary of the specific technologies, services or products being exchanged.

b. A summary of the major market participants and the nature of the transactions and other interactions between them – including buyers, sellers and intermediaries.

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[18] *Proposed Guidelines for Conducting Market Assessment and Evaluation.* (CBEE Technical Services Consultants 1998).

c. A description of how information concerning products and services flows through the market actors and the identification of key information hubs.

d. A description of the distribution chain – i.e., the variety of paths that a product follows on its way from a manufacturer to an end user. A helpful tool here might be a product flow diagram.

e. A description of the geographic boundaries of the market.

f. A description of the circumstances and settings under which transactions tend to occur, including the sales practices and the market events that tend to result in transactions within the market (for example, a decision to remodel precipitating the purchase of a new C&I lighting system).

g. Approximate estimates of the number of buyers, sellers and intermediaries in the market, as well as an order of magnitude estimate of the total annual sales of relevant measures and services.

5.1. Specific Technologies

A scaled up RPP Program will partner with more than one retailer and cover some but not necessarily all of the same product categories. While a scaled up RPP Program can promote different energy efficient product categories, we focus on the six that have been identified for the 2016 Program:

1. Freezers
2. Air purifiers/cleaners
3. Room air conditioners
4. Sound bars (ENERGY STAR + 50%)
5. Electric clothes dryers
6. Gas clothes dryers

While most of these technologies are purchased by residential households, some portion might also be purchased by small commercial customers.

It is important to note that of these product categories, indeed any product category, has its own technical challenges, development timeline, supply chain, end-users, barriers, and opportunities. Although there are similarities across product types, programs should treat each product individually when designing an implementation strategy. It is not advisable to treat electronics products as measures to be included in a single, overarching program design.

The RPP Program recognizes this program design principle in a rather unique way. Rather than developing an implementation strategy for each product category, the RPP Program staff leave it up to each retailer to devise the most effective strategies and tactics to sell the qualified models within each product category in a way that recognizes the unique characteristics of each product category. The RPP Program staff must review and approve the strategic plan for selling qualified models developed by each retailer. The RPP Program staff will also negotiate with each retailer an incentive for qualified models within each product category.

5.2. Major Market Participants

Energy efficiency rebate programs promote a wide variety of energy efficient products, each with its own unique market. The RPP is no different. In the sections that follow, we present an overview of the markets for the six product categories that will be covered in Phase II Pilot. The product categories addressed by future retailers in a scaled up RPP may choose to address a slightly different set of product categories.

5.2.1. Manufacturers

Table 8 and Table 9 present the manufacturers, whether they are an ENERGY STAR partner and the brands for the eight product categories while Table 10 summarizes these data. From Table 8, one can see that some manufacturers produce equipment for multiple brands. For example, Bosch produces refrigerators under the Bosch, Thermador, and Gaggenau brands. Or, that Funai produces Blu Ray/DVD players under the Emerson, Magnavox, and Philips brands.

Table 6. Appliance Manufacturers

Manufacturer	Brands	Room Air Conditioners	Air Purifiers	Freezers	Refrigerators	Energy Star Partner
Blue Air	Blue Air		X			X
Bosch	Bosch, Thermador, Gaggenau	X		X	X	X
Dacor	Dacor				X	
Danby	Danby	X		X	X	X
Electrolux	Electrolux, Frigidaire	X	X	X	X	X
Friedrich	Friedrich	X		X	X	X
GE	GE, Hotpoint	X	X	X	X	X
Haier	Haier, Fisher & Paykel	X	X	X	X	X
Jarden	Bionaire, Holmes		X			
Kaz	Honeywell, Vicks	X	X			X
LG	LG	X	X		X	X
Miele	Miele			X	X	X
Nacco Industries	Hamilton Beach		X			
Samsung	Samsung				X	
Sharp	Sharp	X	X			X
Sub-zero Group	Sub-zero, Wolf				X	X
Techtronic Floor Care Technology	Hoover		X			
Viking Range	Viking			X	X	X
Whirlpool	Amana, Jenn-Air, Kitchenaid, Maytag, Whirlpool	X	X	X	X	X
Multiple manufacturers	Kenmore Sears does not manufacture any of their products, instead they are all made by the other leading manufacturers, often with added features. They are then rebranded with the Kenmore (or other) brand name.	X	X	X	X	

Sources: Amazon.com, Corporate web sites

The only recent data regarding market share for particular appliances, refrigerators and freezers, was supplied by Peters et al. (2012) who reported that:

> The U.S. refrigerator market is dominated by three players who together hold over 80% of the market: Whirlpool, GE, and Electrolux. The three have shuffled positions during the last 15 years, with Whirlpool taking over from GE as the dominant brand, and Electrolux and Haier gaining market share. Samsung, although not on the chart of top U.S. refrigerator manufacturers, reports rapidly growing sales worldwide and in the U.S. (p. 103)

Peters et al. (2012) went on to note that: "Freezers are an even more consolidated market than refrigerators. Electrolux holds nearly two thirds of the market with only two significant competitors. (p.103)"

From Table 9, one can see that while there are only 19 appliance manufacturers, there are 70 unique manufacturers of consumer electronics.

Table 7. Consumer Electronics Manufacturers

Manufacturer/Holding Co.	Brands				Energy Star Partner
	DVD/Blu Ray	HTIB/Soundbar	Compact Stereo	Docking Station	
Affinity North America		Affinity			
Aiptek Inc.				Aiptek	
ALCO Electronics				Venturer	
Apple				Apple	X
Atlantic Technology		Atlantic Technology			
Axess Products Corporation			Axess	Axess	
Belkin International Inc.				Belkin	
Best Buy House Brand - Different mfrs for each product	Insignia	Insignia	Insignia	Insignia	X
Bose Corporation		Bose	Bose	Bose	
Chi Mei Group					
Coby Electronics Corporation	Coby	Coby	Coby	Coby	
Craig Electronics	Craig	Craig	Craig	Craig	
Crosley Radio			Crosley		
Curtis International Ltd	Curtis			Curtis	
Cyber Acoustics LLC		Cyber Acoustics			
D&M Holdings		Boston Acoustics		Boston Acoustics	
D&M Holdings	Denon	Denon	Denon	Denon	
D&M Holdings	Marantz		Marantz		
Definitive Technology		Definitive Technology			
Dell		Dell			
Digital Products International, Inc.	GPX		GPX	GPX	
Digital Products International, Inc.		iLive	iLive	iLive	
Disruptive Limited				Gear4	
Edifier International Ltd.		Edifier	Edifier	Edifier	
Electrohome Ltd.			Electrohome	Electrohome	
Element Electronics	Element				
Focal-Jmlab		Focal			
Funai	Emerson		Emerson	Emerson	X
Funai		Funai			X
Funai	Magnavox	Magnavox			X
Funai	Philips	Philips	Philips	Philips	X
Geneva Labs			Geneva	Geneva	
Gold Peak Group		KEF			
Grace Digital Inc.			Grace Digital	Grace Digital	
Grande Holdings Ltd			Akai		
Haier Group	Haier	Haier		Haier	
Harman International Industries, Inc.		Harman Kardon			
Harman International Industries, Inc.		JBL	JBL	JBL	
Hitachi, Ltd.		Hitachi			
iLuv Creative Technology				iLuv	
Imation			Memorex	Memorex	

Table 8. Consumer Electronics Manufacturers (Cont.)

Manufacturer/Holding Co.	Brands				Energy Star Partner
	DVD/Blu Ray	HTIB/Soundbar	Compact Stereo	Docking Station	
Infinity Lifestyle Brands				Altec Lansing	
Inkel Corporation	Sherwood	Sherwood	Sherwood	Sherwood	
JVC Kenwood Corporation	JVC	JVC	JVC	JVC	
LG Electronics Corp.	LG	LG	LG		X
Logitech		Logitech		Logitech	
Maxell Corporation of America				Maxell	
MCR Group, Inc.				Ottavo	
Naxa Electronics, Inc.	Naxa Electronics	Naxa Electronics	Naxa Electronics	Naxa Electronics	
ON Corp.					
ON Corp.	RCA				
Onkyo Corporation	Onkyo	Onkyo	Onkyo		
OPPO Digital	OPPO Digital				
Orion Group	Memorex				
Orion Group					
Orion Group					
Panasonic Corporation	Panasonic	Panasonic	Panasonic	Panasonic	X
Pioneer Electronics	Pioneer	Pioneer	Pioneer	Pioneer	X
Polk Audio		Polk Audio		Polk Audio	X
Pyle Audio		Pyle	Pyle	Pyle	
Samsung Corp.	Samsung	Samsung	Samsung		
Sangean Electronics, Inc.				Sangean	
Sceptre Inc.		Sceptre			
SDI Technologies				iHome	X
SDI Technologies				SDI Technologies	X
SEIKI Digital, Inc.		Seiki		Seiki	
Sharp Corporation	Sharp	Sharp	Sharp	Sharp	X
Sony Corporation	Sony	Sony	Sony	Sony	X
SunBriteTV, LLC					
Supersonic Inc.		Supersonic	Supersonic	Supersonic	
TCL Corporation					
TEAC Corporation			Teac	Teac	
TMAX Digital Inc.					
Toshiba Corporation	Toshiba	Toshiba			X
TPV Technology Limited					
Viore, Inc. (Walmart house brand)					
Vizio Inc.	VIZIO	VIZIO			X
Voxx International			Audiovox		
Voxx International		Energy			
Voxx International		Jamo			
Voxx International			Jensen	Jensen	
Voxx International		Klipsch		Klipsch	
Voxx International		RCA	RCA	RCA	
Xiamen Overseas Chinese Electronics Co. - Best Buy House Brand	Dynex				
Yamaha Corporation	Yamaha	Yamaha	Yamaha	Yamaha	
Zeikos Inc.				iHip	

Sources: Amazon.com, Corporate web sites

Table 10 summarizes the product categories by number of manufacturers and brands.

Table 8. Product Categories, by Number of Manufacturers and Brands

Product Category	Manufacturers	Brands
Freezers	9	19
Air Purifiers/Cleaners	11	21
Sound Bars	37	45
Electric Clothes Dryers	TBD	12
Gas Clothes Dryers	TBD	9
Room Air Conditioners	TBD	TBD

5.2.2. Retailers

The sales of major appliance for top 100 retailers exceeded 130 billion dollars in 2014. The top 20 retailers in Table 11 represented 91%, the top 10 represent 80%, and the top five represent 71% of these sales. Table 11 also indicates those retailers that are ENERGY STAR partners.

Table 9. Estimated Sales of Consumer Electronics (Millions), by Retailer

Retailer	2014	ENERGY STAR Partner
Best Buy	$ 29,759	Yes
Walmart	$ 21,626	Yes
Amazon.com	$ 18,017	Yes
Apple Retail Stores	$ 12,383	Yes
Target	$ 5,679	Yes
Costco Wholesale	$ 5,159	Yes
GameStop	$ 4,458	No
Newegg.com	$ 2,559	No
Sam's Club	$ 2,525	Yes
RadioShack	$ 2,482	Yes
Dell	$ 2,432	Yes
Micro Center	$ 2,352	No
Sears	$ 1,894	Yes
Office Depot	$ 1,563	Yes
Staples	$ 1,433	Yes
Fry's Electronics	$ 1,164	No
Hhgregg	$ 918	Yes
Army - Air Force Exchange	$ 833	Yes
Hewlett-Packard	$ 751	Yes
Toys"R"Us	$ 730	No
Systemax	$ 681	No
QVC	$ 657	No
P.C. Richard & Son	$ 550	No
BJ's Wholesale Club	$ 492	Yes
Bose	$ 480	No
Kmart	$ 479	Yes
Microsoft	$ 437	Yes
Conn's	$ 426	No
B & H Photo	$ 381	No
Home Shopping Network	$ 372	No
Other (70 Retailers)	$ 7,275	
Total	**$ 130,942**	

Source: TWICE: This Week in Consumer Electronics, 5/18/2015 Supplement Top 100 Retailers

The sales of major appliance for top 50 retailers exceeded 27 billion dollars in 2014. The top 20 retailers in Table 12 represented 94% of these sales, the top 10 represent 87% of these sales, and the top five represent 79% of these sales. Table 12 also indicates those retailers that are ENERGY STAR partners.

Table 10. Estimated Sales of Major Appliances (Millions), by Retailer

2014 RANK	2014	ENERGY STAR Partner
Lowe's	$ 5,985	Yes
Sears	$ 5,126	Yes
The Home Depot	$ 4,828	Yes
Best Buy	$ 2,552	Yes
Sears Hometown Stores	$ 1,579	Yes
Hhgregg	$ 998	Yes
Walmart	$ 918	Yes
P.C. Richard & Son	$ 685	Yes
Conn's	$ 329	Yes
Costco Wholesale	$ 259	Yes
Abt Electronics	$ 235	Yes
BrandsMart USA	$ 232	Yes
Nebraska Furniture Mart	$ 209	No
Menards	$ 188	Yes
Pacific Sales Kitchen & Bath Centers	$ 178	Yes
ABC Warehouse	$ 178	No
Amazon	$ 170	Yes
Target	$ 169	Yes
R.C. Willey Home Furnishings	$ 143	No
Sam's Club	$ 123	Yes
Other (30 retailers)	$ 1,783	
Total	$ 26,775	

Source: TWICE: This Week in Consumer Electronics, 5/18/2015 Supplement Top 50 Retailers

5.2.3. End Users

In the PG&E service territory, there are 5.1 million electric customer accounts and 4.3 million natural gas customer accounts. Of these 5.1 million electric customers, 4.4 million are residential households (2009 RASS) which on average consume 6,399 kWh/year.

5.3. Product Cycles

The timing of the various types of interaction between the retailers and the EEPS is critical. Table 13, provided by Navitas Partners (2013), provides direction for appropriate times to engage the retailers for energy efficiency programs in lighting, appliances, electronics, and other categories. The table displays recommended times for EEPS to coordinate program design and implementation activities with a retailer.

Table 11. Coordinating Program Design and Implementation with Retail Calendars

Product Category	Best Time To Engage SPOC	Best Time To Collaborate on Program Design	Best Time To Communicate Program Specifications	Best Time To Initiate Program Implementation	Key Retailing Events
Lighting	Nov-Dec	Jan-Feb	April	Sept-Oct	Day Light Savings Time, Jan 2014 due to legislation
Appliances	Sept-Oct	Nov-Dec	Jan	Apr-May	Major Holidays; primarily Independence Day, Labor Day, Memorial Day
Electronics	Jan-Feb	Apr-May	Sept	Mar-Apr (new product introductions)	Nov-Feb Major Holiday; primarily Black Friday, Super Bowl
Water Heaters	Jan-Feb	Feb-Mar	Dec	November and Spring (weather conditionality)	Seasonal with regional weather conditions
Windows/ Insulation	Dec-Jan	Jan	Feb	Mar	Spring

Navitas Partners goes on the emphasize that: "Implementation lead times are a critical detail that are varied and unique to each retailer and EEPS' account managers need to be sure to verify lead time details with the Retail SPOC" (p. 13).

5.4. Supply/Demand Chain

While the structure of the market varies by product category, Figure 3 presents a prototypical supply chain for consumer electronics developed by ODC (2011). A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service.

Figure 4. Prototypical Supply Chain for Consumer Electronics
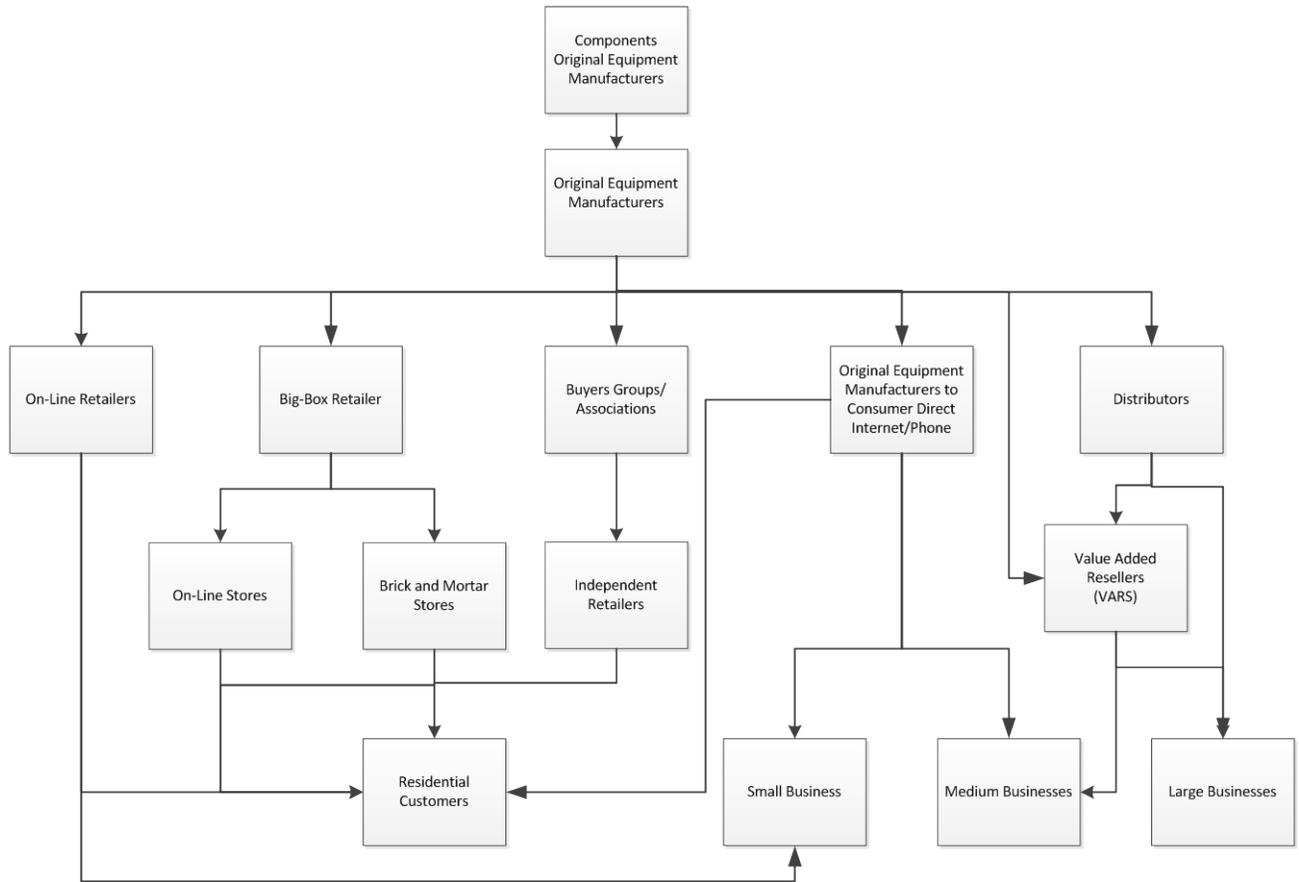
Figure 4 reflects a slight modification of Figure 3 to represent a prototypical structure for major appliances developed by ODC (2011).

Figure 5. Prototypical Supply Chain for Major Appliances
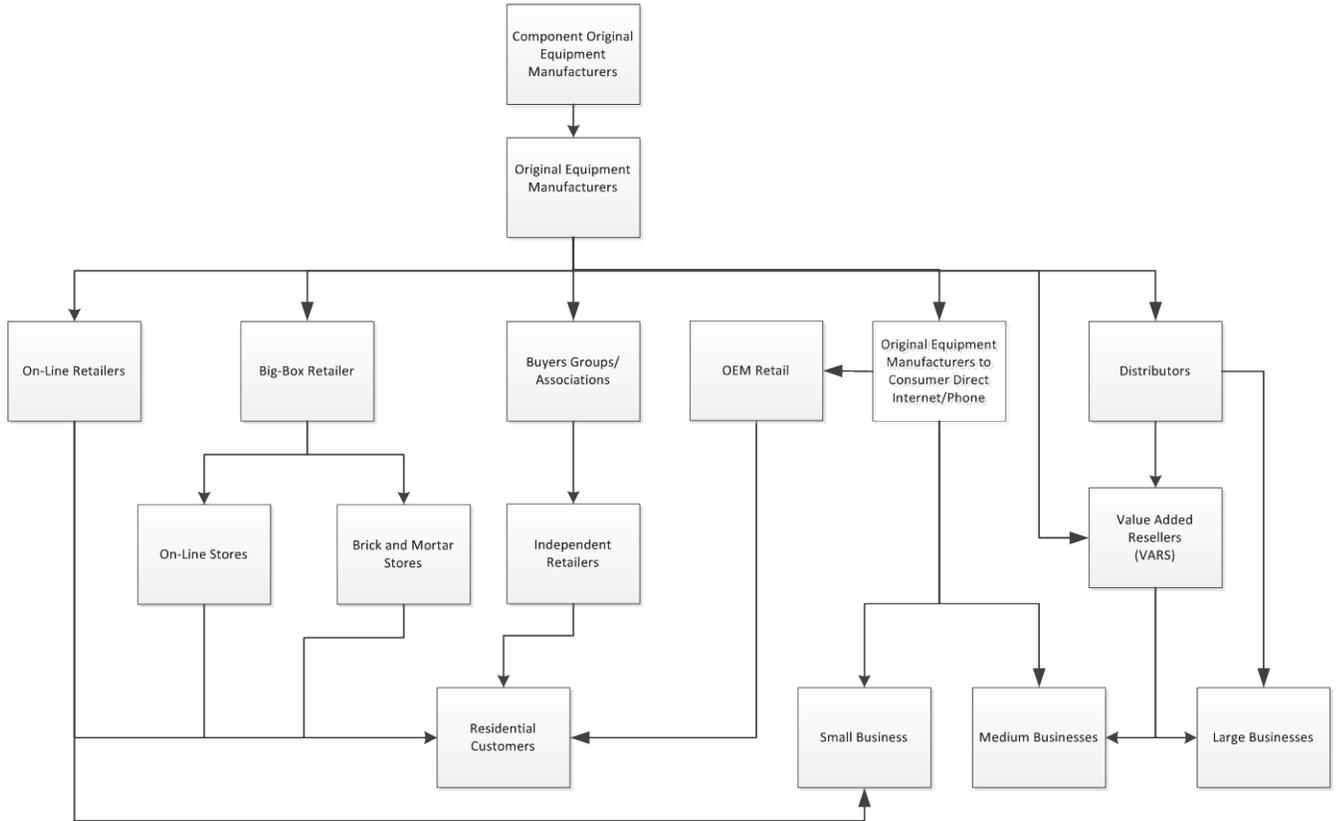
Note that while the initial phase of the RPP Program will focus on bricks-and-mortar stores, the internet (clicks and mortar stores) may be eventually included.

6. Geographic Areas

This section presents the geographic areas for the California IOUs, SMUD, and NEEA.

6.1. California IOUs

The service territories for California's four investor-owned utilities are presented in Figure 6.

Figure 6. California's Investor-Owned Utilities
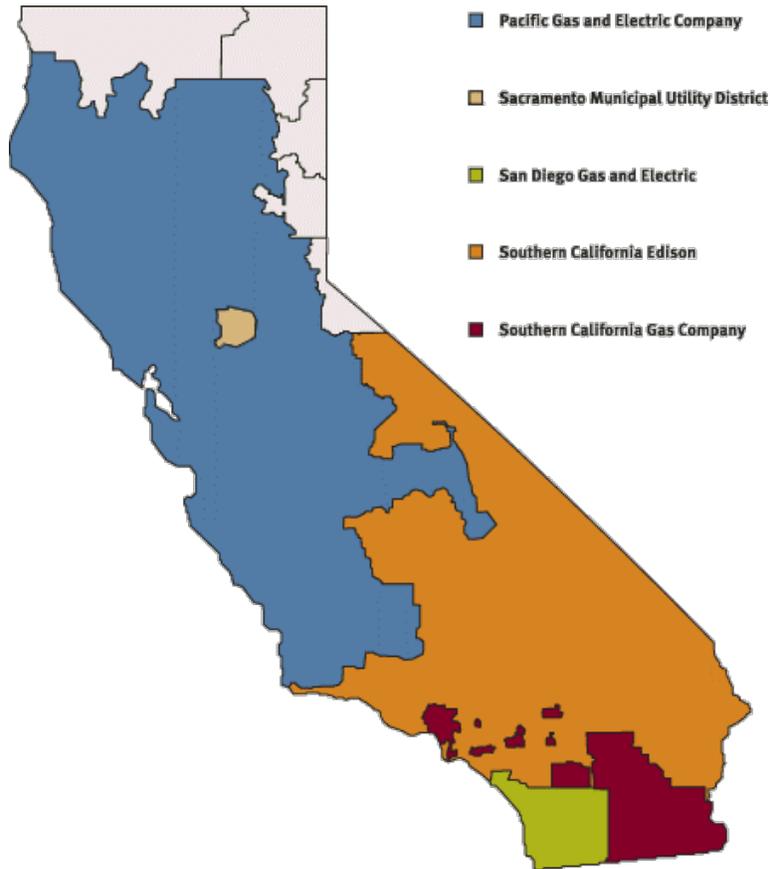
The essential characteristics of the electric and gas systems are:

- PG&E's service area covers 70,000 square miles.
- Service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east.
- 141,215 circuit miles of electric distribution lines and 18,616 circuit miles of interconnected transmission lines.
- 42,141 miles of natural gas distribution pipelines and 6,438 miles of transportation pipelines.

Because some products are weather sensitive (e.g., room air conditioners that might be included in the 2016 RPP Program), it is important to understand the California climate zones. California is divided into 16 climate zones by the California Energy Commission (CEC). Figure 7 illustrates these climate zones.

Figure 7. CEC Climate Zones
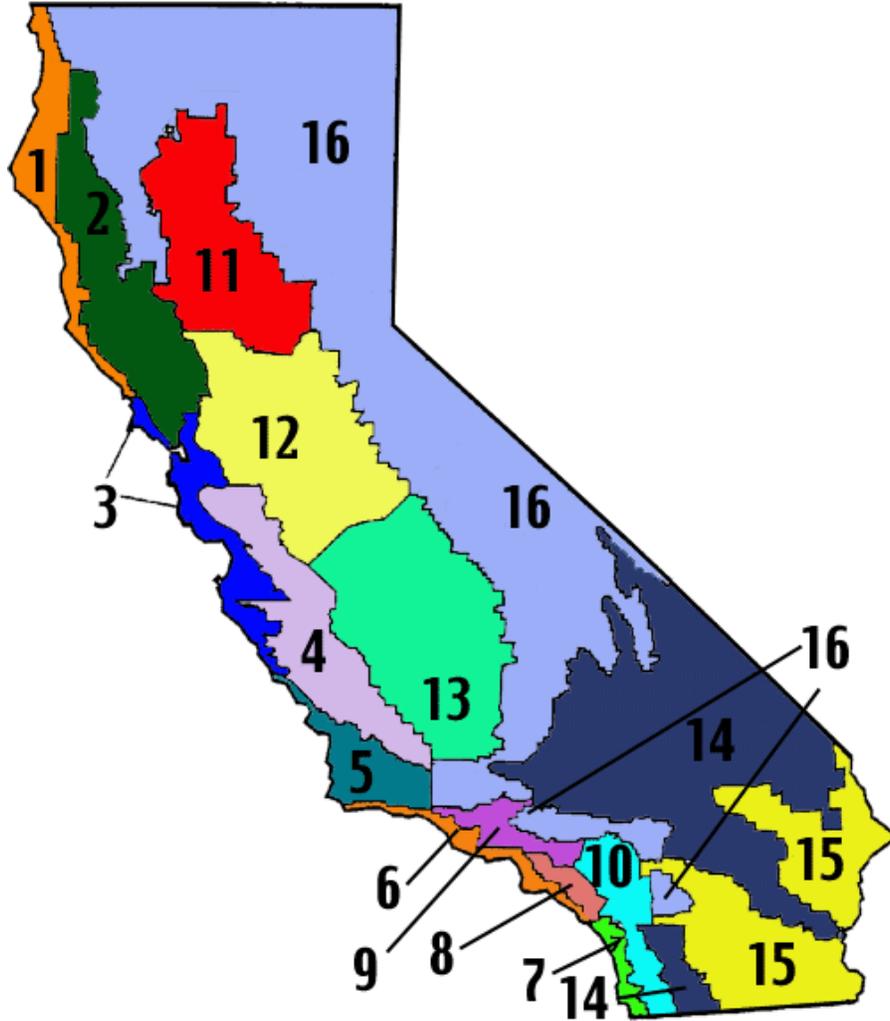
6.2. NEEA

NEEA is an alliance of more than 140 Northwest utilities (Washington, Oregon, Idaho, and Montana) and energy efficiency organizations. It is funded by

- Avista Utilities
- Bonneville Power Administration
- Clark Public Utilities
- Cowlitz County PUD
- Energy Trust of Oregon
- Eugene Water & Electric Board
- Idaho Power
- NorthWestern Energy
- Pacific Power

- Puget Sound Energy
- Seattle City Light
- Snohomish County PUD
- Tacoma Power

Its market transformation efforts support local efficiency programs and help funders meet their energy efficiency goals.

6.3. SMUD

SMUD provides electric service to approximately 900 square miles in the heart of the capital region. It serves most of Sacramento County and a portion of Placer County and is dived into seven wards, each of which is represented by a board member elected to SMUD's Board of Directors. Figure 8 presents the SMUD service territory.

Figure 8. **SMUD Service Territory**

7. Market Assessment

Market assessment tracks changes in markets over time with a specific focus on market indicators that might be influenced by the RPP. Of course, prior to the launch of the RPP, the

first step in this market assessment is the establishment of market-level baselines. In the RPP, there are in effect six markets, one for each product category. In this section, the market assessment will focus more broadly on indicators that are organized into five broad groupings:

- Market actor awareness and knowledge
- Perceived value of energy efficiency measures
- Accessibility of energy efficiency measures
- Pricing and incremental cost
- Market share

7.1. Manufacturers

Most of the top manufacturers have become Energy Star partners defined as any company that manufactures or private labels any product(s) that meet the current ENERGY STAR qualification criteria. Of the 19 major appliance manufacturers listed earlier in Table 6, the following 14 (74%) are Energy Star partners:

1. Blue Air
2. Bosch
3. Danby
4. Electrolux
5. Friedrich
6. GE
7. Haier
8. Kaz
9. LG
10. Miele
11. Sharp
12. Sub-Zero Group
13. Viking Range
14. Whirlpool

Clearly, the level of awareness and active support of ENERGY STAR among manufacturers is quite high.

Of the 70 unique consumer electronics manufacturers listed earlier in Table 7, the following 11 (16%) are ENERGY STAR partners:

1. Apple
2. Best Buy House Brand
3. Funai
4. LG Electronics Corporation
5. Panasonic
6. Pioneer Electronics
7. Polk Audio
8. SDI Technologies
9. Sharp Corporation
10. Sony Corporation

11. Toshiba Corporation

Unlike major appliance manufacturers, the level of awareness and active support of ENERGY STAR among manufacturers is relatively low.

For each product category, Table 14 summarizes the number of manufacturers, brands and Energy Partners.

Table 12. Summary: Product Category, by Number of Manufacturers, Brands, and ENERGY STAR Status

Product Category	Manufacturers	Brands	ENERGY STAR Partner
Sound bar	37	45	12
Electric Dryers	TBD	12	9
Gas Dryers	TBD	9	7
Air Cleaners	11	21	8
Room Air Conditioners	TBD	TBD	TBD
Freezers	9	19	9

7.2. Retailers

Most of the top retailers have become ENERGY STAR partners defined as any company that manufactures or private labels any product(s) that meet the current ENERGY STAR qualification criteria. Of the top 20 consumer electronics retailers listed earlier in Table 11, the following 15 (75%) are Energy Star partners.

1. Best Buy
2. Walmart
3. Amazon.com
4. Apple Retail Stores
5. Target
6. Costco Wholesale
7. Sam's Club
8. RadioShack
9. Dell
10. Sears
11. Office Depot
12. Staples
13. Hhgregg
14. Army - Air Force Exchange
15. Hewlett-Packard

Of the 20 major appliance retailers listed earlier in Table 12, the following 17 (85%) are Energy Star partners:

1. Lowe's
2. Sears
3. The Home Depot
4. Best Buy
5. Sears Hometown Stores
6. Hhgregg
7. Walmart
8. P.C. Richard & Son
9. Conn's
10. Costco Wholesale
11. Abt Electronics
12. BrandsMart USA
13. Menards
14. Pacific Sales Kitchen & Bath Centers
15. Amazon
16. Target
17. Sam's Club

7.3. End Users

The most recent study of these customers was conducted by Peters and Randazzo (2012). Their General Population Survey (GPS) of the appliance and electronic products afforded them an opportunity to explore purchasing behavior relevant to the HEER and BCE programs. Note that while this study focused on somewhat difference appliances and consumer electronics that will be targeted in the RPP Program, the findings remain largely applicable to the RPP Program. The following notable findings Emerged this study:

- California residents were buying many more electronic products than appliances. Among the electronic products we inquired about in the GPS, TVs were bought the most frequently [mentioned by slightly more than one-third (39%) of respondents]. Among the appliance products we inquired about, refrigerators were bought the most frequently [mentioned by one-fifth (21%) of respondents in SCE territory].[19]

- Customers who bought a TV or desktop computer were less likely than those who bought an appliance to report intending to buy an energy-efficient version of these products. At least two-thirds of those who bought a refrigerator, clothes washer, water heater, or room air-conditioner said they planned to buy an ENERGY STAR appliance. Half of those (50%) who bought a TV and less than one-third (29%) of those who bought a desktop computer intended to buy an ENERGY STAR model at the time they bought these electronic goods.].

- Knowledge of HEER rebates did not vary across nonparticipant groups. Half of the nonparticipants who intended to buy an ENERGY STAR appliance knew about HEER

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[19] Only SCE customers were asked about refrigerators.

rebates. Similarly, half of the nonparticipants who had not intended to buy an ENERGY STAR appliance knew about HEER rebates.

The study identified five segments and estimated awareness of ENERGY STAR within each segment. While in general the level of awareness was quite high (approximately 75%), it did vary by segment but was low ranging from 50% to and over 90%. Such a high level of awareness is consistent with other surveys such as EPA (2012). For ENERGY STAR Most Efficient, a much newer program, the level of awareness in general was, not surprisingly, much lower (approximately 20%), also varied by segment but was low ranging from 12% to and over 25%.[20]

While awareness of ENERGY STAR in general is quite high, customers who bought a TV or desktop computer were less likely than those who bought an appliance to report intending to buy an energy-efficient version of these products. That is, energy use is simply not a high priority for buyers of consumer electronics. This suggests educating customers about the energy use of various consumer electronics will be a challenge and that the changing of assortments and product placement is perhaps the preferred strategy.

7.4. Sales Associate Behavior

The extent to which the behavior of sales associates has been studied varies for the six product categories. In general, they have low levels of awareness and knowledge of ENERGY STAR energy efficiency and are limited in their willingness and ability to recommend these products to their customers (Ridge, 2000). However, these findings with respect to these products is likely consistent with the findings of ODC (2009) which focused on televisions and desktop computers. This study found: "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 (p. 2)." Perhaps things have changed somewhat as Peters et al. (2012) reports that over 80% of store managers indicated that staff at their location are "Knowledgeable" or "Very Knowledgeable" about ENERGY STAR (p. 17). In addition, 47% of the retailers reported being aware of higher ENERGY STAR tiers. Another 47% also indicated that more training would be "helpful" or "very helpful."

7.5. Shelf/Floor-Space

For the six product categories in the RPP Program, there is little information regarding the percent of models displayed that are program-qualified. One of the first things that should be done is to conduct baseline shelf-studies of these six products in stores of participating retailers. These baseline studies will be conducted by field staff under contract to PG&E. Interviews with the merchandisers of the participating retailers will also provide estimates of amount of shelf-space and floor space allocated to the six product categories.

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[20] ENERGY STAR® Most Efficient is a new program element to identify and advance highly efficient products in the marketplace. This effort identifies the most efficient products among those that are ENERGY STAR certified in particular product categories. Product categories were selected and recognition criteria were established to ensure that products that receive this recognition demonstrate efficiency performance that is truly exceptional, inspirational, or leading edge consistent with the interests of environmentally-motivated consumers and early adopters.

7.6. Market Shares

The key element of the RPP Program is the definition of market share. For this Program, it is defined as the percent of program qualified models in a given year that meet or exceed the RPP Program specification as it was defined in 2016 when the program launched[21]. Unfortunately, the market share for the product categories promoted in the 2016 RPP Program are market share data for California are either absent or dated. The most recent appliance market share data was supplied by the Residential Market Share Tracking System (RMSTS) (Itron, 2009) but only tracked two of the eight RPP product categories, refrigerators and room air conditions. After 2009, funding for the RMSTS was eliminated since many of the retailers were unwilling to continue providing sales data. With the exception of TVs, market shares for consumer electronics have not yet been estimated.

While no current California-specific market share estimates could be identified, national-level estimates were obtained from U.S. EPA. Table 16 presents these estimates.

Table 13. EPA Estimated Market Shares in 2015, by Product Category

Sound Bars (ENERGY STAR +50%)	Room Air Conditioners	Freezers	Electric Clothes Dryers	Gas Clothes Dryers	Room Air Cleaners
36%	30%	30%	13%	5%	32%

Going forward, there is the potential for calculating market shares for all RPP product categories using a variety of data sources. The first is based on a combination of sources from such commercial sources as NPD Group, the Association of Home Appliance Manufacturers (AHAM) and the Consumer Electronics Association (CEA). Appendix D contains a list of commercially available data sources.

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[21] If there is a change in the specification, the models that do not meet the new specification will not be eligible for incentives but since they meet the original specification, they will be counted toward the market share. Retailers will continue to sell these original models until they are no longer available. We, like NEEA, will also count their savings until those models are no longer commercially available.

Appendix A. Potential Program Performance and Market Transformation Indicators

Table 17 presents a number of program performance indicators (KPI) and market transformation indicators (MTI). For each, we present the concept being measured, the logic model component, the construct being measured, data needs, and data source.

Note that some of these indicators are simple (e.g., the number of utility partners recruited) while other are more complex (e.g., AKA-B with respect to ENERGY STAR) and will require more work to operationalize. To the extent possible each will also have to be transformed into SMART (**s**pecific, **m**easureable, **a**mbitious, **r**ealistic, and **t**ime-bound) objectives[22]. For each, decisions must also be made regarding the frequency of data collection (e.g., monthly, quarterly, annually, every third year, etc.) as well as the targeted level of accuracy and precision. In addition, we must decide which of these indicators will require that a baseline be established as soon as possible. Finally, both the Energy Division and the IOUs must collaborate in making all of these decisions.

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[22] Poister, Theodore H. (2003). *Measuring Performance in Public and Nonprofit Organizations*. San Francisco, CA: Jossey-Bass.

Table 14. Potential Program Performance Metrics and Market Transformation Indicators

Logic Model Component	Short, Mid, or Long-Term	Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)	ID	Concept	Calculation	Indicator Computed as Part of Other Indicator	Reporting Level	Notes	Proposed Frequency	Data Collection Activity	Evaluator Responsible for Collecting Data
Activity A: Program Administrators (PAs) characterize markets and estimate savings potential for candidate products	Short	PPI	A1	Estimated sales volumes, market shares, and energy savings potential, by candidate product category	Critical review of information		PA/Multi-Regional		Every third year	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Activity B: PAs contact other potential PAs regarding collaboration in Program delivery	Short	PPI	B1	Number of PAs approached	Count of the number of PAs approached		PA/Multi-Regional (already completed for CA)		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output C: Additional PAs recruited	Short	PPI	C1	Number of recruited PAs	Count of number of PAs recruited		PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output C: Additional PAs recruited	Short	MTI	C2	Reach of recruited PAs	Count of utility customers served by each PA running a mid-stream plug-load program		PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Activity D: Participating PAs determine which retailers to recruit	Short	PPI	D1	Number of retailers targeted for recruitment	Count of retailers targeted for recruitment		PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Activity D: Participating PAs determine which retailers to recruit	Short	PPI	D2	Market share of all in-store units sold (in US and by PA) for potential retailers, by retailer, by product category	Potential Retailer Market Share of all in-store sales, by product category p, by retailer r, for a specific time period t: $PRMS_{p,r,t} = $ Total Sales$_{p,r,t}$ / US (and PA) Total Sales$_{p,r,t}$	Yes: F3	PA/Multi-Regional		Baseline needed for each product category; annually thereafter	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Activity E: Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.	Short	MTI	E1	Energy-savings market potential for potential retailers, by product category, by retailer	Long-term forecast of market adoptions times UES values	Yes: E2	PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Activity E: Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.	Short	PPI	E2	Number of targeted product categories	Count of product categories targeted	Yes: E1	PA/Multi-Regional		As needed	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output F: Signed contracts between PAs and retailers.	Short	PPI	F1	Number of signed contracts with new retailers	Count of signed contracts with new retailers		PA/Multi-Regional		As needed	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output F: Signed contracts between PAs and retailers.	Short	PPI	F2	Number of signed contracts with returning retailers	Count of signed contracts with returning retailers		PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator

Logic Model Component	Short, Mid, or Long-Term	Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)	ID	Concept	Calculation	Indicator Computed as Part of Other Indicator	Reporting Level	Notes	Proposed Frequency	Data Collection Activity	Evaluator Responsible for Collecting Data
Output F: Signed contracts between PAs and retailers.	Short	MTI	F3	Market share of all in-store units sold (in US and by PA) for participating retailers, by retailer, by product category	Participating Retailer Market Share of all in-store sales, by product category p, by retailer r, for a specific time period t: $PRMS_{p,r,t}$ = Total $Sales_{p,r,t}$ / US (and PA) Total $Sales_{p,r,t}$	Yes: D2	PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output F: Signed contracts between PAs and retailers.	Short	PPI	F4	Market share of all units sold (in US and by PA) for participating retailers, by retailer, by product category	Participating Retailer Market Share of all sales, by product category p, by retailer r, for a specific time period t: $PRMS_{p,r,t}$ = Total $Sales_{p,r,t}$ / US (and PA) Total $Sales_{p,r,t}$		PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output F: Signed contracts between PAs and retailers.	Short	PPI	F5	Energy-savings market potential for participating retailers, by product category, by retailer	Long-term forecast of energy and demand potential (market adoptions times UES and UDR values)	Yes: E1	PA/Multi-Regional		Annually	Other Program/ Implementation Data Reviews	Region-Specific Evaluator
Output G: PAs approve retailers' marketing plans including sales forecasts of program-qualified models within each product category.	Short	PPI	G1	Number, types, and dates of strategies and tactics (e.g., price, promotion, placement)	Inventory and schedule of planned marketing activities		PA		Upon PA approval of plan	Implementation Plan Reviews	Region-Specific Evaluator
Output G: PAs approve retailers' marketing plans including sales forecasts of program-qualified models within each product category.	Short	PPI	G2	Clearly defined and measurable sales goals for targeted product categories	Presence of clearly defined and measurable sales goals for targeted product categories		PA		Upon PA approval of plan	Implementation Plan Reviews	Region-Specific Evaluator
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H1	Product Assortment: Assortment of program-qualified models (if applicable)	Proportion of models on sales floor, within each product category, that are program qualified	Yes: I1	PA	Indicator only used if assortment changes are included in the retailers implementation plan	Baseline needed for each product category; periodically thereafter (depending on sales cycle of product)	In-Field Verification/Shelf Survey	Region-Specific Evaluator
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H2	Price: Size of price discount and frequency and duration of sales promotions for program-qualified models (if applicable)	Weighted-average price index reflecting the extent to which pricing plans (i.e., price, frequency, duration) were consistently implemented across participating stores, by retailer		PA	Indicator only used if discount pricing plans are included in the retailers implementation plan	Ongoing	In-Field Verification	Region-Specific Evaluator

Logic Model Component	Short, Mid, or Long-Term	Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)	ID	Concept	Calculation	Indicator Computed as Part of Other Indicator	Reporting Level	Notes	Proposed Frequency	Data Collection Activity	Evaluator Responsible for Collecting Data
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H3	Placement: Preferential placement of program-qualified products (if applicable)	Weighted-average placement index reflecting the extent to which each of the components of the placement plan (i.e., frequency, placement) were consistently implemented across participating stores, by retailer		PA	Indicator only used if unique placement plans are included in the retailers implementation plan	Ongoing	In-Field Verification	Region-Specific Evaluator
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H4	Promotion: Increased frequency and improved placement of in-store and web-based advertising (if applicable)	Weighted-average promotion index reflecting the extent to which each of the components of the promotion plan (i.e., frequency, promotion) were consistently implemented across participating stores, by retailer		PA	Indicator only used if unique assortment plans are included in the retailers implementation plan	Ongoing	In-Field Verification	Region-Specific Evaluator
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H5	Indicator to whether sales staff training as outline in the implementation plan occurred (if applicable)	Indicator variable indicating whether staff training in implementation plan (if present) was conducted		PA	Indicator only used if staff training is included in the retailers implementation plan	Annually	Retailer Staff Interviews	Multi-Region Evaluator
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H6	Retail buyer routine consideration of model energy use when considering assortment	AKA index reflecting the awareness and knowledge of retailer merchants regarding increasing plug-load energy use.		PA/Multi-Regional		Annually	Retailer Staff Interviews	Multi-Region Evaluator
Outcome I: Reduction in customer market barriers to purchase products that are more energy efficient	Short	MTI	I1 (Note: this is the same as H1)	Product availability: proportion of program-qualified models available to customers	Proportion of models on sales floor, within each product category, that are program qualified	Yes: H1	PA/Multi-Regional		Baseline needed for each product category; periodically thereafter (depending on sales cycle of product)	In-Field Verification/Shelf Survey	Region-Specific Evaluator
Outcome I: Reduction in customer market barriers to purchase products that are more energy efficient	Short	PPI	I2	Awareness, knowledge, and/or attitudes of customers regarding ENERGY STAR and energy use of targeted products	CA ENERGY STAR AKA-B index (0 to 100)		PA		Annually [a]	Customers Market Barriers Research	Region-Specific Evaluator
Outcome I: Reduction in customer market barriers to purchase products that are more energy efficient	Short	PPI	I3	Awareness, knowledge, and/or attitudes of customers regarding residential plug load	CA Plug Load AKA-B question battery		PA		Annually [a]	Customers Market Barriers Research	Region-Specific Evaluator

Logic Model Component	Short, Mid, or Long-Term	Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)	ID	Concept	Calculation	Indicator Computed as Part of Other Indicator	Reporting Level	Notes	Proposed Frequency	Data Collection Activity	Evaluator Responsible for Collecting Data
Outcome J: Increased sales of energy efficient models within targeted product categories (for participating retailers)	Short	MTI	J1	Total sales volumes of targeted product categories by participating retailer	Total sales volumes of targeted product categories by participating retailer		PA		Baseline needed; annually thereafter	Retailer Sales Data	Region-Specific & Multi-Region Evaluator
Outcome K: Retailers receive incentives from PAs	Short	PPI	K1	Error rate of incentive payment processing	Percent of incentives erroneously paid to retailers for non-qualified products; percent of qualified products for which no incentive was paid		PA		Bi-Annually	Other Program/Implementation Data Reviews	Region-Specific Evaluator
Outcome L: Increased participating retailer engagement	Short	PPI	L1	Participating retailer self-reported satisfaction with program	Battery of questions regarding satisfaction with the RPP Pilot/Program (1=Very Dissatisfied - 5=Very Satisfied)		PA/Multi-Regional		Annually	Retailer Staff Interviews	Multi-Region Evaluator
Outcome M: Increased share of efficient models sold in targeted product categories among participating retailers	Mid	MTI	M1	Program-qualified share for participating retailers, by product category	Participating Retailer Program-Qualified Share (PQS) by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$		PA/Multi-Regional		Baseline needed; annually thereafter	Retailer Sales Data	Region-Specific & Multi-Region Evaluator
Outcome M: Increased share of efficient models sold in targeted product categories among participating retailers	Mid	PPI	M2	Program-qualified share for participating retailers, by retailer, by product category	Participating Retailer Program-Qualified Share (PQS) by product category p, by retailer r, for a specific time period t: $PQS_{p,r,t}$ = Program-Qualified $Sales_{p,r,t}$ / Total $Sales_{p,r,t}$		PA/Multi-Regional		Baseline needed; annually thereafter	Retailer Sales Data	Region-Specific & Multi-Region Evaluator
Outcome N: Increased share of efficient models sold in targeted product categories among nonparticipating retailers	Mid	MTI	N1	Program-qualified share for nonparticipating retailers, by product category	Nonparticipating Retailer Program-Qualified Share (PQS) by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$		PA/Multi-Regional		Baseline needed; annually thereafter	Secondary Market Data	Region-Specific & Multi-Region Evaluator
Outcome O: Energy and demand savings and other environmental and non-energy impacts	Short, Mid & Long	PPI	O1	Emissions benefits (tons of CO2 valued at market price)	(Tons of CO2/kWh)*Net Kwh Reductions		PA		Baseline needed; annually thereafter	Secondary Market Data	Region-Specific & Multi-Region Evaluator
Outcome O: Energy and demand savings and other environmental and non-energy impacts	Short, Mid & Long	MTI	O2	Gross and net kWh, kW (and potentially therm) impacts by product category	For each product category, Gross Saving = Total PQ sales volumes x UES; Net Savings = Gross Savings x NTGR		PA/Multi-Regional		Baseline needed; annually thereafter	Retailer Sales Data	Region-Specific & Multi-Region Evaluator
Outcome P: Increased demand experienced by manufacturers for more efficient models in targeted product categories	Long	MTI	P1	Manufacturer self-reported changes in demand for efficient product	Qualitative assessment of changes gathered via in-depth interviews		PA/Multi-Regional		Baseline needed; every third year thereafter	Manufacturer Interviews	Multi-Region Evaluator

Logic Model Component	Short, Mid, or Long-Term	Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)	ID	Concept	Calculation	Indicator Computed as Part of Other Indicator	Reporting Level	Notes	Proposed Frequency	Data Collection Activity	Evaluator Responsible for Collecting Data
Outcome Q: Manufacturers increase production of the efficient models in targeted product categories	Long	MTI	Q1	Manufacturer self-reported efforts to increase supply of efficient products in the U.S.	Qualitative assessment of reported efforts gathered via in-depth interviews		PA/Multi-Regional		Baseline needed; every third year thereafter	Manufacturer Interviews	Multi-Region Evaluator
Outcome Q: Manufacturers increase production of the efficient models in targeted product categories	Long	MTI	Q2	Number of new entrants to the market (if applicable)	Count of new manufacturers		PA/Multi-Regional		Baseline needed; every third year thereafter	Manufacturer Interviews	Multi-Region Evaluator
Outcome R: Increase in market share of efficient models in targeted product categories	Long	MTI	R1	Increase in program-qualified shares for targeted products as compared to baseline	Market-Level Program Qualified Share (PQS), by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$		PA/Multi-Regional		Baseline needed; annually thereafter	Secondary Market Data	Region-Specific & Multi-Region Evaluator
Outcome S: Permanent change in the availability of efficient models in targeted product categories among participating and nonparticipating retailers	Long	MTI	S1	Self-reported retailer commitment to maintain and even increase the number of qualified products purchased and displayed	Qualitative assessment of retailer plans to continue assorting and promoting PQ models in the absence of the program, collected via in-depth interviews		PA/Multi-Regional		Annually	Retailer Staff Interviews	Multi-Region Evaluator
Outcome S: Permanent change in the availability of efficient models in targeted product categories among participating and nonparticipating retailers	Long	MTI	S2	Sustained program-qualified shares for targeted products post program-period	Market-Level Program Qualified Share (PQS), by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$		PA/Multi-Regional		Baseline needed; annually thereafter	Secondary Market Data	Region-Specific & Multi-Region Evaluator
Outcome V: In the mid-term and/or long-term, more stringent mandatory and voluntary standards are adopted	Mid & Long	MTI	V1	New codes and/or standards planned and/or adopted	Count of new codes and/or standards planned and/or adopted		PA/Multi-Regional		Annually	RPP Program Collaborator Interviews	Multi-Region Evaluator
Activity B: PAs contact other potential PAs regarding collaboration in Program delivery Activity D: Participating PAs determine which retailers to recruit Activity E: Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.	Short	MTI	Int1	Level of collaboration in program administration; number of PAs contacted	In-depth qualitative research with PAs with regards to program development, launch, and implementation activities. Focus will be on assessing interorganizational collaboration and the degree to which collaboration facilitated program-related outcomes.		PA/Multi-Regional		Annually	RPP Program Collaborator Interviews	Multi-Region Evaluator
Activity T: PAs participate in meetings with and provide market data to staff of ENERGY STAR and Codes & Standards Programs regarding targeted product categories Activity U: PAs provide input on proposed energy efficiency model specifications to staff of	Short	MTI	Int2	Level of collaboration in voluntary and mandatory specification setting	In-depth qualitative research with PAs, ENERGY STAR staff, and C&S program staff with regards to interorganizational collaboration and other efforts in relation to influencing voluntary and mandatory energy efficiency specifications.		PA/Multi-Regional		Annually	RPP Program Collaborator Interviews	Multi-Region Evaluator

52

Logic Model Component	Short, Mid, or Long-Term	Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)	ID	Concept	Calculation	Indicator Computed as Part of Other Indicator	Reporting Level	Notes	Proposed Frequency	Data Collection Activity	Evaluator Responsible for Collecting Data
ENERGY STAR and Codes & Standards programs											

[a] Note that though the EM&V team proposes conducting annual data collection to assess AKA-B, customer data collection is not being proposed as part of this Pilot.

Appendix B: Glossary

Assortment: The retail offering as two key dimensions: product range breadth, also called variety (the number of product lines included) and assortment depth (how many product items are included in each category).

Buying Groups: An entity that is created to leverage the purchasing power of a group of businesses to obtain discounts from vendors based on the collective buying power of the members. This is a sub-set of Retailers.

Catchment Area: The geographical area from which trade to a store or center is attracted; the primary catchment area defines the area from which the vast majority of shoppers (80-90%) tend to use a particular store or center in preference to other stores or centers.

Distributors: An entity that buys non-competing products or product-lines, warehouses them, and resells them to retailers, value added resellers (VARs) or direct to the end user.
Elasticity: The percentage change in the market share due to a 1% increase advertising or assortment or a 1% decrease in price. An *elastic* variable (or elasticity value greater than 1) is one which responds more than proportionally to changes in other variables. In contrast, an *inelastic* variable (or elasticity value less than 1) is one which changes less than proportionally in response to changes in other variables

Innovation: An innovation is an idea, practice, or object that is perceived as new by an individual or other object of adoption. It matters little, so far as human behavior is concerned, whether or not an idea is objectively new as measured by the lapse of time since its first use or discovery. The perceived newness of the idea for the individual determines his or her reaction to it. If the idea seems new to the individual, it is an innovation. Newness in an innovation need not just involve new knowledge. Someone may have known about an innovation for some time but not yet developed a favorable or unfavorable attitude toward it, not have adopted or rejected it. "Newness" of an innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt. (Rogers, p. 11)

Manufacturers: An entity that makes a good through a process involving raw materials, components, or assemblies, usually on a large scale. Manufacturers sell through many channels, including: direct to end customers (business and consumer), to Distributors, to Value Added Resellers and to Retailers.

Market Transformation: Long-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where *continuation of the same* publicly-funded intervention is no longer appropriate in that specific market. *Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next*

generation of even more efficient technologies, processes or design solutions to the market.
D.09-09-047 at 89.

Planograms: Visual representations of a store's products or services. They are considered a tool for visual merchandising. According to the Oxford Dictionary, "It is a diagram or model that indicates the placement of retail products on shelves in order to maximize sales." Planograms therefore help dictate a retail store's layout. The ultimate effectiveness of the planogram can be measured by sales volume.

Retailers: An entity which sells goods to the consumer. Retailers include large businesses such as Wal-Mart and Kmart, and also smaller, non-chain locations run independently.

Supply Chain: A supply chain consists of all parties involved, directly or indirectly, in fulfilling a customer request. The supply chain not only includes the manufacturer and suppliers, but also transporters, warehouses, retailers, and customers themselves. Within each organization, such as manufacturer, the supply chain includes all functions involved in receiving and filling a customer request. These functions include, but are not limited to, new product development, marketing, operations, distribution, finance, and customer service.

Value-Added Reseller (**VAR**): A company that adds features or services to an existing product, then resells it (usually to end-users) as an integrated product or complete "turn-key" solution. This practice occurs commonly in the electronics industry, where, for example, a VAR might bundle a software application with supplied hardware.

Visual product placement (VPP): VPP is supported by different theories, including horizontal, vertical, and block placement. Horizontal product placement increases the concentration of a certain article for customers. Research studies have found that a minimum placement range between 15 centimeters (5.9 in)–30 centimeters (12 in) of one single product is necessary to achieve an increase in customer attention. This also depends on a customer's distance from the unit. Vertical product placement puts products on more than one shelf level to achieve 15 centimeters (5.9 in)–30 centimeters (12 in) of placement space. Similar products are placed in blocks – brands, for example.

Appendix C: Sales of Consumer Electronics & Appliances for the Top 50 Retailers

Rank	Retailer	2014 Appliance Sales (Millions)	2013 Appliance Sales (Millions)	2014 CE sales	2013 CE sales	2014 Total CE & App. Sales	2013 Total CE & Appl. Sales	Year/Year Growth
1	Best Buy	$ 2,552	$ 2,299	$ 29,759	$ 30,146	$ 32,311	$ 32,445	0%
2	Walmart	$ 918	$ 928	$ 21,626	$ 22,327	$ 22,544	$ 23,255	-3%
3	Amazon	$ 170	$ 116	$ 18,017	$ 15,607	$ 18,187	$ 15,723	16%
4	Apple Retail Stores	$ -	$ -	$ 12,383	$ 11,859	$ 12,383	$ 11,859	4%
5	Sears	$ 5,126	$ 4,967	$ 1,894	$ 1,973	$ 7,020	$ 6,940	1%
6	Lowe's	$ 5,985	$ 5,866	$ 27	$ 26	$ 6,012	$ 5,892	2%
7	Target	$ 169	$ 191	$ 5,679	$ 5,627	$ 5,848	$ 5,818	1%
8	Costco Wholesale	$ 259	$ 220	$ 5,159	$ 4,985	$ 5,418	$ 5,205	4%
9	The Home Depot	$ 4,828	$ 4,295	$ 104	$ 99	$ 4,932	$ 4,394	12%
10	GameStop	$ -	$ -	$ 4,458	$ 4,424	$ 4,458	$ 4,424	1%
11	Newegg.com	$ -	$ -	$ 2,559	$ 2,730	$ 2,559	$ 2,730	-6%
12	Sam's Club	$ -	$ -	$ 2,525	$ 2,672	$ 2,525	$ 2,672	-6%
13	RadioShack	$ -	$ -	$ 2,482	$ 2,990	$ 2,482	$ 2,990	-17%
14	Dell	$ -	$ -	$ 2,432	$ 2,763	$ 2,432	$ 2,763	-12%
15	Micro Center	$ -	$ -	$ 2,352	$ 2,261	$ 2,352	$ 2,261	4%
16	hhgregg	$ 998	$ 1,008	$ 918	$ 1,090	$ 1,916	$ 2,098	-9%
17	Sears	$ -	$ -	$ 1,894	$ 1,973	$ 1,894	$ 1,973	-4%
18	Sears Hometown Stores	$ 1,579	$ 1,640	$ -	$ -	$ 1,579	$ 1,640	-4%
19	Office Depot	$ -	$ -	$ 1,563	$ 1,821	$ 1,563	$ 1,821	-14%
20	Staples	$ -	$ -	$ 1,433	$ 1,632	$ 1,433	$ 1,632	-12%
21	P.C. Richard & Son	$ 685	$ 650	$ 550	$ 600	$ 1,235	$ 1,250	-1%
22	Fry's Electronics	$ 68	$ 64	$ 1,164	$ 1,308	$ 1,232	$ 1,372	-10%
23	Fry's Electronics	$ -	$ -	$ 1,164	$ 1,308	$ 1,164	$ 1,308	-11%
24	hhgregg	$ -	$ -	$ 918	$ 1,090	$ 918	$ 1,090	-16%
25	Army - Air Force Exchange	$ -	$ -	$ 833	$ 911	$ 833	$ 911	-9%
26	Conn's	$ 329	$ 259	$ 426	$ 372	$ 755	$ 631	20%
27	Hewlett-Packard	$ -	$ -	$ 751	$ 715	$ 751	$ 715	5%
28	Toys"R"Us	$ -	$ -	$ 730	$ 744	$ 730	$ 744	-2%
29	Systemax	$ -	$ -	$ 681	$ 784	$ 681	$ 784	-13%
30	QVC	$ -	$ -	$ 657	$ 614	$ 657	$ 614	7%
31	BrandsMart USA	$ 232	$ 234	$ 347	$ 407	$ 579	$ 641	-10%
32	Kmart	$ 84	$ 82	$ 479	$ 573	$ 563	$ 655	-14%
33	P.C. Richard & Son	$ -	$ -	$ 550	$ 600	$ 550	$ 600	-8%
34	Abt Electronics	$ 235	$ 210	$ 260	$ 233	$ 495	$ 443	12%
35	BJ's Wholesale Club	$ -	$ -	$ 492	$ 517	$ 492	$ 517	-5%
36	Bose	$ -	$ -	$ 480	$ 470	$ 480	$ 470	2%
37	Kmart	$ -	$ -	$ 479	$ 573	$ 479	$ 573	-16%
38	Nebraska Furniture Mart	$ 209	$ 190	$ 267	$ 252	$ 476	$ 442	8%
39	ABC Warehouse	$ 178	$ 173	$ 216	$ 214	$ 394	$ 387	2%
40	R.C. Willey Home Furnishings	$ 143	$ 133	$ 92	$ 91	$ 235	$ 224	5%
41	Curacao	$ 33	$ 29	$ 186	$ 195	$ 219	$ 224	-2%
42	Pacific Sales Kitchen & Bath Centers	$ 178	$ 192	$ 36	$ 38	$ 214	$ 230	-7%
43	Menards	$ 188	$ 176	$ 22	$ 22	$ 210	$ 198	6%
44	Sam's Club	$ 123	$ 121	$ -	$ -	$ 123	$ 121	2%
45	Warehouse Discount Center	$ 123	$ 121	$ -	$ -	$ 123	$ 121	2%
46	Albert Lee Appliance Co.	$ 120	$ 105	$ -	$ -	$ 120	$ 105	14%
47	Warners' Steman Appliance	$ 94	$ 85	$ -	$ -	$ 94	$ 85	11%
48	ApplianceSmart	$ 89	$ 83	$ -	$ -	$ 89	$ 83	7%
49	Ferguson	$ 82	$ 79	$ -	$ -	$ 82	$ 79	4%
50	Howard's Appliance	$ 77	$ 75	$ -	$ -	$ 77	$ 75	3%

Source: TWICE: This Week in Consumer Electronics, 5/18/2015 Supplement Top 100 Retailers

Appendix D: Possible Sources of Data for Long-Term Performance Metrics

D&R International
http://www.drintl.com/
Provides key market information for water residential heating and air conditioning, freezers, refrigerators, clothes washers and dryers.

NPD Group
Provides point-of-sales data for household appliances and consumer electronics
https://www.npd.com/wps/portal/npd/us/home/

Dunn & Bradstreet
(888) 703-2268
http://www.hoovers.com/industry-facts.consumer-electronics-appliances-stores.1526.html

Association of Home Appliance Manufacturers (AHAM)
http://www.aham.org/industry/ht/d/Items/cat_id/522/pid/1146/cids/522

World Major Household Appliances: World Industry Study with Forecasts to *2009 & 2014*
Toll Free US Tel: 800.927.5900 or +1 440.684.9600 Fax: +1 440.646.0484
E-mail: info@freedoniagroup.com

Major Household Appliance Manufacturing in the US: Market Research Report
http://www.ibisworld.com/industry/default.aspx?indid=789

Global Consumer Electronics Manufacturing: Market Research Report
IBISWorld's Global Consumer Electronics Manufacturing global market research report
http://www.ibisworld.com/industry/global/global-consumer-electronics-manufacturing.html

Report Linker: +1 718 473 0872
http://www.reportlinker.com/ci02164-p4/Major-Appliance.html/mode/public

U.S. Census Bureau
http://www.census.gov/manufacturing/m3/index.html
- Electronics and appliance stores: NAICS 4431

- Household Appliances Stores: 443111

- Electronics Stores: 443112

Consumer Electronics Association
The CE MarketMetrics program tracks shipments of CE products from the factory to U.S. consumer sales channels. CE MarketMetrics' weekly and monthly reports cover over 50 product

categories; and the program's semi-annual forecasts provide a six year snapshot of unit sales, dollar sales and average product price.
http://www.ce.org/Research/Products-Services/Industry-Sales-Data.aspx

Appendix B

Pacific Gas and Electric Company Retail Plug-Load Portfolio (RPP) Trial: Evaluation Report

Pacific Gas and Electric Company Retail Plug-Load Portfolio (RPP) Trial: Evaluation Report

ET Project Number: ET13PGE8052

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ABBREVIATIONS AND ACRONYMS

AHAM	Association of Home Appliance Manufacturers
BTU	British thermal units
CADR	Clean air delivery rate
CF	Coincident factor
CPUC	California Public Utility Commission
CPUC-ED	California Public Utility Commission-Energy Division
DEER	Database for Energy Efficiency Resources
DID	Difference-in-differences
DVD	Digital video disc
EM&V	Evaluation, measurement and verification
EO	Evaluation objective
HTiB	Home theater-in-a-box
Int	Intervention
IOU	Independently-owned utility
kW	Kilowatt
kWh	Kilowatt-hour
NEEA	Northwest Energy Efficiency Alliance
NEEP	Northeast Energy Efficiency Partnership
Non-PQ	Non-program-qualified
NTGR	Net-to-gross ratio
OO	Operational objective
PG&E	Pacific Gas and Electric Company
PO	Performance objective
PQ	Program-qualified
PQS	Program-qualified share

QA/QC	Quality assurance/quality control
RPP	Retail Plug Load Portfolio
SMUD	Sacramento Municipal Utility District
UND	Unit demand reductions
UEC	Unit energy consumption
UES	Unit energy savings

FIGURES

TABLES

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xi

EQUATIONS

CONTENTS

EXECUTIVE SUMMARY

In an innovative attempt to address the growing issue of residential plug-load in the State of California, the Pacific Gas and Electric Company (PG&E) and the Sacramento Municipal Utility District (SMUD) launched the Retail Plug-Load Portfolio (RPP) Trial in 2013 and 2014. The RPP Program uses a mid-stream design to influence retailers to demand, stock, and sell a greater proportion of energy efficient models of home appliances and consumer electronics in targeted product categories, which will ultimately result in residential customer energy and demand savings. Retailers are paid per-unit incentives for every program-qualified model that they sell during the program period. Program-qualified models are typically models that meet or exceed the minimum ENERGY STAR specification in each product category.

The RPP Trial was conducted with a single participating retailer, in 26 participating stores, over the 14-month period of November 2013 through December 2014.

PROJECT GOAL

This innovative program is the first program relying on a mid-stream design that is a true market transformation program launched in California. As such, questions remain about how to evaluate the program over the short-, mid-, and long-terms, as well as how to best implement and administer it in a cost-effective manner. This evaluation focused on assessing the initial operationalization of this new and novel program, as well as applying and testing an array of different evaluation methods that can be used to evaluate it.

PROJECT DESCRIPTION

The evaluation team used an array of different approaches to evaluate the RPP Trial (see Table 1).

TABLE 1: RESEARCH APPROACHES USED FOR THE RPP TRIAL EVALUATION

Process Evaluation Methods	Impact Evaluation Methods

• Retailer Interviews
  - Merchants
  - Marketers
  - Store Managers
• Leadership Team PG&E Program Staff Interviews
• Implementation Team Interviews
• Salesforce Data Review
• Retailer Marketing Activities Review
• Retailer Shelf Surveys
• Program Document Review
	• Difference-in-Differences
	• Regression Analysis Using Program-Tracking Data
	  - Participant-Only Pre-Post Forecasted Baseline to Actual Data
	  - Participant-Only Regression (modified step and segmented)
	  - Comparison Group-Based Regression (modified step and segmented)
	• Review of qualitative data

PROJECT FINDINGS/RESULTS
Process Evaluation Findings/Results

Merchant & Marketer Interviews
- Buyers were very well informed about the RPP Trial and activities.
- Price is absolutely the most important consideration when deciding to assort a product.
- The program has little chance of affecting the retailer's decisions and behaviors over the longer term unless it is scaled up.
- Energy use or energy efficiency of a model has traditionally been unimportant as a buying criteria. However, one of the two buyers indicated that she will weight these attributes more heavily in the future.
- The home appliance buyer indicated that a new model of ENERGY STAR refrigerator was added to their inventory as part of the RPP Trial and that he "absolutely would not" have added it in the absence of the trial.
- Both at baseline and follow-up, all buyers indicated that they would not have done *anything* related to promoting energy efficiency without the RPP Trial.

Corporate Leadership Team Interviews
- The corporate leadership team is motivated and interested in making the retailer's participation in the trial successful. They were genuinely excited about the trial and its potential.
- One of the biggest challenges in implementing the trial was the fact that the retailer had shifting corporate staff and staff on-leave.
- Due to its small scale, the cost and time to manage the trial exceeded the benefits.
- Fulfilling the data requests was also challenging.
- Much of what they learned throughout the trial helped them quickly develop an effective marketing strategy and plan for the last quarter.

Store Manager Interviews/Surveys
- Store managers have limited input in to store promotions. Promotional plans come from the retailer's corporate offices in the form of planograms, detailing how specific products should be displayed in order to increase customer purchases.
- Five of six store managers surveyed at follow-up were aware of the RPP Trial and indicated that the trial resulted in some lift for certain product categories, though their estimates of the lift varied.
- The store managers indicated their customers are generally aware of ENERGY STAR—and many ask for these products specifically. However, they are a price-point focused retailer, so most customers are only oriented to the lowest price.

Implementation Team Debrief
- They see this role and their communications as both important and effective. Their staff has decades of experience working in the retail environment and recognize and understand the retailer's needs and perspectives and are able to translate the utility's desires in a manner that is amenable to the retailer, and vice versa. They feel this was key to gaining participation and engagement from the retailer during the trial period.
- There is often a disconnect between the program team's perceived importance of the program and the actual importance to the retailer.
- The program was able to engage this retailer to participate in the program that provided a relatively small financial gain due to the small scale of the trial.
- While the costs to the retailer to implement the trial were not negligible, the retailer remained engaged and motivated throughout the trial period.
- The greatest implementation hurdle was the small scale of the trial. The RPP Program is a market transformation program and "26 participating stores are not going to transform any market."

- The participating retailers will likely need additional support in implementing the program for it to recognize its fullest potential.
- There is a need to recognize that *many* aspects of the retail market will need to be transformed for the program to reach its full potential.
- There is a notable risk to this program if regulators, utilities, and evaluators do not adequately grasp the implications tied to the program being a *market transformation* program.

PG&E Program Staff Interviews and Debrief
- Simply launching this innovative program and recruiting a retailer were viewed as major accomplishments.
- Everything was new and processes and procedures needed to be developed and implemented for all aspects of the program.
- Lessons learned:
  - The process for determining which models were program-qualified and which were not was not as straightforward as expected.
  - A key to successful implementation was understanding the data needs and the procedures for processing it.
  - This particular participating retailer selected for testing the program concept, may not represent the typical retailer. Nevertheless, the degree of engagement and participation they did receive was positive.
  - The Trial has helped clarify who should be responsible for what, what the processes and protocols should be, and how to improve collaboration. These clarifications have also provided greater insights into how and where costs may be cut, and areas of potential concerns.
- Areas needing attention moving ahead:
  - Data management will continue to be a challenge as the amount of data that is needed to support this program is large.
  - Obtaining reliable data representing the *non*participating retailers and the overall regional and national markets are big concerns.
  - PG&E needs to better support their "product," which is the program—they are like any other vendor working in the retail environment. This will likely be reflected as the IOU, and more specifically the field team, providing greater on-site support.
  - They may need to revise some of their expectations.
  - The product selection process will be refined and will continue to focus on ensuring the program is targeting the appropriate product categories.

Retailer Marketing Plans and Implementation
- The retailer implemented a wide range of promotional activities during the trial, including price reductions, preferential product placement, development of promotional flyers, product-specific and ENERGY STAR signage, and in-store broadcasts.
- Promotions were slow to begin, with significant promotional activity not starting until March 2014.
- Shelf surveys—as well as interviews with the retailer staff—indicated the implementation of the promotions was not always consistent across stores.

Impact Evaluation Findings/Results
Table 2 shows the estimated percentage point increases in PQS for each product class. Table 3 shows the preliminary first-year ex post gross energy and demand savings for each product class. Table 4 shows the preliminary first-year ex post net energy and demand savings for each product class.

TABLE 2: ESTIMATED NET PROGRAM EFFECTS ON PROGRAM-QUALIFIED SHARE

Product	Class	Net Program Effects
Air Cleaner	<100 CADR	11%
DVD/Blu-Ray	Blu-Ray	-1%
DVD/Blu-Ray	DVD	1%
Freezer	Chest	1%
Refrigerator	Compact	8%
Refrigerator	Medium	3%
Refrigerator	Very Large	6%
HTiB	Sound Bars	1%
Room Air Conditioners	<12,000 BTU	14%

TABLE 3: PRELIMINARY FIRST-YEAR EX POST GROSS SAVINGS

Product	Class	UES kWh	UES kW	Quantity Sold	Ex Post Gross Savings kWh	kW
Air Cleaner	<100 CADR	114.439	0.01293	183	20,942.36	2.3660
DVD/Blu-Ray	Blu-Ray	4.800	0.00005	2,171	10,420.80	0.1077
DVD/Blu-Ray	DVD	5.900	0.00013	1,350	7,965.00	0.1758
HTiB	Sound bar	52.600	0.00065	933	49,075.80	0.6074
Freezer	Frzr-Chest-ManDef_Large	18.600	0.00330	70	1,302.00	0.2310
Refrigerator	Refg-All_CmpMini	20.800	0.00380	336	6,988.80	1.2768
Refrigerator	RefgFrz-BM_VLarge	52.900	0.00950	4	211.60	0.0380
Refrigerator	RefgFrz-BM-Ice_VLarge	59.900	0.01080	10	599.00	0.1080
Refrigerator	RefgFrz-SM-TTD_VLarge	62.500	0.01130	105	6,562.50	1.1865
Refrigerator	RefgFrz-TM_CmpMini	33.000	0.00590	2	66.00	0.0118
Refrigerator	RefgFrz-TM_Med	35.900	0.00670	45	1,615.50	0.3015
Refrigerator	RefgFrz-TM_VLarge	41.000	0.00760	10	410.00	0.0760
Room AC	<12,000 BTU	69.975	0.03296	286	20,012.83	9.4260
TOTAL				5,505	126,172.2	15.9124

TABLE 4: PRELIMINARY FIRST-YEAR EX POST NET SAVINGS

Product	Class	Net Effect	Ex Post Net Savings kWh	kW
Air Cleaner	<100 CADR	0.11	2,303.66	0.2603
DVD/Blu-Ray	Blu-Ray	-0.01	-104.21	-0.0011
DVD/Blu-Ray	DVD	0.01	79.65	0.0018
HTiB	Sound bar	0.01	490.76	0.0061
Freezer	Frzr-Chest-ManDef_Large	0.01	13.02	0.0023
Refrigerator	Refg-All_CmpMini	0.08	559.10	0.1021
Refrigerator	RefgFrz-BM_VLarge	0.06	12.70	0.0023
Refrigerator	RefgFrz-BM-Ice_VLarge	0.06	35.94	0.0065
Refrigerator	RefgFrz-SM-TTD_VLarge	0.06	393.75	0.0712
Refrigerator	RefgFrz-TM_CmpMini	0.08	5.28	0.0009
Refrigerator	RefgFrz-TM_Med	0.03	48.47	0.0090
Refrigerator	RefgFrz-TM_VLarge	0.06	24.60	0.0046
Room AC	<12,000 BTU	0.14	2,801.80	1.3196
TOTAL			6,664.5	1.8

Taking: 6,664.5 kWh/ 126,172.2 kWh= 0.0528. Thus, 5.28% lift in sales due almost exclusively to promotional interventions.

The evaluation team argues it is premature to draw any firm conclusions regarding low gross and net impacts and a true program net-to-gross ratio (as such, we refer to the computed value as the *partial leading indicator net-to-gross ratio*). These are first-year savings from this small-scale trial of a new market transformation program, and savings and the NTGR were never expected to be substantial. Factors influencing these results are: (1) use of minimum ENERGY STAR specification, (2) very limited opportunity for the retailer make notable changes to their product assortment, and (3) net effects are almost entirely due to marketing and promotional activities.

PROJECT RECOMMENDATIONS

Based on the preponderance of evidence, the evaluation team has concluded the RPP Trial was reasonably successful at meeting its performance and operational objectives. The evaluation team also feels that the following recommendations should be considered in order to improve the design, delivery, and evaluation of the RPP Program.

Program Design and Implementation Recommendations

- Launching a program in the last quarter of the year should be avoided if possible. Retailers have a lot of activities underway during the holiday season, and gaining access to staff to conduct the necessary baseline research is a challenge. Also, unless there is adequate notice given to the retailers, it is likely many if not most of their marketing and promotional activities are planned several months in advance of the holiday sales period.

- Include a contractual commitment from the participating retailers to provide access to the staff needed to conduct evaluation tasks. The evaluation team had difficulty gaining access to retailer staff at key points in time (or at all) in order to conduct evaluation activities in a timely manner.

- Once the contract is signed, the participating retailers should develop retailer implementation plans as soon as possible to ensure that interventions occur early. Delays in getting retailer implementation plans in place is a risk to the program as PG&E will be paying incentives for "business as usual" sales (represented by the store's pre-program market share of program-qualified products) until interventions are in place to increase sales. In the trial, most product categories did not begin interventions until March 2014, five months into the program. It is likely that these five months of relatively little activity contributed significantly to the low net-to-gross ratio of 5% for the portfolio.

- Require the retailer's to develop detailed retailer implementation plans that outline strategies, time of implementation, and ideally, sales goals. In order to help bolster net-to-gross ratios, it may be worth considering adding a clause to contracts that states if the retailer does not do anything to promote a certain targeted product category for a certain period of time (e.g., a quarter), incentives will be withheld for that product category until some effort by the retailer to promote qualified models within a product category is observed. This would be most applicable to the first year or two of participation, when promotions are expected to play the key—if not only role—in increasing the sales of program-qualified products.

- Ensure the program data has a clear chain of ownership and control that is transparent, defendable, and absent of any potential conflicts of interest. This should minimize concerns regarding the accuracy of the data and the ensuing results. Ideally, the data should go directly from the retailer to the data service provider.

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- At least in the short term, more attention should be focused on promoting and incenting program-qualifying specifications that exceed the minimum ENERGY STAR specification. For many retailers for many product categories, a significant proportion of their product assortment is already ENERGY STAR. Even the retailer that participated in the trial—though energy efficiency never entered into their product purchasing decisions—had some high PQS values for some product categories before the trial even began. For example, the PQS for Blu-Ray players in the month before the program began (October 2013) was 71%; 36% for sound bars; 33% for air cleaners. Thus, incenting these product categories at the minimum ENERGY STAR specification will translate to relatively low net-to-gross ratios, and will likely have a limited effect on transforming the market. While in the future, the RPP Program theory suggests program-induced influence on voluntary specifications (e.g., ENERGY STAR) and/or mandatory standards (e.g., state or federal codes and standards) will occur and may negate the need for more stringent qualifying specifications, until these expected effects actually occur and are validated, efforts should be incorporated to help bolster net program savings.

- Retailers will likely need support to effectively and consistently implement the RPP Program. Inconsistent implementation across stores arose in the shelf survey data as well as the retailer buyer interviews. Support for implementation may consist of assisting store staff in deploying promotional materials such as signage or helping build promotional displays; it could also consist of assisting corporate staff to develop effective marketing and promotional strategies.

Evaluation Recommendations

- In terms of evaluation, the array of different modeling approaches should be retained until there is greater clarity around which impact approach(es) work best. While the comparison-based approaches provided, what the evaluation team feels are, the most reasonable estimates of net PQS, we also recognize that the participant-only designs may be the only feasible approach in the future, once the program effects begin to dissipate into other regions. More needs to be learned about how the participant-only models might perform with a larger-scale implementation of the program. Also, evaluators need to consider how the more quantitative impact evaluation methods might be coupled with self-report methods to derive impact results that are more widely informed and based on a preponderance of evidence.

- The shelf surveys, as they were conducted for the trial, provided information that was ultimately of limited use. However, a method for assessing retailers' implementation of the program interventions in their stores is still needed. A better approach might be to develop a schedule for in-store verification of marketing activities based on the retailers' implementation plans. These visits could also be leveraged to allow the field team to help support the retailers if gaps in implementation are found.

- The use of Salesforce needs substantive revision if it is to be a useful evaluation tool. Processing the Salesforce data was extremely resource intensive, and the contents of Salesforce only allows for limited validation of program activities, because only the implementation team uses it. The evaluation team feels other approaches might be more useful for assessing whether certain logic model components are occurring. For example, a periodic (e.g., quarterly) web-based survey of stakeholders would allow the evaluation team to collect more robust data in a manner that allows for easier and more systematic analysis.

- The role of the retailer store manager interviews need to be carefully considered and weighed in the context of the overall evaluation objectives. From a process evaluation perspective, the store research can provide informative insights into how the program

implementation may be refined or improved. However, it will be critical that the evaluator target the people in the stores that are most knowledgeable about the program and/or product categories. This may vary from retailer to retailer and will not likely be the store managers.

• Future evaluation efforts should be based on a theory-driven evaluation framework in order to provide robust support for future claims of attribution. As the RPP Program scales-up and becomes more complex, ascertaining impacts and effects of the program will become more complicated as many of these will occur outside of the participating retailers. We recommend focusing greater attention on evaluating the specific components of the logic model with a focus on validating that the activities, outputs, and short-, mid-, and long-term outcomes are occurring as expected, as well as validating that the hypothesized causal mechanisms. Within a theory-driven framework, the assessment of program performance through the use of multiple research designs and analyses of key leading indicators of program performance is the best way to manage risks faced by each stakeholder.

• In collaboration with the ED, identify key program performance metrics and market transformation indicators so that appropriate baselines can be constructed during the next phase of the RPP Program. Table 46 of this report outlines the key proximate or short- to mid-term indicators program progress and performance recommended by the evaluation team; Table 47 showed the proposed indicators of long-term effects and/or benefits.

OVERVIEW: RETAIL PLUG LOAD PORTFOLIO (RPP) PROGRAM

Because plug loads represent a significant proportion of residential electricity consumption, reducing plug load energy consumption is a critical step on the path towards achieving California's residential Zero Net Energy (ZNE) goals. The 2012 ZNE Technical Feasibility Report stated, "…minimizing plug loads will be critical to meeting ZNE goals" (Arup et al., 2012), and recommended that utilities "continue equipment efficiency incentive programs" and "aggressively promote equipment efficiency regulations at the state and federal level."

In response, the Pacific Gas and Electric Company (PG&E) has teamed with the Sacramento Municipal Utility District (SMUD) to develop and launch the Retail Plug-Load Portfolio (RPP) Program.[1] The RPP Program uses a mid-stream design to influence retailers to demand, stock, and sell a greater proportion of energy efficient models of home appliances and consumer electronics in targeted product categories. Retailers are paid per-unit incentives for every program-qualified model that they sell during the program period. Program-qualified models are typically models that meet or exceed the minimum ENERGY STAR specification in each product category. By increasing the proportion of sales of energy efficient, program-qualified models over less efficient models, the RPP Program is expected to generate gross and net energy and demand savings in the short- and mid-term through participating retailers, while transforming the overall market towards higher efficiency—and greater energy and demand savings—in the long-term. The broader RPP Program strategy is discussed in detail in the PG&E document *Retail Plug-Load Portfolio Trial Plan* (Navitas, 2013)*.*

Importantly, the RPP Program concept is one of the first programs of its type aimed at longer-term market transformation in the State of California through an intervention strategy with a mid-stream emphasis. More specifically, the RPP Program is inherently a *targeted market transformation program:*

> *"[Targeted] market transformation interventions are designed to induce sustained increases in the adoption and penetration of energy efficient technologies and practices through structural changes in the market and in behaviors of market actors."* (Prahl and Keating, 2014)

As a result, outcomes of the program are expected to occur over different time frames. In the short-term, the RPP Program is intended to motivate participating retailers to promote and sell more efficient models. However, over the longer-term, other retailers, utilities, and program administrators outside of PG&E's service territory (e.g., municipal utilities such as SMUD, and regional bodies, such as the Northwest Energy Efficiency Alliance (NEEA) and the Northeast Energy Efficiency Partnerships (NEEP)) will collaborate in this effort to get retailers to regularly demand, assort, and promote the most efficient models available. At the same time, the IOUs and utility partners will be working with ENERGY STAR and others to advance voluntary and mandatory standards in order to propel the broader marketplace towards greater efficiency. This broader scale will be necessary because the markets for consumer electronics and home appliances are complex and world-wide and it may be

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[1] Throughout this evaluation report we refer to the "RPP Program" as the more holistic program that is being planned for broader launch. We use "RPP Trial" to refer specifically to the trial that was evaluated

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difficult for a single utility or state to significantly influence the market forces to affect how manufacturers and mid-stream players act.

RPP PROGRAM LOGIC MODEL

Logic models go hand-in-hand with program theory in the market transformation literature. Rosenberg and Hoefgen (2009) state: "Program logic models are graphic representations of the causal links between program activities, short-term responses to those activities among market actors, and longer-term market effects."

The elements used to describe or represent a logic model include inputs, activities, and outputs, which in combination loosely form a program process theory, short-term outcomes (sometimes called initial, proximal, or immediate outcomes), mid-term outcomes (sometimes called intermediate or proximal outcomes), and long-term outcomes (sometimes called distal outcomes or impacts), which are intended to represent a program impact theory (Donaldson, 2007; Donaldson & Lipsey, 2006; Lipsey, Rossi & Freemen, 2004; Patton, 2008). In these logic models, activities are the actions undertaken to bring about a desired end, outputs are the immediate results of an action, and outcomes are the anticipated changes that occur directly or indirectly as a result of inputs, activities, and outputs.

The RPP Program concept is built upon a series of hypothesized causal linkages between program activities, outputs, and intended program outcomes that are depicted in the program logic model as illustrated in Figure 1. The development of this logic model evolved over the 14-month period of the trial and is not exactly the same logic model that was included in the initial evaluation plan. The changes to the logic model were *not* based on the results of the evaluation of the trial itself, but were based on conversations among PG&E program staff, the program implementation team, and the evaluation team. Any revisions to the model were relatively minor. For example, the original requirement that retailers have an approved implementation plan *before* signing a contract was deemed unreasonable, and the logic model was revised to show that the approved plan is necessary once the contract is signed. Also, wording was changed to reflect changes in program metrics that are tracked for the program. The current logic model is based on three main sources of information:

- Prior theory and research (e.g., economics of the firm, retailer behavior, consumer behavior, etc.)
- Implicit theories of those close to the program (e.g., PG&E program managers, the experience of experts in the retail industry, experience of CPUC-ED and its consultants, and PG&E EM&V staff and its consultants), and
- Observations of the program in operation during the trial.

FIGURE 1: RETAIL PLUG LOAD PORTFOLIO PROGRAM LOGIC MODEL

Sample of External Influences: Broad economic conditions, market events, cost of energy, federal standards, Energy Star, perceived need for conservation, etc. Factors can influence program at all levels and time frames.

Activities

A. PG&E characterizes markets and estimate savings potential for candidate products

B. PG&E contacts utility partners regarding collaboration in Program delivery

C. Utility partners recruited

D. PG&E and utility partners determine which retailers to recruit

E. PG&E, utility partners and identified retailers target product categories with energy savings potential

U. PG&E and utility partners participate in meetings with and provide market data to staff of Energy Star and Code and Standards Programs regarding targeted product categories

V. PG&E and utility partners provide input on proposed energy efficient model specifications to staff of Energy Star and Code and Standards Programs

W. In the mid-term and/or long-term, more stringent mandatory and voluntary standards are adopted

Outputs

F. PG&E and utility partners determine incentive levels for program-qualified models within each product category, present them to retailers, and sign contracts.

G. PG&E and partner utilities approve retailer marketing plans including sales forecasts of program-qualified models within each product category.

H. Retailers implement plans employing various strategies and update as necessary.

M. Additional retailers join program

L. Increased retailer engagement

P. Short-, mid-, and long-term energy and demand savings and other environmental and non-energy impacts.

T. Increase in market share of efficient models in targeted product categories

Short-Term Outcomes (1-2 Years)

I. Reduction in customer market barriers to purchase products that are more energy efficient

J. Increased sales of energy efficient models within targeted product categories

K. Retailers receive incentives from PG&E and utility partners

O. Increased share of efficient models sold in targeted product categories among nonparticipating retailers.

S. Permanent change in the availability of efficient models in targeted product categories among participating and nonparticipating retailers

Mid-Term Outcomes (3-6 Years)

N. Increased share of efficient models sold in targeted product categories among participating retailers

R. Manufacturers increase production of the efficient models in targeted product categories

Long-Term Outcomes (7-10 Years)

Q. Increased demand experienced by manufacturers for more efficient models in targeted product categories.

10

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The fundamental program theory is that, with the right combination of incentives and engagement, market barriers for both retailers and consumers – and eventually manufacturers – can be reduced or overcome.[2]

A number of market barriers, faced by the retailers, the manufacturers, and customers, are addressed by the RPP Program theory. We begin by noting that a market is determined by both supply and demand characteristics. Retailers can offer products that are not demanded at the price, quality, or other associated characteristics offered. Demanders can seek, or more passively hope for, products and services that they cannot find, or cannot find at the price, quality, etc., they require. Thus, some of these barriers affect the demand for energy efficient measures while others affect the supply of these measures. To the extent that these barriers are present, the supply of and demand for these products will be suboptimal.

Supply-side market barriers (manufacturers, distributors, and suppliers of residential energy-using equipment) include:

- Manufacturers may be uncertain about the response of customers to their new products or retailers might be reluctant to promote products for which their performance is uncertain. To the extent that this is a problem, the supply of these products at reasonable prices will be suboptimal.

- Products and services may be unavailable because manufacturers, distributors, and service providers have difficulty accurately predicting customer demand for their products/services, and may respond to this uncertainty in a risk-adverse manner, thereby limiting the availability of their products/services. Often this unavailability is associated with new products/services and the uncertainty of market response. Or, they might not perceive sufficient demand for energy efficiency and new energy technologies in multifamily buildings.

- Lack of information and awareness among upstream market actors regarding the benefits of energy efficient equipment.

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[2] Note that the RPP is not a lift program, which pays an incentive only for the number of units sold that is greater than the forecasted number of units that would have been sold normally. That is, incentives are paid only for the incremental, or net, units above this baseline forecast. Rather, with the RPP Program, an incentive will be paid for every program-qualified unit sold by the participating retailers. This is no different than any other standard utility rebate program, which pays an incentive for every qualified measure (e.g., a refrigerator). Some portion of program participants are always freeriders, something determined as part of an ex post evaluation. To mitigate the risk of high freeridership, program designers must decide to promote those energy efficient measures that have relatively low sales and market shares within a given retailer.

Market infrastructure barriers include:

- Low levels of awareness and knowledge regarding product specifications or differentiation regarding efficiency levels among retail merchandizers.

- Limited experience with energy efficient equipment

- Perception of risk with stocking or installing efficient appliances when customer demand or product quality has yet to be proven (uncertainty about product performance and profit potential)

- Undervaluing energy efficiency and sustainability and their impact on economic development, denial of climate change, and low sense of urgency regarding adoption of energy efficient technologies

- Information or search costs. Specifically, the lack of expertise among equipment sales staff due to the lack of energy efficiency training opportunities
- Institutional policies and practices might prevent some retailers from shifting their assortment to the more energy efficient products simply because they never have. Energy use is not always an attribute that retail merchandizers consider when buying products from manufacturers.

- Lack of differentiated product marketing by retailers to motivate customers to make more efficient purchasing choices.

- Market lacks experience in determining the best way to create a profitable long-term business model

Demand-side market barriers include:

- Customers often unaware and lack knowledge and understanding of energy-efficient products and services

- Information costs associated with understanding the energy related features and associated benefits of energy-efficient technologies and services.

- Because energy efficiency is rarely valued by the customer more than the requested functionality, efficient models do not always receive consumer attention.

- Sometimes the energy-efficiency attributes of a product or service may not be packaged with other features customers desire. For example, some energy-efficient options may only be available on high-end products, such as on high-end or large refrigerators.

- Many customers and some businesses in the distribution chain are uncertain about the performance of energy-efficient products and services, and may not trust the performance claims made by manufacturers and vendors. Many customers also have difficulty assessing the value of energy efficiency as an investment, because the costs are paid upfront but the less certain benefits accrue over time.

- High incremental costs for the more efficient models.

- Resistance to new or innovative technologies

As a result of overcoming these market barriers, it is hypothesized that retailers will increase their sales of more energy efficient models (models that meet and/or exceed ENERGY STAR specifications) to more informed customers than they would have absent the program, thereby generating energy savings, and with sustained engagement,

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12

transforming the retail channel market in delivering energy efficient plug load products and appliances.

In terms of the logic model, initial program activities are aimed at characterizing the market and savings potential for candidate product categories (A), contacting utility partners (B), recruiting utility partners (C), determining which retailers to recruit (D), and determining which product categories to target (E). Next, the utility partners and program/implementation team determine incentive levels and sign contracts with the recruited retailers (F). Once contracts are signed, the retailers develop marketing plans for selling a greater proportion of energy efficient products (G), and begin implementing these plans (H). The retailers' efforts reduce customer market barriers (I), resulting in increased sales of efficient products in the targeted product categories (J). Incentives for the sale of energy efficient products are paid to retailers (K), which are expected to increase the engagement of participating retailers (L), and perhaps non-participating retailers may also sense market signals suggesting that more efficient products are profitable and decide to join the program (M). The reduction of customer market barriers and the increased sale of efficient products also will, in the short-term, result in energy, demand, and other environmental and non-environmental impacts (P). In the mid-term, success of the program will be evidenced by participating retailers selling an increased share of efficient products (N). If the benefits seem great enough, nonparticipating retailers might simply begin stocking more efficient products without joining the program (O), which also will, in the mid-term, result in energy, demand, and other environmental and non-environmental impacts (P). In the long-term, both demand pressures experienced by manufacturers (Q) as well as policy-related effects on standards (U, V and-W) are expected to alter manufacturer supply of efficient products (R), which ultimately will result in permanent changes in the availability and sales of efficient models in the marketplace (S and T), which also will, in the long-term, result in energy, demand, and other environmental and non-environmental impacts (P).

Because the duration of the RPP Trial was 14 months, this evaluation focuses mainly on analyzing the initial activities, outputs, and short-term outcomes. However, the evaluation team also assesses and makes recommendations with regards to establishing metrics and baselines for mid- to long-term program performance and market effects metrics as well.

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THE RPP TRIAL

The RPP Trial ran from November 2013 to December 2014[3] with a single participating retailer in a total of 24 participating stores[4] in the PG&E and SMUD service territories (22 participating stores located in the PG&E service territory; two stores in the SMUD service territory). In addition to the participating stores, the participating retailer also provided product sales data for all of their other stores in California (the "nonparticipating" stores) to serve as comparison stores. There were a total of 66 nonparticipating stores (17 in the PG&E service territory; 49 located elsewhere throughout the state).[5] Table 5 provides the counts of participating and nonparticipating stores by service territory.

TABLE 5: PARTICIPATING AND NONPARTICIPATING STORES BY SERVICE TERRITORY

Service Territory	Store Type		TOTAL
	Participating	Nonparticipating	
PG&E	22	17	39
SMUD	2	0	2
Other	0	49	49
TOTAL	**24**	**66**	**90**

Figure 2 shows the locations of the participating and nonparticipating stores that remained open during the trial throughout the state by service territory.

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[3] Initially, the RPP Trial was expected to run for 12 months, from November 2013 through October 2014. However, because the retailer was unable to modify their holiday promotion plans to accommodate the Program on such short notice, sales of program-qualified products were very low. As a result of this slow start (see *Lessons Learned and Recommendations* section of this report), by advice of the CPUC-ED and the PG&E program staff, and in consultation with the participating retailer, it was decided to extend the trial period through the end of December 2014 in order to plan more effectively for the 2014 holiday season.

[4] Originally, there were a total of 26 participating stores (24 PG&E; two SMUD). However, two of the participating stores in the PG&E service territory terminated participation in the trial due to unforeseen business circumstances and are excluded from our analyses.

[5] Originally, there were a total of 77 nonparticipating stores, but due to closures or other circumstances, 11 stores are excluded from analyses.

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FIGURE 2: PARTICIPATING RETAILER STORES
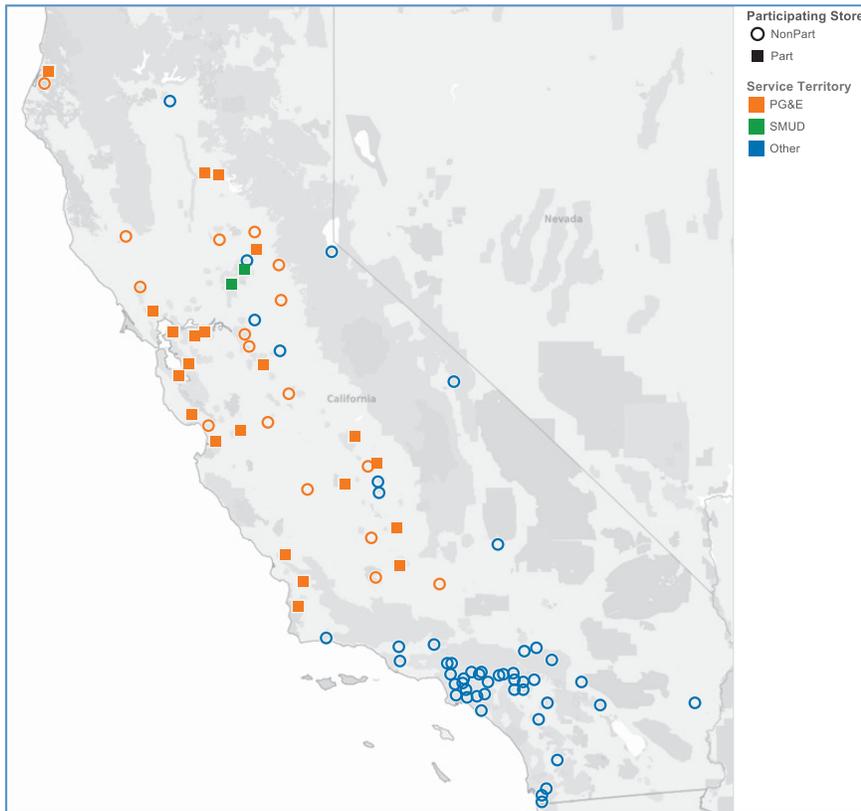
The RPP Trial targeted and paid incentives on six product categories.[6] Table 6 shows the product categories included in the Trial along with the qualifying efficiency levels and incentives paid to the retailer for each unit sold.

TABLE 6: RPP TRIAL PRODUCT CATEGORIES, EFFICIENCY STANDARDS, AND PER-UNIT INCENTIVES

Product Category	Efficiency Standard	Per-Unit Incentive
Air Cleaners	ENERGY STAR v1.0	$25
DVD/Blu-Ray Players	ENERGY STAR v3.0	$4
Home Theaters-in-a-Box/Sound bars	ENERGY STAR v3.0	$15
Freezers	ENERGY STAR v4.0	$25
Refrigerators	ENERGY STAR v4.0	$40
Room Air Conditioners	ENERGY STAR v2.0	$40

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[6] Initial plans for the RPP Trial also included targeting docking stations and compact audio. However, because the participating retailer ultimately did not stock any program-qualified models in either of these categories, these product categories were ultimately excluded from the trial.

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For the trial of the RPP Program, a model was considered program-qualified if the model met the minimum ENERGY STAR specification that was in effect at the start of the program (November 2013) for the given targeted product category.[7] The one exception to this was the room air conditioner category. Because the summer of 2013 was cooler than expected nationwide and store sales did not meet expectations, the participating retailer had no plans to purchase additional room air conditioners to stock for the 2014 season. However, they did have an abundant inventory of a specific model of room air conditioner that met the prior, ENERGY STAR 2.0 specification, which exceeded the efficiency of all other models the retailer stocked, though this inventory was stockpiled in a distribution center outside of the State. The project team, in consultation with the retailer, agreed to incent that model of room air conditioner and the retailer committed to shipping extra units from their Midwestwern distribution center and implementing bulk-stack displays of these units along with additional signage and promotion to sell more of the relatively more-efficient model.[8]

During the Trial, any new models within the targeted product categories that were added to the retailer's assortment were referenced against the online ENERGY STAR qualified products database to determine if they were program-qualified. This was done because new models may not have been in production when the ENERGY STAR specifications from November 2013 were in effect (and thus, would not appear in the original ENERGY STAR Qualified Product List), because the online database incorporates some models that were deemed to meet the ENERGY STAR specification but were added *after* the original specification was released, or because some models may have met a new specification that was more stringent than the initial specification.

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[7] While models were considered to be program-qualified if they met the minimum ENERGY STAR specification for the trial, there are plans for the program to focus on efficiency levels for some product categories that exceed the minimum ENERGY STAR specification (e.g., ENERGY STAR +X% or ENERGY STAR Most Efficient).

[8] The retailer had no plans to assort and promote this particular model of air conditioner in the participating stores at the level they ultimately did without the program. Thus, though they decided to promote a model that already possessed, the increased inventory shipped to the participating stores along with the targeted promotional activities allowed the retailer to sell a greater proportion of more efficient units than they would have in the absence of the program.

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STUDY OBJECTIVES

The RPP Trial was the first implementation of this complex program, and as such, an array of different objectives were defined and aimed at better understanding the potential performance of the program, but also to support refinement of the program processes that could effect implementation. Not all of these objectives were under full control of the evaluation team; some objectives were the responsibility of the PG&E program staff, the program implementation team, and the data service provider.[9] These objectives were classified as performance or operational objectives, and are shown below.

PERFORMANCE OBJECTIVES

PO1: Achieve an increase in the program-qualified share in targeted product categories among participating retailers.

PO2: Achieve gross and net energy and demand reductions associated with the sales of program-qualified models in targeted product categories among participating retailers.[10]

Note that these performance objectives are tied to the expected outcomes from the RPP Program at larger-scale implementation. For the purposes of this specific trial, due to its small scale and short time frame, the amassing of substantive gross and net energy and demand savings were not expected. As such, the evaluation efforts focused on developing methods for measuring and assessing sales increases and gross and net savings.

OPERATIONAL OBJECTIVES

OO1: Participating retailer develops strategic plan to sell targeted products.

OO2: Participating retailer faithfully implements the strategic plan designed to sell targeted products.

OO3: Operationalize Activity A through Output F denoted in the logic model (see Figure 1).

OO4: Establish data processing, QA/QC, and analysis methodology.

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[9] The RPP Trial requires a large amount of data for implementation and administration (e.g., tracking program-qualified units sold to facilitate incentive payments; tracking product market shares to understand intervention timing and structure, etc.), as well as evaluation. The data service provider was a third-party firm contracted with PG&E to provide data management and data processing services for the RPP Trial.

[10] In the initial evaluation plan, this goal was stated as: "Achieve a reduction in the sales weighted unit energy consumption (SWUEC) of targeted product categories." However, analyses conducted during the trial period revealed that the sales weighted unit energy consumption is an ineffective metric for evaluating or tracking progress of this program. Instead, since the focus of the RPP Program is to ultimately reduce energy consumption, this objective was reoriented to focus on gross and net energy and demand savings.

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OO5: Identify variables that should be tracked by the RPP Program.

OO6: Continue building relationships with other program partners such as SMUD, NEEA, and other utilities and organizations for future partnerships.

OO7: Increase retailer awareness of promoting, selling, and/or stocking products based on energy efficiency criteria.

While achieving these operational objectives were mostly the responsibility of the PG&E program staff, the program implementation team, and the data service provider, the evaluation team participated in and provided input on most of them in order to improve the evaluability of the RPP Program.

In addition to the performance and operational objectives shown above, additional objectives were also defined specifically to support evaluation of the RPP Trial, and because of the complexity of the program design, to provide input into future evaluation efforts for the RPP Program.

EVALUATION OBJECTIVES

EO1: Test various methods to evaluate the RPP Trial.

EO2: Identify, operationalize, track, and analyze key proximate (short and mid-term) indicators of performance.

EO3: Propose performance indicators for measuring longer-term effects and/or benefits.

EO4: Identify data collection and analysis responsibilities (retailer, utility staff, evaluators).

EO5: Measure the extent to which trial RPP Program objectives were achieved.

EO6: Assess potential program trial spillover effects on non-participating stores within the PG&E and utility partner service territories.

It is important to note that no single methodology is suitable for assessing all objectives. Some objectives are more qualitative in nature and involve assessing and evaluating operational activities and processes to ensure that the program trial was implemented as planned and is functioning as expected—more inline with a typical process evaluation. Other objectives are more quantitative in nature and involve defining, measuring, and analyzing specific metrics that serve as indicators of program progress, attribution, and/or success—more analogous to a traditional impact evaluation. Also, since this is a relatively new and novel program concept aimed at market transformation via a mid-stream model, as noted under the evaluation objectives, an additional goal of this evaluation involves assessing an array of potential approaches to evaluating the program in order to identify those that are most effective, feasible, scalable, and cost-effective to employ in the future.

To the extent possible, this evaluation of the RPP Trial complies with the *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals* (TecMarket Works Team, 2005) and *The Program Evaluation Standards: A Guide for Evaluators and Evaluation Users* (Yarbrough et al., 2011).

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RESEARCH METHODS/APPROACHES

Because of the dynamic and complex nature of the RPP Program, and the added complexity resulting from non-program-related factors interacting with program-related effects, this evaluation relies on multiple approaches and analyses to support conclusions regarding program performance and impacts. The evaluation team used an array of different methods to evaluate the RPP Trial. The evaluation of the operational objectives relied mainly on a traditional process evaluation, while the evaluation of performance objectives relied on an impact evaluation that employed a variety of quasi-experimental methods.

Figure 3 summarizes the collection of research tasks conducted for the RPP Trial evaluation.

FIGURE 3: RESEARCH METHODS USED FOR THE RPP TRIAL EVALUATION

Process Evaluation Methods	Impact Evaluation Methods

• Retailer Interviews
  - Merchants
  - Marketers
  - Store Managers
• Leadership Team PG&E Program Staff Interviews
• Implementation Team Interviews
• Salesforce Data Review
• Retailer Marketing Activities Review
• Retailer Shelf Surveys
• Program Document Review
	• Difference-in-Differences
	• Regression Analysis Using Program-Tracking Data
	  - Participant-Only Pre-Post Forecasted Baseline to Actual Data
	  - Participant-Only Regression (modified step and segmented)
	  - Comparison Group-Based Regression (modified step and segmented)
	• Review of qualitative data

Also, though not presented as a specific impact evaluation method, one should not discount the value of visual inspection of charts and figures to discern trends in variables of interest (e.g., program-qualified share for participating and nonparticipating stores). The sales data series used for this evaluation contain significant month-to-month variability, and sometimes relatively low sales volumes, which result in forecasts and regressions that are also variable and somewhat imprecise. This makes significant, program-induced differences difficult to detect form a purely statistical perspective. This is especially the case in the shorter-term (i.e., with only 14-months of trial-period data available). However, from a practical and longer-term perspective, graphical representations are quite helpful for detecting early trends that may not be significant now, but could become statistically significant in the future. Through visual inspection, one often obtains an immediate and strong impression of the trend just by noting whether the series seems flat or moves generally up or down over time. Also, visual inspection allows the researcher to detect anomalies in the data or issues that can detrimentally affect certain analyses. As such, when conducting the more rigorous quantitative analyses, as a first step, the evaluation team also examined plots of the data to assess trends or highlight issues.

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This section of the report presents the methods and approaches used for evaluating the RPP Trial. It begins by discussing the process evaluation methods, proceeds to a discussion of the retailer data used for conducting the quantitative analyses, and concludes by introducing the impact evaluation methods.

PROCESS EVALUATION METHODS

The evaluation team conducted up to two waves of interviews with a range of actors associated with the RPP Trial. In order to capture the retailer's perspectives and experiences with the program, the evaluation team conducted primary research with merchants (buyers), marketers, store managers, and corporate leadership team members. In order to capture other stakeholders' perspectives and experiences, the evaluation team conducted primary research with PG&E program staff and program implementation team members. The number of interviews conducted across the different interviewees is shown in Table 7. All of the interview guides/surveys are provided in Appendix A.

TABLE 7: INTERVIEWS CONDUCTED AS PART OF THE RPP TRIAL EVALUATION

GROUP	WAVE 1 INTERVIEWS CONDUCTED (FEB. & MAR. 2014)	WAVE 2 INTERVIEWS AND SURVEYS CONDUCTED (FEB. & MAR. 2015)	DETAILS
Retailer Merchants	1	2	At start-up, the merchants and the marketers were both participating in the planning for the RPP Trial; by Wave 2, only the merchants were responsible for planning and implementing RPP. For Wave 1, the evaluation team was only able to complete interviews with the home appliance merchant and marketer; for Wave 2 we were able to complete interviews with both the home appliance and consumer electronics merchants.
Retailer Marketers	1	NA	
Retailer Store Managers	5	6	Wave 1 consisted of in-depth interviews with a small sample of store managers. For Wave 2, a web survey was conducted, with email invitations sent to the entire population of participating store managers.
Retailer Leadership Team	2	1	Only one staff member was operating as the RPP representative of the Retailer Leadership Team in Wave 2.
PG&E Program Staff	2	2	A project debrief telephone call was conducted with two members of the PG&E program team at start-up and at the close of the trial.
Implementation Team	NA	3	A project debrief telephone conference was conducted with three members of the implementation team, Navitas Partners, at the close of the trial.

RETAILER INTERVIEWS

Consistent with the design of the RPP Program, and because of the mid-stream focus of the design, the retailers play the central—and most important—role. Without retailers willing to participate in the program, the program would not exist. Retailers also design

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and implement the marketing strategies designed to increase sales of targeted products. Additionally, retailers are the final conduit to the consumers, who ultimately decide to purchase—or not purchase—the energy efficient products. As such, gaining an in-depth understanding of the retailer staff perspectives, experiences, and expectations was a significant component of this evaluation.

The evaluation team conducted two waves of interviews with key retailer staff. The first wave of interviews was conducted in February and March of 2014 and the second wave of interviews was conducted in February and March of 2015.[11] The general topics covered in the retailer interviews included:

RETAILER MERCHANT AND MARKETER INTERVIEW TOPICS
- Awareness and knowledge regarding energy efficiency in general
- Knowledge about energy efficiency initiatives underway at the retailer, and whether there is any collaboration/communication between various departments of the retailer regarding energy efficiency initiatives
- Knowledge about energy efficiency as it relates to the qualified product categories in the RPP Trial
- Product promotion processes
- Awareness of the RPP Trial
- Influence of the RPP Trial on their promotion and purchasing decisions
- Possible increase in efficient product sales due to RPP Trial in participating and nonparticipating stores
- Distribution of products (i.e., do any program-qualified products go to non-participating stores in addition to participating stores)
- Perceptions regarding the appropriate timing and level of incentives
- The likelihood that they would have designed and implemented the agreed-upon retailer implementation plan absent the RPP Trial (to inform NTGRs)
- Experiences with and feedback on the RPP program trial

RETAILER STORE MANAGER INTERVIEW/SURVEY TOPICS
- General awareness of in-store promotional activities
- Awareness of the RPP Trial
- Awareness of RPP-specific promotional activities
- Possible increase in efficient product sales due to RPP Trial in participating stores
- Awareness and knowledge regarding their customers' demands for energy efficient products
- Influence of the RPP Trial on their promotion, pricing, placement, assortment, and stocking decisions
- Activities implemented to promote program-qualified products (staff training, pricing, placement, promotion, assortment, etc.)
- Experiences with and feedback on the RPP Trial

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[11] Though the evaluation team aimed to conduct the first wave of interviews closer to the start of the program in November 2013—and the final wave of interviews closer to the actual end of the trial period in December 2014—this was ultimately not possible. Because of concerns over disrupting business operations during the busy holiday season (roughly the second week of November through the beginning of January), the participating retailer asked that the evaluation team wait until after the New Year to conduct our interviews/surveys.

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- Decisions and input regarding products included in the RPP Trial
- Participation in retailer's retailer implementation plan development
- Involvement with the RPP Trial implementation
- Experiences with the RPP Trial

During the data collection phase of this evaluation, PG&E program staff, the implementer, and the evaluation team discussed the applicability and usefulness of the retailer store manager interviews/surveys. Questions arose regarding: (1) the ability of the store managers to answer questions about specific RPP-related promotions when they are exposed to a wide array of promotions throughout the year, and (2) whether or not the store staff actually have a role in implementing the program when the program theory suggests that these decisions are mostly made at a corporate level (i.e., purchasing and stocking behaviors, development of promotional activities and events, etc.). Nevertheless, the team decided to include the retailer store manager interviews/surveys, but with the additional goal of assessing whether or not store mangers have adequate insight to effectively answer questions related to RPP promotions and effects. A discussion of this additional assessment is included in the results chapter.

PG&E PROGRAM STAFF AND IMPLEMENTATION TEAM STAFF INTERVIEWS/DEBRIEFS

The evaluation team conducted in-depth interviews with relevant PG&E program staff at the beginning of the Trial in January 2014, and conducted a debrief with staff after the Trial in March 2015. The interviews and debrief focused primarily on the operational aspects of the RPP Trial and include topics such as:

- Lessons learned about the development and implementation of the program (e.g., what has worked, what has not? What have been the greatest hurdles? What have been the greatest successes?)
- Recommendations for change and improvement of the program
- Administrative processes and protocols: are they appropriate and scalable?
- Frequency and effectiveness of the communication between the utility, implementers, and retailer
- Identify information that needs to be tracked by the RPP Trial

SALESFORCE DATA REVIEW

Salesforce is a database platform that supports logging, storing, categorizing, and reporting an array of qualitative and quantitative information. Key email-based communications and interactions between the implementation team and PG&E, SMUD, other utilities, utility partners, and other stakeholders (e.g., ENERGY STAR, codes & standards program staff, retailers, product manufactures, etc.), including meeting (in-person and via phone/web conference), agendas, notes, and presentations were logged and tracked by the implementation team in a Salesforce database on a regular basis.

The evaluation team systematically coded, classified, and summarized this qualitative and quantitative information in a manner aimed at describing the communications and interactions. The objective was to better understand the flow and content of communications and to validate that key components of the program logic model were occurring.

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RETAILER MARKETING ACTIVITIES REVIEW

Per the RPP Program design, participating retailers are expected to develop strategies for marketing and assorting targeted products incented through the program during their period of participation. While these plans are intended to be flexible and can be revised over time in accordance with retailers' operational and business needs, it is expected that they will include clear descriptions of the specific marketing activities that are planned for targeted product categories. Typical retailer implementation plans might include plans for:

- Product assortment changes (e.g., stocking and displaying additional qualified models)
- Product pricing strategies (e.g., price promotions for the most efficient model in a product category)
- Product promotion strategies (e.g., promoting energy efficient models over standard efficiency models)
- Product placement strategies (e.g. devoting "prime" shelf and/or store locations to energy efficient models)
- Staff training (e.g., educating sales associates and managers on the benefits of energy efficiency products)

Retailers do not need to commit to all of these activities, and may plan additional activities not mentioned in the list above. Further, the planned activities can, and likely will, vary across different product categories, as the retailers see fit. This flexibility is fundamental to the RPP Program concept. That is, the program is intended to allow retailers—those who know the most about selling products—the flexibility to do whatever they see fit to best promote and sell these products.

As part of this evaluation, the evaluation team reviewed the marketing strategies and inventoried the specific marketing activities conducted by the retailer during the trial, including the type of activity (e.g., sale price, signage, unique placement, etc.) and the implementation period.

RETAILER SHELF SURVEYS

Comprehensive retailer shelf surveys were conducted twice in each of the participating stores (i.e., a census) by a field team directed by PG&E. Wave I of shelf surveys was conducted in February and March 2014; Wave II was conducted in November 2014.[12]

For the shelf surveys, field team members were asked to conduct a comprehensive inventory of all RPP targeted product categories present in each of the stores. Specific tasks included:

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[12] Though the evaluation team aimed to conduct the first wave of shelf surveys closer to the start of the program in November 2013, this was ultimately not possible. Because of concerns over disrupting business operations during the busy holiday season (roughly the second week of November through the beginning of January), the participating retailer asked that the evaluation team wait until after the New Year to conduct our initial shelf surveys. The second wave of shelf surveys was planned for early November 2014 because the retailer had special promotions planned for this time and we wanted to be able to assess the consistency of implementation and we did not want to disturb operations closer the holidays.

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- Log each of the different *models* on display.
- Count of the total number of *units* of each model on display.
- Log the regular and, if applicable, the sale price for each model on display.
- Log the presence of any promotional signage associated with the models on display.
- Photograph the products, representing placement and promotions of the models on display.

After completing the shelf surveys, each individual field team member uploaded their store-level reports and the digital photographs to a secure server for access by the evaluation team.

The evaluation team downloaded the store-level reports and combined them into a single analysis file, which included the store number, product category, model number, number of units on display, regular price, sale price (if applicable), and an indicator variable denoting whether or not the model had any promotional signage present on the sales floor. The evaluation team processed and cleaned the data, merging the shelf survey analysis file with the master RPP Products File (see the next section for a detailed description of the RPP Products File), and through this process, added an indicator variable denoting whether each model was a program-qualified model or not.

The analysis of the shelf survey data was conducted at the store level, with the evaluation team computing the following metrics for each store, for each product category:

- Total number of models
- Total number of program-qualified models
- Percentage of models that were program-qualified
- Total number of program-qualified models on-sale
- Percentage of program-qualified models on-sale
- Total number of program-qualified models with promotional signage
- Percentage of program-qualified models with promotional signage

RPP PROGRAM DATA

As part of this evaluation, the evaluation team conducted extensive and numerous quantitative analyses using retailer sales data in order to assess an array of methods that might be used to evaluate this program and to gain a better understanding of the types of information that can be inferred from the sales data. As part of the operational and evaluation objectives for this evaluation, the evaluation team worked with the data service provider, program staff, and implementation team to develop and refine data processing and management procedures. Before proceeding to a discussion of the impact evaluation methods used in this research, the following sections discuss, in detail, the retailer sales data, the data processing and management procedures, and the main metrics that were developed for evaluating the RPP Trial.

RETAILER SALES DATA

As part of the contractual agreement between the participating retailer and the utilities, the retailer provided two main forms of data: (1) historical sales data (covering the 21-month period February 2012 through October 2013), and (2) trial-period sales data (covering the 14-month period November 2013 through December 2014). This data was provided for all incented product categories, including air cleaners, DVD/Blu-Ray players,

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home theaters-in-a-box, freezers, refrigerators, and room air conditioners. These data files included *all* models sold within each targeted product category *regardless of whether it was program-qualified or not*.

Comprehensive sales data were provided for all participating stores in the PG&E (*N*=24) and SMUD (*N*=2) service territories. Also, to support the comparative analyses, the retailer also provided the same data (historical and trial-period) for all *non*participating stores throughout the state (*N*=66). It is worth emphasizing that while these comparison stores are part of this evaluation, it is unclear if such comparison data will be available from retailers for a larger-scale implementation of this program.

DATA PROCESSING AND MANAGEMENT

Significant effort was made by the evaluation team, PG&E program staff, the implementation team, and the services provider to develop efficient and effective data management and processing protocols as part of the RPP Trial. The amount of data needed to evaluate this program—both from planning and evaluation perspectives—is rather large. Because the RPP Program is expected to be scaled up to include more retailers and a much greater number of stores (and targeted product models), it is expected that data management and processing will become more complicated as the program grows. This growth in data needs will also cause administrative costs to grow and, unless effectively managed, can quickly reach impractical levels. Failing to manage these costs will compromise the cost-effectiveness of the RPP Program.

The following section discusses the details of processing the retailer sales data and the protocols that were used by the evaluation team, data service provider, implementation staff, and PG&E staff to construct analysis data sets.

HISTORICAL AND TRIAL-PERIOD RAW DATA PROCESSING

The raw historical and trial-period data files were first provided to the program implementer who reviewed the data to ensure it captured the relevant time periods, product categories, and models. If any errors or issues were found, the implementer worked with the retailer to resolve issues and get an updated file. Once the implementer conducted their QA/QC, the data files were then provided to the data service provider who developed a system for processing the data in order to facilitate the recording and payment of rebates to the retailer. The evaluation team was provided the raw sales data files from the data service provider.

Two main complications resulted from the fact that the historical sales data and the trial-period sales data came from the retailer's two different data warehousing systems. First, because the different data resided in different systems that were structured differently, the retailer needed to develop two different queries to extract the needed information. The historical data was structured in a way that allowed the retailer to query entire product categories. In contrast, the trial-period data resided in a system that was structured in a way that required the retailer to specify the particular models to include in the extract. Because of these differences, it is possible that the historical data was more comprehensive (i.e., that some models may have been inadvertently left out of the trial-period data queries). Second, the historical data was provided in a format where each row contained the *monthly* net unit sales for a particular model at a particular store (sales minus returns). The unique model identifier in the historical sales data series was a retailer inventory ID (no manufacturer model ID was included), and the file also included

textual model descriptions. The trial-period sales data was provided in a format where each row of the file contained *daily* net unit sales (sales minus returns) for a particular model at a particular store. However, the unique model identifier in the trial-period sales data was the manufacturer model number (no retailer inventory ID was included), and the file did not contain model descriptions. Due to these issues, the matching of models across the two data sets was challenging.

As noted above, the historical data series only included the retailer inventory ID and textual model descriptions. In many cases the textual model descriptions actually contained the manufacturer model number, so matching models for these cases was possible, but needed to be conducted in a time-consuming, model-by-model basis. Many other models in the historical data, however, did not contain product descriptions or the descriptions did not contain a model number and the retailer inventory ID numbers had to be looked up on a case-by-case basis through the retailer's website. However, the retailer inventory IDs did not always produce an ID when we queried the website. The retailer staff indicated this was likely due to some models no longer being stocked, so the IDs were retired. However, there were also some IDs that pointed to totally unrelated products (e.g., clothing, kitchen utensils, etc.), suggesting that the retailer inventory IDs are not necessarily unique or not actually "retired" if a product is no longer in inventory, but instead, assigned to a new product.

Ultimately, there were some models that could not be matched between the historical data series and the trial-period data based on the available information. In many cases, this is to be expected, as some older models are no longer stocked—especially for the consumer electronics categories, which typically have relatively short shelf lives. Nevertheless, since the sales volumes of the models in question were relatively small (see Table 8), the evaluation team does not feel the unmatched models compromise our ability to meaningfully analyze the historical and trial-period data series. Throughout this report the evaluation team highlights specific results that may be impacted by the potential data matching issues.

DEVELOPMENT OF THE "RPP PRODUCTS" FILE

As part of the matching process, the evaluation team, data service provider, and PG&E program staff worked together to develop a separate file that translated the retailer inventory IDs to the manufacturer model numbers. We populated this "RPP Products" file with an array of additional information as well, including brand, product description, and the model attributes that affect energy consumption (see Table 9).

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TABLE 8: DATA PROCESSING COUNTS – UNMATCHED MODELS BY PRODUCT CATEGORY

Product Category	Models in Historical Data	Models in Trial-period Data	Unmatched Models	Percent of Total Historical Sales Volume Unmatched
Air Cleaners	12	4	2	0.4%
DVD/Blu-Ray Players	44	4	4	1.5%
Home Theaters-in-a-Box/Sound bars	37	24	9	1.6%
Freezers	14	12	3	0.2%
Refrigerators	66	27	30	4.5%
Room Air Conditioners	46	12	7	3.4%

TABLE 9: MODEL ATTRIBUTES TRACKED IN THE RPP PRODUCTS TRANSLATION FILE

Product Category	Model Parameters
Air Cleaners	Clean air delivery rate (CADR), efficiency (CADR/Watts), standby power consumption, estimated annual hours-of-use
DVD/Blu-Ray Players	On mode power consumption, idle mode power consumption, standby mode power consumption, estimated annual hours-of-use
Home Theaters-in-a-Box/Sound bars	On mode power consumption, idle mode power consumption, standby mode power consumption, estimated annual hours-of-use, and if applicable parameters for secondary components (e.g., DVD or Blu-Ray player)
Freezers	Volume, adjusted volume, type (chest or upright), defrost mode (auto or manual)
Refrigerators	Refrigerator volume, freezer volume, total volume, adjusted volume, type (top-freezer, bottom-freezer, side-by-side, single-door), defrost mode (auto or manual), presence or absence of through-the-door icemaker, presence or absence of internal ice maker
Room Air Conditioners	Cooling capacity (in BTU), type (window or portable), presence or absence of reverse cycle, presence or absence of louvered sides, energy efficiency rating (EER), power consumption (in Watts), estimated annual hours-of-use

Each model appearing in the RPP Products file was also coded as qualified or non-qualified based on the relevant qualifying efficiency specification that defined payment of incentives that was in effect at the start of the retailer's participation in the program (see Table 6). Also, unit energy consumption (UEC) and, for qualified models, unit energy savings (UES) and unit demand reduction (UDR) estimates were assigned to each model appearing in the sales data based on the methods described in the white paper, *Calculation Methodology for Unit Energy Consumption (UEC) and Unit Energy Savings (UES) for the Retail Plug-Load Portfolio (RPP) Program* (Malinick et al., 2015). In general, the approach consisted of:

- Using UEC and UES values from the California Database for Energy Efficient Resources (DEER) for the product categories present in DEER (i.e., freezers and refrigerators),

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- Using measure-level UEC values from secondary data or sources when this information was available, or
- Using model-level UEC values and developing sales-weighted UES values for remaining product categories.

In order to facilitate fair comparisons and derive meaningful energy consumption and savings estimates, the evaluation team divided the six broad RPP targeted product categories into product classes. Within a product category, different features, characteristics, and/or sizes can affect energy consumption—and ultimately energy savings estimates—across models. For example, for air cleaners, models with a higher clean air delivery rate (CADR) use more energy than models with lower CADRs. Table 10 shows the product classification scheme for the products included in the RPP Trial.

TABLE 10: RPP TRIAL PRODUCT CATEGORIES AND CLASSES

PRODUCT CATEGORY	RPP PRODUCT CLASS
Air Cleaners	1. <100 CADR 2. >=100 CADR
DVD/Blu-Ray Players	1. Standard DVD players 2. Blu-Ray players
Home Theaters-in-a-Box	1. Home theater-in-a-box 2. Home theater-in-a-box w/ DVD player 3. Home theater-in-a-box w/Blu-Ray player 4. Sound bar
Freezers [A]	1. Chest 2. Upright
Refrigerators [B]	1. Compact Mini (<5 cu. ft.) 2. Compact (5-7 cu. ft.) 3. Very Small (<13 cu. ft.) 4. Small (13-16 cu. ft.) 5. Medium (17-20 cu. ft.) 6. Large (21+23 cu. ft.) 7. Very Large (>23 cu. ft.)
Room Air Conditioners	1. <12,000 BTU (<1.00 ton) 2. 12,000-17,999 BTU (1.00-1.49 ton) 3. 18,000-23,999 BTU (1.50-1.99 ton) 4. 24,000-29,999 BTU (2.00-2.49 ton) 5. >=30,000 BTU (>=2.50 ton)

[A] Note that for the purposes of assigning UEC and UES values, the 12 DEER classes for freezers were used. However, the participating retailer sold relatively few models of program-qualified freezers. In order to ensure there were an adequate number of models present in the classes to facilitate analyses, the evaluation team grouped the freezers by type, as this characteristic drove savings more than size.

[B] Note that for the purposes of assigning UEC and UES values, the 55 DEER classes for refrigerators were used. However, the participating retailer sold relatively few models of program-qualified refrigerators. In order to ensure there were an adequate number of models present in the classes to facilitate analyses, the evaluation team grouped the refrigerators by DEER size class instead of DEER product class.

It is worth noting that not all of the classes shown in Table 10 will appear in the results section of this report. In some cases, the participating retailer sold no models in individual product classes; in some other cases, the retailer may have sold models in a product class, but they did not sell any *program-qualified* models. In cases where a product class has no models sold or no program-qualified models sold, there is nothing to analyze and the classes are excluded from analyses.

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FINAL HISTORICAL AND TRIAL-PERIOD DATA PROCESSING

The RPP Products file was used as a translation file allowing the evaluation team to synch the historical data files and the trial-period data in order to ensure the correct models were matched. Ultimately, the evaluation team developed an analysis data file that indicated how many units of each specific product model were sold in each of the participating retailer stores (both participating and nonparticipating stores) each month from February 2012 through December 2014. Each store was coded as participating or nonparticipating; each model was assigned to its associated product category and class; each model was coded as program-qualified or nonqualified; UEC values were assigned to all models; program-qualified models were assigned the associated UES value. In addition to including the model-related information, the evaluation team also coded the program activities that the participating retailer implemented throughout the trial (for more details on this coding, see the *Sales Data Analytic Methods* section of the report). The evaluation team used this analysis data file for analyses conducted for the evaluation. However, none of the metrics assessed and computed in this report are reported at the store level. Instead, to ensure the confidentiality of the participating retailer's sales information, all results are aggregated to various levels to obscure actual sales volumes of specific models to the extent possible, while still providing the necessary resolution to draw informed and well-grounded conclusions (e.g., at the participating versus nonparticipating store level, or at the program-qualified versus non-qualified product level).

METRICS DEVELOPMENT

This section of this report provides details regarding the quantitative metrics that the evaluation team constructed and analyzed as part of this evaluation.

PROGRAM-QUALIFIED SHARE (PQS)

In addition to total units sales volumes of program-qualified and non-qualified models, the evaluation team computed and tracked the *program-qualified share (PQS),* define as the proportion of total unit sales volumes within targeted product classes (*p*), over a specific time period (*t*), that are program-qualified, as shown in Equation 1:

EQUATION 1: PROGRAM QUALIFIED SHARE (PQS)

$$PQS_{p,t} = Total\ Qualified\ Units\ Sold_{p,t}\ /\ Total\ Units\ Sold_{p,t}$$

Notably, and as discussed elsewhere in this plan, the evaluation team does not expect substantial changes in the PQS in the short-term (one to two years). Retail seasonal buying patterns mean that in the first year of participation, retailers will likely have already made their stocking decisions. Thus, the first-year effects will likely be very limited since sales were almost completely driven by promotional activities, with such small effects being much harder to detect statistically. However, the expectation is that the PQS values will increase over time as the participating retailers increase their assortment of program-qualified models.

The time period (*t*) is incorporated to account for the different time periods that may be assessed as part of the evaluation. For example, with regards to the PQS, a monthly PQS may be computed reflecting the proportion or program-qualified units sold within a given month, a historical PQS may be computed based only on the sales volume-weighted

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average of 21 months of historical data, or a trial-period PQS may be computed to reflect a sales volume-weighted average of the PQS over the 14 months of the trial.

UNIT ENERGY CONSUMPTION (UEC)

Unit energy consumption (UEC) is the average estimated annual electricity usage, in kilowatt-hours (kWh), for a specific product or device. Figure 4 shows the generalized method for computing UEC estimates. The estimate for annual hours of usage is multiplied by the measured power (in Watts) to derive the estimate for annual UEC in each of a device's operating modes. The UEC estimates for each mode are then summed to arrive at the estimate for total device UEC (Roth & McKenney, 2007).[13] For products with a single operating mode, the estimate for total UEC is simply the annual hours of usage multiplied by the device's measured power.

FIGURE 4: GENERALIZED UNIT ENERGY CONSUMPTION (UEC) ESTIMATION METHODOLOGY
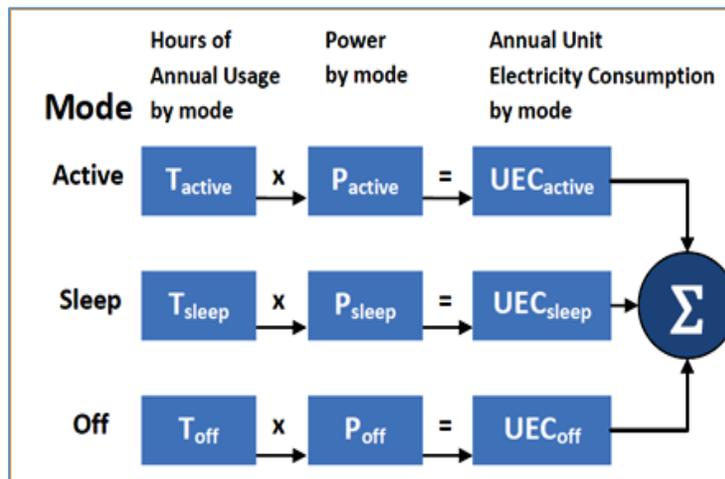
UNIT ENERGY SAVINGS (UES)

Though some details vary with regards to the final computation of UES estimates depending on the availability of data and the approach taken,[14] the basic premise is that the *unit energy savings (UES),* in kilowatt-hours (kWh), for an energy efficient model within a particular product class (*p*) for a particular period of time (*t*) is the difference between the average UEC for the non-qualified models and the average UEC for qualified models. This calculation is shown in Equation 2:

EQUATION 2: UNIT ENERGY CONSUMPTION (UES)

$$UES_{p,t} = UEC_{Non-Qualified_{p,t}} - UEC_{Qualified_{p,t}}$$

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[13] In the example shown, active mode also includes when a product is no longer being used but remains in a high-powered state, often referred to as idle mode.

[14] For a complete description of details, see Malinick et al., 2015.

The time subscript (t) is included to account for the fact that: (1) UEC and UES values can be computed for a range of different time periods (e.g., monthly, quarterly, yearly, etc.), and (2) in the scaled up RPP Program, UES estimates will need to be recomputed periodically. UES values are likely to change over time as either retailers' product assortments change (for products where the UES values estimated at the model-level), or the other sources of data such as DEER or secondary information is updated (for products where the UES is computed at the measure-level). As a result periodic re-computation of the UEC and UES values will be warranted. In general, we recommend that they be computed at the beginning of the Trial period based on the historical sales data that will be provided by the participating retailers, and held constant for a one-year period. For this evaluation, however, since the trial ran for a total of 14 months, we hold the UES values constant for all 14 months.

PRELIMINARY EX POST GROSS PROGRAM ENERGY SAVINGS

Preliminary ex post gross program energy savings[15] are derived by multiplying the UES, in kilowatt-hours (kWh), for a product subcategory (p) and time period (t) by the total number of units sold (Q) for that product subcategory and time period and then summing across all subcategories across all products, as shown in Equation 3.

EQUATION 3: PRELIMINARY EX POST GROSS PROGRAM SAVINGS

$$Preliminary\ Ex\ Post\ Gross\ Program\ Energy\ Savings = \sum (UES_{p,t} \times Q_{p,t})$$

UNIT DEMAND REDUCTION (UDR)

In addition to energy savings, the RPP Program will also result in demand reductions that will be claimed by PG&E. In order to estimate *unit demand reduction (UDR)*, peak coincident factors (CF) will be derived for each product subcategory (p) as well as the average kilowatt (kW) peak demand for non-qualified models and the average kilowatt (kW) peak demand for qualified models for the product subcategory for a specific time period (t). This calculation is shown in Equation 4.

EQUATION 4: UNIT DEMAND REDUCTION (UDR)

$$UDR_{p,t} = (CF_p \ x \ kW_{Non-Qualified_{p,t}}) - (CF_p \ x \ kW_{Qualified_{p,t}})$$

PRELIMINARY EX POST GROSS PROGRAM DEMAND SAVINGS

Preliminary ex post gross program demand savings will be derived by multiplying the UDR, in kilowatts (kW), for a product subcategory (p) and time period (t) by the total number of units sold (Q) for that product subcategory and time period and then summing across all subcategories, as shown in Equation 5.

EQUATION 5: PRELIMINARY EX POST GROSS PROGRAM DEMAND REDUCTION

$$Preliminary\ Ex\ Post\ Gross\ Program\ Demand\ Reduction = \sum (UDR_{p,t} \times Q_{p,t})$$

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[15] Note that for the purposes of this evaluation, we refer to this as "preliminary ex post" savings because this report does not represent the official CPUC-ED ex post evaluation of the program.

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Table 11 shows the UES and UDR values for the products included in the RPP Trial, indicating what UES method was used to develop the UES values. The table also distinguishes between *UEC* product class and *RPP* product class. For products contained in the DEER database, the UEC product class is analogous to the DEER product class. Gross energy and demand savings are computed at the UEC product class levels. However, the UEC product classes are quite numerous and rather specific for the home appliances, and sales volumes in some UEC classes were quite sparse. The RPP product classes were developed to facilitate other analyses that do not rely on energy or demand savings (e.g., PQS analyses), by aggregating similar sizes (for refrigerators) or types (for freezers) of products to ensure their were an adequate number of sales in each class to conduct meaningful analyses.

TABLE 11: UES VALUES FOR RPP TRIAL PRODUCTS

Product Category	UEC Product Class	RPP Product Class	UES kWh	UES kW	UEC/UES METHOD
Air Cleaner	<100 CADR	<100 CADR	114.43910	0.01293	Model-Level
DVD/Blu-Ray	Blu-Ray	Blu-Ray	4.80000	0.00005	Measure-Level
DVD/Blu-Ray	DVD	DVD	5.90000	0.00013	Measure-Level
HTiB	Sound bar	Sound bar	52.60000	0.00065	Measure-Level
Freezer	Frzr-Chest-ManDef_Large	Chest	18.60000	0.00330	DEER
Refrigerator	Refg-All_CmpMini	Compact	20.80000	0.00380	DEER
Refrigerator	RefgFrz-BM_VLarge	Very Large	52.90000	0.00950	DEER
Refrigerator	RefgFrz-BM-Ice_VLarge	Very Large	59.90000	0.01080	DEER
Refrigerator	RefgFrz-SM-TTD_VLarge	Very Large	62.50000	0.01130	DEER
Refrigerator	RefgFrz-TM_CmpMini	Compact	33.00000	0.00590	DEER
Refrigerator	RefgFrz-TM_Med	Medium	35.90000	0.00670	DEER
Refrigerator	RefgFrz-TM_VLarge	Very Large	41.00000	0.00760	DEER
Room AC	<12,000 BTU	<12,000 BTU	69.97494	0.03296	Model-Level

IMPACT EVALUATION METHODS

Recall that one of the main evaluation objectives of this study was to assess different methods and approaches for conducting the evaluation to make recommendations regarding those methods that have promise for evaluating a larger-scale implementation of the RPP Program in the future, especially in terms of assessing program effects and energy and demand impacts. As such, in addition to the various process evaluation methods already discussed, an array of different quasi-experimental approaches were also used to assess the sales data and conduct the impact evaluation.

A true experimental design is often considered the most rigorous of all research designs. A well-designed and correctly implemented experiment allows researchers to control for factors potentially affecting the outcomes of interest (i.e., PQS) by randomly assigning subjects to a treatment group (or in this case, the RPP Program) and to a control group that does not receive the treatment (i.e., nonparticipating retailers or nonparticipating

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stores for participating retailers). If designed well and certain constraints are upheld, any statistically significant differences in the PQS between the participating and nonparticipating retailers/stores at the end of the program should be attributable to the program.

However, the strength and validity of an experiment is highly dependent on certain design-related factors, the most important being the ability to randomly assign retailers/stores to treatment and control groups. In the case of the RPP Trial, there was no way to randomly assign *retailers* to treatment and control groups since there was only one retailer. Random assignment of the *stores* for this one retailer to treatment and control groups was considered, but was ultimately deemed impractical by the retailer.

That said, given it was not possible to implement a *true* controlled experimental design for the trial, a variety of *quasi*-experimental designs were assessed in an attempt to control for the effects of history. The main distinction between a true experimental design and a quasi-experimental design is that under a quasi-experimental design the treatment and control cases are *not* randomly assigned. Instead, the control or comparison group is composed of a set of cases that are deemed comparable to the treatment cases by the researchers. For the purposes of this evaluation, two types of comparison groups were defined: (1) a quasi-experimental pre-post participant-only design where the pre, or historical, period served as the control, and (2) a quasi-experimental comparison group design where the all of the participating retailer's *non*participating stores throughout the State of California served as the control.[16]

More specifically, as part of this trial evaluation, the evaluation team included four types of quasi-experimental designs (each discussed in more detail in the following sections) aimed at estimating net program effects on PQS. The first, and simplest approach was a standard difference-in-differences analysis that compared both participating and nonparticipating stores historical PQS values to their trial-period PQS values. The difference between the two groups differences were the estimated net program effects. The second, and simplest *modeling* approach was a participant-only pre-post forecasted PQS baseline approach, where the historical period was used to forecast a PQS baseline, which was then compared to the actual PQS values during the trial period. The difference between the forecasted baseline and the actual PQS values over the trial period were the net program effects on the PQS. The third, more sophisticated approach was a quasi-experimental participant-only regression with the PQS as the dependent variable, where the entire series (both historical and trial period) was used to develop a regression model predicting the PQS, and the predicted PQS values were then computed with two versions of the model: (1) with the program, and (2) without the program. The predicted PQS estimates from both versions of the model were then compared in order to estimate net program effects on PQS. The final approach, a comparison-based PQS regression approach, was added at the request of the CPUC-ED. This latter approach involved developing PQS regression models incorporating the entire series, with the models including a variable that distinguished between participating and nonparticipating stores.

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[16] The evaluation team also looked at nonparticipating stores only in the PG&E service territory as an additional basis for comparison. However, preliminary analysis revealed the nonparticipating stores within the service territory were not substantively different from all the nonparticipating stores in the state. Since the comparisons using the statewide nonparticipating stores provides a much larger number of stores for our analyses, and thus more robust analyses, the results from the within service territory comparisons have been excluded but can be provided upon request.

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The predicted PQS values were then estimated using the model with the participation variable "on" to derive participating store estimated PQS values, and again with the participation variable turned "off" to derive *non*participating store estimated PQS values. The difference between these predicted values was the net program effects on PQS.

It is important to emphasize that in future years, such a comparative design using participating retailers' nonparticipating stores will likely be impossible since most—if not all—of the participating retailers' stores in the state will likely be participating in the program. Further, as the RPP Program is expected to have influence on nonparticipating stores outside of California as well, participating retailers' nonparticipating store data from outside the state might also be of questionable value in assessing program impacts. The evaluation team is assessing other potential comparison group designs for future year's evaluations of the RPP Program, but these are outside of the scope of this evaluation report.[17]

Before proceeding to a detailed discussion of each of the quasi-experimental approaches, it is also worth emphasizing that the descriptions of the approaches as they are presented herein represent "idealized" examples intended to best illustrate and describe the methods. In all the examples shown, the PQS regressions and/or depictions of actual plotted sales data are presented as increasing steadily and continuously over time. In reality, this consistently increasing trend is not the case with the retailer sales data or the findings presented in the *Results* chapter.

In general, in the short-term (i.e., retailers' first year or two in the program), retailers will not yet have had the opportunity to make significant alterations to their product assortment, and the main types of interventions at play will be three of the Marketing 4Ps – price, placement, and promotion (the fourth being product, which represents assortment changes). "Price" will be reflected in sale pricing (or possibly reward point programs); "placement" will be reflected in improved product displays on the sales floor; "promotion" will reflect signage or other actions aimed at increasing customers' awareness of the program-qualified products. Notably, all three of these activities can be "turned on" and "turned off" at different times, which result in increases and decreases in the underlying PQS.

For example, a special promotional price may be offered in January and February and, as a result, the plot of the PQS values may increase over this two-month period. However, if the sale pricing concludes at the end of February and another marketing or promotional strategy is not implemented to replace it, the PQS is likely to decrease in March. In addition, since PQS represents the proportion of all units sold that were program-qualified, this metric is also sensitive to other promotions the retailer may implement aimed at selling non-qualified products during the same time period. For example, the retailer may offer sale pricing on a particular model of energy efficient air cleaner for a month, which, other things being equal or held constant, should cause the PQS for air cleaners to increase. However, they may also offer similar sale pricing on a non-qualified

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[17] Other possible comparison groups could include nonparticipating retailer sales data (either within the state or outside the state), but obtaining the needed sales data from nonparticipating retailers is unlikely to happen. Other sources of data such as the NPD Group and/or the Association of Home Appliance Manufacturers (AHAM) are also being considered, but it is not clear if these will be available at the level of granularity needed to facilitate useful comparisons or at a cost that is feasible.

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air cleaner model during the same period, which could dampen or even entirely offset the PQS gains for that month.

That all said, even though there are challenges to assessing program effects and impacts in the short-term, the value of the regression modeling approaches as a tool for evaluating the RPP Program over the mid- to longer-term should not be discounted. Keep in mind that the RPP Program is a market transformation program that needs to be considered over a several-year time frame. Substantial and statistically detectable impacts are more likely as the retailers increase their assortment of program-qualified models each year. For example, a retailer's assortment of program-qualified might be 5% in year one, 10% in year two, 15% in year three, and so on. In the short-run, because specific pricing, placement, or promotional activities aimed at both program-qualified and non-qualified models will begin and end at different times throughout the year, both the PQS and overall sales of program-qualified products will be highly variable. However in the mid- and long-term, as the assortment of program-qualified models increases (at the expense of non-qualified models), these metrics are expected to manifest a general upward trend.

The remainder of the section presents the different approaches that the evaluation team used to analyze the retailer sales data.

DIFFERENCE-IN-DIFFERENCES ANALYSIS

The first analysis conducted was a simple difference-in-differences (DID) analysis of the PQS for each of the targeted product categories, comparing the historical PQS values to the trial-period PQS values. The DID equation is shown in Equation 6.

EQUATION 6: DIFFERENCE-IN-DIFFERENCES CALCULATION

$$DID = \left(PQS_{p,post} - PQS_{p,pre}\right) - \left(PQS_{np,post} - PQS_{np,pre}\right)$$

For the participating stores, the mean PQS in the pre-program (historical) period was subtracted from the mean PQS in the post-trial period. The same calculation was done for the nonparticipating stores. The difference between these two PQS differences equals the net impact of the RPP Program. Since under this approach the PQS values were based on aggregate sales volumes for each of the time periods, they do not account for the notable month-to-month variability that occurred throughout the series, and they do not capture the unique effects of each marketing intervention. Nevertheless, they provide a coarse indication of change that is useful for providing insights into program effects.

QUASI-EXPERIMENTAL PARTICIPANT-ONLY PRE-POST FORECASTED PQS BASELINE TO ACTUAL DATA

The simplest quasi-experimental *modeling* approach to assessing program effects involves using only the participating stores and their historical data series to forecast a counterfactual PQS baseline for each targeted product category class over the trial period. These forecasted baselines are then compared to the actual, recorded trial-period sales data. Figure 5 illustrates this approach.

FIGURE 5: ILLUSTRATION OF QUASI-EXPERIMENTAL PARTICIPANT-ONLY PRE-POST FORECASTED PQS BASELINE TO RECORDED DATA
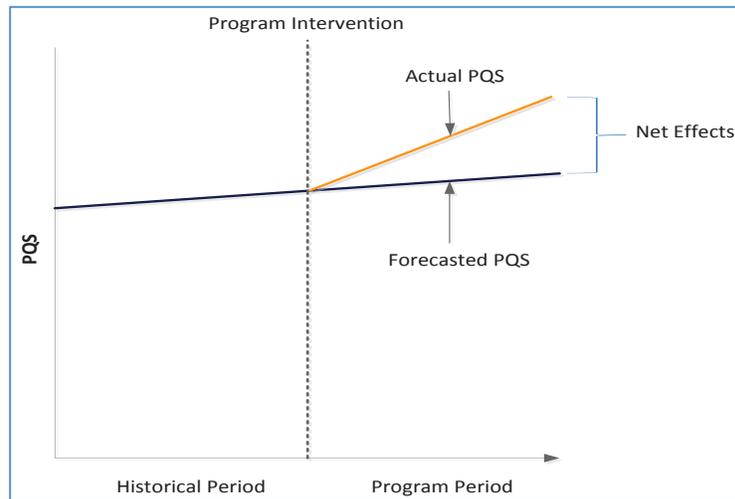
The difference between the sales-weighted average actual trial-period PQS over the 14-month trial period and the forecasted PQS over the same period is an estimate of the net effect of the program. Note that the sales weighting facilitates the computation of a single mean trial-period PQS across the 14 months of the trial period, which is used to compare against the forecasted PQS baseline to estimate net effects.

For each product class, the general functional form of the model that was used to forecast the baseline over the 14-month trial period as a function of time was an exponential smoothing technique, which is a procedure for continually revising a forecast in the light of more recent experience, as shown in Equation 7.

EQUATION 7: FORECASTED PQS BASELINE

$$F_{T+1} = AX_T + (1 - A)F_T$$

Where:
F_{T+1} = Forecasted value for the next period
A = Smoothing constant ($0 \leq A \leq 1$)
X_T = Actual value of series in period T
F_T = Average experience of series smoothed to period T or forecasted value for last period

The evaluation team used the software package Forecast Pro to develop the forecasts. Because of the extensive variability in the historical data series, Forecast Pro was unable to detect any seasonal or trend effects in any of the targeted product class data sets. As such, the best forecasts possible using the exponential smoothing technique essentially predict the forecasted PQS baseline as the value of the last month's PQS prior to the trial period.

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QUASI-EXPERIMENTAL INTERRUPTED TIME-SERIES ANALYSES

The other more sophisticated approach that is used to assess the influence of the program on PQS is a quasi-experimental design using interrupted time-series regressions. This approach involved coding the retailer's program-related promotional activities (e.g., price reductions, promotional activities, etc.), into the comprehensive sales data files (including both the historical and trial periods) to be able to assess, through regression techniques, the incremental effect of the various interventions periods.

Recall that the sales data was first processed so that each row represented the total sales volume of a particular model sold at a particular store in a particular month. Separate files were developed for each targeted product class. The files also contained variables indicating whether the store was participating or nonparticipating, and whether the model was program-qualified or non-qualified. For modeling purposes, the files were further processed so that each row of the analysis files represented the PQS for a particular month for participating and nonparticipating stores. As such, each file contained 70 cases – two cases (one for participating stores; one for nonparticipating stores) per month (ranging from February 2012 to December 2014). The only exceptions to this were the final compact refrigerator file, which had only 66 cases (33 months of historical data; 33 months of trial-period data), because in two months participating stores recorded no sales, and the same months in the historical period were removed to facilitate modeling. Also, the room air conditioner file contained 64 cases (32 months of historical data; 32 months of trial-period data), because in three months participating stores recorded no sales, and the same months in the historical period were removed

In terms of coding the program activities, the evaluation team assessed several different approaches. Our first approach to coding the activities was aimed at including variables denoting each and every activity and when it occurred in order to provide the greatest degree of insight into the differential effects of the individual marketing strategies. However, many of the marketing activities implemented by the retailer occurred in conjunction with each other, which introduced collinearity into the models. For example, a promotional flyer (an activity in itself) would typically promote a certain product at a sale price (another activity) and offer promotional signage (yet another activity) for the product while it was on sale. Further, a product was never promoted via a flyer without a sale price (or rewards points) and signage; bulk stacks were never conducted without sale pricing and signage. In order to avoid introducing collinearity into the models, the evaluation team revised the coding scheme to focus on coding *periods* of promotions. For example, if a flyer (with its associated sale pricing and signage) was implemented for a product in March 2014, the month was coded as 1, or 0 otherwise.

Using these analysis files, the evaluation team conducted two types of interrupted time-series regression analyses with the RPP Trial data. The first was a participant-only design, which only included data from the retailer's participating stores; the second was a comparison group design, which contrasted the retailer's participating stores against all their nonparticipating stores statewide.

QUASI-EXPERIMENTAL PARTICIPANT-ONLY INTERRUPTED TIME-SERIES

Figure 6 illustrates an idealized example of the participant-only approach, showing how the slope of the regression might change once the intervention begins and certain promotional activities are implemented (the vertical line labeled Intervention 1), and

again once an additional intervention activity is implemented (labeled Intervention 2). For example, depending on the retailer's implementation strategy, the slope of segment B may be different than the slope of segment A due to in-store advertising associated with the program; the slope of segment C might be different than the slopes of segments A or B due to the addition of new program-qualified models into the assortment.

FIGURE 6: ILLUSTRATION OF IDEALIZED QUASI-EXPERIMENTAL PARTICIPANT-ONLY PQS REGRESSION
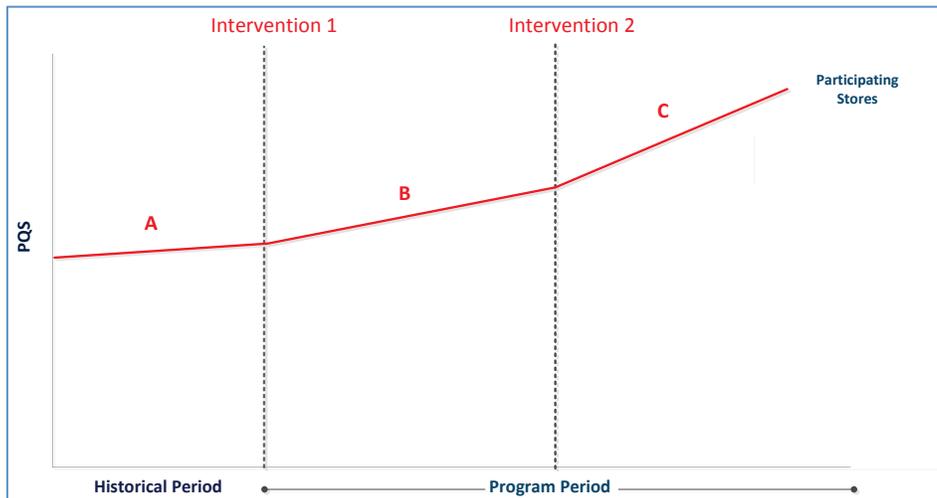
Two model forms were tested, including a modified step regression[18] and a full segmented regression. For this evaluation, separate models were developed for each targeted product class incorporating the specific intervention activities that took place during the RPP Trial.

The general form of the participant-only *modified step* regression model used for this evaluation is illustrated in Equation 8:

EQUATION 8: QUASI-EXPERIMENTAL PARTICIPANT-ONLY PQS MODIFIED STEP REGRESSION

$$Y_t = \beta_0 + \beta_1 Time_t + \beta_2 Intervention_{t,i} + \varepsilon_t$$

Where:

Y_t = PQS in month t

$Time_t$ = Continuous variable indicating the number of months from the start of the historical series

$Intervention_{t,i}$ = Indicator variable that takes the value 0 in the pre-intervention period and 1 in the months the intervention(s) was/were in effect

β_0 = Intercept

β_1 = Estimate of the change in the monthly PQS due to the passage of time

β_2 = Estimates the change in *level* of the PQS due to the intervention

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[18] The term "modified step regression" used throughout this report signifies a regression model of the traditional step form (i.e., a basic staircase form), but which also incorporates an additional variable that captures *trend* in the overall data series, so that the fitted regression is not entirely flat, or parallel to the x-axis (for example, see Figure 11 and Figure 13).

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ε_t = Estimates the error

The general model form can be extended to add more interventions, as depicted in Figure 6.

The evaluation team estimated separate models for each of the targeted product classes. Once the models were estimated, they were evaluated *with* and *without* the program. The model with the program was shown in Equation 8. The model used to estimate the without-program condition is shown in Equation 9:

EQUATION 9: QUASI-EXPERIMENTAL PARTICIPANT-ONLY PRE-POST PQS MODIFIED STEP REGRESSION – WITHOUT PROGRAM

$$\hat{Y}_t = \beta_0 + \beta_1 \text{Time}_t$$

The difference between Equation 8 and Equation 9 represents the net reduction in the PQS.

The general form of the participant-only *segmented* regression model used for this evaluation is illustrated in Equation 10:

EQUATION 10: QUASI-EXPERIMENTAL PARTICIPANT-ONLY PQS SEGMENTED REGRESSION

$$\hat{Y}_t = \beta_0 + \beta_1 Time_t + \beta_2 Intervention_{t,i} + \beta_3 \text{Time\_After\_} Intervnetion_{t,i} + \varepsilon_t$$

Where:

Y_t = PQS in month *t*

$Time_t$ = Continuous variable indicating the number of months from the start of the historical series

$Intervention_{t,i}$ = Indicator variable that takes the value 0 in the pre-intervention period and 1 in the months the intervention(s) was/were in effect

$Time\_After\_Intervention_{t,i}$ = Continuous variable indicating the number of months from the start of an intervention period

β_O = Intercept

β_1 = Estimate of the change in the monthly PQS due to the passage of time

β_2 = Estimates the change in *level* of the PQS due to the intervention

β_3 = Estimates the change in *trend* of the PQS due to the intervention

ε_t = Estimates the error

Like with the modified step regression, the basic model form for the segmented regression shown above can be extended to add more intervention variables (with their associated interactions) to assess incremental change due to interventions in effect at different time periods during the trial.

Once the models were estimated, they were evaluated *with* and *without* the program. The model with the program was shown in Equation 10; the model used to estimate the without-program condition is shown in Equation 11:

EQUATION 11: QUASI-EXPERIMENTAL PARTICIPANT-ONLY PQS SEGMENTED REGRESSION – WITHOUT PROGRAM

$$\hat{Y}_t = \beta_0 + \beta_1 \text{Time}_t$$

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The difference between Equation 8 and Equation 9 represents the net reduction in the PQS.

QUASI-EXPERIMENTAL INTERRUPTED TIME-SERIES WITH COMPARISON GROUP

Any non-equivalent control group design will have compositional differences between the control and treatment groups. Evaluators have tried to control for these differences in two basic ways: (1) matching control cases to intervention cases on key variables, and (2) introducing covariates into the models to control statistically for these differences. Both approaches were carefully considered, but ultimately found to be infeasible for this evaluation. The stores across the state are all quite similar in terms of store characteristics (e.g., size, number of employees, etc.), so matching on store type was unnecessary. The evaluation team was unable to get zip codes representing the individual store catchment areas, so the use of census information (e.g., household income, educational attainment, home ownership rate, etc.) was not possible. As such, we did not conduct any matching and did not introduce any covariates into the comparison group models.

An idealized depiction of the comparison group approach is represented in Figure 7. This figure shows how, similar to the participant-only approach, interrupted time-series are used to detect changes in the slopes of different segments of the regression. However, this approach distinguishes between the participating and nonparticipating stores by incorporating additional variables into the models.

FIGURE 7: ILLUSTRATION OF SEGMENTED REGRESSION APPROACH WITH TREATMENT AND CONTROL GROUPS
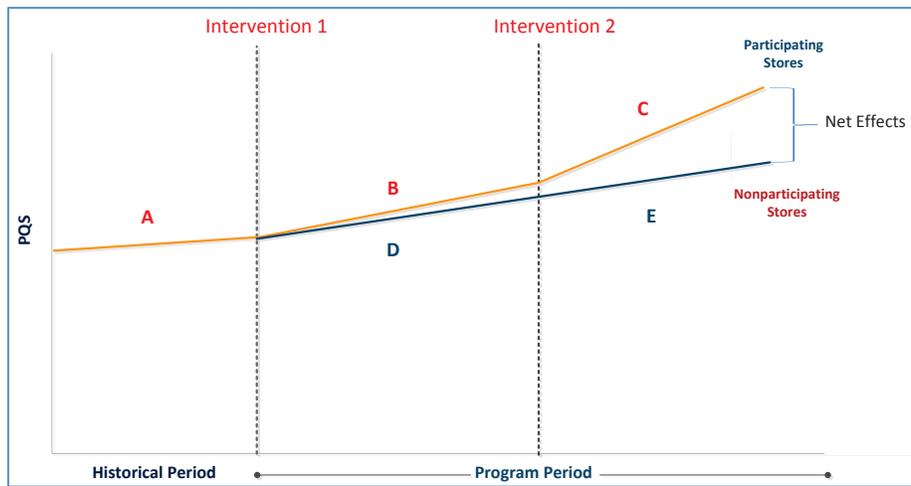
The general form of the *modified step* regression model with the comparison group used for this evaluation is illustrated in Equation 12:

EQUATION 12: QUASI-EXPERIMENTAL PQS MODIFIED STEP REGRESSION WITH COMPARISON GROUP

$$Y_t = \beta_0 + \beta_1 Time_t + \beta_2 Part + \beta_3 Intervention_{t,i} + \beta_4 Part \; x \; Intervention + \varepsilon_t$$

Where:

Y_t = PQS in month t

$Time_t$ = Continuous variable indicating the number of months from the start of the historical series

$Part$ = Indicator variable that takes the value 1 for participating stores and 0 for nonparticipating stores. Represents the historical difference between participating and nonparticipating stores

$Intervention_{t,i}$ = Indicator variable that takes the value 0 in the pre-intervention period and 1 in the months the intervention(s) was/were in effect

$Part\ x\ Intervention_{t,i}$ = Interaction of group membership and intervention

β_0 = Intercept

β_1 = The change in the PQS per month due to the passage of time

β_2 = Estimates the inherent difference between the participant and nonparticipant groups that is not a function of the program[19]

β_3 = The change in *level* of the PQS at time t for intervention i only at the time of the intervention

β_4 = The incremental change in *level* of the PQS at time t for intervention i due to being in the treatment group (i.e., a participating store)

ε_t = Estimates the error

As with the other models, the general form of the model can be extended to add additional intervention periods.

The net effects are computed as the difference in the average predicted values for the 14-month trial period between participating and nonparticipating stores.

The general form of the *segmented* regression model with comparison group used for this evaluation is illustrated in Equation 13:

EQUATION 13: QUASI-EXPERIMENTAL PQS SEGMENTED REGRESSION WITH COMPARISON GROUP

$$\hat{Y}_t = \beta_0 + \beta_1 Time_t + \beta_2 Part + \beta_3 Intervention_{t,i} + \beta_4 Time\_After\_Intervention_{t,i} + \beta_5 Part\ x\ Intervention_{t,i} + \beta_6 Part\ x\ Time_t + \varepsilon_t$$

Where:

Y_t = PQS in month t

$Time_t$ = Continuous variable indicating the number of months from the start of the historical series

$Part$ = Indicator variable that takes the value 1 for participating stores and 0 for nonparticipating stores. Represents the historical difference between participating and nonparticipating stores

$Intervention_{t,i}$ = Indicator variable that takes the value 0 in the pre-intervention period and 1 in the months the intervention(s) was/were in effect

$Time\_After\_Intervention_{t,i}$ = Continuous variable indicating the number of months from the start of an intervention period, which captures the lingering effects of an intervention

$Part\ x\ Intervention_{t,i}$ = Interaction of group membership and intervention

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[19] The values of the β_2 coefficients in the models are also informative as they illustrate the potential self-selection bias due to non-randomly assigning the stores to the participant and nonparticipant groups. In many cases the PQS values for the participating stores exceed those for the nonparticipating stores throughout the historical periods, suggesting that at least some participating stores were already selling a greater proportion of energy efficient products before the program began.

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41

$Part\ x\ Time_t$ = Interaction of month and intervention
β_0 = Intercept
β_1 = The change in the PQS per month due to the passage of time
β_2 = Estimates the inherent difference between the participant and nonparticipant groups that is not a function of the program
β_3 = The change in *level* of the PQS at time *t* for intervention *i* only at the time of the intervention
β_4 = The change in *trend* of the PQS in the post-intervention segment
β_5 = The incremental change in *level* of the PQS at time *t* for intervention *i* due to being in the treatment group (i.e., a participating store)
β_6 = Estimates the change in *trend* of the PQS in the post-intervention segment due to being in the treatment group (i.e., a participating store)
ε_t = Estimates the error

The net effects are computed as the difference in the average predicted values for the 14-month trial period between participating and nonparticipating stores.

A NOTE ON CONFIDENCE INTERVALS AND STATISTICAL SIGNIFICANCE

When conducting the modeling, it is important to emphasize that we were working with the full census of the participating retailer's stores in the State of California. That is, no sampling was conducted; we worked with the population. As such, results from the models (other than the forecasted baseline) do not have confidence intervals around them and any coefficients are what they are (i.e., no statistical testing is applicable to assess whether the values are different from some other hypothesized value).

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RESULTS

This chapter of the report presents the main evaluation findings. It begins by discussing the process evaluation results, and concludes with the impact evaluation results.

PROCESS EVALUATION RESULTS

INTERVIEWS/SURVEYS

This section of the RPP Trial evaluation report summarizes findings from the interviews and surveys conducted with program stakeholders, including retailer merchants (buyers) and marketers, the retailer corporate leadership team, retailer store managers, the program implementation team, and PG&E RPP Program staff.

RETAILER MERCHANTS/MARKETING MANAGER INTERVIEWS

In February 2014 (baseline), the evaluation team conducted a telephone-based in-depth team interview with the retailer's home appliance buyer and marketing planning manager. Of the RPP Trial product categories, these staff members were responsible for refrigerators, freezers, room air conditioners, and air cleaners. Both of these staff members were interviewed at the same time. At baseline, we were unable to gain access to the buyer or marketing manager of the consumer electronics categories that included DVD/Blu-Ray players and sound bars.

In March 2015 (follow-up), we conducted a telephone-based in-depth interview with the home appliance buyer. This was not the same buyer that was interviewed at baseline as the retailer experienced some staff changes during the trial period. The home appliance buyer interviewed at follow-up was the senior buyer for appliances and was responsible for refrigerators and freezers (a different buyer was responsible for air cleaners and room air conditioners, but this person was new and had little to no knowledge of the program, so was not interviewed). In March 2015, we also conducted a telephone-based in-depth interview with the current consumer electronics buyer. Due to staffing changes at the retailer, this buyer was only involved with the RPP Trial for the second half of the trial period. When preparing for the follow-up interviews, the evaluation team was informed that the marketing manager(s) had little on-going responsibility with the program, so they were not interviewed at follow-up.

Interviewee Roles and Responsibilities

The marketing planning manager described her role as focused on deciding the best way to spend marketing dollars. More specifically related to the RPP Trial, the marketing planning manager reported they work with the appliance buyer, the consumer electronics staff, and the retailer's corporate Green Leadership Team to decide how to best spend the allotted funds for the trial. Their focus is on finding "the best way to get the word out about ENERGY STAR and what makes sense to the customer. Not just throw money around; try to make sure it's more impactful than just talking to associates once in a awhile." For example, they were interested in making sure the flyers are something that could help the associates talk to the customer, but also something the customers could use on their own.

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The buyers all indicated they were responsible for determining which products to stock and how to price them. More specific to the RPP Trial, the buyers worked with corporate leadership by focusing on the products. However, the buyers noted that the leadership team probably drove them more than they drove the leadership team. "They'll let me know about rebates or offers coming from utilities, and then I'll try to understand how that impacts my products and how I can leverage those funds."

RPP Trial Awareness

At baseline, both the home appliance buyer and marketing manager were aware of the RPP Program by name. When asked to describe the program, the buyer stated: "I know that there is some sort of rebate to [the retailer] given as long as they're participating and promoting some sort of ENERGY STAR appliances. Doesn't have to be price, but that's what they're working towards at the moment." When asked if there were any aspects of the program that were not clear, the buyer replied: "Probably, but "I don't know what I don't know."

At follow-up, both the home appliance and the consumer electronics buyers we spoke with were very well informed about the RPP Program. The appliance buyer was able to provide significant detail about how the program was designed and implemented, and was able to provide model-specific information about promotions and sales. The consumer electronics buyer also understood the program design and product promotions, but commented that in the beginning "she was not aware of which product lines and models were energy efficient."

Product Purchasing Logistics

At baseline, we asked the home appliance buyer to walk us through the purchasing process. She responded that the individual product buyers put together purchasing plans and pitch them the buying manager. The individual buyers are the ones responsible for interacting with manufacturers, and once their plans are approved, are the ones that submit the final order. In general, orders are filled and shipped to the retailer's distribution centers, which are spread throughout the country, with each center serving a particular region.[20]

The appliance buyer indicated they can distribute products at a pretty granular level. For example, they can distribute different models to inner-city locations as compared to suburban locations. To determine how products are to be distributed, they predominantly focus on historical sales. The consumer electronics buyer confirmed that the amount of units distributed to each store depends on the historical store purchasing traffic. However, there are often other considerations, such as regional demographics, and when a store is located close to a larger competitor who stocks more products, they may go with a smaller assortment because they know they cannot likely compete based on selection. On the flip side, if they have a location where there is not a nearby competitor, they might go with a larger assortment of products in a category.

Product Purchasing Decisions

The evaluation team also asked the corporate buyers about the factors that drive their product purchase decisions. **They responded that price is absolutely the most**

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[20] This can actually be a bit more complicated for larger appliances as they often go to direct delivery centers, which then ship to the regional distribution centers.

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important consideration when deciding to assort a product. According to the appliance buyer, this is not just a corporate concern in terms of profits, but it is also their particular target customer population: "All they want is the cheapest thing." The consumer electronics buyer agreed that it is "price that drives everything." The buyers felt there are certain times they can get customers to buy up, but it's few and far between. They indicated they have a few places where they have commissioned sales associates, so they can leverage these staff to talk to the consumer.

While brand may be a significant factor at many retailers, the buyer indicated that in terms of home appliances, they focus most of their efforts on one particular brand. **When asked how much the energy efficiency or energy consumption of the products they sell affects their buying decisions, the buyer responded "not very."**

Product Promotion Decisions

The evaluation team asked the marketing manager how they decide which products to promote. **They stated that the buyer typically determines the promotions decisions**. However, the marketing manager then works with the buyer to execute the promotion (except for pricing—which is driven by the buyer). If it's something in a flyer or an email, the marketing manager might work with the other marketing people to get something out. Nevertheless, the buyer makes the final call on all of it.

During the follow-up interviews, the home appliance buyer indicated he drove the entire fall promotion. The corporate leadership team provided input into what they generally wanted to do and when, but the buyer made the final decisions. Here, however, **he suggested that the small scale of the trial made promotional decisions and planning somewhat of an onerous task. Typically, the retailer conducts most of their promotions at the national level and much of the marketing efforts are conducted by marketing staff – and these are by far the most successful promotions. He had to manage the logistics of putting together specific promotional materials for a small set of stores in a limited geographic location, which was an added and time-consuming task for the buyer.** The consumer electronics buyer reported very similar experiences and challenges. She explained that because of how marketing efforts are typically handled, it would have been easier to implement a national level program where expectations are consistent across all stores. She noted that **two major challenges experienced with implementing the trial were inconsistent store executions of product pricing and that some promotional products did not arrive at stores until the beginning of the fourth quarter**.

At baseline, we also asked the home appliance buyer and marketing manager what types of promotional activities were used by the retailer, and which are generally most effective. They emphasized pricing, signage, and rewards points. They responded that any time they change the price of a product it will generate new signage. They've got key price points that work with different items. They also said that leveraging their rewards points system seems to work well with their customer population.

At follow-up, the home appliance buyer reiterated that price mattered the most. However, he also stated he felt the bulk stack events and additional signage were quite effective at driving sales. The buyer also indicated he felt that in-store broadcasts were probably effective. Though he could not provide substantive evidence of the effect of the in-store broadcasts tied to the RPP Trial, he did provide some anecdotal

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evidence regarding some independent in-store broadcast he had developed for other promotions that he felt really provided a sales lift.

When asked about the timing of promotional activities, **they indicated that they typically set the promotion decisions/retailer implementation plan 4-5 months out** – it is not something that happens all at once during the year. According to the consumer electronics buyer, having more communication out to the stores earlier in the pilot would have helped with their execution.

Energy Efficiency Awareness

The evaluation team asked a series of questions to probe the buyers' awareness of the *energy efficiency of the products they purchase and sell*. *At baseline, when asked if they were familiar with any energy efficiency metrics for the products you manage (e.g., UEC, kWh, BTUs, etc.), they said they were not. This did not change at follow-up. However, they indicated they were very familiar with Department of Energy standards, even being aware at baseline, unprompted, that a new standard was coming in 2014 for refrigerators and freezers. They also indicated they were aware of ENERGY STAR.*

That said, when asked if energy efficiency or energy consumption has been a consideration in purchasing or promotional decisions, both the appliance buyers and marketing manager responded that energy has not affected their decisions in the past. The consumer electronics buyer, who previously was in involved with TV purchases, also reported that energy efficiency did not impact purchasing decisions prior to the program.

At follow-up, when asked how much the home appliance buyer now factors in the energy use or energy efficiency of a model into his buying decisions, he replied that it would likely factor in very little as they are still a price-point focused retailer. However, the consumer electronics buyer had an opposing view stating that now, since she is much more conscientious of ENERGY STAR and energy efficiency, she will be incorporating these both into future purchasing decisions. She indicated that there will not be any formal changes related to internal purchasing processes across the retailer, but she will be more aware of the availability of energy efficient products and options.

The consumer electronics buyer also explained that the energy use of products is occasionally available, but not always. For example, the last time energy use was not available she had to reach out to someone at ENERGY STAR to check on several sound bars to see if they qualified.

Expected Impact of the Trial

When asked at baseline if the RPP Trial had caused them to make any changes in their plans to promote/purchase/assort/stock products for the coming year (2014), the home appliance buyer and marketing manager indicated it had not affected any purchasing decisions. However, they were offering a special discount of qualified refrigerators and freezers throughout the year (only in participating stores). However, they also stated they were working on additional promotional activities for the year and some decisions were still pending*.*

At follow-up, the home appliance buyer indicated that a new model of ENERGY STAR refrigerator was added to their inventory as part of the RPP Trial. When

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asked if they would have added that product in the absence of the program, he responded "absolutely not." The consumer electronics buyer did not mention the addition of any particular models due solely to the trial. **Importantly, both at baseline and follow-up all buyers indicated that they would not have done anything related to promoting energy efficiency without the RPP Program.**

When asked if they expected the trial would affect their promotion, purchasing, assortment, stocking, and/or placement plans for *next year* (i.e., in the absence of the program), at baseline they said they would need to track how sales perform during the trial period and see how it's doing. If they see some impact, they indicated they definitely will make some changes in purchasing/assorting, but otherwise they probably will not make any changes. Ultimately, they just have to make sure the customer is seeing the value. If energy usage is resonating, then that's great, but if it's not, they have to go back to price. On this point, the buyer also noted that it was very good that this is a relatively long trial and not something that is being implemented for just two weeks or a month. The longer duration is going to help them decide if the program is actually worthwhile. However, the buyer also indicated they would like it to be more stores.

At follow-up, the home appliance buyer was a bit more direct about the issue of scale and reiterated several time during the interview that he felt the RPP Program had little chance of affecting the retailers decisions and behaviors over the longer term unless it was scaled up to national level. He emphasized that even though specific stocking decisions may vary from store to store, **most of their purchasing decisions are made at the national level**. **Trying to purchase products for sale only in a small number of participating stores is not a simple task as their inventory and sales systems are not designed for this type of granularity.** This is a perspective that the consumer electronics buyer wholly supported: purchasing for a single region instead of nationally is a challenge because it means that there are different store execution expectations.

Also, since purchasing decisions are made based on profitability concerns, at a small scale, the effect of incentives can be "lost" in the bigger picture. An example offered by the appliance buyer was that while the retailer may gain incentives that can help rebalance the profitability equation and decision towards purchasing and stocking a more efficient model, if these incentives are only available for a small number of participating stores in a certain region, the incentives are unlikely to weigh very heavily in their final decision when making purchasing decisions at the national level.

Spillover of Program Interventions into Nonparticipating Stores

In order to understand possible spillover effects of promotional activities from participating to non-participating stores, we asked if any program-related activities were conducted in nonparticipating stores. **The consumer electronics buyer reported that since promotions were solely focused on in-store methods (e.g., promotional flyers, in-store radio, etc.), there was likely not any promotional spillover. Likewise, the home appliance buyer at follow-up also indicated that none of the program-related promotions had occurred outside of the participating stores**, with one exception. In mid-2014 a specific model of room air conditioner was sale-priced and promoted in participating stores through the program. A staff member committed a pricing error and inadvertently assigned the sale price nationally. The buyer was not certain on the details of when this happened or for how long the incorrect pricing persisted, but felt it was only a "few weeks at most." Nevertheless, the retailer lost a

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substantial amount of money due to this mishap. He exemplified the fact that these are the types of errors they risk when the program is not occurring nationally.

Assessment of the RPP Trial

The evaluation team asked the buyers and marketing manager if they were involved with the development of the official retailer implementation plan that was part of the RPP Trial implementation at the retailer. At baseline, the buyer and marketing manager indicated that they were not. They believed the corporate leadership team developed the plan and told the buyer what prices to use. However, the marketing manager stated that she had met with the leadership team a few times to talk about the plan. **At baseline, both the buyer and marketing manager were aware of some of the planned activities and promotions**. However, they indicated that they did not think $5,000 of Marketing Development Funds (MDF) per store was a whole lot of money. It is not enough to cover something like radio advertising, so they were **going with a strategy of making the buying process easier for customers**: flyers, multiple flyers throughout the year for customers and associates, discount pricing, etc.

At follow-up, the home appliance buyer indicated he was much more engaged with the retailer implementation plans and activities than the baseline interviewees indicated. He stated that he drove the whole fall promotion. He stated that while the corporate leadership team stated what they would like to do and when, the buyer made the final decisions. He put together the signage and directed marketing staff to put together other materials. The consumer electronics buyer expressed similar experiences and engagement with the retailer implementation plans and activities at follow-up.

We also asked the interviewees if they thought there were additional activities or actions that could be implemented to drive the sales of qualified models that were not currently part of the program. At baseline, **the interviewees mentioned that they felt that the more they could do to call attention to the products when customers walk by, the better**. This can be done with effective signage. They also emphasized they felt additional associate training could help. "Call out the value to customer with on-product material and then get the sales associates to reinforce that message." If they are doing this as a joint effort with consumer electronics, they could have a specified sales person, so they could give them some training about why ENERGY STAR is a good thing, what it does for the customers. **They also felt that messaging around how much money the energy efficient models might save the customer would be useful: "Make it less of a guessing game."**

At follow-up, both the home appliance and the consumer electronics buyers again emphasized the need for scale as means of better promoting the program, as they felt that national promotions are by far the most effective marketing strategy they use. They also suggested that web-based geo-targeting with emails or banners and other digital marketing could be useful, but again emphasized that it would need to be a big program to initiate these efforts.

Incentive Amounts/Timing

Both the buyers and marketing manager were aware of the incentive levels being paid to the retailer. At baseline, when asked if they felt the incentive levels were adequate to affect purchasing decisions, they said it was currently hard to say if the amounts are right until they can tell if sales are increasing. If it's working, they need to

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dig down and figure out why. **When asked if they felt the program design (i.e., paying the incentives to the retailer) was an effective motivator they agreed that it was**.

RETAILER CORPORATE LEADERSHIP TEAM INTERVIEWS

The evaluation team conducted telephone-based interviews with representatives of the retailer corporate leadership team at the beginning of the Trial (February 2014) and again after the Trial in March 2015.

Corporate Leadership Team Purpose

The retailer corporate leadership team is referred to as the "Green Leadership Team," and is responsible for implementing environmental initiatives throughout the retailer's business operations. These efforts are focused in two main areas: (1) sustainability, and (2) green leadership. The sustainability area has focused on making business operations more energy efficient and reducing the organizations environmental impacts (e.g., reducing energy consumption in facilities, recycling, waste management, etc.). The green leadership area has focused primarily on programs and products. It started roughly five years ago and until recently was mainly focused on managing rebate programs associated with federal or state governments (presumably as part of the American Recovery and Reinvestment Act of 2009) and utilities, but now this area's core focus is managing relationships with utilities.

The retailer is dedicated to its pro-environmental mission, and is an ENERGY STAR partner and has received the partner of the year award for the last four years in a row, and has recently received the titled of "Sustained Excellence". That said, the team (across both areas) is very small. The exact number of staff is constantly in flux, but each area typically only has a couple staff, under the overall leadership a Vice President that oversees both area teams.

Corporate Leadership Team Role in RPP

Overall, the retailer's corporate leadership team was responsible for developing, implementing, and overseeing their organization's participation in the RPP Trial. They participated in the selection of product categories for targeting through the trial, helped lead the development of the retailer implementation plans and strategies in consultation with the merchants and marketing staff, initiated or facilitated communications with various external parties (e.g., the program implementer, ENERGY STAR, manufacturers, etc.) as needed, implemented the historical and trial-period data extracts provided for incentive tracking and evaluation purposes, and conducted other day-to-day program operations activities.

During both the baseline and follow-up interviews the corporate leadership team members revealed a significant degree of motivation and personal interest in making the retailer's participation in the trial succeed. They were genuinely excited about the program and its potential. They emphasized how they enjoyed identifying the internal key players and getting them all involved and in the same room to help make decisions—they considered this a key lesson-learned that will help aid future efforts. They also emphasized how much they have enjoyed working with the program implementation team, and their efforts to support the retailer and help them get the program launched.

Challenges in Implementing the RPP Program

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That all said, they also highlighted some of the challenges they have faced in implementing the trial. **One of the biggest challenges they discussed was the fact the retailer had shifting corporate staff and staff on-leave.** The consumer electronics merchant and one of the key marketing staff went on leave, and the home appliance merchant position shift to a new staff person (which happened by the end of the Trial). This made planning and making consistent and continued progress difficult.

Another area that came up as a challenge was that because the trial only included 26 participating stores, it was costly and time consuming to manage in relation to their potential return. They did not have existing processes and protocols developed to support implementation of a program like this, and much of the activities were created on an as-needed basis to meet immediate needs. They emphasized both at baseline and follow-up that they had spent a lot of time on making sure this trial was operating, and the costs of doing so were not likely in their favor. However, they understood that this was a *trial* and that an expanded scale would likely help alleviate this issue – at east to some degree as they also recognized that other issues would likely arise with increased scale.

The third area that they mentioned was a significant challenge was fulfilling the data requests. Due to the small scale of the trial, they conducted the data extracts (in contrast to and IT Department staff), and these were very time consuming. They were not aware of all the data needs up-front, and though they tried to accommodate all the request as best they could, these were time consuming and difficult because of the structure of their data warehousing systems. The suggested that it would have been nice to know what requests were going to arise ahead of time, so they could plan and prepare accordingly.

Perceptions of Program Efficacy

During the follow-up interview the evaluation team asked the interviewee about their perceptions of trial's efficacy. She admitted that while she felt the trial was a little slow getting traction, she felt there was some significant movement in the second half of the trial. Though she could not provide specific numbers, she highlighted the success the retailer saw in promoting the compact refrigerators and the air cleaners during the 2014 holiday season, and mentioned that **much of what they learned throughout the trial helped them quickly develop an effective marketing strategy and plan for these products**.

RETAILER STORE MANAGER INTERVIEWS/SURVEYS

The baseline interviews with store managers were conducted in February and March of 2014 over the telephone. Notably, at the time of the interviews, because of challenges in getting the program launched during the holiday seasons, the retailer had yet to implement significant promotional activities associated with the RPP Trial. Thus, though these the initial interviews were conducted several months after the November 2013 trial launch, they serve as useful baselines.

For the baseline interviews, retailer corporate staff sent out an email announcement to all the participating store managers (N=26) asking if they would be willing to participate in the phone interview. Interested mangers were put in contact with the evaluation team to conduct the interviews. EMI Consulting ended up completing interviews with five participating store managers. These interviewees reported having been managers with the retailer from 5 to 20 years. They all reported similar responsibilities, indicating they

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were generally accountable for the day-to-day operations of the stores, including sales, inventory management, merchandise presentation, and back-office operations (e.g., staffing, invoicing, reporting, etc.).

The follow-up survey was conducted with the store managers in March and April 2015. As noted in the methods section of this report, there was some discussion amongst PG&E program staff, the implementation team, and the evaluation team as to the usefulness of the store manager interviews/surveys given that the design of the RPP Program is predominantly top down. That is, the retailer's corporate staff makes the product assortment and promotion decisions, and these are prescribed to store staff to implement. Some felt that given this arrangement, the store mangers would be unlikely to provide useful information. Nevertheless, the stakeholders agreed that this notion needed to be formally tested, and a web survey was developed with the additional goal of attempting to assess store managers' relative awareness and familiarity with promotions conducted in their stores.

For the follow-up surveys, retailer corporate staff sent out an email announcement to all the participating store managers ($N=24$)[21] containing a link to the web survey. A total of six store managers responded to the web survey (response rate of 25%). Five of the six completed the entire survey, with one respondent quitting about halfway through.

Awareness of in-store promotional activities in general

During the baseline interviews and follow-up surveys, the participating store managers indicated they generally have limited input in to store promotions. Promotional plans typically come from the retailer's corporate offices in the form of "plan-o-grams," detailing how specific products should be displayed throughout the store. That said, the managers also stated they do have some autonomy around displays and sometimes create additional displays for products they have extra inventory of, or to promote complementary products.

During the follow-up survey, the evaluation team also asked the store managers about whom promotional events get communicated to at their individual stores from the corporate offices. In all cases, the responding managers indicated that they were the ones that directly receive the promotional announcements. However, while three of the six managers indicated they were the person in their store most familiar with promotional activities, the other three pointed to other staff, including assistant store managers, or the electronics leads. Thus, **the store managers may not always be the best person to talk to about specific promotions.**

During the follow-up surveys, when asked how aware they generally were about the various promotions conducted in their stores, five of the six respondents indicated they were "very aware" (83%); the one remaining respondent indicated they were "somewhat aware" (16%). When asked how many promotional events run in their store in a typical week, a wide range of responses were provided by the six responding store managers: one store manager responded that there were "less

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[21] Note that the total number of participating stores was 26 at the start of the trial, but two of these stores terminated participation in the trial due to unforeseen business circumstances, leaving a total of 24 participating stores at follow-up.

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than five" (17%); three of three managers indicated "5 to 10 promotions" (50%); two indicated "More than 10" (33%).

During the follow-up surveys, the evaluation team wanted to get a better sense as to whether the store managers could reliably answer questions regarding specific promotions. To probe this issue, the evaluation team asked the responding managers to briefly describe the details around *any* promotional event run in their store in the past year. Three of the six responding store managers provided responses, including:

> "June 27-29th we featured a sidewalk sale fully staffed, promoting the upcoming Fourth of July weekend. We featured camping essentials i.e. cases of water 2/$7 and Pepsi product that was featured in the weekly ad. In addition we had ice chests, propane, a display of easy ups that were feature for $69.99, and an associate set up outside to assist members with [Retailer] credit card applications."

> "We have [promotional flyers] to promote generally seasonal merchandise. At times we will be given additional signing as well as signs to be carried by our associates to promote the event on busy traffic areas."

> "[Program name] ran periodically throughout year with counter, end cap, and standee signs."

While ultimately only the first of these responses included any notable level of detail, it should also be noted that this was presented as an open-ended question in a web survey; if it had been an in-depth interview, an interviewer could have probed further to see if any additional details could have been drawn out from the respondents.

At baseline, three of the five store managers indicated they were aware of energy efficient products being promoted through store sale flyers in the past (note that at the time the baseline interviews were conducted, RPP Trial-related flyers had not been used yet, so these reflect awareness of other promotions). These typically involved appliances being promoted through rebates and/or discounts. However, four of the five store managers were not aware of any *recent* promotions tied to energy efficiency.

Awareness of the RPP Trial

At baseline, *none* of the five store managers were aware of the RPP Program either by name, or as a general marketing initiative. However, this should not be surprising, as little had been done to implement the program in the stores yet. All were aware of rebates offered for certain appliances, but these were not tied to the RPP Trial.

At follow-up, there was a higher degree of familiarity with the program. To probe whether the store managers had any familiarity with the name of the program, we asked: "Are you aware of the Retail Plug Load Portfolio (RPP) Program trial, sponsored by Pacific Gas & Electric Company (PG&E) and the Sacramento Municipal Utility District (SMUD) that was conducted in your store in 2014?" Two of the six managers responded "Yes," three responded "Don't Know", and only one of the six store managers stated "No." Of the two that stated they were aware of the program, when asked to describe it in open-ended format, they provided the following responses:

> "Energy savings program."

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"If this is the program I am thinking it had numerous pieces of POP on ENERGY STAR appliances, light bulbs, and other energy efficient products sold within the store."

Again, these responses need to be considered in the context that this was an open-ended question in a web survey; if it had been an in-depth interview, the interviewer could have probed further to elicit greater detail. Nevertheless, it seems that both respondents were likely referring to the correct program.

For the respondents that said they were not familiar with the program or didn't know, a follow-up question was asked that provided additional detail about the program to see if they recalled the program with some prompting. The questions posed was:

"The Retail Plug Load Portfolio Program is a program focused on promoting and selling certain categories of energy-efficient consumer electronics and home appliances in [Retailer] stores. The focus is on ENERGY STAR products, some of which have been promoted in your store over the past year. Does this program sound familiar to you?"

Providing the description of the program helped the respondents—all but one respondent indicated that it *did* sound familiar.

Thus, in sum, while none of the five store managers interviewed at baseline were aware of the RPP Trial, all but one of the six managers surveyed at follow-up indicated they were familiar with the trial.

Effects of the RPP Trial on Product Sales

During the follow-up surveys, the evaluation team then asked the five store managers that revealed any awareness of the RPP Trial to indicate, for each specific product category, whether they felt the program was able to increase sales. In general, based on the number of "Don't Know" responses, the store managers seemed more aware of the potential program effects on appliances than on home electronics. Responses are shown in Table 12.

TABLE 12: DID THE PROGRAM INCREASE SALES FOR…? STORE MANAGER SURVEY RESPONSES

PRODUCT CATEGORY	YES	NO	DON'T KNOW
Refrigerators	5	0	0
Freezers	5	0	0
Room Air Conditioners	1	1	3
Air Cleaners	0	2	3
Sound bars	0	1	4
DVD/Blu-Ray players	0	1	4

For each of the products for which they felt sales increases occurred, the responding store managers were then asked to provide their best estimates of by what percent they thought sales increased. In general, **the store manager self-report impact estimates seem quite a bit higher than the results derived by the evaluation team**

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presented later in the *Impact Evaluation Results* section. The minimum, maximum, and mean values for the three product categories are shown in Table 13.

TABLE 13: BY WHAT PERCENT DO YOU THINK SALES INCREASED FOR…? STORE MANAGER SURVEY RESPONSES

PRODUCT CATEGORY	MIN.	MAX.	MEAN	DID NOT PROVIDE ANSWER
Refrigerators	11%	20%	17%	2
Freezers	6%	20%	14%	1
Room Air Conditioners	NA	NA	NA	1

Awareness of RPP-Specific Promotional Activities

At baseline, the store mangers were asked if they were aware of the in-store broadcasts;[22] only one of the five store managers recalled hearing anything about energy efficiency through the in-store broadcasts. However, it is worth noting that there are a large number of announcements occurring in these stores and some sore managers indicated staff that spends many hours each day working in these locations have become accustomed to "tuning-out" these announcements.

During the follow-up surveys the evaluation team also asked the store managers to indicate which promotional strategies were used to promote the different products. **In general, the responding store managers were familiar with the use of the different promotional strategies**, with the only "Not Used" responses associated with the promotional flyers (two managers), store associate training (one manager), and in-store broadcasts (one manager).[23]

TABLE 14: DID THE PROGRAM INCREASE SALES FOR…? STORE MANAGER SURVEY RESPONSES

PRODUCT CATEGORY	USED	NOT USED	DON'T KNOW	DID NOT RESPOND
Discounted pricing on: air cleaners, freezers, refrigerators, DVD/Blue-Ray players, home theaters-in-a-box, room air conditioners	3	0	1	1
Promotional flyer emphasizing energy-efficient products	2	2	0	1
ENERGY STAR signage	4	0	0	1
Reward points	3	0	1	1
Store associate training on energy-efficient products	3	1	0	1
In-store radio announcement informing shoppers about benefits of energy-efficient products	2	1	1	1

Awareness and knowledge regarding their customers' demands for energy efficient products

Three of the five store managers interviewed at baseline indicated that the retailer's customers are fairly to moderately aware of energy efficiency; two specifically mentioned ENERGY STAR. One stated that "roughly 50% of

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[22] At baseline, the in-store announcements were the only promotions the evaluation team was aware of that was supposed to have been implemented across all participating stores.

[23] Note that all of these strategies actually were used in the stores. However, due to the inconsistent implementation of the program across stores, some of these may not have actually been used in all stores.

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customers that shop appliances know that they want an ENERGY STAR product (including those that just want the rebate and those that really do care); the other half are just concerned with which ever product is the least expensive." All of the store managers mentioned that their particular customer population is generally very sensitive to sale price: "It is a case of money now versus savings later and they don't have the money now." Another manager stated: "Customers are not as aware as you may think. Customers are most concerned about value – what is the customer getting for the extra price."

Similar results were seen at follow-up: two of the six managers said their customers were "Very Aware," while three felt they were only "Somewhat Aware." Nevertheless, all five of the store managers that answered this question responded "Yes" when asked if their customers ever ask for ENERGY STAR products. When asked about what proportion of their customers ask for ENERGY STAR products, the responses were generally consistent at about 22% (min: 15%; max: 29%). Finally, when asked how influential they thought the ENERGY STÅR label was in their customers' buying decisions, two store managers responded "Very Influential," two said "Somewhat Influential," and only one indicated "Slightly Influential."

Experiences with and feedback on the RPP Trial

During the baseline interviews, the evaluation team also asked the store managers what they thought could be done to better promote energy efficient products at the retailer's stores. The following were recommendations or statements provided by the five store managers:

- Fact sheets would help staff answer questions about energy efficiency.
- The ENERGY STAR label provides customers with useful information.
- Signage is sometimes helpful, but does not work if customers do not understand energy efficiency.
- It is more effective to have someone actively selling the products—there is a better chance of selling the more efficient models.
- 1:1 touch with the customers is the most effective strategy for selling energy efficient products to customers.
- More training for associates on energy efficiency–they really need more information so they can better educate consumers. Could include workshops or flyers that summarize the benefits.
- Having a utility staff member on site helps.
- In the past, when the state was running more energy efficiency promotions and offering rebates, there was more general interest among customers. Customers were asking about energy efficiency then.
- "When there is significant [point-of-purchase] rebates, there is a big push– customers really like the initial gratification of knowing they just saved money by purchasing a particular product model."

Ordering and Stocking

Some additional questions were included in the baseline interviews to better understand ordering and stocking practices at the retailer's stores. All of the store managers indicated that ordering is determined automatically through the point-of-sale system. Orders are created based on "order up-to" or "trigger numbers". The system knows, based on a general history, how many items of a particular product a store should

generally have and when the sales numbers for a product approaches a trigger number an order is created. The managers reported that inventory comes to them from the regional distribution center and trucks arrive roughly every 3 days, though they can come more frequently.

The stores do review the orders to ensure that the requested items and counts appear correct and stores do have the ability to override orders when needed. However, orders are not regularly adjusted, and when they are adjusted it is to meet needs of weekly ads or specialty events. Occasionally they will "stock balance," which usually happens for seasonal goods or during the holiday time. For example, if the weather has been really poor in the Sacramento area and they have experienced unusually low summer temperatures, pallets of items may be transferred to stores in Southern California that could sell the product. Such products could include air conditioners and/or fans, but such transfers are infrequent. Also, for new items or when a product is selling really well and they feel they could move the item to an end cap and sell considerably more than the recommended amount, the manager may adjust the ordering rate.

Customers can also order from the retailer's website and shipped directly to a customer's house or directly to the store for free shipping. However, this is not generally the case for home appliances, which need to be picked up at the retail store locations.[24]

Very rarely are store-to-store transfers completed for individual items. One manager who has been in their role for many years indicated this has greatly reduced in the last 10 ten years because it is so expensive. When transfers are conducted, it is to replace a broken item or satisfy customer need or request tied to a relatively higher-priced item. However, this rarely happens with larger appliances due to the costs.

IMPLEMENTATION TEAM DEBRIEF

In March 2015 the evaluation team conducted a conference call with three members of the implementation team, Navitas Partners, to better understand their experiences, perceptions, and recommendations related to the RPP Trial. We discussed several topics during this conference call including the implementer's communications with the retailer and the project team, and their experiences and feedback regarding the trial.

Communication

The evaluation team first inquired about the implementation team's role as the primary conduit of communication between the PG&E program staff and the retailer. **The implementation team sees this role and their communication as both important and effective. They argue that since their staff has decades of experience working in the retail environment and recognize and understand the retailer's needs and perspectives, they are able to translate the utility's desires in a manner that is amenable to the retailer, and vice versa. They felt this was key to gaining participation and engagement from the retailer during the trial period.** They also emphasized that this role is important to engaging retailers as **there is often a disconnect between the program team's perceived importance of the program**

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[24] Other than the home appliances, where the sale gets recorded at the store where the customer picks up the product, the products sold through the retailer website do not appear in the program sales data for this trial.

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and the actual importance to the retailer. The program team lives and breathes energy efficiency – this is our business. However, the implementation team pointed out that retailers business is selling products, and energy efficiency will always be an ancillary concern. They noted that recognizing this fact and accommodating this notion is important because **too many requests, requirements, or "asks" in support of the program can become an obstacle to retailers and turn them off from agreeing to participate, or continuing participation**. Ultimately, they stated, from the retailer's perspective it is about "what can we do for retailers to minimize costs?" They also recognize similar needs from the utility's perspective and feel they play a key role in bridging the two perspectives.

Fulfilling the role as the conduit between the utility and the retailer also takes a significant investment of time. When asked how frequently the implementation team communicated with the retailer staff during the trial, they indicated it varied from multiple times a day to no less than once a week. The communications varied from phone calls, to emails, to many onsite face-to-face meetings with retailer staff.

Successes of the Trial

The evaluation team also asked the implementation team for examples of what they felt worked well during the trial. **First and foremost, the implementers emphasized the fact that the trial was able to engage a retailer to participate in the program when they only had an opportunity for a relatively small financial gain due to the relatively small scale of the trial (i.e., 26 participating stores)**. Notably, the participating retailer had not historically targeted energy efficiency and getting them to do so through the trial was perceived as a major success. They clarified this point further by highlighting that the participating retailer is a struggling retailer with a price-point focused clientele, which raised additional challenges in getting the retailer to participate in the program—and remain engaged—and target energy efficient products, as they generally cost more and are not necessarily demanded by their customers. Also, the requirements of the retailer were considered rather large given the scale of the trial. **While the retailer was provided Marketing Development Funds (MDF) to support the development of specific marketing materials like flyers and signage, the cost of other obligations (e.g., querying and providing historical and monthly sales data, tracking the trial's progress, meetings associated with the trial, etc.) were not covered by the MDFs. The costs to the retailer of conducting these additional activities are not negligible, yet they remained engaged and motivated throughout the trial period.**

Challenges in Implementing the Trial and Lessons-Learned

When asked what they felt did not work well, the implementation team provided a few examples. **Most notably, the implementer felt the greatest hurdle to implementing the RPP Trial was the issue of scale**. **The RPP Program is a market transformation program and "26 participating stores are not going to transform any market."** The issue of scale has several implications. First, from a task-related perspective, were the hurdles faced with getting the correct data from the retailer. Because of the small scale of the program, the retailer did not develop an automated or systematic approach to facilitate data extracts, and instead, extracts were conducted on a month-to-month basis by a retailer staff member whose main job was not data management. As such, there were frequent issues with the data files that required frequent interactions with the retailer to correct. However, the implementer felt strongly that if there were sufficient scale, the retailer would be able to develop a more efficient

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data management system and assign trained staff to this important task. The retailer staff in their interviews mentioned this same notion when they noted that there are significant inefficiencies in trying to implement and manage a program in a small locale with a limited number of stores. The implementers felt this was further evidenced by the fact that they often had difficulties "pinning-down" merchants to do things—**if the financial reward for the retailer was greater, more retailer resources would be available to focus on the delivery of the program.**

Another notable lesson learned from the trial was that the participating retailers would likely need support in implementing the program for it to recognize its maximum potential. A fundamental principle underlying the RPP Program is that retailers should be allowed to design the retailer implementation plan since they know how best to sell their products, i.e., "let retailers be retailers." The implementation team indicated that while they still feel that general principle is sound, it is also likely that support from the utilities and implementers will be needed as the MDFs available to the retailers are not likely to drive self-implemented activities (though this too may change with increased scale). A specific example provided by the implementation team was the retailer's development of their strategic retailer implementation plans. At the start of the program, the retailer provided a plan, but in some ways it lacked specificity and aggressive promotions that could have been used to drive increased sales. This is not to say that the plan was not carefully thought out, but rather that the implementer thought more could have been done. The implementation team described how they began to more actively work with the retailer to help develop some more focused promotional activities to better target specific products. An example of better targeting was the 2015 holiday season refrigerator and air cleaner promotions, which they felt were very effective. While the implementation team feels they were key in helping develop and launch these specific promotions, they described the ideal process as one of "collaborative participation." That is, increased support form the utilities is not intended to transform the RPP Program design into a prescriptive design, but instead, should be aimed at leveraging the knowledge, experience, and resources of multiple parties to maximize potential.

The implementation team also mentioned the unique challenges associated with delivering a market transformation program such as the RPP Program. **They emphasized the need to recognize that many aspects of the retail market will need to be transformed for the RPP Program to reach its full potential. They described this transformation as a paradigm shift**. Retailers themselves will need to transform at many levels. Not only will they need to start to see the value, benefits, and advantages of focusing on energy efficiency as a legitimate and marketable business objective, but they will also need to transform and fine tune their protocols and processes to account for the regional or multi-regional implementation of the program.

Program Risks

The implementation team also felt that there is a notable risk to this program if regulators, utilities, and evaluators do not adequately grasp the implications tied to the RPP Program being a market transformation program. Unlike resource acquisition programs where impacts are typically seen in relatively short timeframes, the implementation team is concerned that relatively small short-term results will make key stakeholders unwilling to wait until the program can affect the plug load market. As they noted, "it is not so much that a retailer sold a total of X units one month and a total of Y units some other month. The issue is really whether or not the market is changing. Are retailers engaging? Are actions being taken?" They feel that this will require a much

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longer outlook and evaluation techniques to assess the efficacy of a market transformation program.

PG&E PROGRAM STAFF INTERVIEWS/DEBRIEF

The evaluation team conducted a telephone-based interview with two members of the PG&E program staff in January 2014, and a debrief call with two staff members after the Trial in March 2015. The discussions focused on the topics of successes, hurdles, trial operations, and lessons-learned.

Program Successes

In terms of successes, at baseline (and to some degree at follow-up) the PG&E staff highlighted that simply getting this new, novel program off the ground and recruiting a retailer were accomplishments. Everything was new and processes and procedures needed to be developed and implemented for all aspects of the trial. They felt that there was an array of specific evidence supporting this, including: the recruitment and successful contracting with the retailer, the retailer's development of an acceptable (both to the retailer and PG&E) retailer implementation plan, getting a contract in place with the data services provider, developing an EM&V plan and getting buy-in from the CPUC-ED. Also, the program staff felt like PG&E has established itself as a leader in the difficult arena of plug load by launching this program and driving collaboration across the country with various stakeholders (e.g., PG&E, the implementation team, retailers, ENERGY STAR, other utilities and utility partners, etc.).

Other successes mentioned at follow-up illustrated the significant amount of "learning" that came from the overall process of implementing the trial. Examples included:

- **The process for determining which models were program-qualified and which were not was not quite as straightforward as expected**. Nevertheless, the task provided a significant amount of insight into ENERGY STAR's processes for developing specifications and formulating the Qualified Products Lists. Learnings tied to this effort also helped the program team, the retailer, and the implementation team work together with ENERGY STAR to get additional efficient products stocked by the retailer listed.
- **This particular participating retailer may not have been the ideal retailer for testing the program concept**. While the participating retailer was quite engaged and was able to successfully implement the program in their stores, their market segment is the price-focused consumer. Because of the price focus, it is more difficult to market energy efficiency to this population.
- **Building out an understanding of the data needs and the procedures for processing it was seen as a key learning**. Not only has this helped facilitate the implementation of the program in terms of tasks like tracking and paying incentives and supporting evaluation, it has provided great insights into some of the administrative costs that are associated with this program.
- Overall program processes and procedures were another area of significant learning. For example, **implementing the trial has helped PG&E determine what the necessary roles are, who should be responsible for what, what the processes and protocols should be, and how to improve collaboration. This refinement has also provided greater insights into how and where costs may be cut, and areas of potential concerns.**

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AREAS NEEDING ATTENTION MOVING AHEAD

In addition to the successes and learnings, the program staff also provided some insights into areas that warrant attention moving forward with the program. First, **data will continue to be a challenge as the amount of data that is needed to support this program is large**. Also, it is still unclear what types of additional data is available, and what its total costs might be, to support a large implementation of the program. **Data representing the nonparticipating retailers and the overall regional and national markets are the biggest concerns**. The program staff is eager to understand how cost-sharing agreements might be developed and implemented to ensure the expenses associated with obtaining the necessary data are spread out among the various interested parties and that those who need it will have access to it.

Another area the program team wanted to ensure gets attention is how to better work with the retailers. **They realize that PG&E needs to better support their "product," which is the program**. They feel like they are like any other vendor operating in a retail store, and they want to develop improved processes for working with the retailers via the PG&E field team to not only ensure that retailer implementation plans are being implemented, but also to be able to provide timely feedback and support for improving implementation.

In addition, through the trial the program staff has gained a better understanding of the contrast between what the utility wants, versus what the retailers are willing and able to do. While some of this has been managed through an improved contracting process with the retailers, where expectations are clearly stated, they still feel that **the utility may need to revise some of their expectations.**

Product selection is also seen as a challenge from several perspectives. The program staff recognizes the need to better define a process that targets key opportunities. But this process needs to be more aligned with the retail buying cycles to maximize efficiency and effectiveness. This process also needs to be developed in a way that aligns with retailers overall prioritization process. They suggested a roadmap or prioritization list might be helpful. However, they also recognize the need to get buy-in from the ex ante team on the products the program targets, which poses some timing challenges. This all factors into one of the biggest desires mentioned during the debrief, which was to **develop and refine processes in order to be more timely and responsive to drive more real-time decision-making**. They recognize that the RPP Program design is targeted at affecting a fast moving market, but engineering, evaluation, and CPUC processes and actions tend to be slow, which pose challenges. Overall, they felt that decisions need to be made more efficiently to increase the opportunity to maximize the potential from the RPP Program.

A final area that the program team expects to allocate significant focus to in the future is collaboration and communication with ENERGY STAR. The program staff mentioned that they did not have much opportunity to participate in or contribute to discussions regarding specification setting, because of the small scale of the trial. However, when the program expands to include more retailers, more regions, and more products, they expect the influence of the program to grow and are eager to begin to develop a process for working with ENERGY STAR to help move the market towards greater energy efficiency.

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RETAILER MARKETING PLANS AND IMPLEMENTATION

As part of the RPP Program, retailers are expected to commit to creating and implementing a retailer implementation plan for increasing the sales of energy efficient models in the targeted product categories. The retailer that participated in the RPP Trial included several strategies in their retailer implementation plan aimed at increasing sales of targeted product categories. These activities are discussed below.

BULK STACKS

The participating retailer conducted several "bulk stack" events for certain products at certain times, which consisted of center-aisle or special placement of multiple units of a specific program-qualified model, typically with promotional pricing and signage. The bulk stack events conducted by the participating retailer as part of the RPP Trial are shown in Table 15.

TABLE 15: PARTICIPATING RETAILER BULK STACK EVENTS (NOV. 2013 DEC. 2014)

NEW MODEL	PRODUCT TYPE	SIZE	RPP SIZE CLASS	PRICE DISCOUNT	BULK STACK PERIOD
No	Room Air Conditioner	5,200 BTU	<12,000 BTU	$50.00	Jun.-Aug. 2014
No	HTiB/Sound bar	NA	Sound bar	$50.00	Jun.-Jul. 2014
Yes	HTiB/Sound bar	NA	Sound bar	$15.00	Jun.-Jul. 2014
No	Refrigerator	1.6 cu.ft.	Compact Mini (<5 cu. ft.)	$40.00	Oct.-Dec. 2014
No	Air Cleaner	55 CADR	<100 CADR	$50.00	Oct.-Dec. 2014

Additionally, two of the items shown in Table 15 – the refrigerator and air cleaner – were denoted as "hero" items for October through December 2014, and were offered at their "lowest price ever" through the retailer.

PROMOTIONAL FLYERS

The participating retailer developed two-sided, full-color sale flyers for different time periods during the trial. The front page advertised home appliances; the back page advertised consumer electronics. These were displayed and available at the front of the stores as customers walked in and promoted a selection of program-qualified products. While most of the models included in the flyers were promoted with special sale pricing, some products were instead promoted with reward points[25]–in one case a model was promoted with both sale pricing and reward points.

Table 16 through Table 21 on the following pages show the participating retailer's model-specific promotions conducted during the November 2013 through December 2014 trial

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[25] The participating retailer has a rewards system, where customers receive points for certain product purchases that can be used towards future purchases.

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period. For confidentiality reasons, the actual brand and model numbers are not shown, and different models are designated as Model A, B, C, etc.

FREEZER AND REFRIGERATOR PRICE DISCOUNTS

In addition to the price discounts associated with the bulk stacks and promotional flyers, all program-qualified freezers and refrigerators were offered at reduced prices from December 2014 through September 2015. The retailer discounted freezers by $20 and refrigerators by $30 during this period.

IN-STORE BROADCASTS

In addition to the product- or model-specific promotions, the participating retailer also aired various in-store broadcasts throughout the trial period to promote targeted product categories. The broadcasts (along with the periods they were aired) were:

> ***Announcement #1*** (November 2013-January 2014 and June 2014-September 2014)**:** *"In an effort to reduce energy consumption we are offering an assortment of ENERGY STAR qualified products in our Electronics and Home Appliances departments. When you purchase an item in one of these departments look for the ENERGY STAR logo, you will not only save energy, but also money on your monthly utility bill!"*

> ***Announcement #2*** (February 2014-May 2014)**:** *"Looking to save money on your utility bills? We are now offering $30 off all ENERGY STAR certified refrigerators and freezers. In an effort to reduce energy consumption in our region we are offering an assortment of ENERGY STAR qualified products in our Electronics and Home Appliances departments. When you purchase an item in one of these departments look for the ENERGY STAR logo and start saving energy and money today."*

> ***Announcement #3*** (October 2014-December 2014)**:** *"Please be sure to stop by your Appliance Department to see our Lowest Prices Ever on our [Brand] Compact Refrigerator, and our [Brand] Electronic Air Purifier, your choice only $49.99. Your local utility is helping sponsor this event for a limited time. At these low prices they make great gifts. Stop by our Appliance Department today for these outstanding values!"*

PROMOTIONAL POSTERS

The retailer also worked with PG&E, SMUD and ENERGY STAR to develop ENERGY STAR promotional posters. These full-color posters were displayed in retail stores and informed customers and sales associates about ENERGY STAR products and the ENERGY STAR label. The poster graphic is presented in Appendix B.

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Table 16: Air Cleaner Promotions

New Model	Model	Product Class	Price Discount	Reward Points	Promotional Flyer Oct.-Dec. 2014
No	Model A	< 100 CADR	$50.00	NA	X

Table 17: DVD/Blu-Ray Player Promotions

New Model	Model	Product Class	Price Discount	Reward Points	Promotional Flyer		
					Mar. 2014	Jun. 2014	Oct.-Dec. 2014
No	Model A	Std. DVD	$5.00	NA	X		
No	Model A	Std. DVD	$10.00	NA			X
No	Model B	Blu-Ray	$10.00	NA	X		
No	Model B	Blu-Ray	$10.00	NA		X	
No	Model C	Blu-Ray	$15.00	NA		X	
Yes	Model D	Blu-Ray	$10.00	NA		X	
Yes	Model E	Blu-Ray	$20.00	NA		X	
No	Model F	Blu-Ray	NA	$20.00	X		

Table 18: Home Theater-in-a-Box/Sound bar Promotions

New Model	Model	Product Class	Price Discount	Reward Points	Promotional Flyer		
					Mar. 2014	Jun. 2014	Oct.-Dec. 2014
No	Model A	Sound bar	NA	$30.00		X	
No	Model A	Sound bar	$40.00	NA			X
No	Model B	Sound bar	$30.00	NA		X	
No	Model C	Sound bar	NA	$50.00	X		
No	Model C	Sound bar	$100.00	$50.00		X	
Yes	Model D	Sound bar	$15.00	NA			X
Yes	Model E	Sound bar	NA	$15.00	X		
No	Model F	Sound bar	$40.00	NA			X

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TABLE 19: FREEZER PROMOTIONS

NEW MODEL	MODEL	SIZE (CU.FT.)	SIZE CLASS	PRODUCT CLASS	PRICE DISCOUNT	REWARD POINTS	PROMOTIONAL FLYER	
							MAR. 2014	JUN. 2014
No	Model A	15.0	Medium (13–16 cu.ft.)	Chest	$20.00	NA	X	
No	Model A	15.0	Medium (13–16 cu.ft.)	Chest	$70.00	NA		X

TABLE 20: REFRIGERATOR PROMOTIONS

NEW MODEL	MODEL	SIZE (CU.FT.)	SIZE CLASS	PRICE DISCOUNT	REWARD POINTS	PROMOTIONAL FLYER		
						MAR. 2014	JUN. 2014	OCT.-DEC. 2014
No	Model A	25.4	Very large (>23 cu. ft.)	$30.00	NA	X		
No	Model B	25.4	Very large (>23 cu. ft.)	$30.00	NA	X		
No	Model C	25.4	Very large (>23 cu. ft.)	$30.00	NA	X		
No	Model D	21	Very large (>23 cu. ft.)	$30.00	NA	X		
No	Model D	21	Very large (>23 cu. ft.)	$50.00	NA		X	
No	Model E	18	Medium (17–20 cu. ft.)	$30.00	NA	X		
No	Model E	18	Medium (17–20 cu. ft.)	$70.00	NA		X	
No	Model F	20	Very large (>23 cu. ft.)	$30.00	NA	X		
No	Model G	23	Very large (over 23 cu. ft.)	$30.00	NA	X		
Yes	Model H	1.6	Compact Mini (<5 cu. ft.)	$40.00	NA			X
No	Model I	3.1	Compact Mini (<5 cu. ft.)	$30.00	NA	X		

TABLE 21: ROOM AIR CONDITIONER PROMOTIONS

NEW MODEL	MODEL	SIZE CLASS	PRODUCT CLASS	PRICE DISCOUNT	REWARD POINTS	PROMOTIONAL FLYER
						JUN. 2014
No	Model A	5,200 BTU	<12,000 BTU	$50.00	NA	X

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SHELF SURVEYS

Comprehensive shelf surveys were conducted at all participating stores by the PG&E field services team twice during the RPP Trial: (1) Wave 1 was conducted in February and March 2014, and (2) Wave 2 was conducted in November 2014. The main purposes of the shelf surveys were to gain an understanding into stock assortment changes and program-related promotions.

The field team inventoried all models (both program-qualified and non-qualified) present on the sales floor in each of the targeted product category departments.[26] Additionally, the field team recorded whether or not the program-qualified models were on sale, or had any promotional materials associated with it such as promotional signage. The shelf survey data were first aggregated to the store level (24 total stores), and then to the product category level.

Table 22 shows the some of the results of the shelf surveys, presenting the mean number of program-qualified models per store (with standard deviations in parentheses) and the percent of models within each targeted product category that were program-qualified, by shelf survey wave.

TABLE 22: SHELF SURVEY RESULTS

Product Category	MEAN (S.D). NUMBER OF PROGRAM-QUALIFIED MODELS		PERCENT OF MODELS PROGRAM-QUALIFIED	
	Wave 1	Wave 2	Wave 1	Wave 2
Air Cleaner	1.0 (0.3)	1.2 (0.4)	25%	46%
DVD/Blu-Ray	4.9 (0.8)	7.5 (1.3)	49%	63%
HTiB	1.1 (0.7)	2.7 (1.0)	14%	26%
Freezer	0.7 (0.5)	0.5 (0.5)	14%	11%
Refrigerator	3.0 (2.7)	1.8 (2.0)	36%	18%
Room AC	0.8 (0.4)	0.2 (0.4)	26%	4%

Table 22 suggests that there was some evidence of assortment changes, but these were limited to the consumer electronics product categories. At the start of the program, the participating retailer only stocked an average of one model of qualified air cleaner per

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[26] In addition to inventorying the total number of *models*, the evaluation team also directed the field team to inventory the total number of *units* on the sales for each of the models. However, subsequent analysis of the unit counts indicated this was not a very useful or informative metric due to the relatively long time lapse between waves. For example, consider the a situation where Store A had 20 units of a qualified model on the shelf at Wave 1, and 10 units on the shelf of the same model at Wave 2. One interpretation could be that the store is putting less effort into implementing their retailer implementation plans because they are not stocking the model as intensively at Wave 2 as they did at Wave 1. However, equally reasonable interpretation is that the store is actually doing a commendable job because they sold half of their inventory between Wave 1 and Wave 2. An analogous problem exists with trying to compare different stocking levels across stores within a wave. Thus, the evaluation team excluded the analyses of the unit counts from this report and does not recommend collecting that type of data in future evaluations. Also, more reliable unit information can be gathered from the retailer sales data than the shelf survey results.

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store, but at the follow-up this value increased to 1.2 (one new model of air cleaner appeared in the follow-up shelf survey data, but not at all stores). More notable increases appeared with the DVD/Blu-Ray category, where the mean number of program-qualified models at baseline was 4.9, but increased to 7.5 by the follow-up (this was also evidenced in Table 17, where we see that two new models of Blu-Ray player were promoted through the flyers). Likewise, for home theaters-in-a-box, the mean number of program-qualified models was 1.1 at baseline, and increased to 2.7 by the follow-up (Table 18 shows two new models of sound bars were added to the retailer's assortment). However, it is important to point out that we also saw notable increases in the number of models in the nonparticipating stores in subsequent quasi-experimental analyses, so it is difficult to say that these increases were entirely attributable to the trial. Instead, it appears that at least some of these increases reflect new models that were added to the product assortment irrespective of the trial (more is said with regards to the limitations of the shelf survey approach in the *Synthesis and Research Objectives* chapter under the subsection *EO1: Test various methods to evaluate the RPP Program*).

In contrast, all of the home appliance categories saw declines from the baseline to the follow-up: freezers went from 0.7 qualified models per store to 0.5; refrigerators from 3.0 qualified models per store to 1.8; room air conditioners from 0.8 qualified models per store to 0.2. However, it is important to note several factors when interpreting these latter results. First, notice the relatively larger sizes of the standard deviations in respect to the means for the home appliances as compared to the consumer electronics. Overall, there is more variability in the stock assortment for appliances across both waves than for the consumer electronics product categories. This means that the stocking assortment for each of the home appliance categories varies across stores much more than the assortment of consumer electronics categories. This was apparent in detailed shelf survey results, where by the end of the year, some stores had a notable number of "clearance" appliances on sale that were not present in all stores. Second, the participating retailer – like most appliance retailers – generally stocks fewer individual units for each of the models of larger home appliances because floor space in retail establishments is at a premium. Thus, if the retailer sells out of a particular model, they may not have had the opportunity to restock that particular model, and this may be compounded with the retailer's need to sell out of this year's models to make way for next year's inventory. Third, the room air conditioner category results are likely not very robust as neither wave of the shelf survey were conducted in peak cooling months – the retailer's assortment of room air conditioners in February, March and November are not likely representative of their stocking assortment during the prime summer sales months.

Figure 8 shows other results of the shelf surveys, charting the percent of program-qualified models that were on sale (in the left-hand panel) and appearing with associated promotional materials (e.g., signage) (in the right-hand panel), by product category and wave. Without exception, the number of program qualified models on sale and with promotion increased from Wave 1 to Wave 2. In general, there was relatively little promotion of program-qualified products during the baseline period, but during the follow-up period most (i.e., greater than 50%) of the qualified models were on sale for every product category, while four of the six categories had the majority of models promoted with some type of signage.

FIGURE 8: SHELF SURVEY RESULTS: MODELS ON SALE AND MODELS WITH PROMOTION

Percent of Program-Qualified Models On Sale

Category	Wave 1	Wave 2
Air Cleaner	18%	72%
DVD / Blu Ray	49%	78%
HTIB	58%	75%
Freezer	12%	92%
Refrigerator	21%	91%
Room AC	0%	67%

Percent of Program-Qualified Models with Promo

Category	Wave 1	Wave 2
Air Cleaner	14%	30%
DVD / Blu Ray	31%	75%
HTIB	26%	59%
Freezer	29%	92%
Refrigerator	29%	73%
Room AC	0%	33%
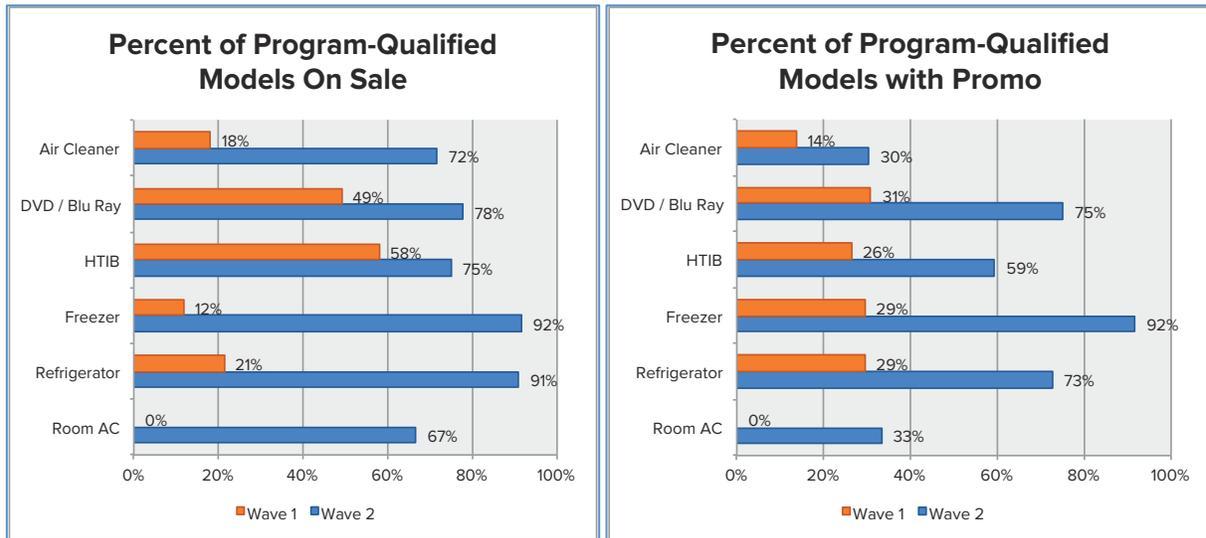
However, the values in Figure 8 are mean values derived across all the participating stores, and there was a great deal of variability in how the individual stores implemented promotions and marketing strategies during the trial. For example, Table 23 shows the Wave 2 store-level values for the air cleaner product category, including the total number of models, number of program-qualified models, number of program-qualified models on sale, and number of program-qualified models with promotions. The Wave 2 shelf surveys were conducted in November 2014, during which time the program-qualified air cleaner was considered a "hero" item, promoted heavily through the retailer's promotional flyer as well as being a designated bulk stack item. However, as shown in Table 23, while all 23 of the stores that stocked air cleaners stocked the program-qualified model, six stores did not have the model on sale, and 15 of the stores had no promotional signage associated with the model. Thus, there appears to be a degree of inconsistency in how the individual stores implemented the marketing activities (the same tables for all of the other targeted product categories are included in Appendix C).

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TABLE 23: AIR CLEANER SHELF SURVEY RESULTS BY STORE

STORE	TOTAL NUMBER OF MODELS	TOTAL NUMBER OF PROGRAM-QUALIFIED MODELS	PROGRAM-QUALIFIED MODELS ON SALE	PROGRAM-QUALIFIED MODELS WITH PROMO
1	2	1	0	0
2	1	1	0	0
3	3	1	0	0
4	1	1	1	0
5	4	1	1	1
6	4	1	1	0
7	3	1	0	0
8	5	1	1	1
9	1	1	0	0
10	5	1	1	1
11	3	1	0	0
12	0	NA	NA	NA
13	3	1	1	1
14	3	1	1	1
15	4	1	1	0
16	4	1	1	0
17	2	1	1	1
18	4	1	1	1
19	4	1	1	0
20	4	1	1	0
21	3	1	1	0
22	3	1	1	0
23	1	1	1	1
24	5	1	1	0

SALESFORCE DATA REVIEW

The evaluation team conducted a comprehensive review of the nearly 200 records in the Salesforce database maintained by the implementation team. The evaluation team examined each record to determine: (1) the program logic model components that were supported by the interaction, (2) the number of records, and (3) the activities or topics discussed. It is important to note that each Salesforce record could potentially contain a long chain of emails with changing topics. The evaluation team took care to separate out different topics when applicable, thus creating additional records. Additionally, some of the records were duplicates or determined to not be supportive of any of the logic model components. These records were discarded.

Importantly, the Salesforce database does not capture *all* activities and interactions. Currently, program implementation staff must manually log each relevant email into Salesforce. This manual process inherently leads to some emails being mistakenly left out of the database. Additionally, while there is email evidence of some phone calls and meetings in the database, these activities are not separately logged by program implementation staff at this time (though the ability to log meetings and phone calls does exist within Salesforce). This means that a phone, web conference, or in-person interaction that does not lead to (or is preceded by) an email interaction is not captured in this analysis. Finally, and maybe most importantly, the Salesforce database was only used by the implementation

and not other stakeholders involved with the RPP Program (e.g., PG&E staff, ENERGY STAR staff, utility partners, etc.). These gaps in the Salesforce data mean that our data review does not tell the whole story regarding the activities that have taken place to implement the RPP Program. That said, we feel that the data, while incomplete, do indicate that the key administrative activities in the logic model are well supported.

Table 24 shows the results of the Salesforce data review. For each of the applicable logic model components the number of relevant records is shown, as are high-level summaries of the activities or topics discussed.

Given that the Salesforce data is not meant to be a comprehensive record of all interactions and activities, the evaluation team feels the evidence indicates that logic model components A – H are well supported. The evaluation team found significant evidence of implementation staff (and PG&E) reaching out to potential utility partners (B) and collaborating with the retailer to implement retailer implementation plans (H). There was also evidence of activities supporting logic model components A, C, D, E, F, and G, though with fewer records. However, this does not mean that these latter logic model components were any less supported. The nature of many of these logic model components does not lend itself to email interactions. For example, logic model component A: PG&E characterizes markets and estimate savings potential for candidate products, likely included a significant amount of Internet research and secondary data review. Further, because the Salesforce data predominantly captures email exchanges, it does not capture the full extent of communication and collaboration that occurred with regards to all these topics. More is said with regards to the limitations of the Salesforce data review in the *Synthesis and Research Objectives* chapter under the *EO1: Test various methods to evaluate the RPP Program* subsection.

TABLE 24: SALESFORCE DATA REVIEW RESULTS

	LOGIC MODEL COMPONENT	NUMBER OF RECORDS	ACTIVITIES/TOPICS DISCUSSED
A	PG&E characterizes markets and estimate savings potential for candidate products	9	- EUL estimation - Product category selection - Retailer type selection - Energy savings estimation - Energy savings data source documentation - Baseline forecasting - Obtaining lists of potential products from potential retail partners
B	PG&E contacts utility partners regarding collaboration in Program delivery	33	- Reached out to Efficiency Vermont - Reached out to NEEP - Reached out to NEEA - Reached out to ComEd - Reached out to MEEA - Reached out to National Grid - Reached out to CEE - Reached out to Xcel Energy - Reached out to NJ Clean Energy Program - Reached out to NYSERDA - Reached out to DTE - Reached out to PSEG-LI - Reached out to DC SEU - Reached out to MA program administrators - Reached out to NH program administrators - Reached out to CT program administrators - Formed core working group for national RPP program & assigned tasks
C	Utility partners recruited	1	-BGE and Pepco joined RPP
D	PG&E and utility partners determine which retailers to recruit	10	- Reached out to Home Depot - Reached out to Costco - Reached out to Lowe's - Reached out to Best Buy - Reached out to Wal-Mart - Discussed other utilities to include in their programs - Retail Action Council (RAC) decided to support RPP - Navitas/EPA recommended RAC members be targeted for RPP participation
E	PG&E, utility partners, and identified retailers target product categories with energy savings potential	13	- Discussed potential products with retailers including HVAC, video game consoles, appliances, audio equipment, air purifiers - Discussed potential products with utility partners including dishwashers, air purifiers, room air conditioners, dehumidifiers - Worked with retailers to determine which products qualify - Obtained lists of products being targeted with pricing reductions from retailers - Discussed product buying and assortment options with merchants; convinced them consider adding more ENERGY STAR products - Discussed product criteria and selection process with utility partners, implementation contractor, and evaluation team
F	PG&E and utility partners determine incentive levels for program-qualified models within each product category, present them to retailers, and sign contracts	9	- Negotiated incentive amounts - Obtained signed participating retailer contract for trial
G	PG&E and utility partners approve retailer implementation plans, including sales forecasts of program-qualified models within each product category	7	- Developed retailer implementation plan guidelines document - Shared logo use and branding guidelines - Approved retailer implementation plan
H	Retailers implement plans employing various strategies and update as necessary	93	- Discussed roles and responsibilities for marketing activities - Discussed and implemented marketing events including price promotions, bulk stack events, reward point promotions, event flyers - Discussed and created marketing materials including flyers, in-store radio, posters, in-store ads, brochures, brochure holders, signs, contests - Discussed and created educational materials and training for retail store staff - Ensured that retailer followed retailer implementation plan - Updated retailer implementation plans

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IMPACT EVALUATION RESULTS

The evaluation team conducted several analyses with the retailer sales data relying on multiple methods. One objective of using multiple methods was to assess the different approaches to better understand their usefulness and potential as evaluation techniques for this complicated program moving forward. Another objective was to draw from the different approaches in order to find multiple forms of support for drawing robust conclusions with regards to the efficacy and impacts of the program.

Where possible, the evaluation team leveraged the fact that we had sales data for all the participating retailer's nonparticipating stores within the State of California to use as a comparison group. While the comparison group provided the evaluation team with the ability to apply more rigorous analytic approaches, the exact same design will not likely be possible in the future. As noted elsewhere in this report, within-state comparisons will probably not be possible because in a scaled-up implementation of the program, participating retailers will require that all their California stores participate in the program. Obtaining nonparticipating retailer sales data is also unlikely as this is viewed as sensitive, confidential information that nonparticipating retailers would have no incentive to share. State-to-state comparisons using participating retailers nonparticipating store data is also a questionable approach for two reasons. First, retailers have indicated that most of their purchasing and promotional decisions are made at the national level, which means that finding stores unaffected by the program would be difficult. Second, the RPP Program is being scaled-up to a national program, which means finding unaffected stores will become increasingly difficult. That all said, the comparison group approaches are inherently the strongest approaches and will be considered. However, alternative comparative approaches such as using secondary data from organizations such as NPD or AHAM, will also be pursued for future evaluations.

The remainder of this chapter presents the results of each of the different analyses conducted using the retailer sales data. Each section starts with a brief description of how the analysis was conducted, followed by a description of the results.

DIFFERENCE-IN-DIFFERENCES (DID) ANALYSIS OF PROGRAM QUALIFIED SHARE (PQS)

The first analysis conducted was a simple difference-in-differences (DID) analysis of the PQS for each of the targeted product categories, comparing the historical PQS values to the trial-period PQS values for the participating and nonparticipating stores. For participating stores, the mean PQS in the pre-trial (historical) period was subtracted from the mean PQS in the trial period. The same calculation was done for the nonparticipating stores. The difference between these two PQS differences equals the net impact of the RPP Trial. The results shown here in the body of this report present the aggregate results, pooling PG&E and SMUD together; Appendix D provides the same tables and figures, but reported separately for PG&E and SMUD.

Table 25 shows the total number of program-qualified (PQ) and non-program-qualified (Non-PQ) units sold, as well as the PQS values, over both the 21-month historical time

period and the 14-month trial period for participating and nonparticipating stores.[27] Table 26 presents the difference-in-differences calculations based on the PQS values. Figure 9 charts the PQS values for the different time periods for the participating and nonparticipating stores.

There are several findings from these results worth highlighting. First, the final column in Table 26 shows the final difference scores for all the product classes. In all cases except for the chest freezers, the final differences are positive, suggesting that the PQS values for the participating stores increased from the historical period after accounting for any contemporaneous change in the nonparticipating stores. That is, there appears to be a program effect for all the product categories other than the chest freezers. The net effects range from 14% for the room air conditioner and compact refrigerator categories to about 2% for the Blu-Ray player and medium refrigerator categories.

Another thing to notice from Table 25 is that in many cases the sales volumes were rather small. For example, looking just at the program-qualified sales for the participating stores during the trial period, the table shows that a total of 45 medium refrigerators, 70 chest freezers, 129 very large refrigerators, and 170 air cleaners were sold. When we consider that this was a 14-month trial that ran in a total of 24 participating stores (excluding the two stores that terminated participation due to unforeseen business circumstances), this means that roughly 0.124 medium refrigerators were sold per store per month, 0.192 chest freezers per store per month, 0.354 very large refrigerators per store per month, and 0.467 air cleaners per store per month. Such low sales volumes make the PQS values very sensitive to small variations in monthly sales. For example, if only two total units were sold in one month and one of the units was program-qualified, we would have a PQS of 50%. Then, if in the next month only one unit was sold and it was not qualified, the PQS would be 0%. Then maybe in the next month one unit was sold again, but this unit was program-qualified; then the PQS would be 100%. While this issue should be kept in mind when reviewing the results of this particular evaluation, it should also be noted that such small sales volumes are unlikely to be such and an issue in a larger, scaled-up version of the program. Once all of a retailer's stores are participating in California, sales volumes would presumably be significantly larger.

Another thing to note form these results is that in some cases very large differences were detected between the historical and trial periods among the participating stores. For example, there was a 44% increase in PQS from the historical to the trial period for sound bars. Similarly, there was a 39% increase in PQS for Blu-Ray players. While alone these results would appear quite impressive, we also have to consider the fact that the nonparticipating stores also exhibited similar PQS increases for these product categories (40% and 37% respectively). Thus, the net effects of the program for these products are rather meager at 4% for sound bars and 2% for Blu-Ray players, because these assortment changes appear to have taken place in both the participating *and* nonparticipating stores.[28]

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[27] The 17 nonparticipating stores in the PG&E service territory were pooled with the other 49 nonparticipating stores throughout the state. There were no nonparticipating stores in the SMUD service territory.

[28] While the retailer did add a new refrigerator to their assortment as part of the trial, this was limited to a single model and stock was only provided to participating stores. Other new models did appear in the product sales data from time to time, but these appeared in both participating and nonparticipating stores. The retailer merchant interviews suggested no substantive product assortment changes were due to the trial other than the refrigerator category.

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These are also important findings because they suggest that these two product categories may not need the support of the program. The historical PQS for Blu-Ray players was roughly 28% and jumped to 67% during the trial period; the historical PQs for sound bars was about 11% and jumped to roughly 53% in one year. In the future, it will be difficult to achieve additional lift. However, if the RPP Program wished to continue incenting these product categories, it should consider incenting models that are more efficient than just meeting the ENERGY STAR specification.[29]

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[29] Actually, the plans for the program are to incent sound bars at the ENERGY STAR +50% level instead of just meeting the ENERGY STAR specification. Blu-Ray players are not currently expected to be part of the next iteration of the program.

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TABLE 25: COMPARING UNIT SALES VOLUMES AND PROGRAM-QUALIFIED SHARE FOR HISTORICAL AND TRIAL PERIODS FOR PARTICIPATING AND NONPARTICIPATING STORES

Product Category	Class	Participating Stores (N=24)						Nonparticipating Stores (N=66)					
		Historical			Trial Period			Historical			Trial Period		
		Non-PQ	PQ	PQS	Non-PQ	PQ	PQS	Non-PQ	PQ	PQS	Non-PQ	PQ	PQS
Air Cleaner	<100 CADR	404	216	35%	174	170	49%	1,112	459	29%	474	255	35%
DVD/Blu-Ray	Blu-Ray	2,494	952	28%	1,017	2,046	67%	7,444	3,105	29%	3,254	6,525	67%
DVD/Blu-Ray	DVD	13,991	3,482	20%	5,789	1,300	18%	37,050	10,098	21%	19,254	3,971	17%
HTiB	Sound bar	834	92	10%	738	872	54%	2,289	314	12%	2,349	2,524	52%
Freezer	Chest	2,613	70	3%	1,998	70	3%	5,021	68	1%	3,862	104	3%
Refrigerator	Compact Mini	1,332	217	14%	1,083	332	23%	3,136	664	17%	2,910	416	13%
Refrigerator	Medium	1,096	49	4%	775	45	5%	2,304	84	4%	1,801	51	3%
Refrigerator	Very Large	127	67	35%	166	129	44%	247	110	31%	405	229	36%
Room AC	<12,000 BTU	2,279	659	22%	1,047	272	21%	7,686	2,203	22%	4,731	308	6%
TOTAL		**25,170**	**5,804**	**19%**	**12,787**	**5,236**	**29%**	**66,289**	**17,105**	**21%**	**39,040**	**14,383**	**27%**

TABLE 26: DIFFERENCE-IN-DIFFERENCES TABLE COMPARING PQS OF PARTICIPATING AND NONPARTICIPATING STORES

Product Category	Class	Part Difference	NonPart Difference	DID
Air Cleaner	<100 CADR	15%	6%	9%
DVD/Blu-Ray	Blu-Ray	39%	37%	2%
DVD/Blu-Ray	DVD	-2%	-4%	3%
HTiB	Sound bar	44%	40%	4%
Freezer	Chest	1%	1%	-1%
Refrigerator	Compact Mini	9%	-5%	14%
Refrigerator	Medium	1%	-1%	2%
Refrigerator	Very Large	9%	5%	4%
Room AC	<12,000 BTU	-2%	-16%	14%
TOTAL		**10%**	**6%**	**4%**

FIGURE 9: PARTICIPATING AND NONPARTICIPATING STORE PQS FOR HISTORICAL AND TRIAL PERIODS

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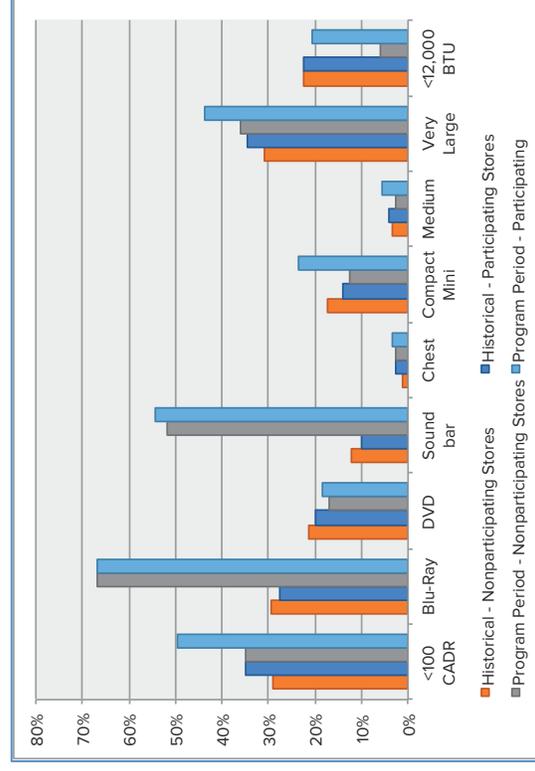
MODELLING APPROACHES

This section of the report presents a discussion of the results from the various modeling efforts aimed at predicting PQS using the historical and trial-period retailer sales data. The approaches used in this evaluation included: (1) forecasted baseline, (2) participant-only modified step regression, (3) participant-only segmented regression, (4) comparison-based modified step regression, and (5) comparison-based segmented regression (see the *Methods* chapter for a detailed discussion of each of these approaches).

Note that an objective of the modeling efforts was not to estimate net program energy and demand savings and a net-to-gross ratio, since as we show with the results, doing so is a complicated task and will vary, at least in the short term, based on the approach used. Further, we also argue that, for any market transformation program, estimates of these parameters need to be based on program performance over a much longer timeframe or we run the risk of drawing misleading conclusions regarding the overall efficacy, impacts, and potential of the program (more on this later). Rather, the discussion is centered on assessing the various approaches as tools for evaluating the RPP Program moving forward and comparing and contrasting the approaches in terms of their potential usefulness and issues to consider when applying them.

To frame this discussion a single product category—Air Cleaners (<100 CADR)—was selected for illustrative purpose. Appendix E through Appendix I contain the modeling results for all the other product categories.

- The results for the **forecasted baseline** are shown in Figure 10, with the computation of net program effects on PQS shown in Table 27.
- The results of the **participant-only modified step regression** are in Figure 11, with the ANOVA results presented in Table 28, the coefficients results in Table 29, and the computation of net program effects in Table 30.
- The results of the **participant-only segmented regression** are in Figure 12, with the ANOVA results presented in Figure 28, the coefficients results in Table 32, and the computation of net program effects in Table 33.
- The results of the **comparison-based modified step regression** are in Figure 13, with the ANOVA results presented in Table 34, the coefficients results in Table 35, and the computation of net program effects in Table 36.
The results of the **comparison-based segmented regression** are in Figure 14, with the ANOVA results presented in Table 37, the coefficients results in Table 38, and the computation of net program effects in Table 39.

The air cleaners are a useful product category to frame this discussion for several reasons. First, very little was done to specifically promote the air cleaner category during the trial until the 2014 holiday season (the last three months of the Trial). The only interventions introduced outside of the holiday season were the introduction of the general in-store broadcasts highlighting energy efficient products in November of 2013, the first month of the Trial and the 22nd month of the data series (denoted as Int22—the lightest-blue shaded areas in the figures), and the introduction of a general consumer electronics brochure and store signage emphasizing ENERGY STAR in June 2014, the 29th month of the series (denoted as Int29—the second blue-shaded areas in the figures). However, when the air cleaner was more aggressively promoted in October through December 2014, a very

significant lift in sales resulted. This is clearly visible in all the figures. The holiday season interventions consisted of promoting the program-qualified air cleaner as a "hero" item, with an associated flyer promotion, "lowest price ever" price discount, bulk stacking, and signage (denoted as Int33—the darkest blue-shaded are in the figures). Second, the PQS values over the range of the data (February 2012 through September 2014) represent a fairly consistent degree of variability with no dramatic or unexplainable shifts, which can complicate the interpretations. Third, the air cleaner data presents a slight increasing trend in the PQS over time, which has implications for the models.

FIGURE 10: FORECASTED PQS BASELINE – AIR CLEANERS (<100 CADR)
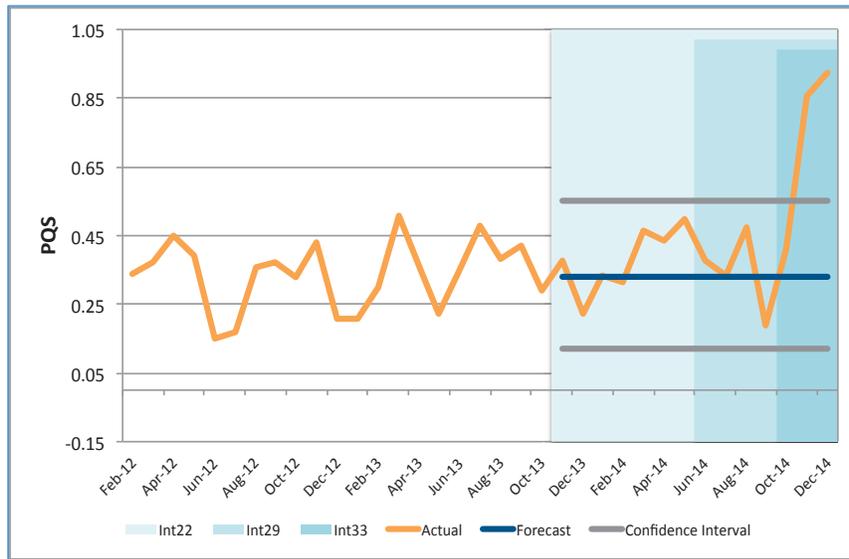
TABLE 27: NET EFFECTS USING FORECASTED PQS BASELINE – AIR CLEANERS (<100 CADR)

Mean Trial-Period PQS	Mean Forecasted PQS	Net Effect
49%	33%	16%

FIGURE 11: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)
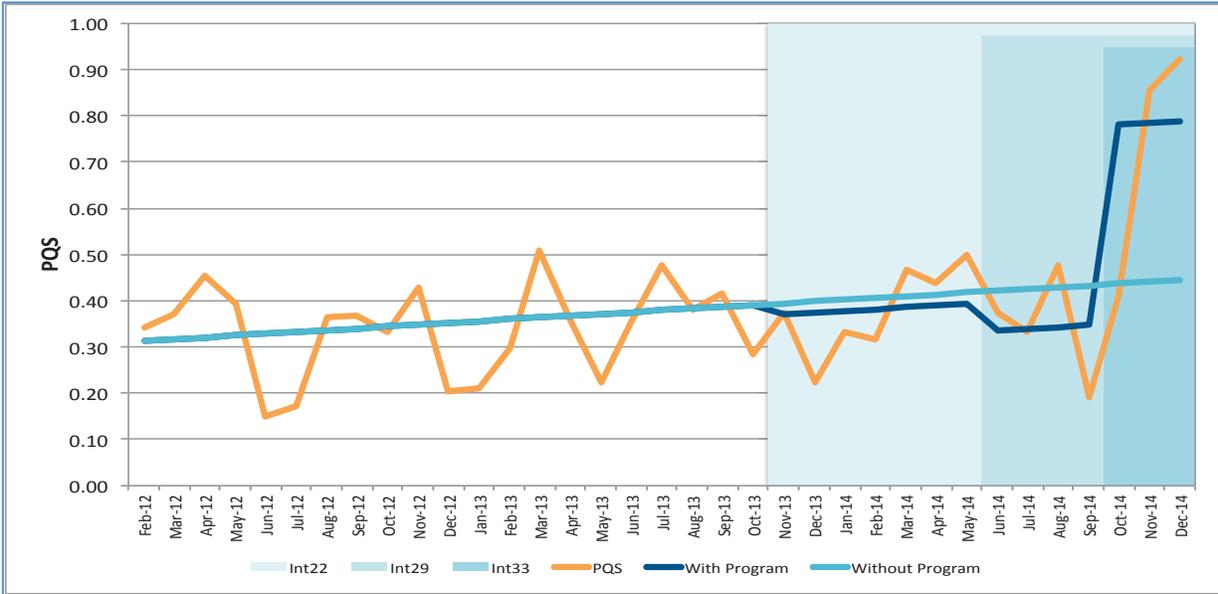
TABLE 28: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.737	4.000	0.184	10.771	0.000
Residual	0.513	30.000	0.017		
Total	1.249	34.000			
R-Square			0.590		
Adjusted R-Square			0.535		

TABLE 29: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.310	0.050	6.165	0.000
MoNo	0.004	0.004	0.897	0.377
Int22	-0.024	0.086	-0.280	0.782
Int29	-0.062	0.091	-0.681	0.501
int33	0.431	0.097	4.441	0.000

TABLE 30: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Mean With-Program	Mean Without-Program	Net Effect
46%	42%	4%
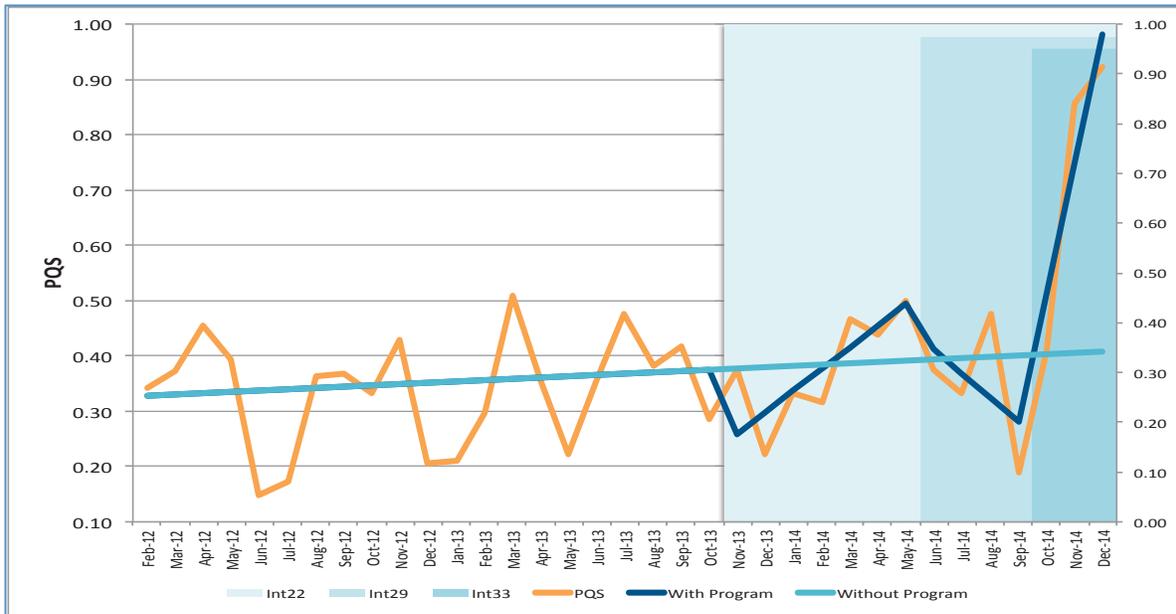
TABLE 31: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.909	7.000	0.130	10.315	0.000
Residual	0.340	27.000	0.013		
Total	1.249	34.000			
R-Square			0.728		
Adjusted R-Square			0.657		

TABLE 32: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.325	0.044	7.426	0.000
MoNo	0.002	0.004	0.633	0.532
Int22	-0.156	0.111	-1.405	0.171
Time22	0.037	0.022	1.673	0.106
Int29	-0.039	0.177	-0.223	0.825
Time29	-0.083	0.061	-1.361	0.185
Int33	-0.001	0.194	-0.006	0.995
Time33	0.278	0.092	3.025	0.005

TABLE 33: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Mean With-Program	Mean Without-Program	Net Effect
45%	39%	5%

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FIGURE 13: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)
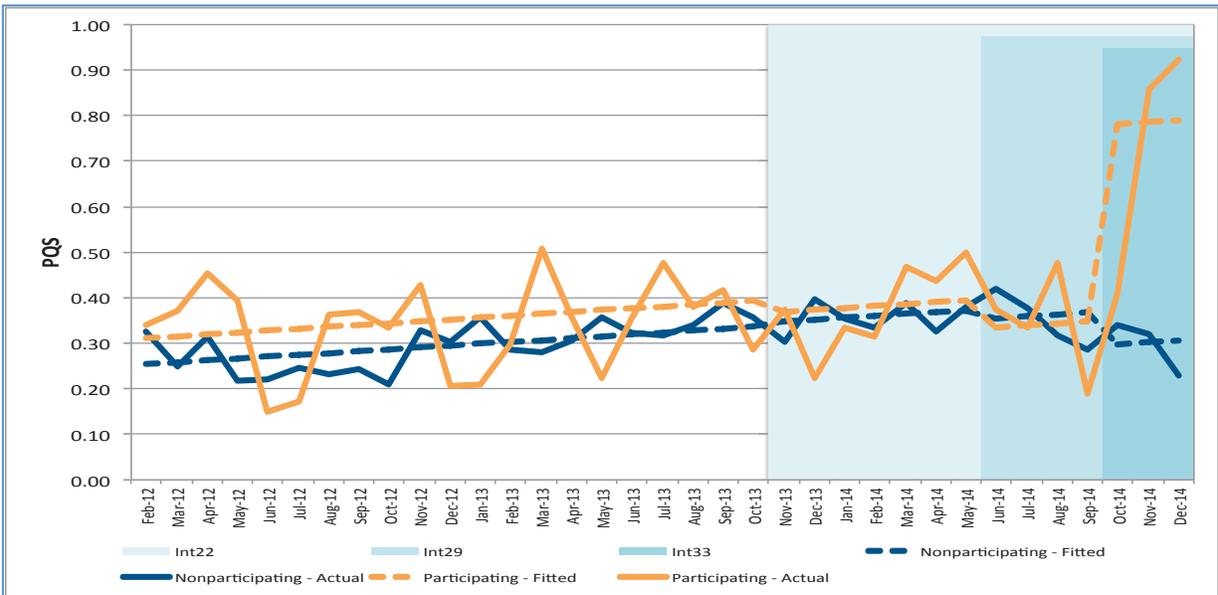
TABLE 34: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.935	8.000	0.117	12.478	0.000
Residual	0.571	61.000	0.009		
Total	1.506	69.000			
R-Square			0.788		
Adjusted R-Square			0.571		

TABLE 35: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.250	0.031	8.132	0.000
MoNo	0.004	0.002	1.799	0.077
isPart	0.057	0.027	2.087	0.041
Int22	0.008	0.055	0.141	0.889
PartInt22	-0.035	0.061	-0.583	0.562
Int29	-0.021	0.068	-0.310	0.758
PartInt29	-0.042	0.094	-0.448	0.655
Int33	-0.074	0.089	-0.829	0.410
PartInt33	0.504	0.114	4.437	0.000

TABLE 36: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
46%	35%	11%

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FIGURE 14: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)
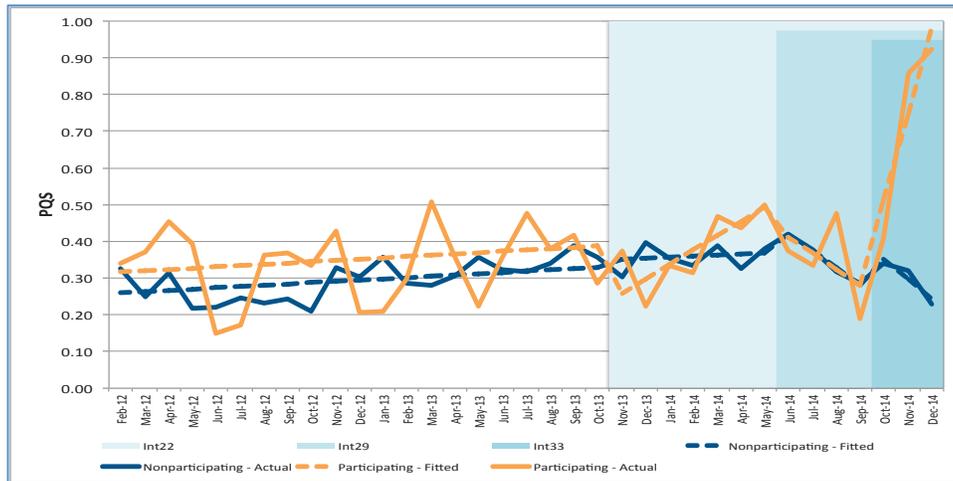
TABLE 37: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	1.120	14.000	0.080	11.400	0.000
Residual	0.386	55.000	0.007		
Total	1.506	69.000			
R-Square			0.744		
Adjusted R-Square			0.678		

TABLE 38: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.256	0.027	9.521	0.000
MoNo	0.004	0.002	1.752	0.085
isPart	0.057	0.024	2.404	0.020
Int22	0.018	0.079	0.223	0.825
Time22	0.000	0.017	-0.021	0.984
PartInt22	-0.186	0.108	-1.720	0.091
PartTime22	0.036	0.024	1.535	0.131
Int29	0.097	0.124	0.781	0.438
Time29	-0.050	0.045	-1.097	0.277
PartInt29	-0.137	0.182	-0.753	0.455
PartTime29	-0.033	0.064	-0.521	0.604
Int33	0.126	0.182	0.694	0.490
Time33	-0.008	0.088	-0.094	0.925
PartInt33	-0.127	0.232	-0.548	0.586
PartTime33	0.286	0.111	2.573	0.013

TABLE 39: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
45%	34%	10%

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Under the forecasted baseline approach, the forecasted baseline appears reasonable. However, it is important to emphasize that because of the variability in the historical time-series, the forecast model for all forecast of PQS is, as noted earlier, exponential smoothing. Such a model essentially derives the forecast as the last data point before the beginning of the intervention period in November 2013. That is, because of the "noise" in the data, the forecasting approach was unable to detect seasonality or trend for any product category—it only detected a level. Thus, while the forecast seems reasonable for the air cleaner category, it is because the last non-trial-period data point happens to occupy a point near the middle of the overall range of variability. For other product categories presented in the Appendix E, this is not the case and the forecasts result in some extreme predictions (e.g., see Blu-Ray players: Figure 20, compact refrigerators: Figure 23, and very large refrigerators Figure 25).

With regards to the forecasted baseline approach it is also notable that the actual plotted PQS values for the 2014 holiday season interventions lie outside the 95% confidence interval for the forecast, indicating that the difference between the PQS during November and December 2014 and the forecasted baseline is statistically significantly different than the forecast. Under the **forecasted baseline approach**, taking the difference between the mean actual monthly PQS values during the trial period and the forecasted counterfactual baseline results in a **positive net program effect of 16%** for the air cleaner (<100 CADR) category.

Under the participant-only modified step regression approach (see Figure 11), we see that the model fits the data reasonably well (the dark blue line in the figure denoted "With-Program"), capturing general level shifts in the trial-period series. Overall, the with-program regression has an adjusted R-square of 0.535. In addition, the coefficients table shows that the coefficient for Int33 is highly significant, suggesting the interventions implemented after the 33rd month of the series (October 2014) have effects that are statistically significantly associated with increases in the PQS. Likewise, the regression depicting the "Without-Program" condition (the light blue plotted line that was derived by computing predicted values only using the intercept and slope terms) also fits the data reasonably well. Under the **participant-only modified step regression approach**, taking the difference between the mean monthly predicted PQS values over the trial period for the with-program and without-program conditions results in a **positive net program effect of 4%** for the air cleaner (<100 CADR) category.

Under the participant-only segmented regression approach (see Figure 12), we also see that the model fits the data well (adjusted R-square of 0.657). The model also detected the significant positive association between PQS and the interventions starting in October 2014. Under the **participant-only segmented regression approach**, taking the difference between the mean monthly predicted PQS values over the trial period for the with-program and without-program conditions results in a **positive net program effect of 5%** for the air cleaner (<100 CADR) category.

Using the more robust comparison-based modified step regression (see Figure 13), we see that both the participating (orange lines) and nonparticipating (blue lines) sales data series are fitted well to the actual data (solid lines represent actual PQS values; dashed lines represent fitted values). The adjusted R-square is 0.571 and the model detects a highly statistically significant association between the PQS and the PartInt33 coefficient (the coefficient represents the incremental effect of the interventions that began in the 33rd month of the series that are attributable to being a participating store). Under the **comparison-based modified step regression approach**, taking the difference between

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the mean monthly predicted PQS values over the trial period for the with-program and without-program conditions results in a **positive net program effect of 11%** for the air cleaner (<100 CADR) category.

Finally, the comparison-based segmented regression also fits the data quite well (see Figure 14), with an adjusted R-Square of 0.678. This model also detects a statically significant positive association between the PQS and the interventions that began in the 33rd month (PartTime33 coefficient p=0.013). Under the **comparison-based segmented regression approach**, taking the difference between the mean monthly predicted PQS values over the trial period for the with-program and without-program conditions results in a **positive net program effect of 10%** for the air cleaner (<100 CADR) category.

In all cases the predicted models fit the actual data reasonably well. Also, under all of the approaches the models showed a significant association between PQS and the interventions implemented during the 2014 holiday season. This suggests that the models considered are doing what we generally want them to do—predicting the patterns of sales and detecting any significant program effects.[30] However, the estimates of net effects of the program varied quite a bit across the different approaches, ranging from 4% with the participant-only modified step regression to 16% using the forecasted baseline approach (this includes the difference-in-differences approach presented in the previous section of this report). Results vary even more dramatically across the approaches for other product categories.

Table 40 presents the mean monthly PQS values (for the trial period) for all the product categories under all the approaches; Table 41 shows the estimated net effects computed under each modeling approach including the difference-in-differences approach. Evident from these tables is the overall variability across the different approaches. The greatest variability is associated with the compact refrigerator category, where the difference-in-differences approach resulted in a net effect of +14% and the forecasted baseline approach resulted in a net effect of -57%, for a total range of 71%. The medium refrigerator category revealed the least variability, with a total range of 5% (7% using the participant-only segmented regression approach; 1% using the forecasted baseline approach).

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[30] With regards to "detecting program effects," it is worth emphasizing that the evaluation team admittedly selected a product category with a rather large known effect for this illustration. While all the air cleaner models were able to detect an effect of the particular intervention, this is not necessarily the case for all interventions or all the models for all the product types. Nevertheless, the overall evidence suggests these general approaches are suitable for detecting at least some interventions.

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TABLE 40: MEAN MONTHLY PQS VALUES DURING THE RPP TRIAL PERIOD

| Product | Class | Forecasted Baseline | | Participant-Only | | | | Comparison-Based | | | |
| | | | | Modified Step | | Segmented | | Modified Step | | Segmented | |
		Actual	Forecast	With Program	Without Program	With Program	Without Program	Part	NonPart	Part	NonPart
Air Cleaner	<100 CADR	49%	33%	46%	42%	45%	39%	46%	35%	45%	34%
DVD/Blu-Ray	Blu-Ray	67%	71%	66%	89%	68%	101%	66%	66%	68%	66%
DVD/Blu-Ray	DVD	18%	14%	18%	11%	19%	9%	18%	18%	19%	19%
Freezer	Chest	3%	3%	3%	1%	3%	0%	3%	3%	3%	3%
Refrigerator	Compact	23%	80%	14%	51%	13%	50%	14%	6%	13%	6%
Refrigerator	Medium	5%	4%	6%	0%	6%	-1%	6%	3%	6%	3%
Refrigerator	Very Large	44%	100%	47%	60%	50%	80%	47%	41%	50%	47%
HTiB	Sound Bars	54%	36%	52%	33%	49%	46%	52%	51%	49%	47%
Room ACs	<12,000 BTU	21%	26%	29%	28%	28%	28%	29%	15%	28%	11%

TABLE 41: ESTIMATED NET PROGRAM EFFECTS ON PQS

| Product | Class | Participant-Only | | | Comparison-Based | | |
		Forecasted Baseline	Modified Step	Segmented	Modified Step	Segmented	DID
Air Cleaner	<100 CADR	16%	4%	5%	11%	10%	9%
DVD/Blu-Ray	Blu-Ray	-4%	-24%	-33%	-1%	1%	2%
DVD/Blu-Ray	DVD	4%	7%	10%	1%	1%	3%
Freezer	Chest	1%	3%	3%	1%	1%	-1%
Refrigerator	Compact	-57%	-38%	-37%	8%	7%	14%
Refrigerator	Medium	1%	6%	7%	3%	3%	2%
Refrigerator	Very Large	-56%	-13%	-30%	6%	3%	4%
HTiB	Sound Bars	18%	18%	3%	1%	1%	4%
Room Air Conditioners	<12,000 BTU	-5%	1%	-1%	14%	17%	14%

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That all said, the comparison-group-based approaches are certainly the strongest and most robust approaches, even though there are questions as to whether these options will be available in the future. Looking only at the comparison-based results we see a much greater level of consistency, with the general pattern indicating there were likely positive program-related effects in all but the chest freezer product category (and possibly the standard DVD player category). Ultimately, however, **if we had to select a single approach for this particular evaluation, the evaluation team would select the comparison-based modified step regression results**. These models fit the data reasonably well, but are also the most parsimonious of the modeling approaches. The comparison-based segmented regression models are far more complex and have fewer degrees of freedom due to the number of variables in the models. The difference-in-differences is a relatively coarse approach because it does not incorporate the month-to-month variability inherent in the sales data nor any of the program interventions. This is not to say, however, that any of these models should be abandoned for future evaluations; we believe they all—including the participant-only designs—could be useful in the future as the program scales up.

PRELIMINARY FIRST-YEAR AND LIFETIME EX POST GROSS AND NET SAVINGS

As part of this overall evaluation effort, the evaluation team also estimated the preliminary ex post gross energy and demand savings resulting from the RPP Trial. These values are considered "preliminary ex post savings" because the evaluation team recognizes that the CPUC-ED is responsible for conducting the ex post impact evaluations for energy efficiency programs in the State of California.

Note that while achieving energy and demand savings from this program were noted earlier as performance objectives, these savings were never expected to be substantial given that the trial was small (only 26 participating stores), the retailer was going through a challenging period financially, and the retailer has a price-point focused target customer base that is not notably driven by energy efficiency. Also, even though the Trial occurred over a 14-month period, results presented elsewhere in this report indicated that the Trial took a while to gain momentum, and major promotional activities did not occur for the first several months, and substantial changes in product assortment were not possible.

Table 42 presents the preliminary first-year ex post gross energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial with the single participating retailer. The results are presented for PG&E, SMUD, and combined.

The first-year gross savings values were derived by taking the per-unit UES values derived for each product class as described in the *Methods* chapter of this report, and multiplying the values times the quantity sold for each product class. As such, the RPP Trial resulted in total first-year gross energy savings of 126,172.2 kWh (119,389.5 kWh for PG&E; 6,782.7 kWh for SMUD). First-year gross demand savings totaled 15.9 kW (15.2 kW for PG&E; 0.7 kW for SMUD).

Table 43 presents the preliminary lifetime ex post gross energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial. The lifetime savings were derived by taking UES values and multiplying them by the effective useful life (EUL) values for each of the product classes and multiplying this product by the total number of units sold for each product class. The RPP Trial resulted in lifetime gross energy savings total of 1,030,340.1 kWh (981,257.1 kWh for PG&E; 49,083.0 kWh for SMUD). Lifetime gross demand savings totaled 156.0 kW (149.7 kW for PG&E; 6.3 kW for SMUD).

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Table 44 presents the preliminary first-year ex post net energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial. The net savings were estimated using the net program effects based on the comparison-based modified step regressions. Total preliminary first-year ex post net energy savings from the trial were 6,664.5 kWh (6,400.1 kWh for PG&E; 264.4 kWh for SMUD). Preliminary first-year ex post demand savings were 1.8 kW (1.7 kW for PG&E; 0.01 kW for SMUD).

Table 45 presents the preliminary lifetime ex post net energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial. The net savings were estimated using the net program effects based on the comparison-based modified step regressions. Total preliminary lifetime ex post net energy savings from the trial was 64,547.1 kWh (62,123.9 kWh for PG&E; 2,423.2 kWh for SMUD). Preliminary lifetime ex post demand savings was 17.0 kW (16.3 kW for PG&E; 0.8 kW for SMUD).

Taking the total portfolio net kWh from Table 44 and the total portfolio gross kWh from Table 42, the evaluation team estimates the partial leading indicator net-to-gross ratio (PLI-NTGR)[31] is:

6,664.5 kWh/ 126,172.2 kWh= **0.0528**

For PG&E the PLI-NTGR is:

6,400.1 kWh/ 119,389.5 kWh= **0.0536**

For SMUD the PLI-NTGR ratio is:

264.45 kWh/ 6,782.7 kWh= **0.0390**

Readers should not misinterpret the net savings values and the PLI-NTGR of 5%. As discussed numerous times throughout this evaluation report, first-year savings from this trial for this market transformation program were not expected to be substantial. The retailer did not have the opportunity to make notable changes to their product assortment and all the net effects are essentially due to marketing and promotional activities. As such, one way to view the PLI-NTGR is that a 5% lift was achieved solely through promotions. The main point to emphasize, however, is that with a longer-term implementation of a larger-scale RPP Program, the net-to-gross ratio is expected to increase substantially once retailers *do* have the opportunity to assort a greater proportion of energy efficient models. In addition, in conjunction with the RPP Program theory, effects upon the greater market are expected to filter down to *non*participating retailers (i.e., through spillover), which will also contribute to increases in the net-to-gross ratio over time. Finally, it is important to also recognize that for the purposes of the trial, the qualification criteria for program-qualified products was simply set to meeting the minimum ENERGY STAR specification, which also contributed to free ridership as the retailer was already stocking some ENERGY STAR products. Future plans for the program include setting higher efficiency standards to target certain product categories (e.g., ENERGY STAR +X%), which will lead to higher net-to-gross ratios.

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[31] The evaluation team refers to the computed value as the "partial leading indicator net-to-gross-ratio" (PLI-NTGR) because we do not want the reader to misinterpret this value as the overall program NTGR.

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TABLE 42: PRELIMINARY FIRST-YEAR EX POST GROSS PROGRAM SAVINGS

Product Category	Class	UES			Quantity Sold			Preliminary First-Year Ex Post Gross Savings					
								PG&E		SMUD		TOTAL	
		EUL	kWh	kW	PG&E	SMUD	Total	kWh	kW	kWh	kW	kWh	kW
Air Cleaner	<100 CADR	9	114.44	0.01293	179	4	183	20,484.6	2.31	457.8	0.05	20,942.4	2.37
DVD/Blu-Ray	Blu-Ray	4	4.80	0.00005	2,029	142	2,171	9,739.2	0.10	681.6	0.01	10,420.8	0.11
DVD/Blu-Ray	DVD	4	5.90	0.00013	1,271	79	1,350	7,498.9	0.17	466.1	0.01	7,965.0	0.18
HTiB	Sound bar	7	52.60	0.00065	861	72	933	45,288.6	0.56	3,787.2	0.05	49,075.8	0.61
Freezer	Frzr-Chest-ManDef_Large	11	18.60	0.00330	70	0	70	1,302.0	0.23	0.0	0.00	1,302.0	0.23
Refrigerator	Refg-All_CmpMini	14	20.80	0.00380	323	13	336	6,718.4	1.23	270.4	0.05	6,988.8	1.28
Refrigerator	RefgFrz-BM_VLarge	14	52.90	0.00950	4	0	4	211.6	0.04	0.0	0.00	211.6	0.04
Refrigerator	RefgFrz-BM-Ice_VLarge	14	59.90	0.01080	10	0	10	599.0	0.11	0.0	0.00	599.0	0.11
Refrigerator	RefgFrz-SM-TTD_VLarge	14	62.50	0.01130	105	0	105	6,562.5	1.19	0.0	0.00	6,562.5	1.19
Refrigerator	RefgFrz-TM_CmpMini	14	33.00	0.00590	2	0	2	66.0	0.01	0.0	0.00	66.0	0.01
Refrigerator	RefgFrz-TM_Med	14	35.90	0.00670	45	0	45	1,615.5	0.30	0.0	0.00	1,615.5	0.30
Refrigerator	RefgFrz-TM_VLarge	14	41.00	0.00760	10	0	10	410.0	0.08	0.0	0.00	410.0	0.08
Room AC	<12,000 BTU	9	69.98	0.03296	270	16	286	18,893.2	8.90	1,119.6	0.53	20,012.8	9.43
TOTAL					**5,179**	**326**	**5,505**	**119,389.5**	**15.2**	**6,782.7**	**0.7**	**126,172.2**	**15.9**

Note that the total sales volumes shown in this table include the two participating stores that terminated participation in the trial due to unforeseen business circumstances. Some program-qualified units were sold in these stores before they ceased participating and contribute to the gross savings.

TABLE 43: PRELIMINARY LIFETIME EX POST GROSS PROGRAM SAVINGS

Product Category	Class	UES			Quantity Sold			Preliminary Lifetime Ex Post Gross Savings					
								PG&E		SMUD		TOTAL	
		EUL	kWh	kW	PG&E	SMUD	Total	kWh	kW	kWh	kW	kWh	kW
Air Cleaner	<100 CADR	9	114.44		179	4	183	184,361.39	20.83	4,119.81	0.47	188,481.20	21.29
DVD/Blu-Ray	Blu-Ray	4	4.80	0.00005	2,029	142	2,171	38,956.80	0.40	2,726.40	0.03	41,683.20	0.43
DVD/Blu-Ray	DVD	4	5.90	0.00013	1,271	79	1,350	29,995.60	0.66	1,864.40	0.04	31,860.00	0.70
HTiB	Sound bar	7	52.60	0.00065	861	72	933	317,020.20	3.92	26,510.40	0.33	343,530.60	4.25
Freezer	Frzr-Chest-ManDef_Large	11	18.60	0.00330	70	0	70	14,322.00	2.54	0.00	0.00	14,322.00	2.54
Refrigerator	Refg-All_CmpMini	14	20.80	0.00380	323	13	336	94,057.60	17.18	3,785.60	0.69	97,843.20	17.88
Refrigerator	RefgFrz-BM_VLarge	14	52.90	0.00950	4	0	4	2,962.40	0.53	0.00	0.00	2,962.40	0.53
Refrigerator	RefgFrz-BM-Ice_VLarge	14	59.90	0.01080	10	0	10	8,386.00	1.51	0.00	0.00	8,386.00	1.51
Refrigerator	RefgFrz-SM-TTD_VLarge	14	62.50	0.01130	105	0	105	91,875.00	16.61	0.00	0.00	91,875.00	16.61
Refrigerator	RefgFrz-TM_CmpMini	14	33.00	0.00590	2	0	2	924.00	0.17	0.00	0.00	924.00	0.17
Refrigerator	RefgFrz-TM_Med	14	35.90	0.00670	45	0	45	22,617.00	4.22	0.00	0.00	22,617.00	4.22
Refrigerator	RefgFrz-TM_VLarge	14	41.00	0.00760	10	0	10	5,740.00	1.06	0.00	0.00	5,740.00	1.06
Room AC	<12,000 BTU	9	69.98		270	16	286	170,039.09	80.09	10,076.39	4.75	180,115.48	84.83
TOTAL					**5,179**	**326**	**5,505**	**981,257.1**	**149.7**	**49,083.0**	**6.3**	**1,030,340.1**	**156.0**

Note that the total sales volumes shown in this table include the two participating stores that terminated participation in the trial due to unforeseen business circumstances. Some program-qualified units were sold in these stores before they ceased participating and contribute to the gross savings.

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TABLE 44: PRELIMINARY FIRST-YEAR EX POST NET PROGRAM SAVINGS

Product Category	Class	Net Effect	Preliminary First-Year Ex Post Net Savings					
			PG&E		SMUD		TOTAL	
			kWh	kW	kWh	kW	kWh	kW
Air Cleaner	<100 CADR	0.11	2,253.31	0.2546	50.35	0.0057	2,303.66	0.2603
DVD/Blu-Ray	Blu-Ray	-0.01	-97.39	-0.0010	-6.82	-0.0001	-104.21	-0.0011
DVD/Blu-Ray	DVD	0.01	74.99	0.0017	4.66	0.0001	79.65	0.0018
HTiB	Sound bar	0.01	452.89	0.0056	37.87	0.0005	490.76	0.0061
Freezer	Frzr-Chest-ManDef_Large	0.01	13.02	0.0023	0.00	0.0000	13.02	0.0023
Refrigerator	Refg-All_CmpMini	0.08	537.47	0.0982	21.63	0.0040	559.10	0.1021
Refrigerator	RefgFrz-BM_VLarge	0.06	12.70	0.0023	0.00	0.0000	12.70	0.0023
Refrigerator	RefgFrz-BM-Ice_VLarge	0.06	35.94	0.0065	0.00	0.0000	35.94	0.0065
Refrigerator	RefgFrz-SM-TTD_VLarge	0.06	393.75	0.0712	0.00	0.0000	393.75	0.0712
Refrigerator	RefgFrz-TM_CmpMini	0.08	5.28	0.0009	0.00	0.0000	5.28	0.0009
Refrigerator	RefgFrz-TM_Med	0.03	48.47	0.0090	0.00	0.0000	48.47	0.0090
Refrigerator	RefgFrz-TM_VLarge	0.06	24.60	0.0046	0.00	0.0000	24.60	0.0046
Room AC	<12,000 BTU	0.14	2,645.05	1.2458	156.74	0.0738	2,801.80	1.3196
TOTAL			**6,400.1**	**1.7**	**264.4**	**0.1**	**6,664.5**	**1.8**

TABLE 45: PRELIMINARY FIRST-YEAR EX POST NET PROGRAM SAVINGS

Product Category	Class	Net Effect	Preliminary First-Year Ex Post Net Savings					
			PG&E		SMUD		TOTAL	
			kWh	kW	kWh	kW	kWh	kW
Air Cleaner	<100 CADR	0.11	20,279.75	2.2911	453.18	0.0512	20,732.93	2.3423
DVD/Blu-Ray	Blu-Ray	-0.01	-389.57	-0.0040	-27.26	-0.0003	-416.83	-0.0043
DVD/Blu-Ray	DVD	0.01	299.96	0.0066	18.64	0.0004	318.60	0.0070
HTiB	Sound bar	0.01	3,170.20	0.0392	265.10	0.0033	3,435.31	0.0425
Freezer	Frzr-Chest-ManDef_Large	0.01	143.22	0.0254	0.00	0.0000	143.22	0.0254
Refrigerator	Refg-All_CmpMini	0.08	7,524.61	1.3747	302.85	0.0553	7,827.46	1.4300
Refrigerator	RefgFrz-BM_VLarge	0.06	177.74	0.0319	0.00	0.0000	177.74	0.0319
Refrigerator	RefgFrz-BM-Ice_VLarge	0.06	503.16	0.0907	0.00	0.0000	503.16	0.0907
Refrigerator	RefgFrz-SM-TTD_VLarge	0.06	5,512.50	0.9967	0.00	0.0000	5,512.50	0.9967
Refrigerator	RefgFrz-TM_CmpMini	0.08	73.92	0.0132	0.00	0.0000	73.92	0.0132
Refrigerator	RefgFrz-TM_Med	0.03	678.51	0.1266	0.00	0.0000	678.51	0.1266
Refrigerator	RefgFrz-TM_VLarge	0.06	344.40	0.0638	0.00	0.0000	344.40	0.0638
Room AC	<12,000 BTU	0.14	23,805.47	11.2124	1,410.69	0.6644	25,216.17	11.8768
TOTAL			**62,123.9**	**16.3**	**2,423.2**	**0.8**	**64,547.1**	**17.0**

SYNTHESIS AND DISCUSSION OF EVALUATION OBJECTIVES

This chapter of the evaluation report synthesizes the key findings of the evaluation in the context of responding to each of the study's performance, operational, and evaluation objectives.

STUDY OBJECTIVES

PERFORMANCE OBJECTIVES

PO1: ACHIEVE AN INCREASE IN THE PROGRAM-QUALIFIED SHARE IN TARGETED PRODUCT CATEGORIES AMONG PARTICIPATING RETAILERS.

The primary performance metric used for this evaluation was the program-qualified share (PQS), which is computed as the total number of program-qualified units sold within a product class divided by the total number of units sold (both qualified and nonqualified) in the product class.

The PQS values were assessed using an array of quasi-experimental approaches and most of the approaches resulted in positive net effects for the product categories targeted in the trial. However, for some products, the participant-only approaches (i.e., forecasted baseline and participant-only regressions) resulted in negative effects. The evaluation team, however, feels historical data patterns or data quality issues that cannot easily be captured with the participant-only designs drove these negative results (also see the discussion about Evaluation Objective 1 later in this chapter). That said, the strongest and most robust approaches are the quasi-experimental comparison-based designs, and the results from these approaches were generally consistent with each other (see Table 41). Ultimately, the evaluation team chose the comparison-based modified step regression results as estimates of the net program effects. Overall, based on the comparison-based modified step regression results, the evidence suggests the trial resulted in increased PQS for all but one of the targeted product categories (Blu-Ray players excepted) within the participating retailer.

PO2: ACHIEVE GROSS AND NET ENERGY AND DEMAND REDUCTIONS ASSOCIATED WITH THE SALES OF PROGRAM-QUALIFIED MODELS IN TARGETED PRODUCT CATEGORIES AMONG PARTICIPATING RETAILERS.

Though achieving energy and demand savings is a key performance goal for the RPP Program, achieving substantial energy and demand savings was not a primary goal of this trial; the focus was more on operationalizing and refining the implementation of the program. With regards to energy and demand savings, the main goal of the evaluation efforts was to develop a systematic, transparent, valid, and cost-effective manner of estimating savings. That all said, this small-scale trial did result in some energy and demand savings.

Table 42 presented the preliminary first-year ex post gross energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial. The RPP Trial resulted in total first-

year gross energy savings of 126,172.2 kWh (119,389.5 kWh for PG&E; 6,782.7 kWh for SMUD). First-year gross demand savings totaled 15.9 kW (15.2 kW for PG&E; 0.7 kW for SMUD).

Table 43 presented the preliminary lifetime ex post gross energy (MWh) and demand (MW) program savings resulting from the 14-month RPP Trial. The RPP Trial resulted in lifetime gross energy savings total of 1,030,340.1 kWh (981,257.1 kWh for PG&E; 49,083.0 kWh for SMUD). Lifetime gross demand savings totaled 156.0 kW (149.7 kW for PG&E; 6.3 kW for SMUD).

Table 44 presented the preliminary first-year ex post net energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial. Total preliminary first-year ex post net energy savings from the trial were 6,664.5 kWh (6,400.1 kWh for PG&E; 264.4 kWh for SMUD). Preliminary first-year ex post demand savings were 1.8 kW (1.7 kW for PG&E; 0.01 kW for SMUD).

Table 45 presents the preliminary lifetime ex post net energy (kWh) and demand (kW) program savings resulting from the 14-month RPP Trial. Total preliminary lifetime ex post net energy savings from the trial was 64,547.1 kWh (62,123.9 kWh for PG&E; 2,423.2 kWh for SMUD). Preliminary lifetime ex post demand savings was 17.0 kW (16.3 kW for PG&E; 0.8 kW for SMUD).

To prevent readers from miss-interpreting the net savings values and the net-to-gross ratio of 5%, some discussion is warranted. As discussed numerous times throughout this evaluation report, first-year savings from this trial for this market transformation program were not expected to be substantial. The retailer did not have the opportunity to make notable changes to their product assortment due to retailer buying cycles, and all the net effects are essentially due to marketing and promotional activities implemented during the trial. As such, one way to view the net-to-gross ratio is that a 5% lift was achieved solely through promotions. The main point to emphasize, however, is that with a longer-term implementation of the scaled-up RPP Program, over time the net-to-gross ratio is expected to increase substantially once retailers *do* have the opportunity to assort a greater proportion of energy efficient models and the program begins to affect *non*participating retailer sales. Additionally, for the purposes of the trial, the qualification criteria for program-qualified products was simply set to meeting the minimum ENERGY STAR specification, which also contributed to high levels of free ridership and low net-to-gross ratios. As the program advances, higher efficiency standards will be used to target certain product categories (e.g., ENERGY STAR +X%), which should lead to higher net-to-gross ratios.

OPERATIONAL OBJECTIVES

OO1: PARTICIPATING RETAILER DEVELOPS STRATEGIC PLAN TO SELL TARGETED PRODUCTS.

The participating retailer did develop plans and strategies to sell promote and increase sales of the targeted product categories. However, there were significant delays in getting these plans developed and in place. Other than a price reduction for freezers and refrigerators (which began in December 2013) and the development of an in-store broadcast (which began in November 2013), not much was done to promote products in stores until March 2014, when the first promotional flyer (with its associated price reduction and signage) was implemented. After that, additional plans for promotions were introduced and implemented periodically through the end of December 2014, when the Trial ended.

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As the *Retailer Marketing Activity Review* section of this report showed, the retailer's promotions included a broad mix of price reductions, reward points, promotional flyers, product-specific signage, and ENERGY STAR signage to promote program-qualified models.

During the debrief with the implementation team, it became apparent that the implementation team helped drive the development of some of the more successful interventions that occurred later in the year. They also suggested that moving ahead, retailers might need more support for such activities than was originally expected when the program was originally conceived and launched. However, it remains to be seen if this is true—or to what degree it may apply—once the program is scaled up and retailers have the opportunity to reap greater rewards from the program. The overall size of the incentives for a full-scale implementation may provide enough motivation for retailers to allocate adequate resources to develop promotional strategies. However, if this is not the case the program should be prepared to help support retailers in these efforts.

In the future, it will be in the program's best interest to have retailers develop and begin implementing them—as soon as possible after joining the program. Months of inactivity will negatively impact net-to-gross ratios, as the utility will be paying incentives on "business as usual" sales of program-qualified models (i.e., freeriders).

OO2: PARTICIPATING RETAILER FAITHFULLY IMPLEMENTS THE STRATEGIC PLAN DESIGNED TO SELL TARGETED PRODUCTS.

There was evidence to conclude that the retailer implemented the plans they developed (i.e., promotional flyers, signage, photos provided by the in-store shelf survey field team, etc.). However, there is also evidence from the shelf surveys and the retailer buyer interviews to suggest the plans were not always implemented consistently across all the participating stores.

The second wave of shelf surveys were conducted in November 2014 when the retailer implementation plans suggested the room air cleaners were supposed to be promoted as a "hero" item. The room air cleaners were supposed to be displayed in bulk stack manner, with promotional signage and price promotions ("the lowest price ever"). However, the shelf survey results revealed that of the 23 stores that stocked air cleaners, all had the hero item in stock, but six stores did not have the model on sale, and 15 of the stores had no promotional signage associated with the model.

The retailer buyer interviews also alluded to this same issue when the consumer electronics buyer indicated that getting the stores to implement the promotions consistently was one of the greatest challenges to implementing the program, along with ensuring they had the right inventory in a timely manner.

All of this, however, is not a new finding. Both the implementation team and the program team recognize that more will need to be done moving ahead to help support the retailers in implementing their marketing activities to realize the full potential of the program. During the program staff debrief, the PG&E program manager underscored this point, stating that the utilities need to recognize that they are like any other vendor working in the retail environment, and need to provide the needed support to the retailer to help sell their "product". In this case, the product is energy efficiency and the RPP Program.

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OO3: OPERATIONALIZE ACTIVITY A THROUGH OUTPUT F DENOTED IN THE LOGIC MODEL.

Activity A through Output F of the RPP Program logic model focus on administrative tasks conducted mainly by PG&E staff and the implementation team, though other stakeholders such as other retailers, utilities, and utility partners play a part. Activity A through Output F of the RPP Program logic model include:

- Activity A: PG&E characterizes markets and estimate savings potential for candidate product
- Activity B: PG&E contacts utility partners regarding collaboration in Program delivery
- Output C: Utility partners recruited
- Activity D: PG&E and utility partners determine which retailers to recruit
- Activity E: PG&E, utility partners, and identified retailers target product categories with energy savings potential
- Output F: PG&E and utility partners determine incentive levels for program-qualified models within each product category, present them to retailers, and sign contracts

The evaluations team feels the Salesforce data review provided evidence that these activities and outputs were operationalized. The evaluation team found significant evidence of PG&E and implementation staff reaching out to potential utility partners and collaborating with the retailer to implement retailer implementation plans. There was also evidence of activities supporting logic model components A, C, D, E, and F, but with relatively fewer records. This does not mean, however, that these latter logic model components were supported any less. The nature of many of these logic model components does not lend itself to email interactions. For example, logic model component Activity A likely included a significant amount of Internet research and secondary data review. The Salesforce database also focused only on email exchanges, and the wide range of other communications and collaborative efforts (e.g., meetings, phone calls, web conferences, presentations, etc.) were not always captured.

OO4: ESTABLISH DATA PROCESSING, QA/QC, AND ANALYSIS METHODOLOGY

OO5: IDENTIFY VARIABLES THAT SHOULD BE TRACKED BY THE RPP PROGRAM.

Operational Objectives 4 and 5 are inherently related. The RPP Program staff worked closely with the implementation team, evaluation team, and the data service provider to develop data processing, QA/QC procedures, and analysis methodologies for the RPP Program (see the *Data Management and Processing* section of the *Methods* chapter of this report). While some of this effort was targeted at refining the processing and conducting QA/QC of the raw data files provided by the retailer, other efforts were targeted at implementing QA/QC of the processed data files, and yet other efforts were targeted at defining methodologies for incorporating energy consumption and energy savings estimates into the processed data. In the process of implementing all these efforts, a good understanding has been developed regarding the array of variables and information that needs to be tracked to facilitate implementation and evaluation of the RPP Program. Our current understanding of the variables and information that are needed to implement and evaluate this program were discussed throughout this report.

Some of the more important variables are UECs, UESs, and effective useful lives. PG&E and the contractors worked closely with the California Technical Forum (CalTF) in developing the white paper "*Calculation Methodology for Unit Energy Consumption (UEC) and Unit Energy Savings (UES) for the Retail Plug-Load Portfolio (RPP) Program*" (Malinick et. al., 2015). The team gave several presentations to the CalTF covering these approaches, methods, and

procedures, and whitepaper was revised based on the CalTF input. The workpaper for the RPP Program, which relied on the whitepaper, is currently under development and has received preliminary approval from the CalTF, pending the addition of some final. The plan is to present the final workpaper to the CalTF for approval in May 2015.

With respect to program administration, PG&E staff has worked closely with the data service provider to refine the process for developing the reports upon which incentive payments are based. Communications with PG&E staff have suggested this has been a time consuming process, but significant improvements have been made and errors that occurred early on in the Trial have been resolved. That said, the process needs to be monitored as the program scales up to ensure it operates accurately and efficiently.

The program team is also gaining a better understanding of the array of different secondary data and information that is needed to assess the overall market for home appliances and consumer electronics. While some useful information is available from ENERGY STAR with regards to information such as efficiency standards and market share, obtaining regional and national market share data at the level of granularity needed to support planning and evaluation remains one of the biggest hurdles. However, PG&E is currently working with the NPD Group to obtain a bid for market level data for the product categories they can supply (consumer electronics). PG&E is also reaching out to other organizations such as the Association of Home Appliance Manufacturers (AHAM) to explore data availability for other product categories.

In addition to the issue of secondary data availability, PG&E program staff indicated there are also some concerns regarding the cost of this data. The RPP Program is built on the notion that this program can be delivered, administered, and evaluated in a cost-effective manner. However, data from the NPD Group is likely to be extremely expensive. Knowing that multiple stakeholders—including the CPUC-ED for their official ex post impact evaluations and other utilities or utility partners who may implement the program in other jurisdictions—will need this data, PG&E staff are eager to understand how cost-sharing agreements might be developed to overcome the logistical and legal hurdles. This is an area that will likely receive significant attention in the near future.

OO6: CONTINUE BUILDING RELATIONSHIPS WITH OTHER PROGRAM PARTNERS SUCH AS SMUD, NEEA, AND OTHER UTILITIES AND ORGANIZATIONS FOR FUTURE PARTNERSHIPS.

PG&E staff and the implementation team have made significant strides in building and fostering relationships with other stakeholders and organizations. PG&E and the implementation team are currently teaming with ENERGY STAR to launch an ENERGY STAR-sponsored multi-regional RPP Program in 2015 across the nation.

To-date, numerous utilities and utility partners have indicated interest in participating in the 2015 ENERGY STAR-sponsored program, including the Northwest Energy Efficiency Alliance (NEEA), the Northeast Energy Efficiency Partnership (NEEP), Southern California Edison (SCE), Sacramento Municipal Utility District (SMUD), Southern California Gas (SoCal Gas), San Diego Gas & Electric (SDG&E), DC Sustainable Energy Utility (DC SEU), and Efficiency Vermont. Others have indicated interest in developing filings for participation in 2016, including Baltimore Gas & Electric (BGE), DTE Energy, PEPCO Holdings, New Jersey's Clean Energy Program (NJCEP), the Southern Maryland Electric Cooperative (SMECO), Eversource, UIL Holdings, and Xcel Energy. Task forces have also been developed around the ENERGY STAR initiative to facilitate collaboration and communication among the various stakeholders. Additionally, the program and implementation team continue to reach out to enlist other potential partners and stakeholders.

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OO7: INCREASE RETAILER AWARENESS OF PROMOTING, SELLING, AND/OR STOCKING PRODUCTS BASED ON ENERGY EFFICIENCY CRITERIA.

From the baseline interview with the retailer's home appliance buyer, it was clear that they were very aware of energy efficiency. They were familiar with ENERGY STAR specifications and were also aware, unprompted, that the Department of Energy federal standards for refrigerators and freezers was going to be changing soon. Though they were aware of general energy efficiency, none of the buyers during the baseline interview or at the follow-up interview were familiar with the energy consumption of specific models.

At follow-up, both the home appliance and consumer electronics buyers indicated that energy efficiency had not been a factor in any of their purchasing decisions prior to the program. However, because of the program they were more aware of energy efficiency and it has been incorporated into some buying decisions during the trial. The appliance buyer gave an example of a specific model of ENERGY STAR refrigerator that he added to their assortment specifically for the trial. When asked if he would have added the new model of refrigerator to their product assortment in the absence of the program, he responded "absolutely not."

At follow-up, when asked how much the energy efficiency of a model would factor into their buying decisions moving ahead, in the absence of the program, the home appliance buyer replied that it would likely factor in "very little," as they are still a price-point focused retailer. In contrast, the consumer electronics buyer indicated now that because she is more conscientious about ENERGY STAR and energy efficiency in general, she will be incorporating these both into her future buying decisions. She indicated that while the purchasing criteria would not be formally modified to include ENERGY STAR and energy efficiency, she would personally be more alert to opportunities.

This difference in attitudes toward energy efficiency is possibly due to the different characteristics for these two product categories. Home appliances are generally more costly than consumer electronics. The incremental cost of ENERGY STAR appliances are likely higher than ENERGY STAR electronics, and while the appliance buyer feels this cost difference affects a buyers decision, it is less of a hurdle for the consumer electronics buyer.

It was reiterated in all of the retailer interviews (including the buyers, marketer, corporate leadership team, and store managers) that the retailer target population is primarily driven by cost. As such, incorporating energy efficiency into this particular retailer's future buying decisions absent the program will be a challenge as energy efficient products typically cost more. The baseline interviews with store managers suggested that while they feel that a significant proportion of their customers are aware of energy efficiency and ENERGY STAR, most are still focused on the less expensive models. However, this may be a little different with home appliances, where one store manager indicated, "roughly 50% of customers that shop appliances know that they want an ENERGY STAR product." To some degree they felt this might be driven by the past availability of rebates for appliances, but it might also reflect the fact that appliances generally consume significantly more energy than smaller electronic devices. In some ways this may represent the bigger problem with plug load— that is, many people in the general population do not recognize the aggregate effect on residential energy consumption of all the smaller electronic devices they have in their home. Educating customers on the growing energy use of all plug loads, rather than the energy use of any one device, might be a better way to change customer attitudes and could possibly be leveraged as a marketing message to incorporate into RPP Program promotions.

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Overall, this particular retailer may be in a unique situation, due to their price-focused target population, that limits their ability to factor energy efficiency into their product purchasing decisions. Nevertheless, when considering a scaled-up RPP Program, these findings may actually point to significant opportunity to affect the plug load market by raising greater awareness around the energy efficiency of products, not just among the actors in the retail population who are responsible for purchasing and assorting the products, but also among the general population who ultimately purchase them.

EVALUATION OBJECTIVES

EO1: TEST VARIOUS METHODS TO EVALUATE THE RPP TRIAL.

The evaluation team applied an array of different approaches and methods to the evaluation of the RPP Trial. Some of these approaches were non-experimental and focused on the process evaluation (i.e., assessing various aspects of the program implementation and operations as well as validating certain components of the program logic model). Other approaches were quasi-experimental and focused on the impact evaluation (i.e., assessing the program effects and impacts). Several important lessons were learned through this evaluation.

Process Evaluation Methods

First, though the Salesforce data review helped to understand communications that the implementation team initiated or participated in, it reflects only one limited aspect of the communications that are needed to support the program. By focusing just on the implementation team's communications, we run the risk of failing to capture a wide range of other interactions that can prove useful for assessing the communication network of the various stakeholders and other parties. Additionally, the processing and analysis of the Salesforce data is very time and resource intensive, as it requires extensive review of large numbers of textual entries.

To make the Salesforce data review more meaningful and efficient, it would require some changes. First, a greater number of stakeholders would need access to Salesforce in order to log entries so we could capture communications along a broader range of actors. This, in itself, may be problematic due to cost-prohibitive licensing requirements for gaining access to the Salesforce software. Second, the email logging process should be automated to ensure that relevant emails are not accidentally left out. Finally, Salesforce reporting should be optimized so that key pieces of data are automatically pulled out of the email records. This would reduce the time needed to review each record. If Salesforce continues to be used as a source of information for evaluation purposes, taking these steps would lead to a more refined and systematic process for logging entries that would facilitate less resource-intensive review and analysis and ensure a more holistic and comprehensive data set.

That all said, the evaluation team feels there are probably better ways to get at similar information in a more systematic, cost-effective, and timely manner. One recommendation would be to develop and implement a brief, quarterly web-based survey to actors engaged in RPP-related communications. This survey could ask the actors who they have communicated with about the RPP Program and/or shared resources, how frequently, what did they discuss/share, and how these communications helped to accomplish the goals of the program. Such an approach would provide much better information on RPP-related communications and would also facilitate a network analysis that could be used to describe, in much richer detail, how RPP is being implemented throughout the marketplace. A web-based survey would also facilitate much easier and less costly analysis as response options

could be used to capture key concepts and analysis would then be predominantly quantitative.

The evaluation team also recommends eliminating the shelf surveys and implementing a different approach of in-store data collection that focuses exclusively on validating that the planned promotional activities are actually taking place. On the plus side, the shelf surveys as implemented for this evaluation did provide useful information regarding the inconsistent implementation of planned marketing across stores during the key promotional event in November 2014. Recall that during November and December 2014 all participating stores were supposed to promote a model of air cleaner as a "hero" item, which consisted of the "lowest price ever," special promotional signing, and unique placement on the sales floor. However, the field team found that about 26% of the stores did not even have the model on sale, and roughly 58% of the stores had no promotional signage. The issue of inconsistent store implementation also surfaced in the retailer buyer interviews, when the consumer electronics buyer indicated that one of the greatest challenges faced in implementing the program was getting the stores to do so consistently (along with getting the needed inventory into the stores at the right time).

The remainder of the information gathered through the shelf surveys was of limited value. For example, while the shelf surveys provided some initial insights into some changes that seemed to take place between the baseline and the follow-up, these conclusions were misleading. For example, the shelf survey results showed that between baseline and follow-up the proportion of program-qualified models on the sales floor increased for all the consumer electronics categories. However, subsequent analysis of the sales data showed that while indeed the proportion of program-qualified models in inventory went up, it did so in the nonparticipating stores as well for all these categories. Thus, the net increases observed in the shelf survey data were not entirely (or in some cases not at all) attributable to the program.

Also, because they were only conducted at two points in time, the usefulness of the information garnered through the shelf surveys was further limited (i.e., it only provided two snapshots in time). The evaluation team asked that the field team conduct comprehensive inventories of all the products on the shelves. But because we only had information from two points in time it was hard to draw conclusions from this data. For example, if we found that one store had 10 units of a program-qualified model on the shelf at baseline, and only five units at follow-up, is this a positive or negative finding? On the one hand, it could reflect that the retailer decided to start stocking less of the qualified model, which could be viewed as a negative finding. However, on the other hand, they may only have five units on the shelf at follow-up because the retailer managed to promote and sell most of their inventory, which would be a positive finding. Without knowing what happened in between, and without being able to tie the findings to specific promotional activities, we determined that conducting comprehensive inventories is not very useful. Further, the evaluation team conducted an ancillary analysis that showed that the proportions of models and units on the sales floor did not differ dramatically from the proportions of models and units that appeared in the sales data, so spending resources to count inventory probably not cost effective.

Moving ahead, the evaluation team recommends a different approach to conducting in-store research. Our proposed approach is to inventory the promotional activities provided in the retailers' implementation plans, and then develop a schedule for conducting field team visits that coincides with the promotions. The in-store visits would be limited to verifying that the expected promotions are taking place (i.e., no counting of inventory as this information is

essentially available in the sales data), and if not, the field team can work with store staff to help ensure promotions are taking place as planned. This approach is more in-line with the evolving perspective that the retailers are going to need more support in implementing the RPP Program than originally envisioned. As the RPP Program manager said in the Trial debrief, the utilities need to start looking at themselves as any other "vendor" operating in the retail environment, and they need to provide support to sell their product, which in this case is the program.

The evaluation team feels the usefulness of the store manager surveys is still not entirely resolved. On the one hand, since the decision-making for this program is very much centered on the retailers' corporate staff (i.e., purchasing decisions; promotional decisions), one might argue that surveying store managers may not be appropriate or, in some cases, may actually provide misleading evidence of program implementation. However, on the other hand, one could also argue that regardless of what level decisions are made at, what really matters is that customers buy the energy efficient models, so knowing as much as possible about what goes on in the stores will provide valuable information.

The results from the store manager interviews and surveys were somewhat split. On the one hand, nearly all the managers surveyed at follow-up indicated they were familiar with the RPP Program (either in unprompted or prompted form), and all of the managers surveyed indicated they were either very or somewhat familiar with the promotions that occur in their stores. However, the level of detail they were able to provide with regards to perceived program effects and the RPP-related promotions that were conducted varied widely.

That all said, a couple things should be kept under consideration when drawing conclusions from the store manager research conducted as part of this study. First, because the retailer only provided the team with limited access to the store managers, we were unable to probe and search to find the individuals in the stores that were *most* familiar with in-store promotions. This is important because during the follow-up surveys, several managers indicated they were *not* the person in their store *most* familiar with the activities. A second thing to consider is that this retailer may not be like all other retailers. The retailer that participated in the trial has price-point focused customer segment, and as such, tries to minimize its operational costs by not having specialized or departmental store staff. Other retailers are much more likely to have staff trained and focused on selling specific product categories (e.g., departmental staff), who may be able to provide much more robust and accurate information. Third, the evaluation team feels understanding the in-store implementation of the program will be key for providing a richer understanding of how the program is being implemented—and how it may be altered or improved in the future to maximize the programs potential. Fourth, the follow-ups were conducted as surveys and not as interviews. It is now apparent that is not likely the best approach for gathering the rich information that is likely needed to capture the in-store activities. In the future, the evaluation team recommends the store managers/store staff research be conducted as in-depth interviews. In conclusion, the evaluation team does not recommend eliminating the store manager interviews from the suite of future research methods, though we do recommend some adjustments.

Impact Evaluation Methods

As far as the quasi-experimental approaches aimed at assessing program effects and impacts, it appears they all have some strengths and weaknesses and various reasons for being considered as evaluations focus on the larger-scale program.

The participant-only approaches resulted in some questionable estimates of net program effects for some product categories, but the reasons for these anomalies appear to be tied to the quality of the historical data, or when a product category that experienced relatively large increases in PQS in the late *historical* period were included in the program. In some cases, this might be resolved by having a better understanding of the retailers product assortment and PQS values before or immediately after a retailer enters the program, though early insight into this is admittedly hindered by data availability, as the retailers are not expected to provide their historical data until after they sign the contract. Nevertheless, the program staff may need to decide not to incent certain product categories through the program if PQS values are at an unexpectedly high level and contribute to low net-to-gross ratios. Alternatively, program staff may decide to raise the qualifying standard to some level above simply meeting the minimum ENERGY STAR specification. This latter approach could also help to increase the net-to-gross ratio while increasing the market share of some product categories. Other studies of similar programs have recommended the same thing. For example, a recent evaluation of the New York Products Program—a program with many similarities to the RPP Program being conducted in New York by NYSERDA—estimated a relatively low net-to-gross ratio of about 10% for the 2010-2012 program cycle and cited the fact that this program that has been running for roughly 15 years (since 1999) and has likely transformed the market (Dimetrosky et. al., 2014). The report goes on to suggest that a reasonable path forward for the program is to pursue higher efficiency standards as the criteria for paying incentives.

Without a doubt, comparison-based approaches are the strongest and most robust methods for assessing program effects. However, for these approaches to be appropriate, of course there needs to be some group that did not receive the intervention, or the control. In a statewide implementation of the RPP Program, a within state control group will likely not be possible. Participating retailers will likely be unwilling to withhold any of their stores to act as controls, and nonparticipating retailers will have no incentive to provide their sensitive sales data. Developing a comparison group based on participating retailers' stores outside the state may be possible, but since retailers typically conduct their purchasing at the national level, it may be difficult to find stores that are totally unaffected by the program interventions. The only remaining option for implementing a comparison group is likely to be secondary market-level data purchased from various third-party sources such as the NPD Group or AHAM, but the costs and availability of the data needed to effectively evaluate this program have not yet been resolved. This remains one of the biggest concerns with regards to effectively evaluating this program in the future, and possibly one of the biggest program risks. As such, even with the issues mentioned above, the participant-only designs should not be discarded as they may represent the only feasible path forward if reliable comparison group designs are infeasible.

That all said, the evaluation team feels the participant-only designs may also prove fruitful when one considers that the RPP Program is a market transformation program that needs to be evaluated over the longer term. As discussed several times in the report, detecting program effects in the first year or two of a retailer's participation in the program is going to be difficult no matter what approach is used, as the net effects are expected to be relatively small and sporadic. Retail buying cycles mean product assortment decisions for any given year are typically made several months in advance, and retailers will not have the opportunity to make dramatic changes to their product assortment in the very short-term. Thus, because first-year effects from the program are going to result predominantly from marketing and promotional efforts that start and stop at various times throughout the year, we expect to see a significant amount of variability over the short-term, or the periods

between assortment changes—much like the variability we currently see in the trial-period data due to specific interventions beginning and ending, and competing efforts aimed at contemporaneously selling non-qualified products mediating or negating program effects. However, over the mid-to long-term, the product assortment changes are expected to produce detectable increases in the PQS. Such a hypothesized pattern is shown in Figure 15.

FIGURE 15: HYPOTHESIZED PATTERN IN PQS OVER SEVERAL YEARS OF THE RPP PROGRAM
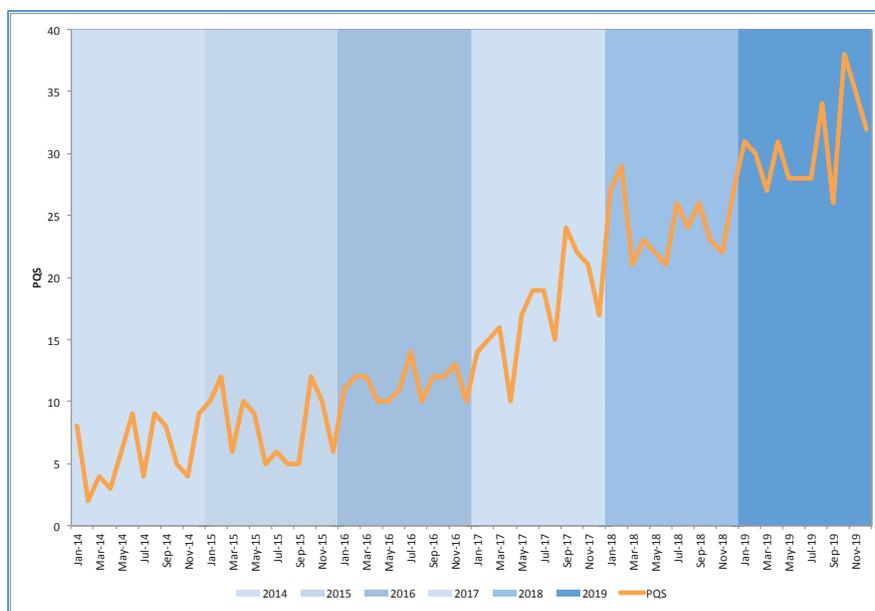
In this example, though it would be difficult to detect significant program effects in any year-to-year comparison due to the general variability over any two adjacent years, over the longer term a detectable pattern is evident that suggests the program may be having its intended effects. This hypothesis could be formally tested by coding the specific timing of assortment changes into the sales data, and using the modeling approaches discussed herein to assess their influence on the PQS. Over the mid- to longer-term the participant-only approaches should be able to detect these effects.

One additional factor needs to be considered when weighing the results presented in this report and assessing the usefulness of the modeling approaches for the future. When applying these—or any—modeling efforts, the quality of the data is critical to ensuring reliable, accurate, and meaningful results. Though significant effort was committed to trying to resolve data issues with the retailer, it appears that there may still be some data issues that put some of the results into question, or at least weaken the models' ability to detect program effects. In two cases—compact refrigerators and room air conditioners—there were a couple of months of missing data. For the comparison-based analyses, these months were omitted to ensure a consistent time-series for participating and nonparticipating stores, but the missing data results in some holes in the models (see Figure 50 and Figure 53). While we do not feel these missing data compromise the modeling efforts overall, as the remaining data points are well fitted, they may affect the accuracy of the net effects estimates.

EO2: IDENTIFY, OPERATIONALIZE, TRACK, AND ANALYZE KEY PROXIMATE (SHORT AND MID-TERM) INDICATORS OF PERFORMANCE.

EO3: PROPOSE PERFORMANCE INDICATORS FOR MEASURING LONGER-TERM EFFECTS AND/OR BENEFITS.

EO4: IDENTIFY DATA COLLECTION AND ANALYSIS RESPONSIBILITIES (RETAILER, UTILITY STAFF, EVALUATORS).

Because they are all closely related, the evaluation team combined Evaluation Objectives 2, 3 and 4.

The evaluation team collected a significant amount of data and conducted and array of analyses using a wide range of approaches in conducting this evaluation. While we argue that future evaluation efforts need to be targeted at assessing and validating the full suite of logic model components (activities, outputs, and short-, mid-, and long-term outcomes) to support robust claims of attribution, several specific metrics will be key for assessing program progress and performance moving ahead.

Table 46 shows the concepts, constructs, data needs, data sources, data collectors, and data analyst for the proposed key proximate (short- and mid-term) indicators of program progress and performance. All of the concepts included are meant to ensure key aspects of the RPP Program logic model are occurring and can be validated. Also, each of them will serve as key metrics to closely monitor and track to ensure the program will meet goals and expectations. Also, without each of these showing some detectable change, it is unlikely the longer-term indicators of market transformation will be positively affected. As such, they can serve as "early warning" metrics (i.e., leading indicators of program success) to indicate if mid-course corrections might be needed.

Table 47 shows the concepts, constructs, data needs, data sources, data collectors, and data analyst for the proposed indicators of long-term effects and/or benefits. Note that two of these (namely PQS and gross and net energy and demand savings) are also denoted as key proximate indicators, and are included in both tables because they should be tracked in the short-, mid- and long-term. The additional indicators are those that align with the longer-term outcomes as described in the RPP Program logic model.

TABLE 46: PROPOSED KEY PROXIMATE (SHORT- AND MID-TERM) INDICATORS OF PROGRAM PERFORMANCE

CONCEPT	CONSTRUCT	DATA NEEDS	DATA SOURCE	DATA COLLECTOR	DATA ANALYST
Faithful implementation of retailer implementation plan	Price reductions	In-store evidence of price reductions in accordance with retailer implementation plan	In-field validation of implementation	Field Team	EM&V
	Unique placement	In-store evidence of unique product placement in accordance with retailer implementation plan	In-field validation of implementation	Field Team	EM&V
	Promotions	In-store evidence of product signage or other promotional materials in accordance with retailer implementation plan	In-field validation of implementation	Field Team	EM&V
	Staff Training	Frequency and length of sales force training	Retailer interviews/surveys	EM&V	EM&V
		Awareness, knowledge and attitudes of store merchants and sales force regarding energy use of targeted products	Retailer interviews/surveys	EM&V	
	Product assortment plans	Plans to add additional program-qualified models	Retailer interviews/surveys	EM&V	
Product assortment changes	Product assortment Changes	Number and type of new program-qualified models	Sales data	Data processing contractor	EM&V
Program-Qualified Share (PQS)	Share of program-qualified models	Total units sold and program-qualified units sold by product class, by store by month	Sales data	Data processing contractor	EM&V
Gross and Net Energy and Demand Savings	Gross energy and demand savings	Total program-qualified units sold by product class, UESs, UDRs	Sales data; RPP Products File	Data processing contractor; EM&V	EM&V
	Net energy and demand savings	Net program effects by product class, gross energy and demand savings	Sales data; output of quasi-experimental approaches; retailer interviews/surveys	Data processing contractor; EM&V	EM&V
Additional retailers joining the program	Increased program participation	Number of recruited retailers	Program data	PG&E and/or Implementation Team	EM&V
Increase in nonparticipating retailer PQS	Share of program-qualified models	Total units sold and program-qualified units sold by product class	Market-level data	Data processing contractor	EM&V

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TABLE 47: PROPOSED PERFORMANCE INDICATORS FOR MEASURING LONGER-TERM EFFECTS AND/OR BENEFITS

CONCEPT	CONSTRUCT	DATA NEEDS	DATA SOURCE	DATA COLLECTOR	DATA ANALYST
Program-Qualified Share (PQS)	Share of program-qualified models	Total units sold and program-qualified units sold by product class, by store by month	Sales data	Data processing contractor	EM&V
Gross and Net Energy and Demand Savings	Gross energy and demand savings	Total program-qualified units sold by product class, UESs, UDRs	Sales data; RPP Products File	Data processing contractor; EM&V	EM&V
	Net energy and demand savings	Net program effects by product class, gross energy and demand savings	Sales data; output of quasi-experimental approaches; retailer interviews/surveys	Data processing contractor; EM&V	EM&V
Changes in efficient product demand	Energy efficient product requests	Manufacturer self-report of the proportion of product orders that are for energy efficient models	Manufacturer interviews	EM&V	EM&V
Increase in nonparticipating retailer PQS	Share of program-qualified models	Total units sold and program-qualified units sold by product class	Market-level data	Data processing contractor	EM&V

EO5: MEASURE THE EXTENT TO WHICH TRIAL RPP PROGRAM OBJECTIVES WERE ACHIEVED.

Overall, the evaluation team concludes the RPP Trial was as successful as one would expect for a trial of a complicated program design. As reiterated several times throughout this report, this was a small-scale trial, with a single and somewhat struggling participating retailer, in a relatively small number of stores, implemented over only a 14-month period. As such, being that this is a market transformation program, only certain aspects of program performance and efficacy could be assessed. The quasi-experimental approaches—especially the stronger, more reliable comparison group designs—consistently detected small but positive net differences in PQS across the majority of the targeted product categories (the only clear exception was the Blu-Ray player category). Though modest, the RPP Trial also resulted in gross and net program savings.

The participating retailer staff was engaged and was able to successfully develop and launch promotional initiatives that were associated with increases in program-qualified share (though some of the interventions seemed to have little to no effect). Implementation and program staff members effectively conducted each of the early activities associated with the RPP Program logic model and have worked to promote the program and recruit additional retailers and additional utilities and utility partners into the upcoming national ENERGY STAR-sponsored RPP Program beginning in 2015.

We also learned a great deal about program processes, operation, and administration. An array of parties put significant effort into developing and refining data processing and management procedures, protocols, and QA/QC methods—though there is likely more to do in this area. Significant effort was also put into refining the incentive payment and reporting system. The program staff learned a lot about how to bridge the gap between utility wants

and needs, and what retailers are willing and able to provide. The program staff and implementation team are ready and willing to adapt their early expectations, and now recognize that effective implantation of the RPP Program will likely require more utility support than was first envisioned. But this is manageable and should probably not be unexpected. As the RPP program manager stated, the utilities need to view themselves like any other vendor working in the retail environment, and provide their support to sell their product, which in this case is the RPP Program, or more specifically, energy efficiency.

From the evaluation perspective, much was learned as well about evaluating this complex market transformation program. The evaluation team incorporated a wide range of non-experimental and quasi-experimental approaches into the overall research design. Some worked well; others did not. With yet others it is still unclear as to their potential usefulness, but they still seem to offer promise if we recognize this program needs to be run and evaluated over an extended time period.

EO6: ASSESS POTENTIAL PROGRAM TRIAL SPILLOVER EFFECTS ON NON-PARTICIPATING STORES WITHIN THE PG&E AND UTILITY PARTNER SERVICE TERRITORIES.

During the follow-up retailer interviews the home appliance and consumer electronics buyers indicated that none of the promotional activities associated with the program spilled over into nonparticipating stores. As mentioned in that section of the report, the only exception to this was a system-wide pricing error that occurred when the one promoted model of room air conditioner was put on sale nationwide. By the time this error was caught and corrected, the buyer stated that it cost the retailer a substantial amount of money. This pricing error may have served to reduce the estimated net effects on the PQS for this product category, but it is hard to know for sure based on the modeling results. The models were developed by coding the intervention periods into *both* the participating and nonparticipating stores to account for any activities that *may* have spilled over, but the model results for air conditioners did not provide any additional information on this issue.

It is worth noting that there were substantial increases in some product category PQS values from the historical to the trial period (e.g., Blu-Ray players and standard DVD players), which subsequent analysis revealed was due to the addition of some new program qualified models. However, these effects were seen in *both* the participating and nonparticipating stores. That is, some assortment changes did occur, but they are not all attributable to the program.

RECOMMENDATIONS

Based on the preponderance of evidence, the evaluation team has concluded the RPP Trial was reasonably successful at meeting its performance and operational objectives. The evaluation team also feels that the following recommendations should be considered in order to improve the design, delivery, and evaluation of the RPP Program.

PROGRAM DESIGN AND IMPLEMENTATION

- Launching a program in the last quarter of the year should be avoided if possible. Retailers have a lot of activities underway during the holiday season, and gaining access to staff to conduct the necessary baseline research is a challenge. Also, unless there is adequate notice given to the retailers, it is likely many if not most of their marketing and promotional activities are planned several months in advance of the holiday sales period, giving the program little chance to affect meaningful changes during this period.

- Include a contractual commitment from the participating retailers to provide access to the staff needed to conduct evaluation interviews/surveys. The evaluation team had difficulty gaining access to retailer staff at key points in time (or at all) in order to conduct evaluation activities in a timely manner.

- Once the contract is signed, the participating retailers should develop retailer implementation plans as soon as possible to ensure that interventions occur as soon as possible. Significant delays in getting retailer implementation plans in place is a risk to the program as PG&E will be paying incentives for "business as usual" sales (represented by the store's pre-program market share of program-qualified products) until interventions are in place to increase sales. In the trial, most product categories did not begin interventions until March 2014, five months into the program. That is five months of potential sales lift that was missed. It is likely that these five months of relatively little activity contributed significantly to the low net-to-gross ratio of 5% for the portfolio.

- Require the retailer's to develop detailed retailer implementation plans that outline strategies, time of implementation, and ideally, sales goals. In order to help bolster net-to-gross ratios, it may be worth considering adding a clause to contracts that states if the retailer does not do anything to promote a certain targeted product category for a certain period of time (e.g., a quarter), incentives will be withheld for that product category until some effort by the retailer to promote qualified models within a product category is observed. This would be most applicable to the first year or two of participation, when promotions are expected to play the key—if not only role—in increasing the sales of program-qualified products.

- Ensure the program data has a clear chain of ownership and control that is transparent, defendable, and absent of any potential conflicts of interest. This should minimize concerns regarding the accuracy of the data and the ensuing results. Currently, the retailer provides the raw sales data to the implementation team, who helps the retailer ensure their data queries are extracting the correct products. The implementation team sends the data to the data service provider after any issues are

resolved. Ideally, the data should go directly from the retailer to the data service provider.

- At least in the short term, more attention should be focused on promoting and incenting program-qualifying specifications that exceed the minimum ENERGY STAR specification. For many retailers for many product categories, a significant proportion of their product assortment is already ENERGY STAR. Even the retailer that participated in the trial—though energy efficiency never entered into their product purchasing decisions—had some high PQS values for some product categories before the trial even began. For example, the PQS for Blu-Ray players in the month before the program began (October 2013) was 71%; 36% for sound bars; 33% for air cleaners. Thus, incenting these product categories at the minimum ENERGY STAR specification will translate to relatively low net-to-gross ratios, and will likely have a limited effect on transforming the market. While in the future, the RPP Program theory suggests program-induced influence on voluntary specifications (e.g., ENERGY STAR) and/or mandatory standards (e.g., state or federal codes and standards) will occur and may negate the need for more stringent qualifying specifications, until these expected effects actually occur and are validated, efforts should be incorporated to help bolster net program savings.

- Retailers will likely need support to effectively and consistently implement the RPP Program. Inconsistent implementation across stores arose in the shelf survey data as well as the retailer buyer interviews. PG&E program staff and the implementation team both recognize the need for this, as evidenced through both of their project debriefs. Support for implementation may consist of assisting store staff in deploying promotional materials such as signage or helping build promotional displays; it could also consist of assisting corporate staff to develop effective marketing and promotional strategies.

EVALUATION

- In terms of evaluation, the array of different modeling approaches should be retained until there is greater clarity around which impact approach(es) work best. While the comparison-based approaches provided, what the evaluation team feels are, the most reasonable estimates of net PQS, we also recognize that the participant-only designs may be the only feasible approach in the future, once the program effects begin to dissipate into other regions. More needs to be learned about how the participant-only models might perform with a larger-scale implementation of the program. Also, evaluators need to consider how the more quantitative impact evaluation methods might be coupled with self-report methods to derive impact results that are more widely informed and based on a preponderance of evidence.

- The shelf surveys, as they were conducted for the trial, provided information that was ultimately of limited use. However, a method for assessing retailers' implementation of the program interventions in their stores is still needed. A better approach might be to develop a schedule for in-store verification of marketing activities based on the retailers' implementation plans. These visits could also be leveraged to allow the field team to help support the retailers if gaps in implementation are found.

- The use of Salesforce needs substantive revision if it is to be a useful evaluation tool. Processing the Salesforce data was extremely resource intensive, and the contents of Salesforce only allows for limited validation of program activities, because only the

implementation team uses it. The evaluation team feels other approaches might be more useful for assessing whether certain logic model components are occurring. For example, a periodic (e.g., quarterly) web-based survey of stakeholders would allow the evaluation team to collect more robust data in a manner that allows for easier and more systematic analysis.

- The role of the retailer store manager interviews need to be carefully considered and weighed in the context of the overall evaluation objectives. From a process evaluation perspective, the store research can provide informative insights into how the program implementation may be refined or improved. However, it will be critical that the evaluator target the people in the stores that are most knowledgeable about the program and/or product categories. This may vary from retailer to retailer and will not likely be the store managers.

- Future evaluation efforts should be based on a theory-driven evaluation framework in order to provide robust support for future claims of attribution. As the RPP Program scales-up and becomes more complex, ascertaining impacts and effects of the program will become more complicated as many of these will occur outside of the participating retailers. We recommend focusing greater attention on evaluating the specific components of the logic model with a focus on validating that the activities, outputs, and short-, mid-, and long-term outcomes are occurring as expected, as well as validating that the hypothesized causal mechanisms. Within a theory-driven framework, the assessment of program performance through the use of multiple research designs and analyses of key leading indicators of program performance is the best way to manage risks faced by each stakeholder.

- In collaboration with the ED, identify key program performance metrics and market transformation indicators so that appropriate baselines can be constructed during the next phase of the RPP Program. Table 46 of this report outlines the key proximate or short- to mid-term indicators program progress and performance recommended by the evaluation team; Table 47 showed the proposed indicators of long-term effects and/or benefits.

APPENDICES

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APPENDIX A: INTERVIEW GUIDES AND SURVEY INSTRUMENTS

RPP TRIAL IN-DEPTH INTERVIEW GUIDE (CORPORATE BUYERS)

This interview guide details the key areas that the evaluation team will focus on during in-depth interviews with [Retailer] corporate staff.

Key Areas of Questioning

- Awareness and knowledge regarding energy efficiency in general
- Knowledge about energy efficiency initiatives underway at [Retailer], and whether there is any collaboration/communication regarding energy efficiency initiatives
- Knowledge about energy efficiency as it relates to the qualified seven product categories part of the RPP Trial
- Distribution of products purchased (i.e., do any program-qualified products go to non-participating stores in addition to participating stores)
- Awareness of the RPP Program Trial
- Influence of the RPP Program Trial on their promotion and purchasing decisions
- A battery of questions regarding the likelihood that they would have designed and implemented the agreed-upon marketing plan absent the RPP Program Trial (to inform NTG).
- Experiences with and feedback on the RPP program trial
- Perceptions regarding the appropriate timing and level of incentives

Introduction

We are part of the team working in California with PG&E, SMUD and [Retailer] on the Retail Plug Load Portfolio (RPP) Program Trial that is currently being tested in 26 [Retailer] stores in PG&E's and SMUD's service territories.

As part of the trial, my company, EMI is working with PG&E, SMUD, and [Retailer] to understand how the trial is going and any potential improvements that could be made. We are talking to buyers like yourself to get your perspectives. Although we will share your responses, you will remain anonymous.

Background Questions

1. Can you please tell me your job title and walk me through your job responsibilities to me?

2. How long have you held this position?

INTERVIEW GUIDE

RPP Program Trial Awareness

3. Are you familiar with the retail plug load product (RPP) trial that is a partnership between [Retailer] and PG&E/SMUD?

4. Can you describe your understanding of the how the trial works?

    a. Do you know what the goal of this trial is?

5. Are there any aspects of the RPP trial that are unclear to you?

Product Purchasing Logistics

6. Which product categories (e.g., refrigerators) are you responsible for purchasing? (If it's unclear) Does that include any of the following?
    a. Refrigerators,
    b. Freezers,
    c. RACs,
    d. Air cleaners,
    e. Compact audio (including docking stations),
    f. HTIB, or
    g. DVD/Blu-Ray

7. Can you walk me through the purchasing process for the products you are responsible for?
    h. Who places the order with manufacturers?
    i. Where do the manufacturers ship products (distribution centers, direct to stores)?
    j. Where are the distribution centers that serve the trial stores located??
    k. Does a single distribution center serve all of the trial stores? If no, how many serve the trial stores?
    l. How much input do individual stores have in your decisions?
    m. For each product category, when are the purchase decisions made in the year?
    n. For each product category, when are products typically shipped to distribution centers?
    o. For each product category, when are products shipped to stores?

8. On a scale of 0 to 10 where 0 is not at all important and 10 is the most important, can you rate the importance of the following factors on your decision to buy products:
    p. Price/profit potential
    q. Previous year sales
    r. Features
    s. Brand
    t. Market/industry trends
    u. Energy efficiency/energy consumption
    v. Other factors?
    w. Inventory turns
    x. Product quality/rates of return
    y. Competitive pricing (relative to the greater marketplace)

RPP TRIAL IN-DEPTH INTERVIEW GUIDE: CORPORATE MERCHANTS

9. Now I want to get a better understanding of how products you purchase are distributed to stores.
    z. Within each product category, does the same assortment of models that you purchase go to every [Retailer] store or just certain stores?
    aa. How do you/someone else determine which models within each product category are shipped to certain stores but not others?
    bb. How do you/someone else ensure that products intended only for certain stores are actually shipped to only those stores and not others?
    cc. Do products that have already been shipped to stores ever get transferred to other stores?
        i. Under what circumstances?
        ii. Who makes these decisions? Are these decisions made by individual stores or by corporate headquarters?

Product Promotion Decisions

10. How do you determine which products to promote?
    a. What are the most important factors in your decision?
    b. Do you work with manufacturers to develop promotion for products?
    c. Do the [Retailer] stores have any input into your promotion decisions?

11. What types of promotional activities do you typically utilize to promote a product (e.g. sales, in-store displays, flyers, media advertising, etc.)?
    d. Are reduced pricing, rewards points, event flyers, in-store signage, and in-store radio announcements promotional activities that you typically use?
    e. For each product category, when are the promotion strategies developed in the year?

Energy Efficiency Awareness

12. In general, are you familiar with any energy efficiency metrics for the products you manage? (UEC, kWh, BTUs, etc.)

13. Are you familiar with:
    a. Department of Energy (DOE) standards for energy use?
    b. How about the ENERGY STAR specification?
    c. Any other specs or standards?
    d. Prior to this trial, had you incorporated these standards into planning decisions for the products you are responsible for?

14. Is the energy efficiency/energy use of these products a factor in your promotion or purchasing decisions?
    e. (Probe whether it is promotion only, purchasing only, or both)
    f. On a scale of 0 to 10 where 0 means absolutely no influence and 10 means total influence, Prior to the start of this trial, how much influence did the energy efficiency or energy usage of a product have on your decision to promote/purchase it?

Expected RPP Program Trial Influence on Behavior

Expected Impact of the Trial

15. Did the trial cause you to make any changes in the way you promoted/purchased/assorted/stocked products *this year*?

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    a. Which changes? (Be sure to differentiate promotion, purchasing, and assortment)
       i. Communications with vendors to identify and possibly assort product moving forward?
    b. Did the changes you made in promotion/purchasing/stocking/assorting/placement affect:
       i. Participating [Retailer] stores
       ii. Stores in the same area but not participating stores
       iii. Regional stores
       iv. National stores
    c. (If no changes) Why did it not cause you to make any changes?

16. Do you expect that the trial will affect your promotion/purchasing/assortment/stocking/placement plans for *next year*?
    d. How? **(Interviewer: Be sure to differentiate promotion, purchasing, and assortment)**
    e. Do you think that the changes you plan to make in promotion/purchasing/stocking/assorting/placement will affect:
       i. Participating [Retailer] stores
       ii. Stores in the same area but not participating stores
       iii. Regional stores
       iv. National stores

    f. What are you planning to do differently?

17. Do you think that this trial might cause you to change your behavior in regards to promoting and/or purchasing products in the future (beyond the trial)? **(Interviewer: Be sure to differentiate promotion and purchasing)**

Assessment of the RPP Program Trial

Intervention Strategy

18. Are you familiar with the RPP Trial Marketing Plan?

19. Were you involved in creating the marketing plan?
    a. How?

20. Can you tell me what input you provided specifically into the marketing plan?

21. Do you think the activities associated with this plan will lead to increased sales of program-qualified products?
    a. Why or why not?

22. Are there other actions that you think would drive sales of program-qualified units that are not currently part of the program?
    b. What are they?
    c. Were these considered for inclusion in the program?
    d. Why or why not?

Incentive Amounts/Timing

23. Are you aware that [Retailer] is a receiving an incentive for each program-qualified unit sold?

24. Do you know what the incentive values are?

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RPP TRIAL IN-DEPTH INTERVIEW GUIDE: CORPORATE MERCHANTS

25. If they don't know, read:
     Air Cleaner: $25
     RAC: $20-$40
     Freezers and Refrigerators: $40
     HTIB and Stereos: $15
     DVD/Blu Ray and Docking Stations: $4

26. Do you think the trial incentive amounts are adequate to affect [Retailer] purchasing decisions?
     a. (If not) What do you think appropriate incentive amounts should be?
     b. What are you basing these values on?

27. Is the timing of the incentives effective in driving your purchasing/assortment/stocking/placement decisions? **(Interviewer: Be sure to differentiate promotion, purchasing, and assortment)**

28. Is the basic program design ($ incentives to [Retailer] from PG&E/SMUD for each program-qualified unit sold) an effective motivation for you to sell more energy efficient products?
     c. Are there other ways besides per-unit incentives that you believe could drive sales of energy efficient models?

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5

RPP TRIAL IN-DEPTH INTERVIEW GUIDE (STORE MANAGERS)

This interview guide details the key areas that the evaluation team will focus on during in-depth interviews with [Retailer] store managers.

1.1   Key Areas of Questioning

- Awareness and knowledge regarding energy efficiency in general
- Awareness and knowledge regarding their customers' demands for energy efficient products
- Knowledge about energy efficiency as it relates to the seven qualified product categories that are part of the RPP Program trial.
- Awareness of the RPP Program Trial
- Influence of the RPP Program Trial on their promotion, pricing, placement, assortment, and stocking decisions
- Perceived influence of the program on customer purchasing decisions
- Activities implemented to promote program-qualified products (staff training, pricing, placement, promotion, assortment, etc.)
- A battery of questions regarding the likelihood that they would have designed and implemented the agreed-upon marketing plan absent the RPP Program Trial (to inform NTG)
- Experiences with and feedback on the RPP Program Trial
- Product placement and assortment

1.2   Intro

We are part of the team working with PG&E and [Retailer] on the Retail Plug Load Portfolio (RPP) Trial that is currently being tested in 26 [Retailer] stores in PG&E and SMUD service territory.

As part of the trial, my company, EMI is working with PG&E and [Retailer] to understand how the trial is going and any potential improvements that could be made. We are talking to store managers like yourself to get your perspectives. Although we will share your responses, you will remain anonymous.

1.3   Background Questions

1. Can you please tell me your job title and walk me through your job responsibilities?

2. How long have you held this position?

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2. INTERVIEW GUIDE

2.1 RPP Program Trial Awareness

3. Are you familiar with the retail plug load portfolio (RPP/PG&E) Trial/program?

4. Can you describe your understanding of your role and responsibilities regarding the Trial/PG&E partnership?

2.2 RPP Program Trial Influence

Previous promotion, pricing, placement, assorting, and stocking activities

5. Were there efforts in your store to drive the sales of energy efficient products before this trial?
   a. This could include discounted pricing on EE models, assortment of EE models, stocking of EE models, promotion (via placement, advertising, SYW points, flyers, staff training), or something else designed to drive sales of more energy efficient products
   b. If so, what were these efforts? What did you do?

6. Were any of these efforts focused on the following products:
   c. Refrigerators
   d. Freezers
   e. Room air conditioners (RACs)
   f. Air cleaners
   g. Compact Audio products (stereos, MP3 docks, etc.)
   h. Home theater in a box (HTIB, sound bars, etc.)
   i. DVD/Blu-Ray players

Activities implemented to promote program-qualified products/models (product pricing, signage, staff training, etc.)

7. Since November of last year, did you implement any of the following activities in Q4 of 2013? And if so, when?
   a. Discounted pricing on: air cleaners ($25), freezers ($40), and refrigerators ($40)
   b. Event Flyer emphasizing energy-efficient products
   c. ENERGY STAR signage
   d. Store associate training on energy-efficiency products
   e. In-store radio announcement informing shoppers about benefits of energy efficient products
   f. Any others?

8. How did you receive instructions to implement these activities?

9. Are you aware of any plans to drive the sales of energy efficient products at your store in the future?

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Actions absent the trial

10. Were you planning to implement any kind of promotion or strategy to sell more energy-efficient appliances or consumer electronics before the trial began?
11. Which promotional strategies for which product categories?

Product Categories	Promotional Strategies
Refrigerators	
Freezers	
Room air conditioners (RACs)	
Air cleaners	
Compact Audio products (stereos, MP3 docks, etc.)	
Home theater in a box (HTIB, sound bars, etc.)	
DVD/Blu-Ray players	

a. For each one, why?

Perceived influence of the program on customer purchasing decisions

12. Do you think that the changes implemented as part of the trial will have an impact on sales in the targeted product categories at your store?
    a. Which products?
    b. What kind of an impact; greater sales of energy-efficient models?

13. What actions/strategies do you think have been/will be the most successful at driving sales of energy-efficient products?

14. Are there any actions/strategies that you think are less effective than others?
    c. Which ones?
    d. Why?

15. Do you have any suggestions about additional changes that could be made to increase the sales of energy-efficient models?

2.3 Assortment and Placement

16. Can you talk me through the process used by [Retailer] to keep shelves stocked with product?

    a. Is there an automated system for maintaining inventory levels or do people make the decisions?
        i. If people: Who makes the decisions (i.e. store managers, other managers, corporate?)
    b. Does product ever get transferred from store-to-store, or does it come from a centralized warehouse?

17. If needed to meet demand, are you able to specifically order additional program-qualifying products?
    c. Where do these units come from (other stores or warehouse)?

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      d. About how often does this happen? (i.e., about how many units have been requested at what frequency)?
      e. Once ordered, how long does it normally take for these products to arrive at your store?

18. How much flexibility do you have to promote products by placing them in different locations within your store or shelf, lowering prices, or any other store-specific promotional efforts to increase the sale of qualified products? (Are your options constrained by existing contracts or decisions from others for product placement or other promotional efforts?)

2.4 Assessment of the RPP Program Trial

19. Do you think the promotional strategies used in this trial are the most effective ways to drive sales of energy-efficient models in the target product categories?
      a. Do you think customers are open to purchasing energy-efficient options?

20. Are there other ways to drive sales of energy-efficient models that you think would be more effective than the current proposed methods?
      b. What are they?
      c. Is there anything that would prevent these strategies from being implemented?

21. Are there any aspects of this program that you think will be a challenge to implement or be burdensome?

2.5 Energy Efficiency Awareness

22. Are you generally familiar with:
      a. Department of Energy (DOE) standards for energy use?
      b. How about the ENERGY STAR specification?
      c. Any other specs or standards?
      d. Prior to this trial, have you incorporated these standards into promotional in your store?

23. Are there specific products that you associate energy efficiency with?
      e. Which ones?
      f. Why?

24. Do your customers ever ask for ENERGY STAR products?
      g. How aware are customers of energy efficiency?

2.6 Closing Question

- If we conduct interviews in August at the completion of the program, would you be interested in participating in a follow-up interview for an additional $50 incentive?

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RPP TRIAL IN-DEPTH INTERVIEW GUIDE: CORPORATE GREEN TEAM

This interview guide details the key areas that the evaluation team will focus on during in-depth interviews with [Retailer] corporate green team staff.

1.1   Key Areas of Questioning

- Decisions on product for the RPP Program Trial
- Involvement with the RPP Program Implementation
- Experiences with the RPP program trial

1.2   Introduction

We are part of the team working in California with PG&E, SMUD and [Retailer] on the Retail Plug Load Portfolio (RPP) Program Trial that is currently being tested in 26 [Retailer] stores in PG&E's and SMUD's service territories.

As part of the trial, my company, EMI is working with PG&E, SMUD, and [Retailer] to understand how the trial is going and any potential improvements that could be made. We are talking to corporate staff like yourself to get your perspectives. Although we will share your responses, you will remain anonymous as much as possible.

1.3   Involvement with RPP Program Implementation

Intervention Strategy

1. Have you participated in the development of market strategies or plan
2. How? Explain. [since we last spoke]
3. What was your involvement

4. Are there certain activities that have so far proven easier to implement? What are they and why were they easy?
5. Are there certain activities that have proven more difficult to implement? What are they and why were they more difficult?

6. Do you think the activities associated with this plan will lead to increased sales of program-qualified products? [probe different products]
   a. Why or why not?

7. Are there other actions that you think would drive sales of program-qualified units that are not currently part of the program?
   b. What are they?
   c. Were these considered for inclusion in the program?
   d. Why or why not?

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1.4   Experience with the RPP Program Trial

Expected Impact of the Trial

1. What changes do you expect the program to have to promoted products *this year*?
   a. Which changes are occurring?
   b. Do you expect the changes to last beyond the promotion period? Why/Why not?

2. Once completed, do you expect that the trial will affect future promotion plans or partnerships?
   a. How?
   b. What are you planning to do differently?

3. What aspects of the program worked well?
   a. Why?
   b. What should future programs do more of?

4. What were the key challenges to the program?
   a. Why did they occur?
   b. Where you able to address any of them during the trial period?
   c. What adjustments were made?
   d. Were there any particularly difficult hurdles?
   e. What can be done better?

If we have any additional questions is it okay if we email or call you?

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RPP TRIAL INTERVIEW TOPIC GUIDE: PG&E/IMPLEMENTATION STAFF

This interview guide details the key areas that the evaluation team will focus on during in-depth interviews with PG&E Program Staff.

1.1   Key Areas of Questioning

- Lessons learned about the development and implementation of the program (e.g., what has worked, what has not? what have been the greatest hurdles? what have been the greatest successes?)
- Recommendations for change and improvement of the program
- Administrative processes and protocols – Are they appropriate and scalable?
- Frequency and effectiveness of the communication between the utility, implementers, and retailer
- Identify information that needs to be tracked by the RPP Program Trial

1.2   Background Questions

- Job title
- Time in current position

1.3   Program Trial Communication

1. Do you think that the overall communication between PG&E/SMUD program staff, Energy Solutions, Navitas, and the retailer regarding the Trial has been effective?

2. Do you feel like you are able to get your questions answered quickly and easily?

3. Do you communicate directly with anyone at [Retailer]? Who? How often?

1.4   Data Tracking & Model Matching

1. Are you/PG&E/SMUD currently getting the data you need from the retailer?
    a. If not, what data are you not getting that you need

2. Are you getting the data that you need from Energy Solutions?
    a. Is the model-matching process working?
    b. Is the turn around time reasonable?
    c. Is the model-matching process scalable to a larger program with multiple retailers and more products?

3. Outside of the data currently tracked by PG&E/EMI ([Retailer] sales data, shelf survey data, email communications from Navitas) Is there any additional information you feel should be tracked by the program?
    a. What information do you feel needs to be tracked by the program?

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1.5   Assessment of the RPP Program Trial/Program

Retailer Engagement

1. Is [Retailer] engaged with the RPP Trial?
    a. Does it seem like [Retailer]'s engagement is increasing or decreasing as the Trial moves forward?

RPP Trial

1. What is working well for the RPP Trial?

2. Is there anything that is not working well for the RPP Trial?

3. What have been the largest hurdles for the RPP Trial?

4. What have been the most significant challenges for you in regards to the Trial?

5. Are there changes that you would like to see made to the RPP Trial?

6. If so, what's preventing those changes from being made?

Full-scale RPP Program

1. Are there any changes that you think would need to be made to any aspects of the current trial to scale it up into a full program?
1. Do you believe the current administrative processes and protocols will be scalable for a potential full program?
    a. Why?
    b. Why not?

RPP Trial In-Depth Interview Guide: Corporate Buyers – Wave 2

Introduction

This interview guide details the key areas that the evaluation team will focus on during in-depth interviews with [Retailer] corporate staff.

Research Questions or Objectives

- Awareness and knowledge regarding energy efficiency in general
- Knowledge about energy efficiency initiatives underway at [Retailer], and whether there is any collaboration/communication regarding energy efficiency initiatives
- Knowledge about energy efficiency as it relates to the qualified six product categories part of the RPP Trial
- Distribution of products purchased (i.e., do any program-qualified products go to non-participating stores in addition to participating stores)
- Awareness of the RPP Program Trial
- Influence of the RPP Program Trial on their promotion and purchasing decisions
- Experiences with and feedback on the RPP program trial

Purpose

We are part of the team working in California with PG&E, SMUD and [Retailer]on the Retail Plug Load Portfolio (RPP) Program Trial that is currently being tested in 26 [Retailer] stores in PG&E's and SMUD's service territories.

As part of the trial, my company, EMI is working with PG&E, SMUD, and [Retailer] to understand how the trial is going and any potential improvements that could be made. We are talking to buyers like yourself to get your perspectives. Although we will share your responses, you will remain anonymous.

Interview

Section A: Background [Only for new interviewees]

A1. Can you please tell me your job title and walk me through your job responsibilities to me?

A2. How long have you held this position?

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Section B: RPP Program Trial Awareness [Only for new interviewees]

B1. What is your understanding of the retail plug load product (RPP) trial that is a partnership between [Retailer] and PG&E/SMUD?

B2. How were you made aware of the RPP Trial program?

    a. What information was provided?
    b. Is there ongoing communication among [Retailer] staff about this program? If so, what type?

Section C: Product Purchasing

C1. My understanding is that the products associated with the program that you are responsible for purchasing are the [**PLUG IN:** home appliances, including refrigerators, freezers, room air conditioners, and air cleaners **or** consumer electronics, including home-theatres-in-a-box, soundbars, and DVD/Blu-ray players]. Is this correct?

Section D: Energy Efficiency Awareness

D1. On a scale of 0 to 10 where 0 means absolutely no influence and 10 means total influence, today, how much influence does the energy efficiency or energy usage of a product have on your decision to purchase it?

D2. Has the program impacted your awareness or knowledge of energy usage for the products you are responsible for?

    a. If so, how?
    b. What are you planning to do differently?

D3. Is the energy use of products that you are responsible for readily available?

    a. Do you check to see if the products are ENERGY STAR rated?
    b. If you had a question about the energy use of a product, where or from whom would you try and get that information?

Section E: Expected RPP Program Trial Influence on Behavior

E1. Has the program caused you to make any changes in the way you purchase products or the assortment and stocking of products? If so, what are those changes (Be sure to specify what behavior has changed)

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RPP TRIAL IN-DEPTH INTERVIEW GUIDE: CORPORATE MERCHANTS – WAVE 2

    a. Did the changes in purchasing/ stocking/ placement have any other affect on following:
        i. Participating [Retailer] stores
        ii. Stores in the same area but not participating stores
        iii. Regional stores
        iv. National stores
    b. (If no changes) Why did it not cause you to make any changes?

E2. By what percentage do you estimate sales of ENERGY STAR (refrigerators, freezers, RAC's, air cleaners) would be lower if the RPP trial promotional incentives for (refrigerators, freezers, RAC's, air cleaners) were not available?

    a. Is the percentage different fro each product type?
    b. (If yes, probe for each responsible product).
    c. How do you track this impact?

E3. Do you expect that the trial will affect your promotion/ purchasing/ stocking/ placement plans for *next year*??

    a. How? (Probe specifically for each of the four behavior types)
    b. Do you think that the changes you plan to make in in promotion/ purchasing/ stocking/ placement will affect:
        i. Participating [Retailer] stores
        ii. Stores in the same area but not participating stores
        iii. Regional stores
        iv. National stores
    c. What are you planning to do differently?

E4. Do you think that this trial might cause you to change your behavior in regards to promoting and/or purchasing products in the future (beyond the trial)?

    a. (Probe specifically for each of the four behavior types)

Section F: Marketing Plan and Activities

F1. Are you familiar with the marketing plan or activities of the RPP trial?

    a. If so, can you explain your understanding of the marketing activities?

Section G: RPP Program Trial Process

G1. From your perspective, what aspects of the RPP trial program are working well?

    a. Why do you think that aspect has been successful?

G2. Where do you see opportunities for improvements in the RPP trial promotion?

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RPP TRIAL IN-DEPTH INTERVIEW GUIDE: CORPORATE MERCHANTS – WAVE 2

      a.   What is challenging about that aspect?
      b.   What recommendations or changes would you suggest?

Section H: Closing

Thank you. Those are all the questions we have for you today. If we have any additional follow-up questions, is it okay if we email or call you

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RPP PROGRAM: STORE MANAGER SURVEY GUIDE: WAVE 2

RPP Program: Store Manager Survey Guide: Wave 2

Introduction

This document details the key areas that the evaluation team will focus on for the online survey with participating [Retailer] store managers.

Research Questions or Objectives

- Awareness of in-store promotional activities in general
- Awareness of the RPP Program Trial
- Awareness of RPP-specific promotional activities
- Possible increase in efficient product sales due to RPP Program Trial in participating stores
- Awareness and knowledge regarding their customers' demands for energy efficient products

Fielding Instructions

EMI Consulting will conduct the web survey via the online survey site Qualtrics. Once the final survey instrument is developed and approved, [Retailer] corporate staff will distribute the survey link to the managers of all participating [Retailer] stores. We anticipate that the survey will take 5-10 minutes to complete. Respondents will initially be given a 2-week window to complete the survey. At the end of the first week, we will have [Retailer] corporate staff send a reminder email to managers who have not yet completed the survey. If necessary, we may also send a 2nd email reminder closer to the completion deadline.

Email Invite

[Retailer] has been working with Pacific Gas & Electric Company (PG&E) and the Sacramento Municipal Utility District (SMUD) in California as part of the Retail Plug Load Portfolio (RPP) Program. Your store participated in the RPP Program in 2014. We are asking that you provide some very valuable insight by completing a short online survey that should only take 10-15 minutes.

Please be assured we will protect your confidentiality by not tying your responses back to you or your store.

The survey link is provided below:

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1

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Survey

Introduction

We are part of the team working with Pacific Gas & Electric (PG&E), the Sacramento Municipal Utility District (SMUD), and [Retailer] on a pilot program called the Retail Plug Load Portfolio Trial was tested last year in 24 [Retailer] stores in the PG&E and SMUD service territories. Your store was one of the 24 participating stores.

As part of the trial, my company, EMI Consulting is working to gain a better understanding of how the trial was implemented in the stores and how it may have impacted sales of energy efficient products.

Please be assured we will protect your confidentiality by not tying your responses back to you or your store.

We thank you for providing feedback. Your insight is extremely valuable. The survey should only take 10-15 minutes to complete.

Section A: Background Questions

A1. What is your [Retailer] store number?

A2. What month and year did you start working as a store manager at this location?

> **1.** Month _____
> **2.** Year _____

Section B: Manager Involvement

We recognize that as a store manager, you have *a lot* of different responsibilities associated with running your store. In this section of the survey, we ask some questions to gain an understanding about your level of involvement specifically with in-store merchandising and promotional activities. Promotional activities can include particular events or programs targeting specific products, discount or sales pricing, signage, advertising, staff training, in-store announcements, etc.

B1. In general, how **aware** are you about the various promotions conducted in your store?

> **1.** Very aware
> **2.** Somewhat aware
> **3.** Not aware **[SKIP TO B5]**

B2. Approximately how many promotional events are running in your store in a typical week?

[ENTER NUMERIC RESPONSE]

2

B3. We want to gauge the type of details you are aware of with regards to promotions. Please briefly describe **one** promotional event **from 2014** in terms of the featured brand(s), dates, and the merchandising strategies that were used (e.g., discount pricing, signage, advertising, staff training, in-store announcements, etc.).

[ENTER VERBATIM RESPONSE]

B4. Briefly describe the influence you think this promotional event had on product sales, customer traffic, etc.

[ENTER VERBATIM RESPONSE]

B5. Our understanding is that corporate staff directs most of the merchandising/promotional activities that are implemented in your store by informing your store of what to implement and when.

Are promotional activities communicated from corporate staff directly to you or some other staff?

1. Directly to me
2. To some other store staff (Please describe this persons role or title: _____)

B6. At your store, whom has the **most** familiarity with the various promotional activities associated with:

Home appliances? (e.g., freezers, refrigerators, room air conditioners, room air cleaners, etc.)
1. Myself
2. Some other staff (Please describe this persons role or title: _____)

Consumer electronics? (e.g., DVD/Blu-Ray players, soundbars, home theaters-in-a-box, etc.)
1. Myself
2. Some other staff (Please describe this persons role or title: _____)

Section C: RPP Program Trial Awareness

C1. Are you aware of the Retail Plug Load Portfolio (RPP) Program trial, sponsored by Pacific Gas & Electric (PG&E) that was conducted in your store in 2014?

1. Yes
2. No **[SKIP TO C3]**
-8. Don't know **[SKIP TO C3]**

C2. Please describe briefly your understanding of the program?

[ENTER VERBATIM RESPONSE] [SKIP TO D1]

C3. The Retail Plug Load Program is a program focused on promoting and selling certain categories of energy-efficient consumer electronics and home appliances in [Retailer]

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3

stores. The focus is on ENERGY STAR products, some of which have been promoted in your store over the past year. Does this program sound familiar to you?

1.   Yes
2.   No   [SKIP TO E1]
-8.   Don't know   [SKIP TO E1]

Section D: RPP Program Trial Influence

D1. Shown below are the product categories that were promoted through the Retail Plug Load Program in 2014. For each product, please indicate whether or not you think the Retail Plug Load Program helped to increase the sales of energy efficient models of the product.

[Response options YES/NO/DON'T KNOW for each]

a.   Refrigerators
b.   Freezers
c.   Room air conditioners
d.   Air cleaners
e.   Home theaters-in-a-box (including sound bars)
f.   DVD/Blu-Ray players

D2. For each of the different product categories below, by what percentage do you estimate your store's sales of ENERGY STAR products increased because of the Retail Plug Load Program?

[Show if Selected YES in D1] [Include DON'T KNOW response options]

a.   Refrigerators
b.   Freezers
c.   Room air conditioners
d.   Air cleaners
e.   Home theaters-in-a-box (including sound bars)
f.   DVD/Blu-Ray players

D3. Please indicate whether each strategy shown below was used in your store last year to promote sales of energy efficient, ENERGY STAR products through he Retail Plug Load Program. [Response options: USED, NOT USED, DON'T KNOW]

a.   Discounted pricing on: air cleaners, freezers, refrigerators, DVD/Blu-Ray players, home theaters-in-a-box, room air conditioners
b.   Event Flyer emphasizing energy-efficient products
c.   ENERGY STAR signage
d.   Rewards points
e.   Store associate training on energy-efficiency products
f.   In-store radio announcement informing shoppers about benefits of energy efficient products

D4. If you recall any other strategy used in your store last year to promote sales of energy efficient models, please note them here.

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[ENTER VERBATIM RESPONSE]

D5. What actions or strategies do you think have been the most successful at driving sales of energy-efficient products?

[SHOW ONLY ITEMS SELECTED IN D3]
a. Discounted pricing on: air cleaners, freezers, and refrigerators
b. Event Flyer emphasizing energy-efficient products
c. ENERGY STAR signage
d. Rewards points
e. Store associate training on energy-efficiency products
f. In-store radio announcement informing shoppers about benefits of energy efficient products
g. Any others?

[RATE EACH ON FIVE POINT SCALE]
1. Not at all effective
2. Slightly effective
3. Somewhat effective
4. Very effective
5. Extremely effective

D6. Do you have any suggestions about what activities would help increase the sales of energy-efficient models?

[ENTER VERBATIM RESPONSE]

Section D: Energy Efficiency Awareness

E1. Are you familiar with ENERGY STAR?

1. Yes
2. No   **[SKIP TO F1]**
-8. Don't know   **[SKIP TO F1]**

E2. Generally, how aware do you think your customers are of ENERGY STAR?

1. Not at all aware   **[SKIP TO F1]**
2. Slightly aware
3. Somewhat aware
4. Moderately aware
5. Extremely aware

E3. Do your customers ever ask for ENERGY STAR products?

1. Yes
2. No   **[SKIP TO F1]**
-8. Don't know   **[SKIP TO F1]**

E4. About what proportion of your customers ask for ENERGY STAR products?

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       1.   Scale 0% to 100%
      -8.   Don't know

E5.   In general, how influential do you think the ENERGY STAR label is in customer buying decisions?

       1.   Not at all influential
       2.   Slightly influential
       3.   Somewhat influential
       4.   Very influential
       5.   Extremely influential

Section E: Closing

F1.   Thank you for taking the time to complete this survey, that wraps up all of our questions. Your input is greatly appreciated and will be used to help assess the program effectiveness.

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6

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RPP Trial In-Depth Interview Guide: Corporate Green Team – Wave 2

Introduction

This interview guide details the key areas that the evaluation team will focus on during follow-up in-depth interviews with [Retailer] corporate green team staff.

Research Questions or Objectives

- Participation in RPP Program Marketing
- Involvement with the RPP Program Implementation
- Experiences with the RPP program trial

Purpose

We are talking to corporate staff like yourself to better understand the RPP Trial progress from your perspectives. Although we will share your responses, you will remain anonymous as much as possible.

Interview

Section A: Participation in RPP Program Marketing

A1.   Have you participated in the development of new market strategies or plans since we last spoke?

   a. If so, how? Explain.
   b. How were you involved? What was your contribution?

Section B: Involvement with RPP Program Implementation

B1.   Are there certain program activities that have so far proven easier to implement?

   a. Which activities? Why were they easier?

B2.   Are there certain program activities that have proven more difficult to implement?

   a. Which activities? Why were they more difficult?

B3.   Do you think the activities associated with this plan will lead to increased sales of program-qualified products?

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      a. Why or why not?
      b. Have you seen any evidence so far that would support that?
      c. [Probe for impacts for each of the different products]

B4.   Are there other actions that you think would drive sales of program-qualified units that are not currently part of the program?

      a. What are they?
      b. Were these considered for inclusion in the program?
      c. Why were they not included in the original plans?

Section C: Experience with the RPP Program Trial

C1.   What changes did you expect the program to have promoted for products *this year*?

      d. What changes are occurring?
      e. Do you expect the changes to last beyond the promotion period? Why or why not?

C2.   Once completed, do you expect that the trial will affect future promotion plans or partnerships?

      a. If so, how?
      b. What are you planning to do differently?

C3.   What aspects of the program worked well?

      a. Why?
      b. What should future programs do more of?

C4.   What were the key challenges to the program?

      a. Why did they occur?
      b. Were you able to address any of them during the trial period?
      c. What adjustments were made?
      d. Were there any particularly difficult hurdles?
      e. What can be done better?

Section D: Closing

Thank you. Those are all the questions we have for you today. If we have any additional follow-up questions, is it okay if we email or call you

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APPENDIX B: RETAILER ENERGY STAR SIGNAGE

APPENDIX C: SHELF SURVEY RESULTS BY STORE

TABLE 48: DVD/BLU-RAY PLAYER SHELF SURVEY RESULTS BY STORE

STORE	TOTAL NUMBER OF MODELS	TOTAL NUMBER OF PROGRAM-QUALIFIED MODELS	PROGRAM-QUALIFIED MODELS ON SALE	PROGRAM-QUALIFIED MODELS WITH PROMO
1	13	8	7	7
2	13	8	6	6
3	7	4	3	3
4	12	8	6	4
5	13	8	5	5
6	12	8	6	6
7	13	8	6	6
8	12	8	6	5
9	13	8	5	5
10	13	8	6	6
11	11	8	6	6
12	13	8	7	5
13	13	8	6	7
14	12	8	6	6
15	5	3	2	2
16	9	6	6	6
17	13	8	6	6
18	13	8	5	5
19	13	8	7	7
20	12	8	7	7
21	13	8	7	7
22	13	8	7	7
23	12	8	7	6
24	13	8	6	6

TABLE 49: HOME THEATER-IN-A-BOX SHELF SURVEY RESULTS BY STORE

STORE	TOTAL NUMBER OF MODELS	TOTAL NUMBER OF PROGRAM-QUALIFIED MODELS	PROGRAM-QUALIFIED MODELS ON SALE	PROGRAM-QUALIFIED MODELS WITH PROMO
1	10	3	2	2
2	10	2	1	1
3	11	3	2	2
4	10	3	3	3
5	8	1	0	0
6	13	4	2	2
7	12	2	2	2
8	8	4	2	2
9	9	2	2	2
10	11	2	2	2
11	13	3	3	3
12	13	4	1	1
13	12	4	1	1
14	6	2	2	2
15	10	2	2	1
16	10	2	1	1
17	14	4	3	2
18	11	3	2	0
19	13	3	3	2
20	9	1	1	0
21	9	3	3	2
22	13	4	4	2
23	10	2	2	2
24	0	NA	NA	NA

TABLE 50: FREEZER SHELF SURVEY RESULTS BY STORE

STORE	TOTAL NUMBER OF MODELS	TOTAL NUMBER OF PROGRAM-QUALIFIED MODELS	PROGRAM-QUALIFIED MODELS ON SALE	PROGRAM-QUALIFIED MODELS WITH PROMO
1	4	1	1	1
2	6	0	NA	NA
3	4	0	NA	NA
4	4	1	1	1
5	6	0	NA	NA
6	4	1	1	1
7	3	0	NA	NA
8	5	0	NA	NA
9	5	1	1	1
10	5	0	NA	NA
11	9	1	NA	NA
12	5	0	NA	NA
13	3	0	NA	NA
14	5	0	NA	NA
15	6	1	1	1
16	5	1	1	1
17	3	0	NA	NA
18	4	1	1	1
19	4	1	1	1
20	5	1	1	1
21	5	1	1	1
22	5	1	1	1
23	2	0	NA	NA
24	5	0	NA	NA

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TABLE 51: REFRIGERATOR SHELF SURVEY RESULTS BY STORE

STORE	TOTAL NUMBER OF MODELS	TOTAL NUMBER OF PROGRAM-QUALIFIED MODELS	PROGRAM-QUALIFIED MODELS ON SALE	PROGRAM-QUALIFIED MODELS WITH PROMO
1	10	2	2	2
2	9	1	1	1
3	3	1	1	1
4	5	1	1	1
5	17	6	6	2
6	5	1	1	1
7	2	0	NA	NA
8	14	4	3	0
9	5	1	1	1
10	9	1	1	1
11	19	8	3	3
12	3	0	NA	NA
13	5	1	1	1
14	17	5	2	1
15	8	1	1	0
16	8	1	1	0
17	4	1	1	1
18	6	1	1	1
19	12	3	2	1
20	9	1	1	1
21	11	1	1	1
22	9	1	1	1
23	2	0	NA	NA
24	5	1	1	1

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TABLE 52: ROOM AIR CONDITIONER SHELF SURVEY RESULTS BY STORE

STORE	TOTAL NUMBER OF MODELS	TOTAL NUMBER OF PROGRAM-QUALIFIED MODELS	PROGRAM-QUALIFIED MODELS ON SALE	PROGRAM-QUALIFIED MODELS WITH PROMO
1	2	0	NA	NA
2	0	NA	NA	NA
3	0	NA	NA	NA
4	2	0	NA	NA
5	6	1	1	1
6	4	0	NA	NA
7	3	0	NA	NA
8	6	1	1	0
9	1	0	NA	NA
10	4	1	0	0
11	0	NA	NA	NA
12	0	NA	NA	NA
13	0	NA	NA	NA
14	1	0	NA	NA
15	0	NA	NA	NA
16	0	NA	NA	NA
17	0	NA	NA	NA
18	3	0	0	0
19	0	NA	NA	NA
20	0	NA	NA	NA
21	3	0	0	0
22	6	0	0	0
23	7	0	0	0
24	0	NA	NA	NA

TABLE 55: COMPARING UNIT SALES VOLUMES AND PROGRAM-QUALIFIED SHARE FOR HISTORICAL AND TRIAL PERIODS FOR SMUD AND NONPARTICIPATING STORES

Product Category	Class	SMUD (N=2)						NONPARTICIPATING STORES (N=66)					
		HISTORICAL			TRIAL PERIOD			HISTORICAL			TRIAL PERIOD		
		Non-PQ	PQ	PQS	Non-PQ	PQ	PQS	Non-PQ	PQ	PQS	Non-PQ	PQ	PQS
Air Cleaner	<100 CADR	23	8	26%	4	4	50%	1,112	459	29%	474	255	35%
DVD/Blu-Ray	Blu-Ray	122	49	29%	77	142	65%	7,444	3,105	29%	3,254	6,525	67%
DVD/Blu-Ray	DVD	912	184	17%	535	79	13%	37,050	10,098	21%	19,254	3,971	17%
HTiB	Sound bar	55	10	15%	90	72	44%	2,289	314	12%	2,349	2,524	52%
Freezer	Chest	252	3	1%	213	0	0%	5,021	68	1%	3,862	104	3%
Refrigerator	Compact Mini	49	5	9%	48	13	21%	3,136	664	17%	2,910	416	13%
Refrigerator	Medium	49	1	2%	53	0	0%	2,304	84	4%	1,801	51	3%
Refrigerator	Very Large	7	0	0%	17	0	0%	247	110	31%	405	229	36%
Room AC	<12,000 BTU	161	28	15%	61	16	21%	7,686	2,203	22%	4,731	308	6%
TOTAL		**1,630**	**288**	**15%**	**1,098**	**326**	**23%**	**66,289**	**17,105**	**21%**	**39,040**	**14,383**	**27%**

TABLE 56: DIFFERENCE-IN-DIFFERENCES TABLE COMPARING PQS OF SMUD AND NONPARTICIPATING STORES

Product Category	Class	SMUD Difference	NonPart Difference	Difference
Air Cleaner	<100 CADR	24%	6%	18%
DVD/Blu-Ray	Blu-Ray	36%	37%	-1%
DVD/Blu-Ray	DVD	-4%	-4%	0%
HTiB	Sound bar	29%	40%	-11%
Freezer	Chest	-1%	1%	-2%
Refrigerator	Compact Mini	12%	-5%	17%
Refrigerator	Medium	-2%	-1%	-1%
Refrigerator	Very Large	0%	5%	-5%
Room AC	<12,000 BTU	6%	-16%	22%
TOTAL		**8%**	**6%**	**1%**

FIGURE 17: SMUD AND NONPARTICIPATING STORE PQS FOR HISTORICAL AND TRIAL PERIODS

Legend: Historical - Nonparticipating Stores ; Historical - SMUD ; Program Period - Nonparticipating Stores ; Program Period - SMUD

TABLE 55: COMPARING UNIT SALES VOLUMES AND PROGRAM-QUALIFIED SHARE FOR HISTORICAL AND TRIAL PERIODS FOR SMUD AND NONPARTICIPATING STORES

Product Category	Class	SMUD (N=2)						NONPARTICIPATING STORES (N=66)					
		HISTORICAL			TRIAL PERIOD			HISTORICAL			TRIAL PERIOD		
		Non-PQ	PQ	PQS	Non-PQ	PQ	PQS	Non-PQ	PQ	PQS	Non-PQ	PQ	PQS
Air Cleaner	<100 CADR	23	8	26%	4	4	50%	1,112	459	29%	474	255	35%
DVD/Blu-Ray	Blu-Ray	122	49	29%	77	142	65%	7,444	3,105	29%	3,254	6,525	67%
DVD/Blu-Ray	DVD	912	184	17%	535	79	13%	37,050	10,098	21%	19,254	3,971	17%
HTiB	Sound bar	55	10	15%	90	72	44%	2,289	314	12%	2,349	2,524	52%
Freezer	Chest	252	3	1%	213	0	0%	5,021	68	1%	3,862	104	3%
Refrigerator	Compact Mini	49	5	9%	48	13	21%	3,136	664	17%	2,910	416	13%
Refrigerator	Medium	49	1	2%	53	0	0%	2,304	84	4%	1,801	51	3%
Refrigerator	Very Large	7	0	0%	17	0	0%	247	110	31%	405	229	36%
Room AC	<12,000 BTU	161	28	15%	61	16	21%	7,686	2,203	22%	4,731	308	6%
TOTAL		**1,630**	**288**	**15%**	**1,098**	**326**	**23%**	**66,289**	**17,105**	**21%**	**39,040**	**14,383**	**27%**

TABLE 56: DIFFERENCE-IN-DIFFERENCES TABLE COMPARING PQS OF SMUD AND NONPARTICIPATING STORES

Product Category	Class	SMUD Difference	NonPart Difference	Difference
Air Cleaner	<100 CADR	24%	6%	18%
DVD/Blu-Ray	Blu-Ray	36%	37%	-1%
DVD/Blu-Ray	DVD	-4%	-4%	0%
HTiB	Sound bar	29%	40%	-11%
Freezer	Chest	-1%	1%	-2%
Refrigerator	Compact Mini	12%	-5%	17%
Refrigerator	Medium	-2%	-1%	-1%
Refrigerator	Very Large	0%	5%	-5%
Room AC	<12,000 BTU	6%	-16%	22%
TOTAL		**8%**	**6%**	**1%**

FIGURE 17: SMUD AND NONPARTICIPATING STORE PQS FOR HISTORICAL AND TRIAL PERIODS

APPENDIX E: RESULTS OF FORECASTED PQS BASELINE APPROACH

FIGURE 18: FORECASTED PQS BASELINE – AIR CLEANERS (<100 CADR)
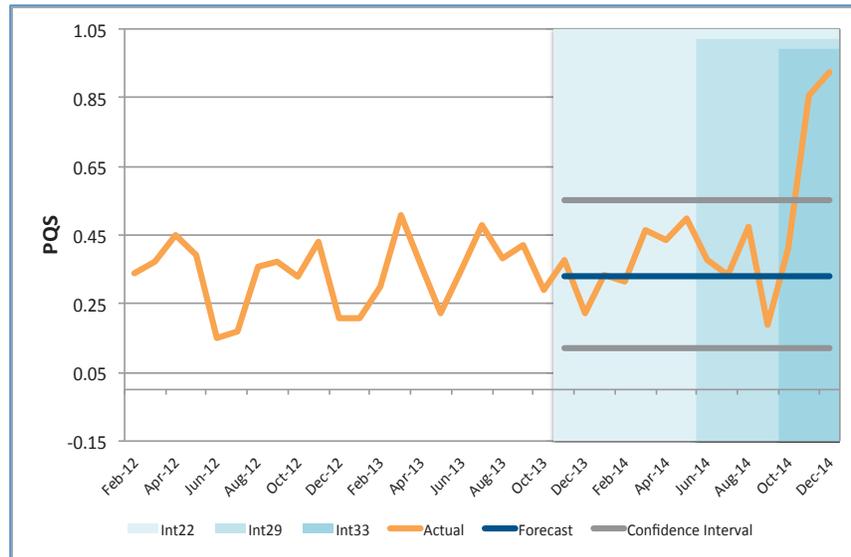
TABLE 57: NET EFFECTS USING FORECASTED PQS BASELINE – AIR CLEANERS (<100 CADR)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
49%	33%	16%

FIGURE 19: FORECASTED PQS BASELINE – DVD/BLU-RAY PLAYERS (DVD)
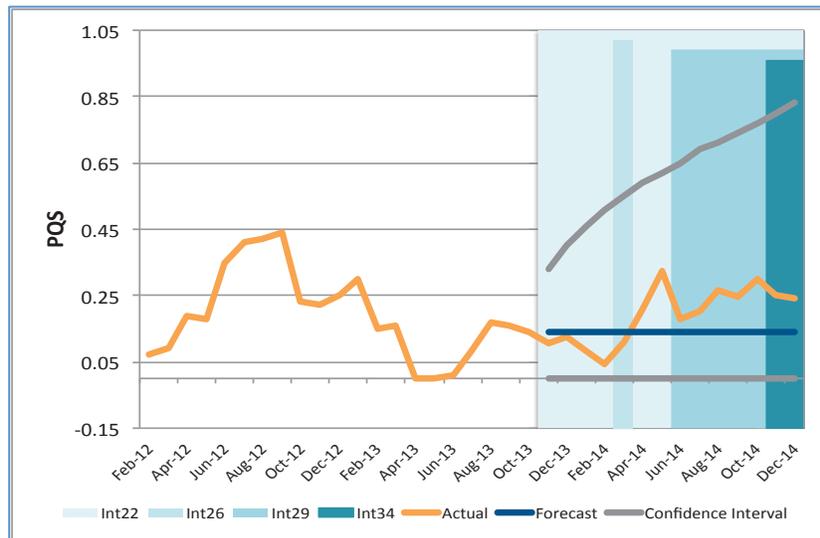
TABLE 58: NET EFFECTS USING FORECASTED PQS BASELINE – DVD/BLU-RAY PLAYERS (DVD)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
18%	14%	4%

FIGURE 20: FORECASTED PQS BASELINE – DVD/BLU-RAY PLAYERS (BLU-RAY)
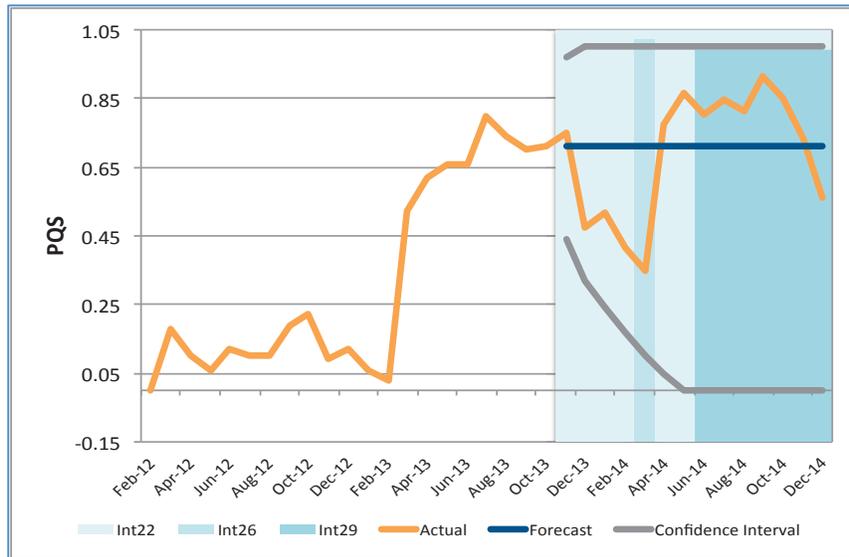
TABLE 59: NET EFFECTS USING FORECASTED PQS BASELINE – DVD/BLU-RAY PLAYERS (BLU-RAY)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
67%	71%	-4%

FIGURE 21: FORECASTED PQS BASELINE – HOME THEATERS-IN-A-BOX (SOUND BARS)
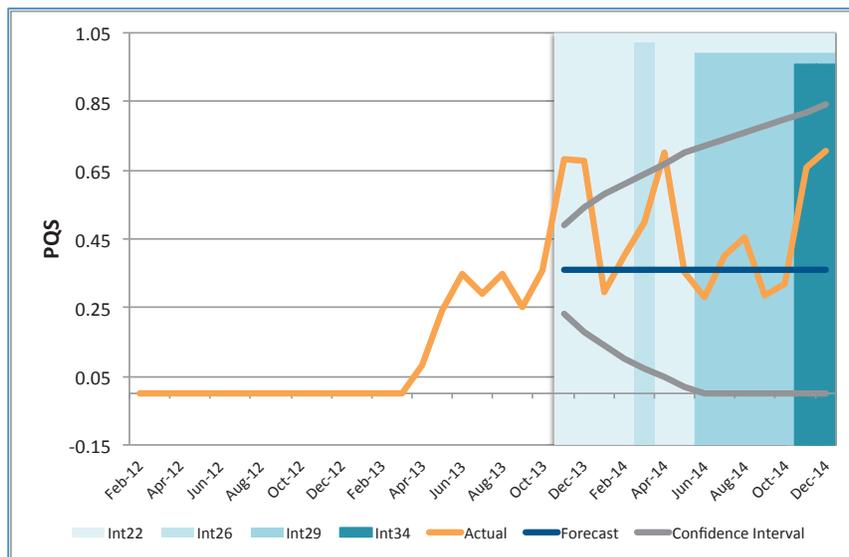
TABLE 60: NET EFFECTS USING FORECASTED PQS BASELINE – HOME THEATERS-IN-A-BOX (SOUND BARS)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
54%	36%	18%

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FIGURE 22: FORECASTED PQS BASELINE – FREEZERS (CHEST)
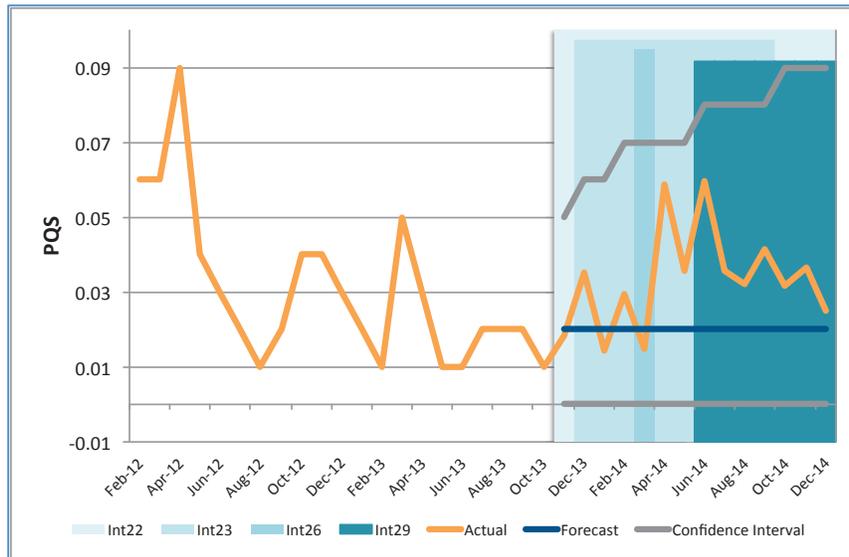
TABLE 61: NET EFFECTS USING FORECASTED PQS BASELINE – FREEZERS (CHEST)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
3%	3%	1%

FIGURE 23: FORECASTED PQS BASELINE – REFRIGERATORS (COMPACT)
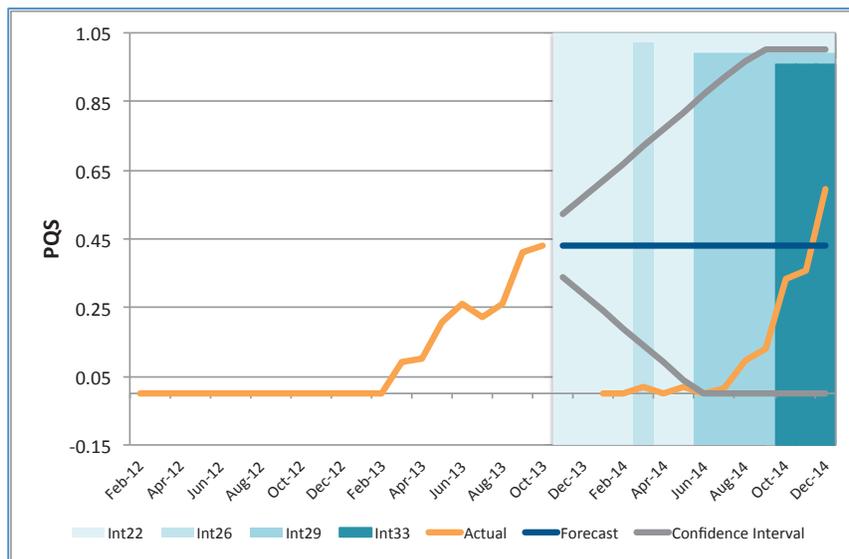
TABLE 62: NET EFFECTS USING FORECASTED PQS BASELINE – REFRIGERATORS (COMPACT)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
23%	80%	-57%

FIGURE 24: FORECASTED PQS BASELINE: REFRIGERATORS (MEDIUM)
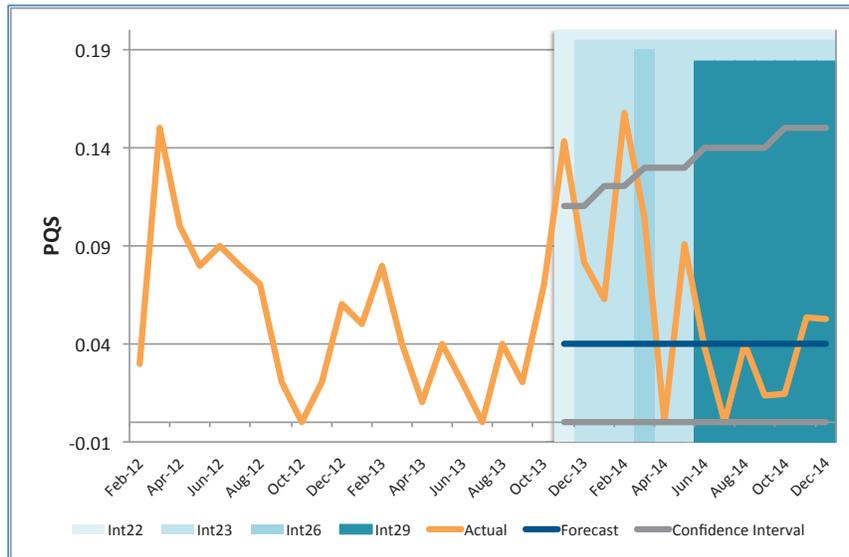
TABLE 63: NET EFFECTS USING FORECASTED PQS BASELINE – REFRIGERATORS (MEDIUM)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
5%	4%	1%

FIGURE 25: FORECASTED PQS BASELINE – REFRIGERATORS (VERY LARGE)
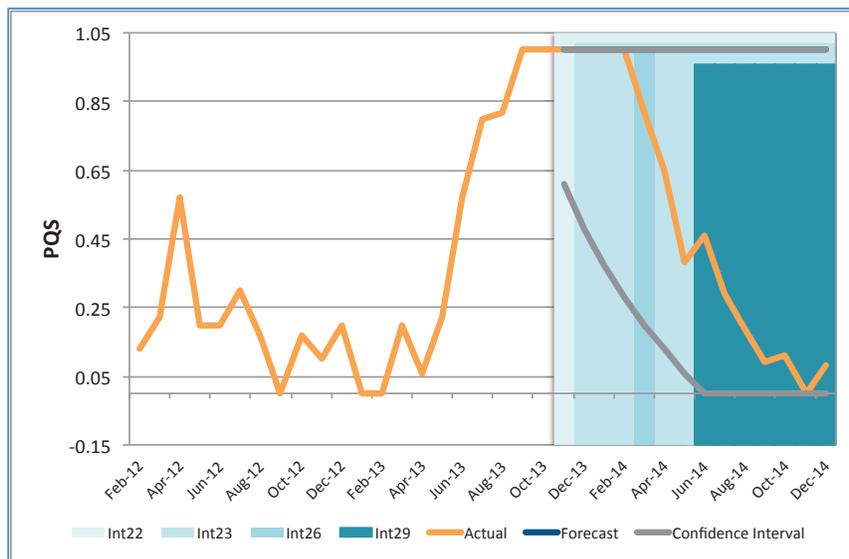
TABLE 64: NET EFFECTS USING FORECASTED PQS BASELINE – REFRIGERATORS (VERY LARGE)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
44%	100%	-56%

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FIGURE 26: FORECASTED PQS BASELINE – ROOM AIR CONDITIONERS (<12,000 BTU)
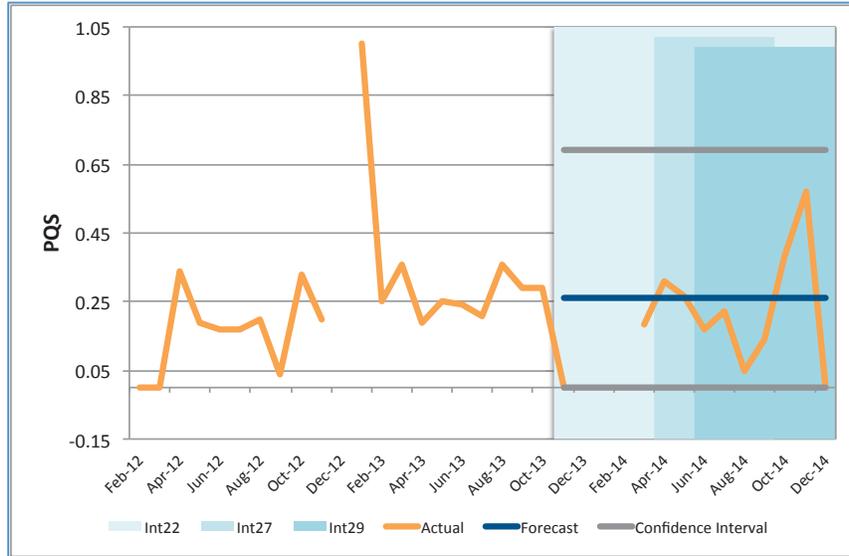
TABLE 65: NET EFFECTS USING FORECASTED PQS BASELINE – ROOM AIR CONDITIONERS (<12,000 BTU)

Mean Trial-period PQS	Mean Forecasted PQS	Net Effect
21%	26%	-5%

APPENDIX F: RESULTS OF PARTICIPANT-ONLY PQS MODIFIED STEP REGRESSIONS

FIGURE 27: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)
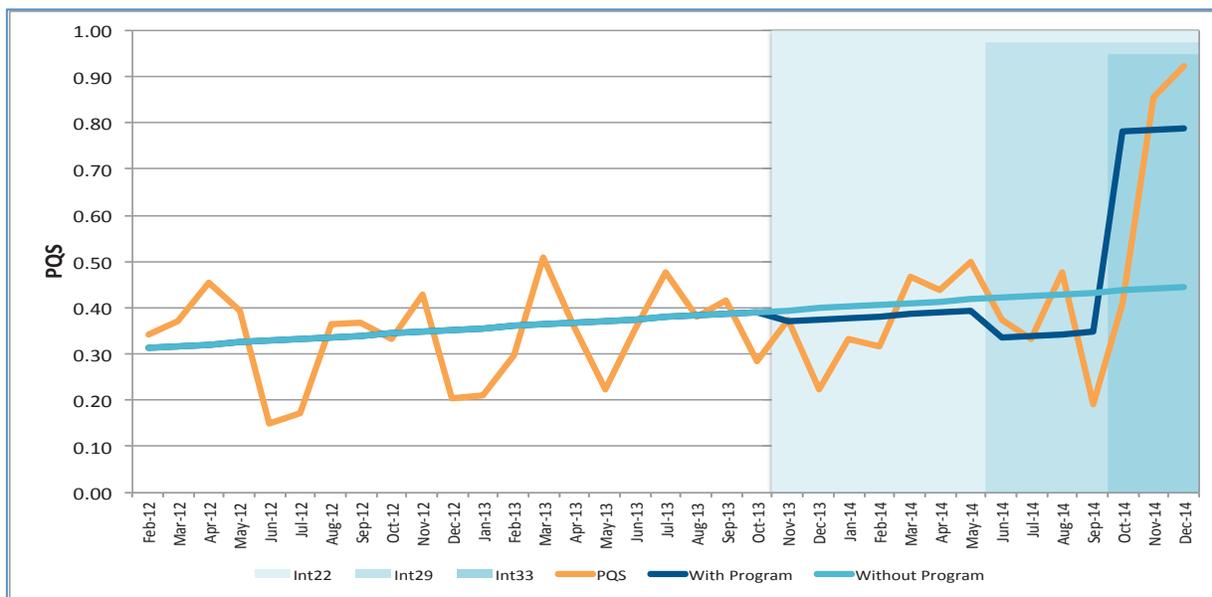
TABLE 66: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.737	4.000	0.184	10.771	0.000
Residual	0.513	30.000	0.017		
Total	1.249	34.000			
R-Square			0.590		
Adjusted R-Square			0.535		

TABLE 67: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.310	0.050	6.165	0.000
MoNo	0.004	0.004	0.897	0.377
Int22	-0.024	0.086	-0.280	0.782
Int29	-0.062	0.091	-0.681	0.501
int33	0.431	0.097	4.441	0.000

TABLE 68: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Mean With Program	Mean Without Program	Net Effect
46%	42%	4%

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FIGURE 28: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)
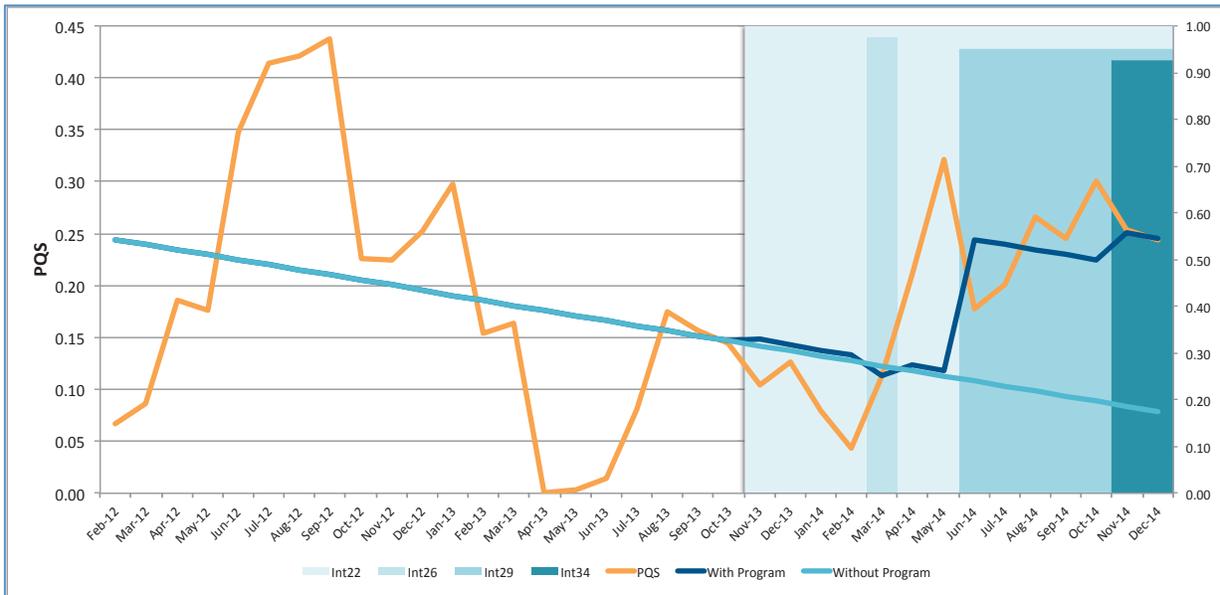
TABLE 69: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS DVD)

	Sum of Square	df	Mean Square	F	Sig.
Regression	1.448	5.000	0.290	0.734	0.604
Residual	11.452	29.000	0.395		
Total	12.900	34.000			
R-Square	0.112				
Adjusted R-Square	-0.041				

TABLE 70: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.249	0.048	5.158	0.000
MoNo	-0.005	0.004	-1.177	0.249
Int22	0.006	0.083	0.072	0.943
Int26	-0.015	0.152	-0.100	0.921
Int29	0.131	0.089	1.465	0.154
Int34	0.030	0.113	0.268	0.790

TABLE 71: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)

Mean With Program	Mean Without Program	Net Effect
18%	11%	7%

FIGURE 29: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)
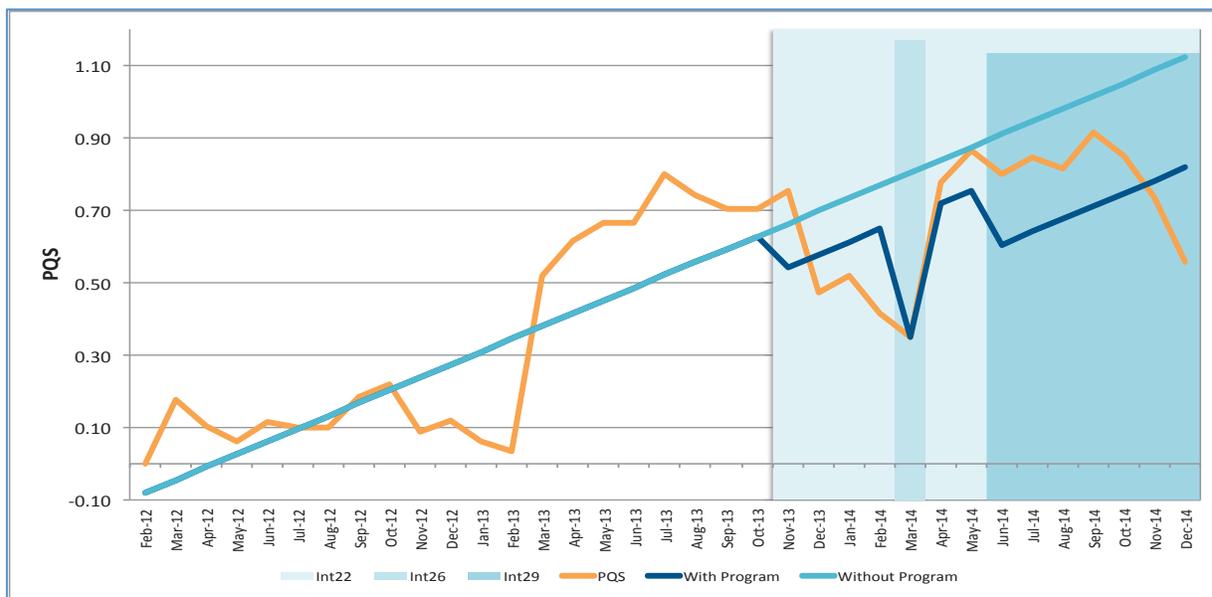
TABLE 72: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)

	Sum of Square	df	Mean Square	F	Sig.
Regression	16.488	4.000	4.122	17.128	0.000
Residual	7.220	30.000	0.241		
Total	23.708	34.000			
R-Square			0.695		
Adjusted R-Square			0.655		

TABLE 73: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.115	0.094	-1.226	0.230
MoNo	0.035	0.008	4.620	0.000
Int22	-0.120	0.125	-0.962	0.344
Int26	-0.336	0.237	-1.420	0.166
Int29	-0.185	0.111	-1.662	0.107

TABLE 74: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Mean With Program	Mean Without Program	Net Effect
66%	89%	-24%

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FIGURE 30: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)
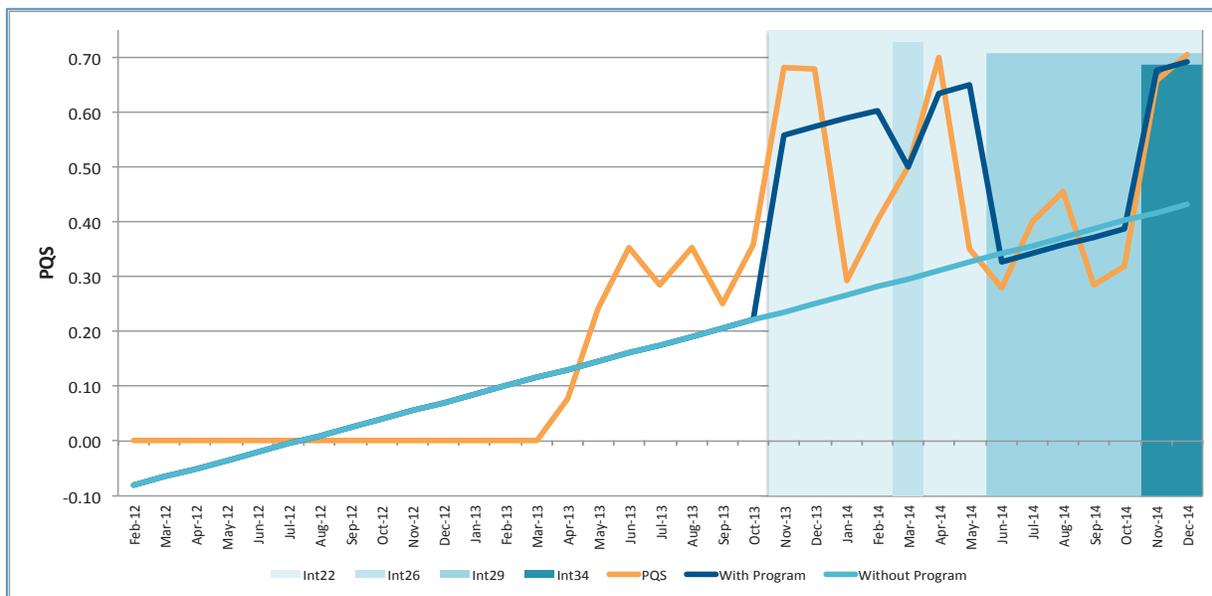
TABLE 75: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

	Sum of Square	df	Mean Square	F	Sig.
Regression	6.193	5.000	1.239	28.542	0.000
Residual	1.259	29.000	0.043		
Total	7.452	34.000			
R-Square			0.831		
Adjusted R-Square			0.802		

TABLE 76: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.095	0.090	-1.060	0.298
MoNo	0.015	0.006	2.332	0.027
Int22	0.322	0.089	3.636	0.001
Int26	-0.119	0.160	-0.742	0.464
Int29	-0.336	0.077	-4.343	0.000
Int34	0.274	0.069	3.956	0.000

TABLE 77: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Mean With Program	Mean Without Program	Net Effect
52%	33%	18%

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FIGURE 31: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)
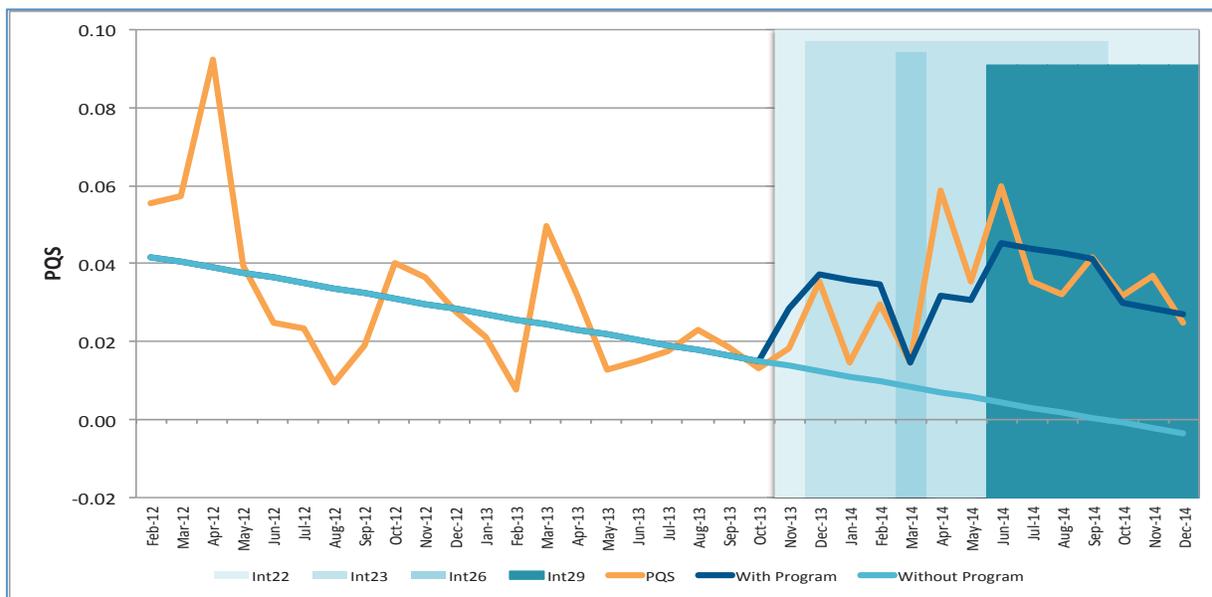
TABLE 78: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.015	5.000	0.003	2.914	0.030
Residual	0.030	29.000	0.001		
Total	0.045	34.000			
R-Square			0.334		
Adjusted R-Square			0.220		

TABLE 79: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.043	0.007	6.017	0.000
MoNo	-0.001	0.001	-2.620	0.014
Int22	0.015	0.011	1.329	0.194
Int23	0.010	0.008	1.312	0.200
Int26	-0.019	0.015	-1.249	0.222
Int29	0.016	0.008	1.889	0.069

TABLE 80: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)

Mean With Program	Mean Without Program	Net Effect
3%	1%	3%

FIGURE 32: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)
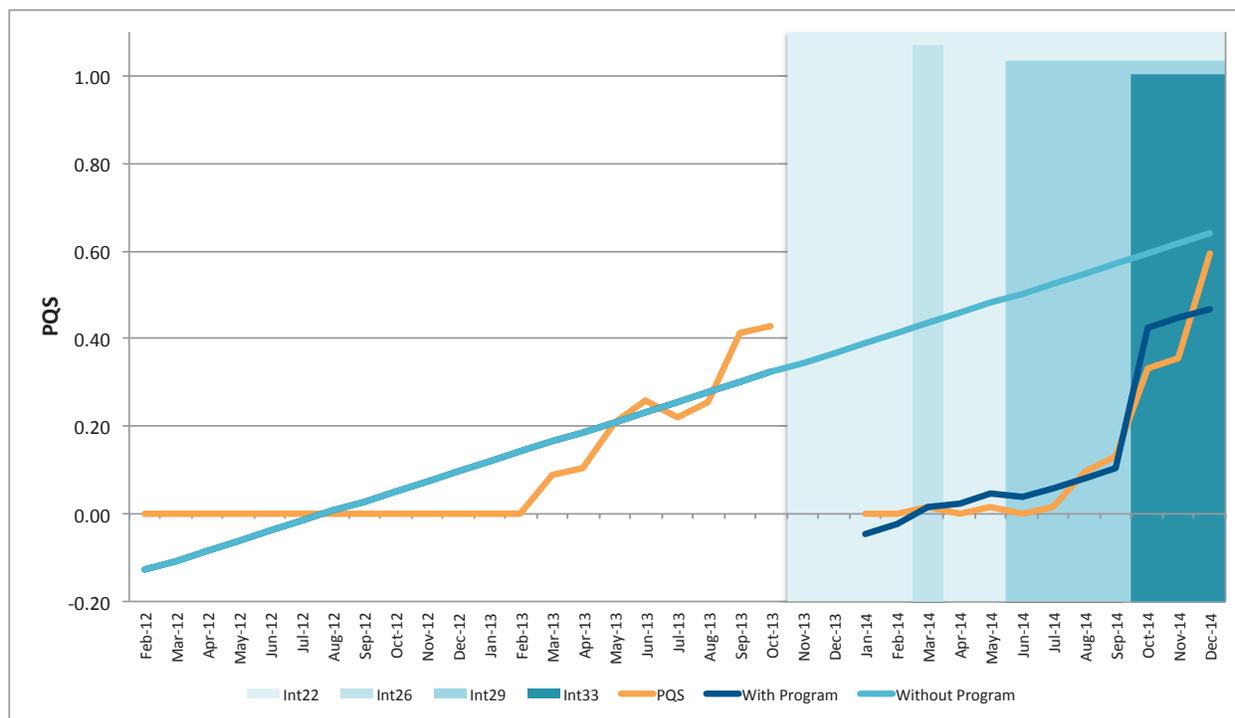
TABLE 81: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)

	Sum of Square	df	Mean Square	F	Sig.
Regression	3.784	5.000	0.757	30.939	0.000
Residual	0.661	27.000	0.024		
Total	4.445	32.000			
R-Square			0.851		
Adjusted R-Square			0.824		

TABLE 82: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.152	0.045	-3.341	0.002
MoNo	0.023	0.003	7.118	0.000
Int22	-0.436	0.075	-5.840	0.000
Int26	0.017	0.116	0.147	0.884
Int29	-0.031	0.068	-0.451	0.656
Int33	0.296	0.046	6.454	0.000

TABLE 83: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)

Mean With Program	Mean Without Program	Net Effect
14%	51%	-38%

FIGURE 33: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)
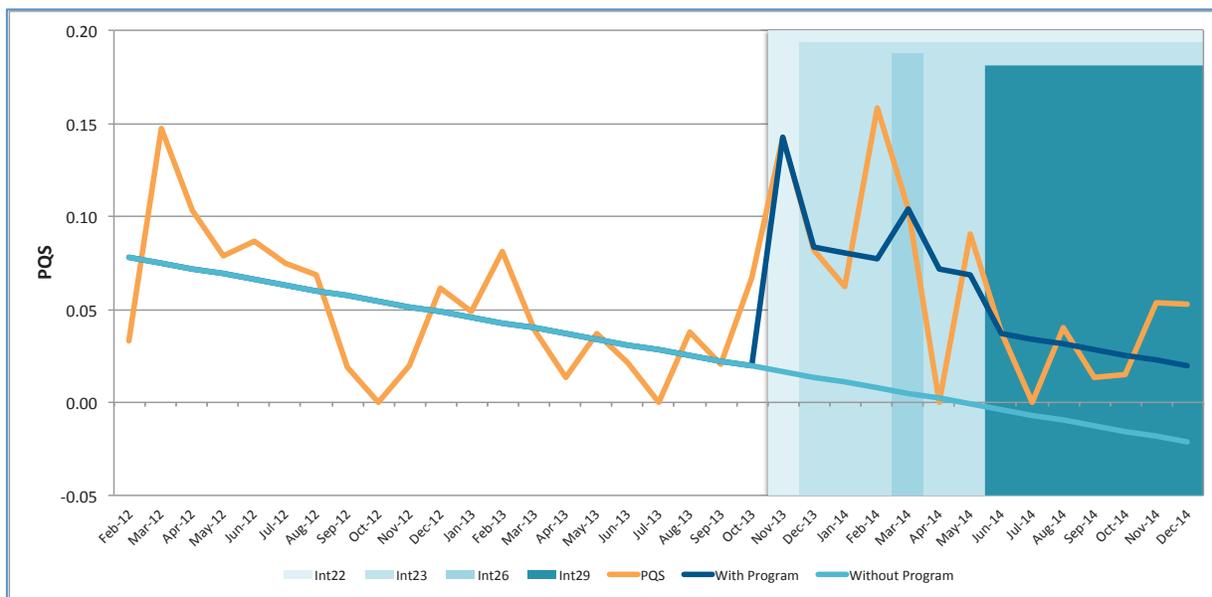
TABLE 84: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.065	5.000	0.013	5.199	0.002
Residual	0.073	29.000	0.003		
Total	0.138	34.000			
R-Square			0.473		
Adjusted R-Square			0.382		

TABLE 85: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.081	0.016	5.031	0.000
MoNo	-0.003	0.001	-2.604	0.014
Int22	0.126	0.037	3.377	0.002
Int23	-0.057	0.039	-1.464	0.154
Int26	0.029	0.030	0.969	0.341
Int29	-0.029	0.020	-1.425	0.165

TABLE 86: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)

Mean With Program	Mean Without Program	Net Effect
6%	0%	6%

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FIGURE 34: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)
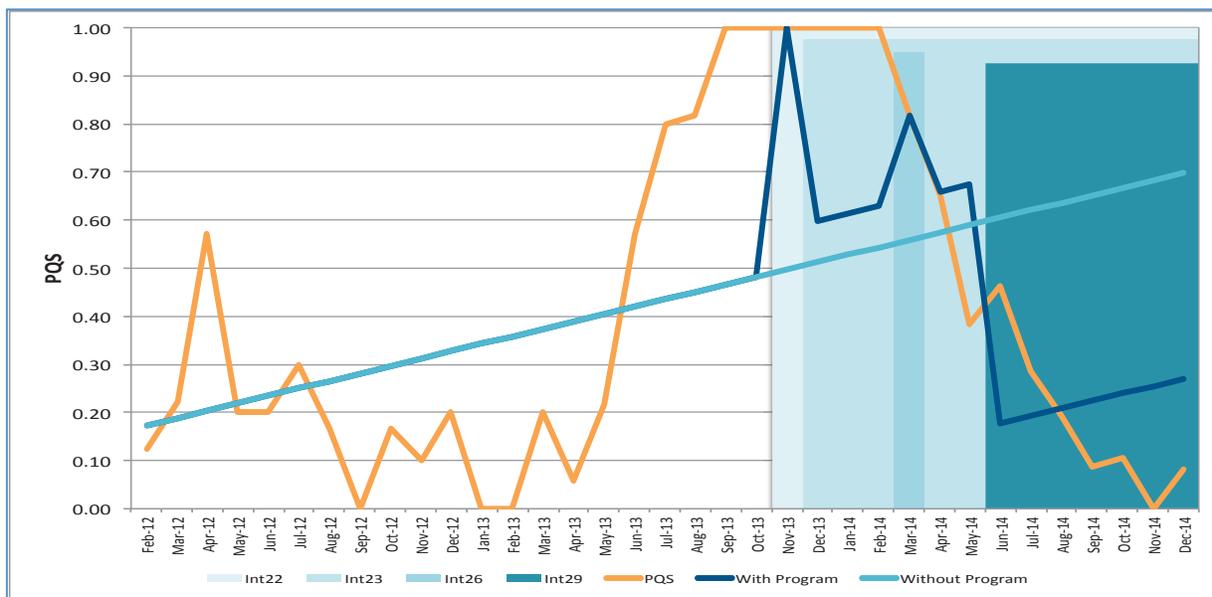
TABLE 87: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)

	Sum of Square	df	Mean Square	F	Sig.
Regression	1.042	5.000	0.208	4.989	0.002
Residual	1.212	29.000	0.042		
Total	2.254	34.000			
R-Square			0.462		
Adjusted R-Square			0.370		

TABLE 88: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.158	0.144	1.092	0.284
MoNo	0.015	0.011	1.458	0.156
Int22	0.503	0.658	0.764	0.451
Int23	-0.418	0.655	-0.638	0.529
Int26	0.174	0.183	0.949	0.351
Int29	-0.512	0.127	-4.048	0.000

TABLE 89: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)

Mean With Program	Mean Without Program	Net Effect
47%	60%	-13%

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FIGURE 35: PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)
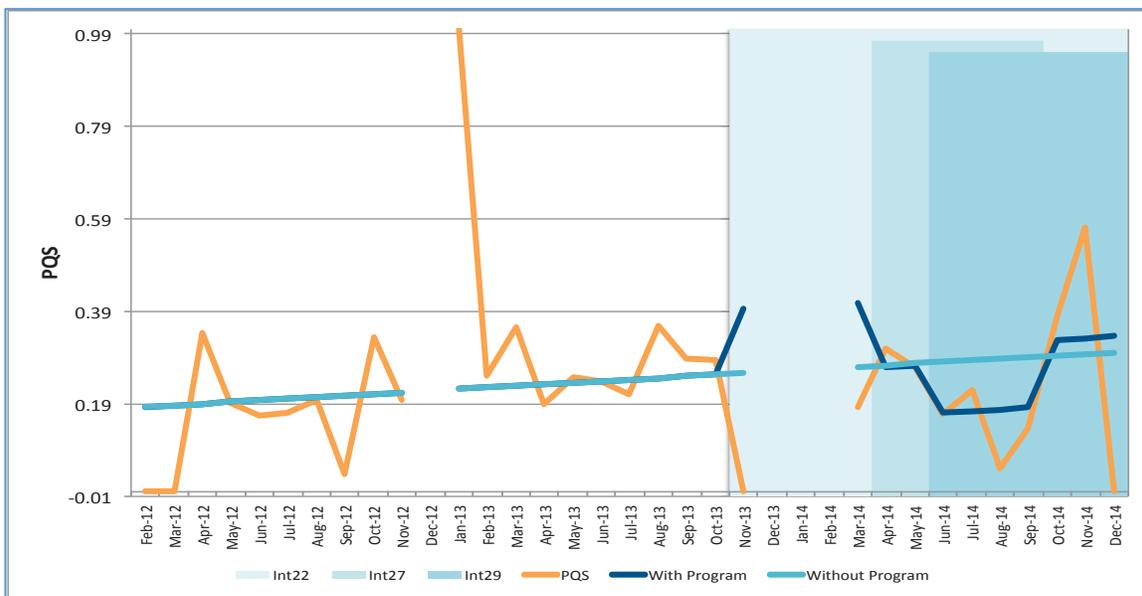
TABLE 90: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.207	4.000	0.052	2.491	0.067
Residual	0.561	27.000	0.021		
Total	0.767	31.000			
R-Square			0.270		
Adjusted R-Square			0.161		

TABLE 91: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.180	0.031	5.782	0.000
MoNo	0.003	0.002	1.548	0.133
Int22	0.138	0.116	1.193	0.243
Int27	-0.144	0.107	-1.341	0.191
Int29	-0.104	0.044	-2.375	0.025

TABLE 92: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)

Mean With Program	Mean Without Program	Net Effect
29%	28%	1%

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APPENDIX G: RESULTS OF PARTICIPANT-ONLY PQS SEGMENTED REGRESSIONS

FIGURE 36: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)
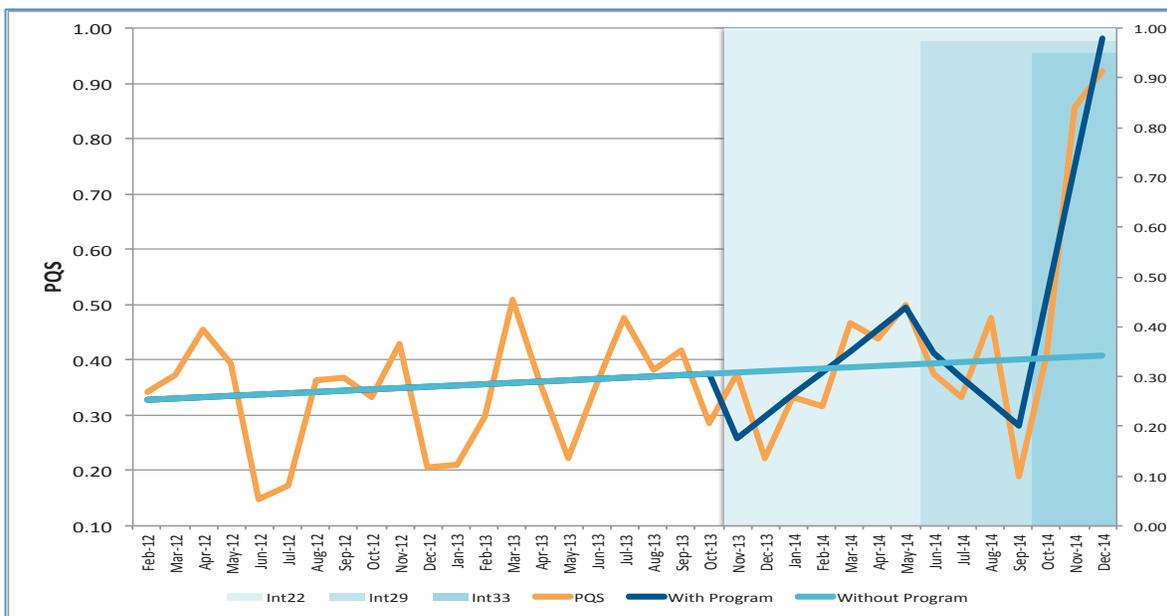
TABLE 93: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.909	7.000	0.130	10.315	0.000
Residual	0.340	27.000	0.013		
Total	1.249	34.000			
R-Square			0.728		
Adjusted R-Square			0.657		

TABLE 94: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.325	0.044	7.426	0.000
MoNo	0.002	0.004	0.633	0.532
Int22	-0.156	0.111	-1.405	0.171
Time22	0.037	0.022	1.673	0.106
Int29	-0.039	0.177	-0.223	0.825
Time29	-0.083	0.061	-1.361	0.185
Int33	-0.001	0.194	-0.006	0.995
Time33	0.278	0.092	3.025	0.005

TABLE 95: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Mean With Program	Mean Without Program	Net Effect
45%	39%	5%

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FIGURE 37: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (DVD)
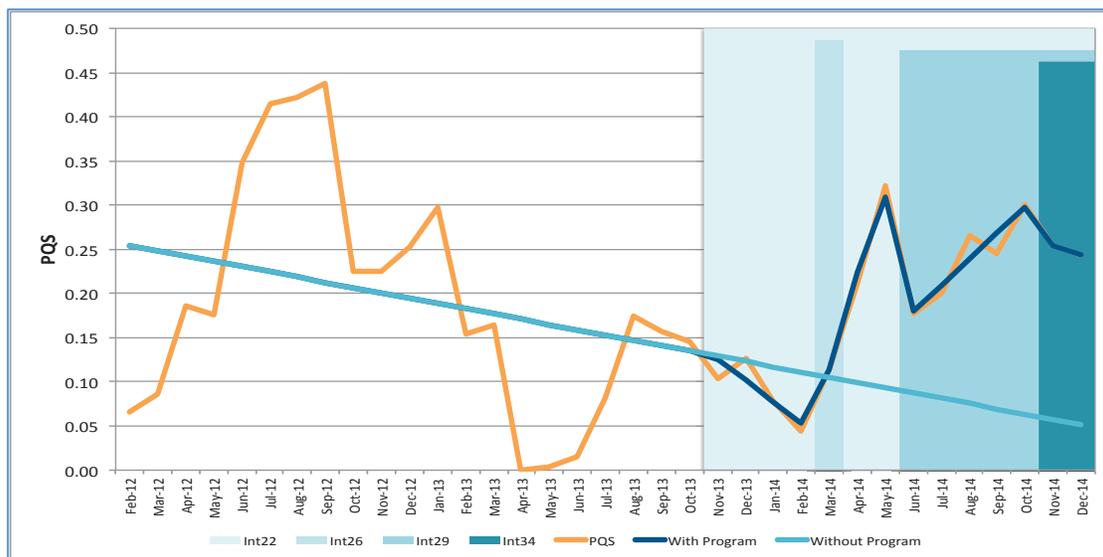
TABLE 96: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (DVD)

	Sum of Square	df	Mean Square	F	Sig.
Regression	2.729	9.000	0.303	0.745	0.665
Residual	10.171	25.000	0.407		
Total	12.900	34.000			
R-Square	0.212				
Adjusted R-Square	-0.072				

TABLE 97: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (DVD)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.260	0.050	5.242	0.000
MoNo	-0.006	0.004	-1.397	0.175
Int22	0.015	0.158	0.093	0.927
Time22	-0.018	0.057	-0.319	0.753
Int26	-0.025	0.165	-0.154	0.879
Time26	0.110	0.105	1.040	0.308
Int29	-0.159	0.202	-0.784	0.440
Time29	-0.056	0.078	-0.716	0.480
Int34	-0.034	0.329	-0.104	0.918
Time34	-0.040	0.191	-0.208	0.837

TABLE 98: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (DVD)

Mean With Program	Mean Without Program	Net Effect
19%	9%	10%

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FIGURE 38: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)
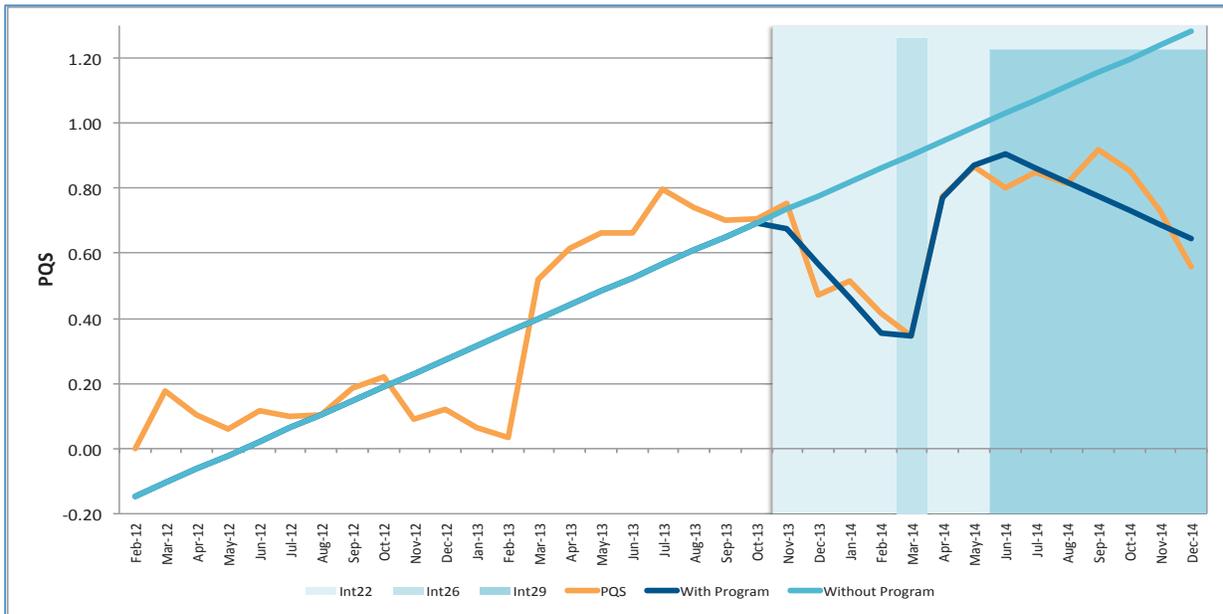

TABLE 99: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)

	Sum of Square	df	Mean Square	F	Sig.
Regression	19.409	7.000	2.773	17.415	0.000
Residual	4.299	27.000	0.159		
Total	23.708	34.000			
R-Square			0.819		
Adjusted R-Square			0.772		

TABLE 100: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.189	0.081	-2.334	0.027
MoNo	0.042	0.007	6.308	0.000
Int22	0.088	0.156	0.567	0.576
Time22	-0.148	0.060	-2.492	0.019
Int26	-0.319	0.199	-1.603	0.121
Time26	0.209	0.083	2.525	0.018
Int29	0.076	0.180	0.424	0.675
Time29	-0.146	0.046	-3.167	0.004

TABLE 101: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Mean With Program	Mean Without Program	Net Effect
68%	101%	-33%

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160

FIGURE 39: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)
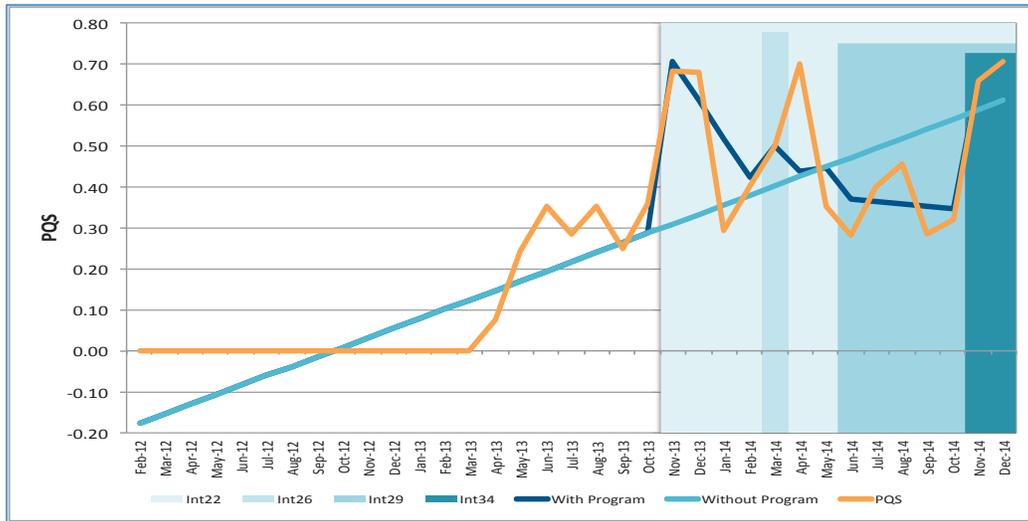
TABLE 102: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

	Sum of Square	df	Mean Square	F	Sig.
Regression	6.737	9.000	0.749	26.198	0.000
Residual	0.714	25.000	0.029		
Total	7.452	34.000			
R-Square			0.904		
Adjusted R-Square			0.870		

TABLE 103: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.200	0.078	-2.560	0.017
MoNo	0.023	0.006	4.091	0.000
Int22	0.512	0.098	5.249	0.000
Time22	-0.117	0.038	-3.053	0.005
Int26	0.068	0.140	0.490	0.628
Time26	0.100	0.074	1.361	0.186
Int29	-0.069	0.128	-0.536	0.596
Time29	-0.013	0.052	-0.256	0.800
Int34	0.266	0.142	1.873	0.073
Time34	0.053	0.082	0.651	0.521

TABLE 104: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Mean With Program	Mean Without Program	Net Effect
49%	46%	3%

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FIGURE 40: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)
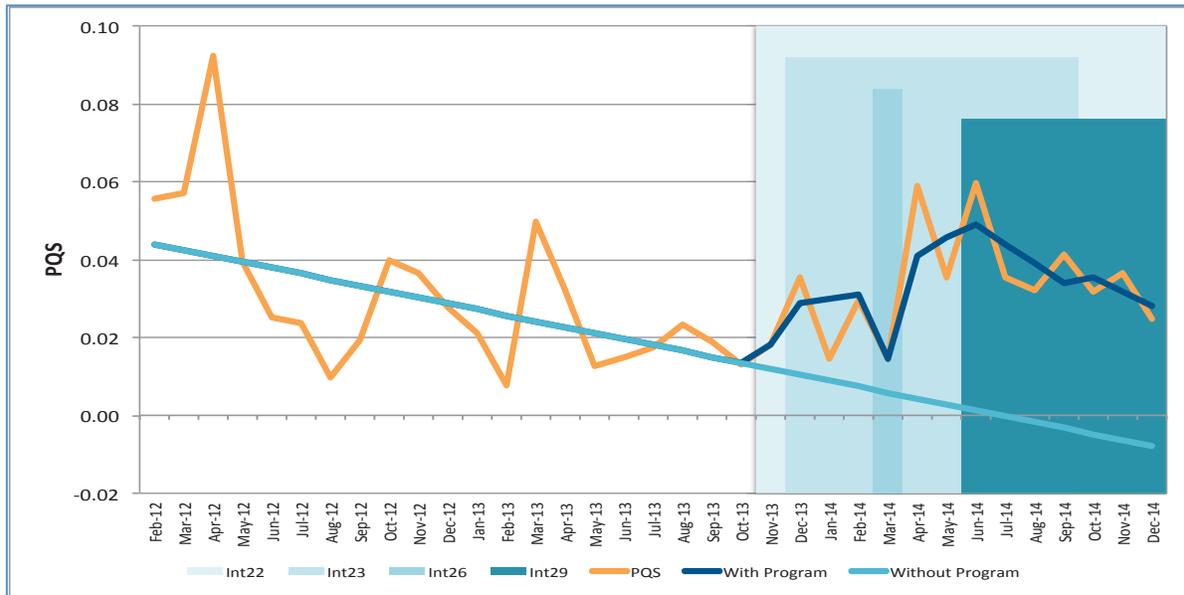
TABLE 105: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.019	9.000	0.002	2.016	0.080
Residual	0.026	25.000	0.001		
Total	0.045	34.000			
R-Square			0.421		
Adjusted R-Square			0.212		

TABLE 106: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.046	0.007	6.125	0.000
MoNo	-0.002	0.001	-2.871	0.008
Int22	0.002	0.017	0.124	0.903
Time22	0.004	0.009	0.434	0.668
Int23	0.010	0.028	0.348	0.731
Time23	-0.001	0.003	-0.497	0.623
Int26	-0.021	0.017	-1.287	0.210
Time26	0.004	0.016	0.233	0.817
Int29	0.008	0.019	0.447	0.659
Time29	-0.010	0.008	-1.165	0.255

TABLE 107: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)

Mean With Program	Mean Without Program	Net Effect
3%	0%	3%

FIGURE 41: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)
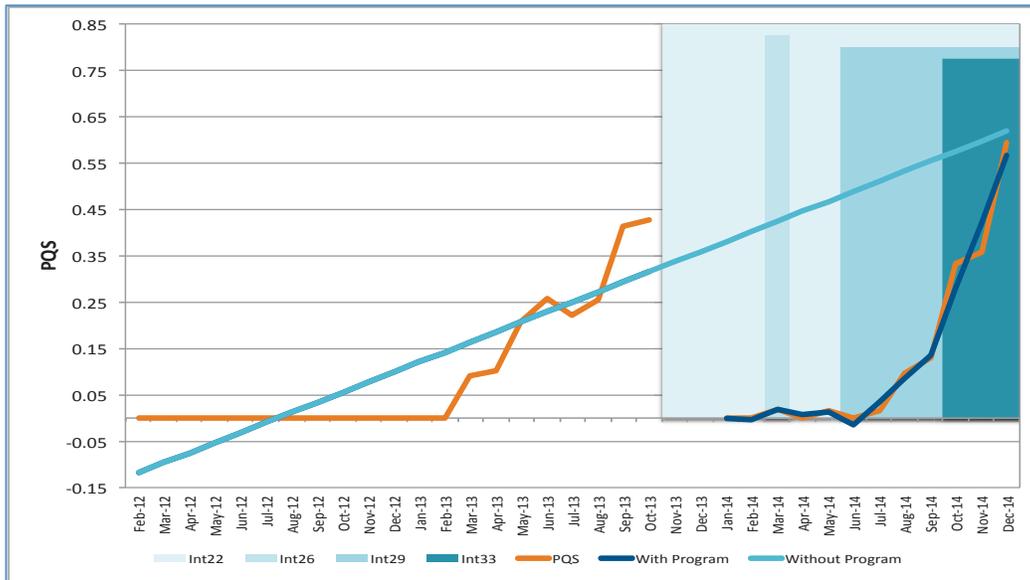
TABLE 108: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)

	Sum of Square	df	Mean Square	F	Sig.
Regression	4.040	9.000	0.449	25.524	0.000
Residual	0.405	23.000	0.018		
Total	4.445	32.000			
R-Square			0.909		
Adjusted R-Square			0.873		

TABLE 109: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.140	0.039	-3.604	0.001
MoNo	0.022	0.003	7.967	0.000
Int22	-0.307	0.520	-0.590	0.561
Time22	-0.025	0.147	-0.167	0.869
Int26	0.015	0.110	0.133	0.895
Time26	0.008	0.178	0.047	0.963
Int29	-0.080	0.117	-0.685	0.500
Time29	0.045	0.054	0.830	0.415
Int33	0.001	0.088	0.009	0.993
Time33	0.093	0.044	2.100	0.047

TABLE 110: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)

Mean With Program	Mean Without Program	Net Effect
13%	50%	-37%

FIGURE 42: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)
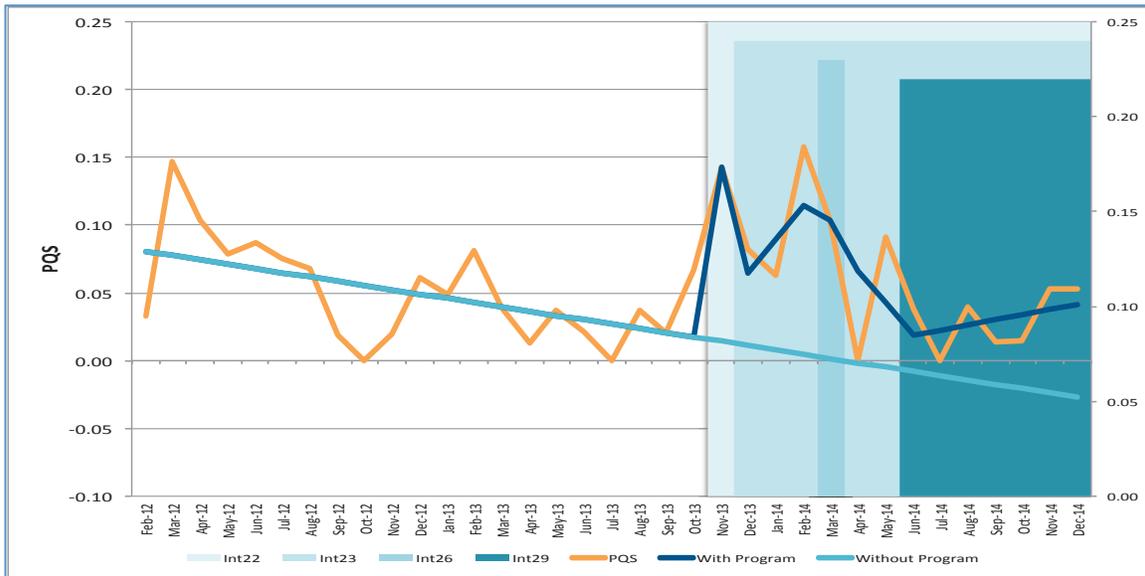
TABLE 111: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.074	8.000	0.009	3.734	0.005
Residual	0.064	26.000	0.002		
Total	0.138	34.000			
R-Square			0.535		
Adjusted R-Square			0.391		

TABLE 112: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.084	0.016	5.149	0.000
MoNo	-0.003	0.001	-2.769	0.010
Int22	0.129	0.037	3.458	0.002
Int23	-0.104	0.061	-1.692	0.103
Time23	0.028	0.024	1.173	0.251
Int26	0.013	0.034	0.396	0.695
Time26	-0.049	0.036	-1.351	0.188
Int29	-0.028	0.040	-0.689	0.497
Time29	0.028	0.017	1.615	0.118

TABLE 113: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)

Mean With Program	Mean Without Program	Net Effect
6%	-1%	7%

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FIGURE 43: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)
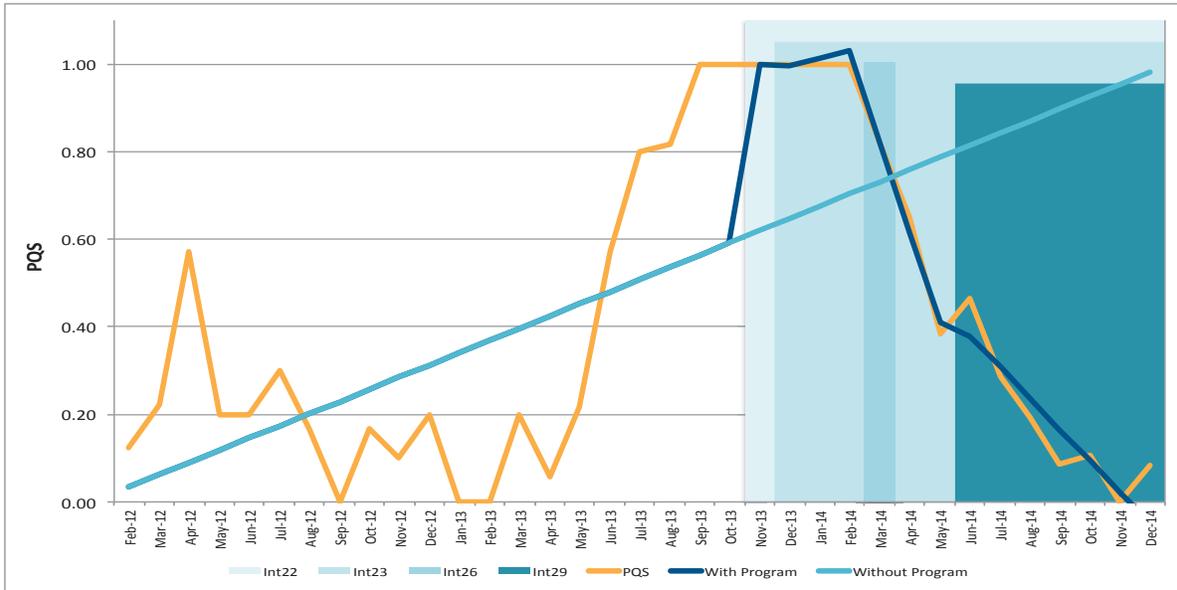
TABLE 114: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)

	Sum of Square	df	Mean Square	F	Sig.
Regression	1.628	8.000	0.203	8.448	0.000
Residual	0.626	26.000	0.024		
Total	2.254	34.000			
R-Square		0.722			
Adjusted R-Square		0.637			

TABLE 115: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.006	0.115	0.055	0.957
MoNo	0.028	0.008	3.289	0.003
Int22	0.380	0.500	0.761	0.454
Int23	-0.023	0.620	-0.037	0.971
Time23	-0.010	0.153	-0.068	0.947
Int26	-0.005	0.160	-0.029	0.977
Time26	-0.224	0.202	-1.114	0.276
Int29	0.040	0.153	0.263	0.795
Time29	0.136	0.078	1.755	0.091

TABLE 116: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)

Mean With Program	Mean Without Program	Net Effect
50%	80%	-30%

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FIGURE 44: PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)
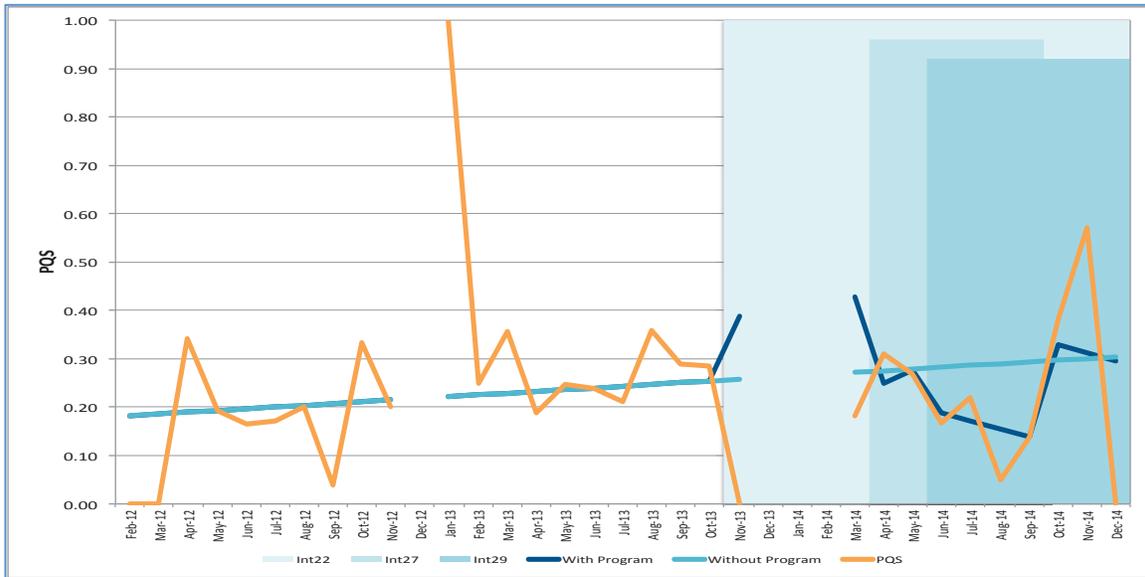
TABLE 117: ANOVA TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.219	7.000	0.031	1.365	0.265
Residual	0.549	24.000	0.023		
Total	0.767	31.000			
R-Square			0.285		
Adjusted R-Square			0.076		

TABLE 118: COEFFICIENTS TABLE FOR PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.179	0.033	5.440	0.000
MoNo	0.004	0.002	1.517	0.142
Int22	0.125	0.712	0.175	0.863
Time22	0.006	0.152	0.040	0.968
Int27	-0.207	0.148	-1.394	0.176
Time27	0.018	0.187	0.098	0.923
Int29	-0.071	0.072	-0.987	0.334
Time29	-0.045	0.093	-0.480	0.635

TABLE 119: NET EFFECTS USING PARTICIPANT-ONLY PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)

Mean With Program	Mean Without Program	Net Effect
28%	28%	-1%

APPENDIX H: RESULTS OF COMPARISON-BASED PQS MODIFIED STEP REGRESSIONS

FIGURE 45: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)
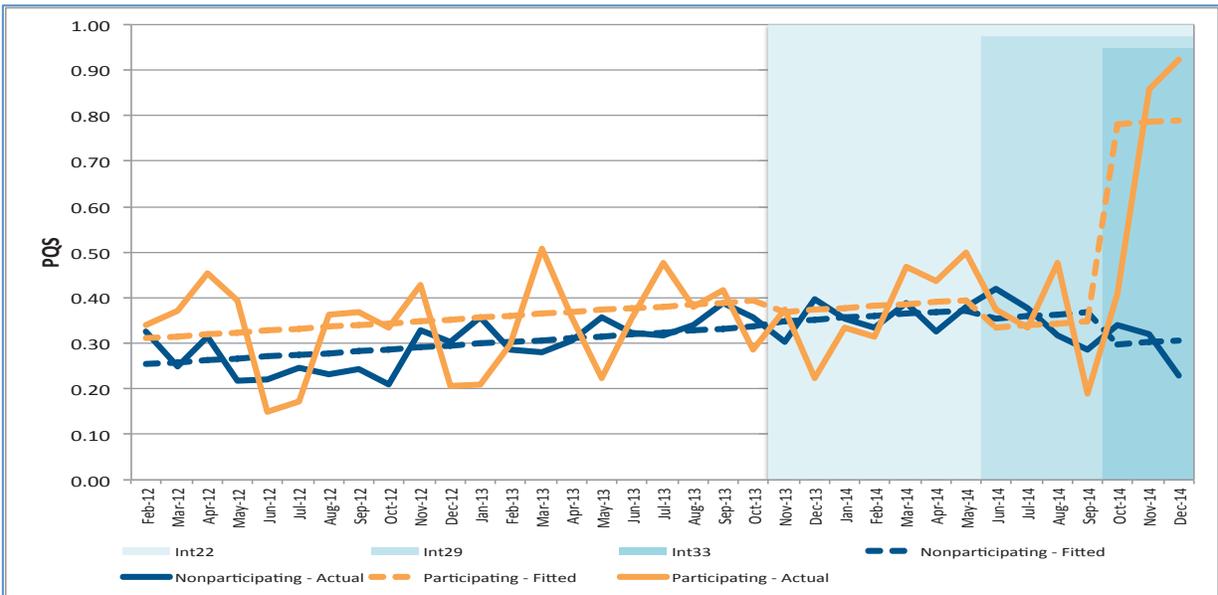

TABLE 120: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.935	8.000	0.117	12.478	0.000
Residual	0.571	61.000	0.009		
Total	1.506	69.000			
R-Square			0.788		
Adjusted R-Square			0.571		

TABLE 121: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.250	0.031	8.132	0.000
MoNo	0.004	0.002	1.799	0.077
isPart	0.057	0.027	2.087	0.041
Int22	0.008	0.055	0.141	0.889
PartInt22	-0.035	0.061	-0.583	0.562
Int29	-0.021	0.068	-0.310	0.758
PartInt29	-0.042	0.094	-0.448	0.655
Int33	-0.074	0.089	-0.829	0.410
PartInt33	0.504	0.114	4.437	0.000

TABLE 122: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – AIR CLEANERS (<100 CADR)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
46%	35%	11%

FIGURE 46: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)
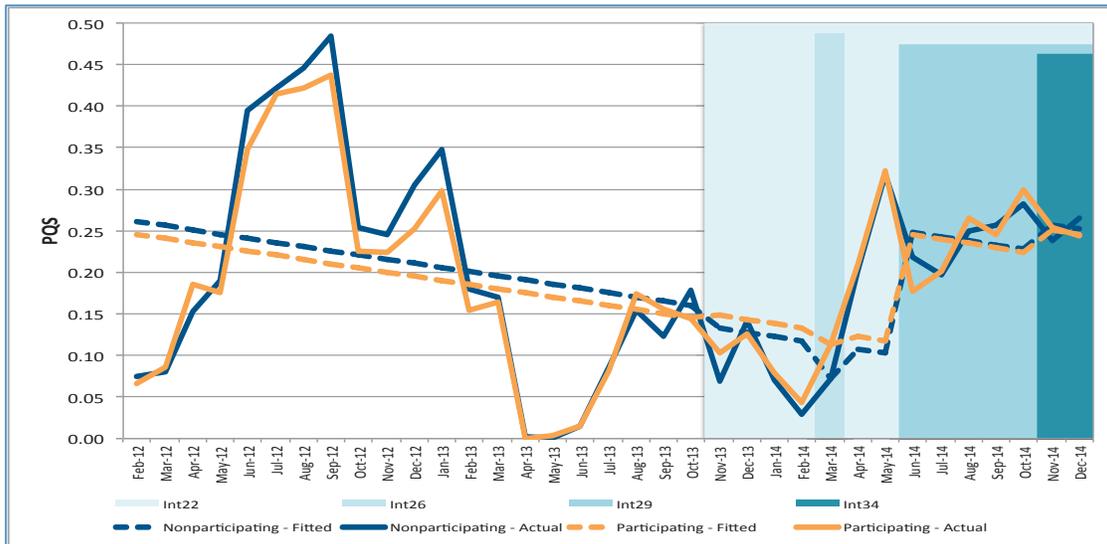

TABLE 123: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)

	Sum of Square	df	Mean Square	F	Sig.
Regression	4.010	10.000	0.401	0.925	0.517
Residual	25.571	59.000	0.433		
Total	29.581	69.000			
R-Square			0.136		
Adjusted R-Square			-0.011		

TABLE 124: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.266	0.040	6.667	0.000
MoNo	-0.005	0.003	-1.654	0.103
isPart	-0.015	0.035	-0.446	0.657
Int22	-0.023	0.069	-0.329	0.743
PartInt22	0.031	0.083	0.375	0.709
Int26	-0.040	0.142	-0.284	0.778
PartInt26	0.026	0.214	0.119	0.905
Int29	0.150	0.085	1.771	0.082
PartInt29	-0.019	0.121	-0.152	0.879
Int34	0.035	0.114	0.304	0.762
PartInt34	-0.004	0.163	-0.024	0.981

TABLE 125: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (DVD)

| Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
18%	18%	1%
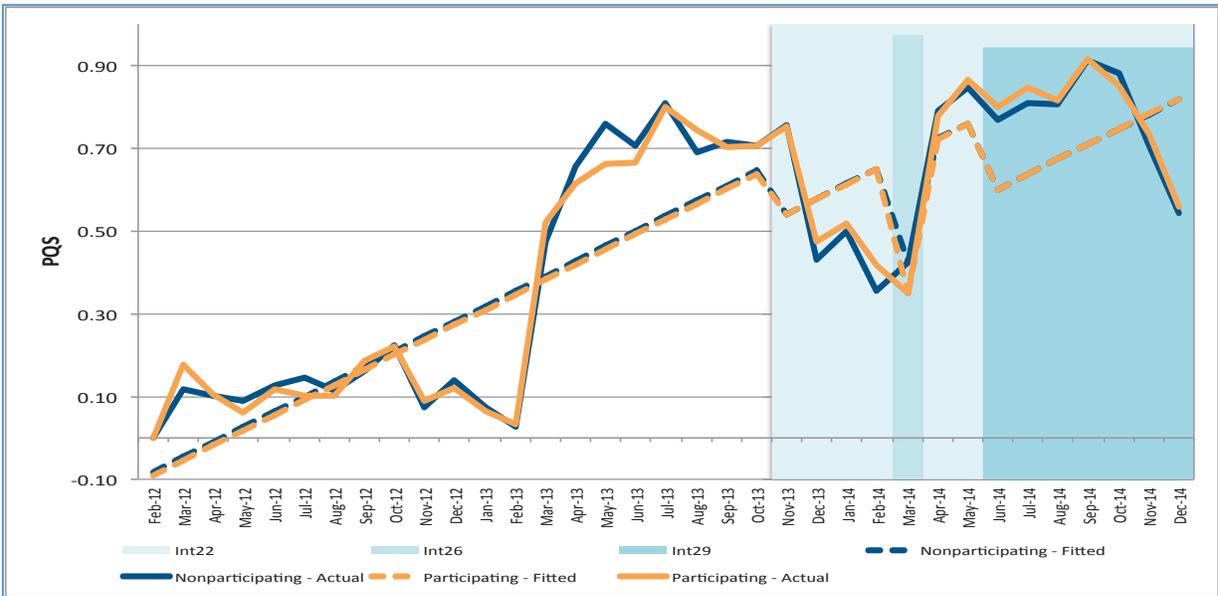
TABLE 126: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)

	Sum of Square	df	Mean Square	F	Sig.
Regression	34.644	8.000	4.331	16.206	0.000
Residual	16.300	61.000	0.267		
Total	50.944	69.000			
R-Square			0.680		
Adjusted R-Square			0.638		

TABLE 127: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.119	0.075	-1.598	0.115
MoNo	0.036	0.005	6.627	0.000
isPart	-0.008	0.059	-0.137	0.892
Int22	-0.142	0.102	-1.393	0.169
PartInt22	0.008	0.110	0.068	0.946
Int26	-0.261	0.252	-1.035	0.305
PartInt26	-0.077	0.354	-0.217	0.829
Int29	-0.196	0.099	-1.976	0.053
PartInt29	0.001	0.127	0.012	0.991

TABLE 128: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
66%	66%	-1%

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FIGURE 48: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)
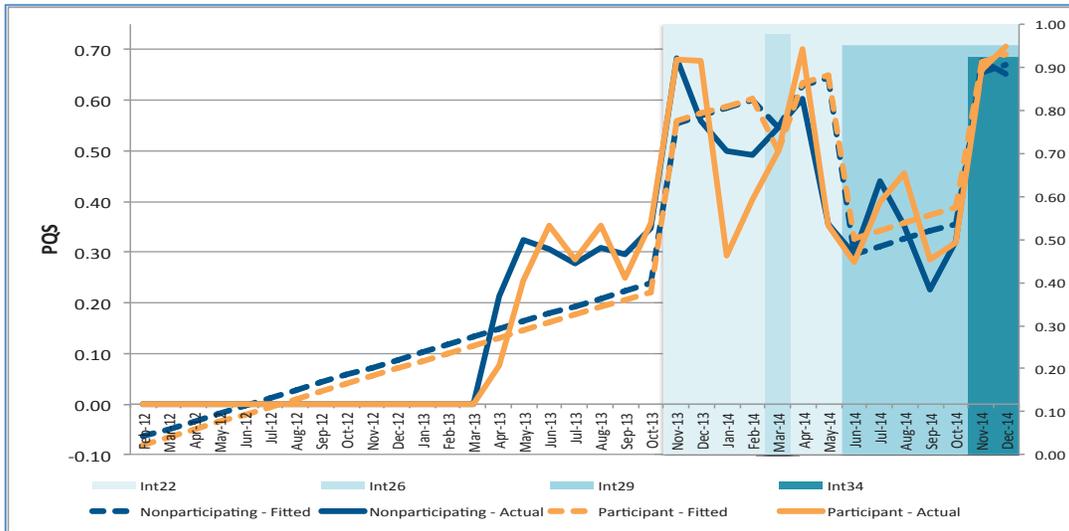

TABLE 129: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

	Sum of Square	df	Mean Square	F	Sig.
Regression	11.929	10.000	1.193	30.710	0.000
Residual	2.292	59.000	0.039		
Total	14.220	69.000			
R-Square			0.839		
Adjusted R-Square			0.812		

TABLE 130: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.079	0.063	-1.263	0.212
MoNo	0.015	0.004	3.677	0.001
isPart	-0.017	0.045	-0.385	0.702
Int22	0.300	0.065	4.640	0.000
PartInt22	0.022	0.070	0.311	0.757
Int26	-0.068	0.141	-0.480	0.633
PartInt26	-0.051	0.206	-0.249	0.804
Int29	-0.364	0.062	-5.845	0.000
PartInt29	0.027	0.080	0.341	0.735
Int34	0.284	0.063	4.533	0.000
PartInt34	-0.010	0.087	-0.119	0.906

TABLE 131: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
52%	51%	1%

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**FIGURE 49: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)**
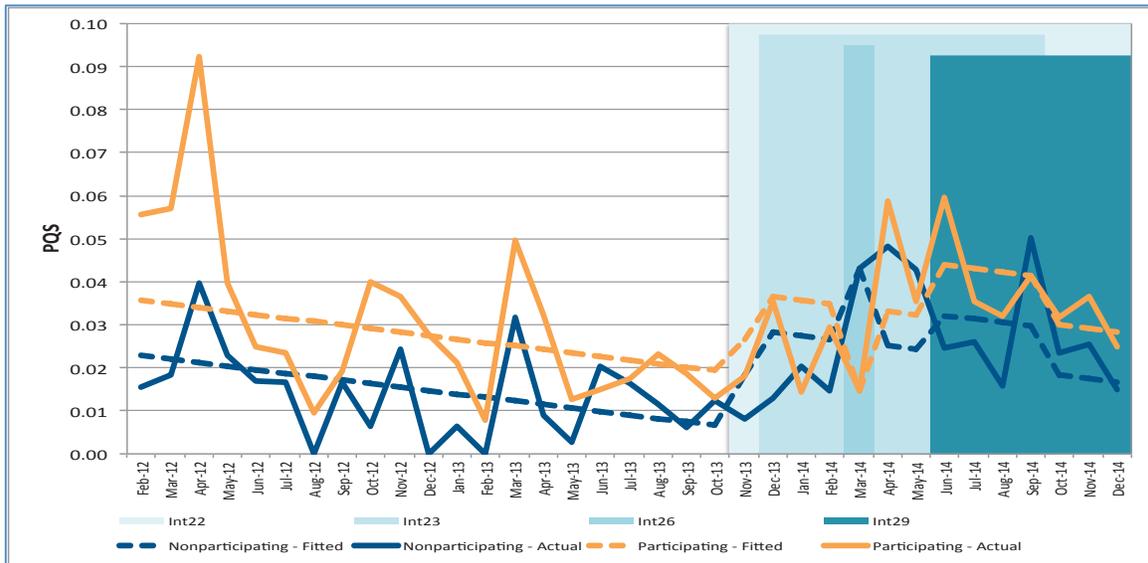
TABLE 132: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.030	10.000	0.003	3.738	0.001
Residual	0.047	59.000	0.001		
Total	0.077	69.000			
R-Square			0.388		
Adjusted R-Square			0.284		

TABLE 133: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.024	0.005	4.385	0.000
MoNo	-0.001	0.000	-2.370	0.021
isPart	0.013	0.004	3.059	0.003
Int22	0.013	0.010	1.257	0.214
PartInt22	-0.005	0.012	-0.393	0.696
Int23	0.011	0.008	1.326	0.190
PartInt23	0.000	0.010	0.001	0.999
Int26	0.017	0.016	1.093	0.279
PartInt26	-0.036	0.020	-1.790	0.079
Int29	0.009	0.008	1.068	0.290
PartInt29	0.004	0.010	0.357	0.722

TABLE 134: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – FREEZERS (CHEST)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
3%	3%	1%

FIGURE 50: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)
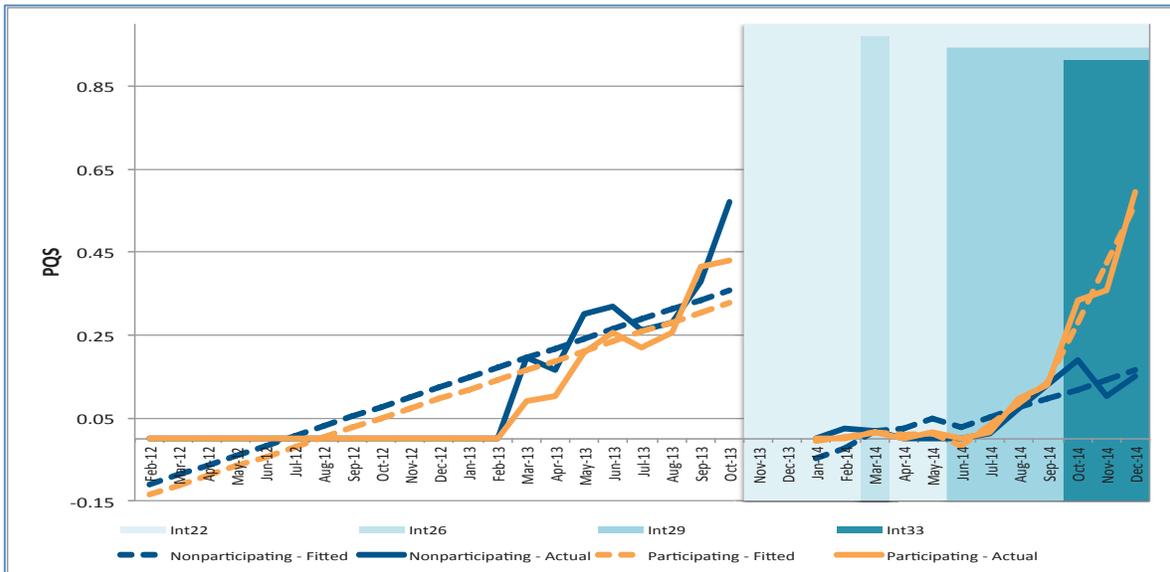

TABLE 135: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)

	Sum of Square	df	Mean Square	F	Sig.
Regression	5.532	10.000	0.553	28.832	0.000
Residual	1.055	55.000	0.019		
Total	6.587	65.000			
R-Square	0.840				
Adjusted R-Square	0.811				

TABLE 136: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.134	0.032	-4.147	0.000
MoNo	0.023	0.002	11.564	0.000
isPart	-0.029	0.025	-1.150	0.255
Int22	-0.475	0.066	-7.179	0.000
PartInt22	0.028	0.082	0.341	0.735
Int26	0.017	0.121	0.139	0.890
PartInt26	0.001	0.159	0.003	0.997
Int29	-0.044	0.066	-0.665	0.509
PartInt29	0.009	0.088	0.100	0.920
Int33	-0.004	0.046	-0.083	0.934
PartInt33	0.297	0.061	4.895	0.000

TABLE 137: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (COMPACT)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
14%	6%	8%

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FIGURE 51: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)
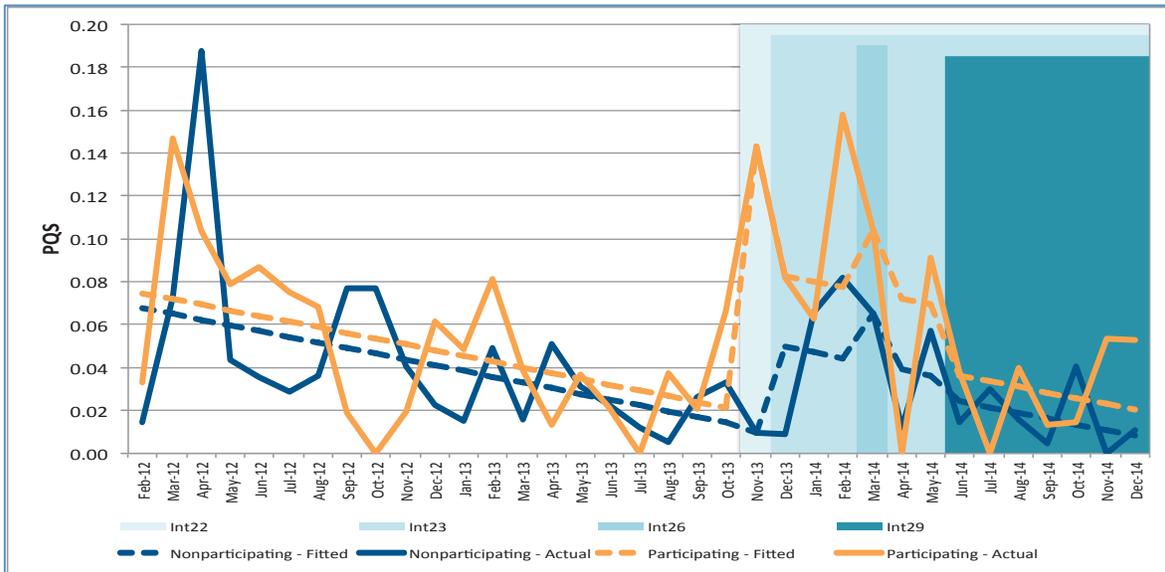

TABLE 138: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.092	10.000	0.009	5.011	0.000
Residual	0.109	59.000	0.002		
Total	0.201	69.000			
R-Square			0.459		
Adjusted R-Square			0.368		

TABLE 139: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.070	0.012	5.938	0.000
MoNo	-0.003	0.001	-3.629	0.001
isPart	0.007	0.009	0.783	0.437
Int22	-0.002	0.034	-0.053	0.958
PartInt22	0.126	0.046	2.750	0.008
Int23	0.043	0.037	1.162	0.250
PartInt23	-0.100	0.049	-2.027	0.047
Int26	0.023	0.030	0.776	0.441
PartInt26	0.006	0.040	0.149	0.882
Int29	-0.010	0.019	-0.503	0.617
PartInt29	-0.021	0.024	-0.846	0.401

TABLE 140: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (MEDIUM)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
6%	3%	3%

FIGURE 52: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)
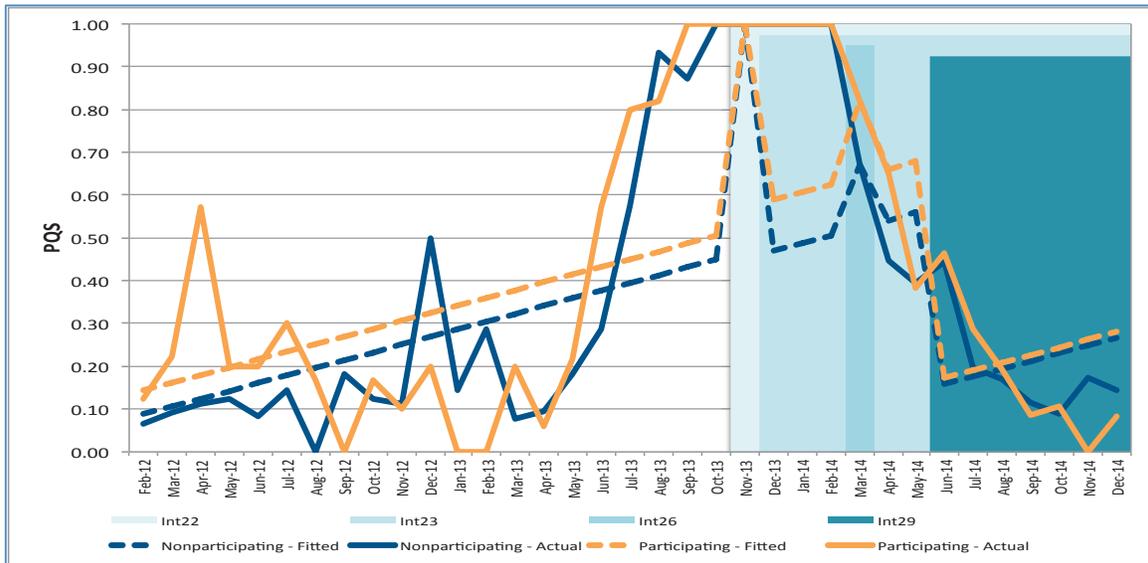

TABLE 141: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)

	Sum of Square	df	Mean Square	F	Sig.
Regression	1.964	10.000	0.196	5.065	0.000
Residual	2.287	59.000	0.039		
Total	4.251	69.000			
R-Square			0.462		
Adjusted R-Square			0.371		

TABLE 142: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.070	0.114	0.612	0.543
MoNo	0.018	0.007	2.498	0.015
isPart	0.056	0.090	0.620	0.538
Int22	0.533	0.389	1.369	0.176
PartInt22	-0.056	0.734	-0.076	0.940
Int23	-0.549	0.391	-1.406	0.165
PartInt23	0.120	0.739	0.162	0.872
Int26	0.148	0.169	0.879	0.383
PartInt26	0.027	0.244	0.112	0.912
Int29	-0.419	0.113	-3.696	0.000
PartInt29	-0.106	0.156	-0.678	0.500

TABLE 143: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – REFRIGERATORS (VERY LARGE)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
47%	41%	6%

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FIGURE 53: COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)
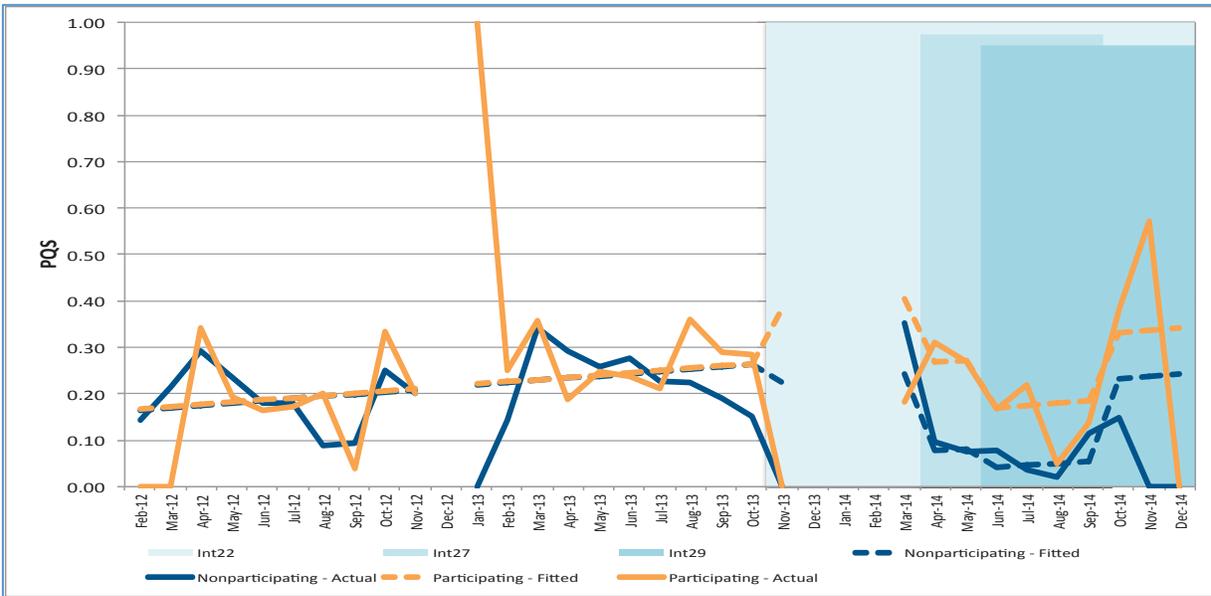

TABLE 144: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)

	Sum of Square	df	Mean Square	F	Sig.
Regression	2.022	8.000	0.253	12.529	0.000
Residual	1.110	55.000	0.020		
Total	3.132	63.000			
R-Square			0.646		
Adjusted R-Square			0.594		

TABLE 145: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.160	0.022	7.257	0.000
MoNo	0.005	0.001	3.306	0.002
isPart	0.002	0.017	0.109	0.914
Int22	-0.044	0.116	-0.378	0.707
PartInt22	0.159	0.157	1.010	0.317
Int27	-0.172	0.114	-1.500	0.139
PartInt27	0.030	0.156	0.193	0.847
Int29	-0.046	0.035	-1.323	0.191
PartInt29	-0.061	0.055	-1.111	0.271

TABLE 146: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (MODIFIED STEP) – ROOM AIR CONDITIONERS (<12,000 BTU)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
29%	11%	14%

APPENDIX I: RESULTS OF COMPARISON-BASED PQS SEGMENTED REGRESSIONS

**FIGURE 54: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)**
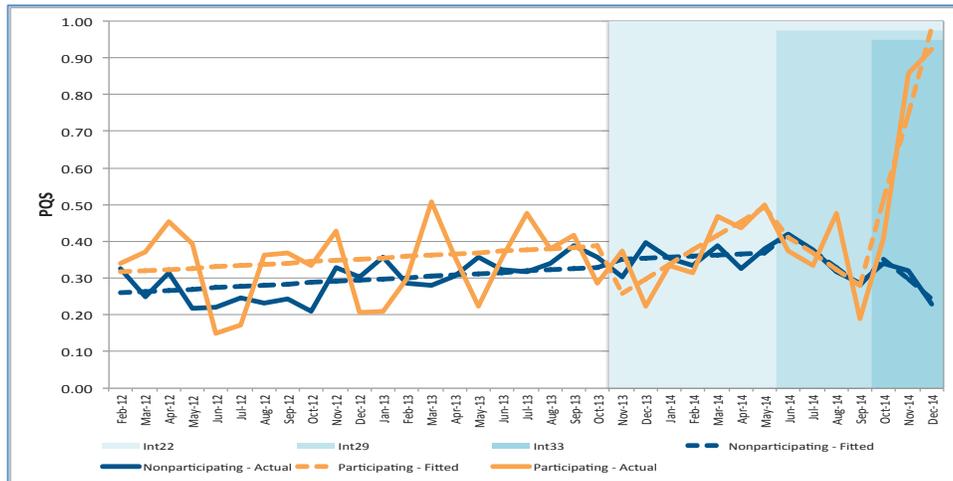
TABLE 147: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

	Sum of Square	df	Mean Square	F	Sig.
Regression	1.120	14.000	0.080	11.400	0.000
Residual	0.386	55.000	0.007		
Total	1.506	69.000			
R-Square	0.744				
Adjusted R-Square	0.678				

TABLE 148: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.256	0.027	9.521	0.000
MoNo	0.004	0.002	1.752	0.085
isPart	0.057	0.024	2.404	0.020
Int22	0.018	0.079	0.223	0.825
Time22	0.000	0.017	-0.021	0.984
PartInt22	-0.186	0.108	-1.720	0.091
PartTime22	0.036	0.024	1.535	0.131
Int29	0.097	0.124	0.781	0.438
Time29	-0.050	0.045	-1.097	0.277
PartInt29	-0.137	0.182	-0.753	0.455
PartTime29	-0.033	0.064	-0.521	0.604
Int33	0.126	0.182	0.694	0.490
Time33	-0.008	0.088	-0.094	0.925
PartInt33	-0.127	0.232	-0.548	0.586
PartTime33	0.286	0.111	2.573	0.013

TABLE 149: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – AIR CLEANERS (<100 CADR)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
45%	34%	10%

**FIGURE 55: COMPARISON-BASED PQS REGRESSION (SEGMENTED) — DVD/BLU-RAY PLAYERS (DVD)**
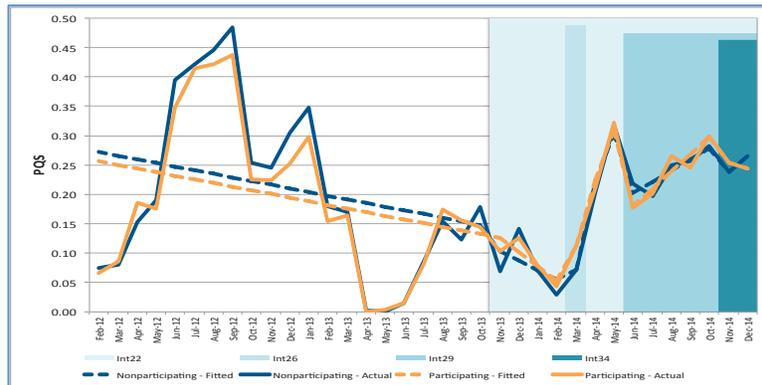
TABLE 150: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) — DVD/BLU-RAY PLAYERS (DVD)

	Sum of Square	df	Mean Square	F	Sig.
Regression	6.695	18.000	0.372	0.829	0.659
Residual	22.886	51.000	0.449		
Total	29.581	69.000			
R-Square			0.226		
Adjusted R-Square			-0.047		

TABLE 151: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) — DVD/BLU-RAY PLAYERS (DVD)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.278	0.041	6.776	0.000
MoNo	-0.006	0.003	-1.973	0.054
isPart	-0.016	0.035	-0.442	0.660
Int22	-0.029	0.132	-0.223	0.825
Time22	-0.010	0.051	-0.189	0.851
PartInt22	0.047	0.204	0.229	0.820
PartTime22	-0.008	0.078	-0.106	0.916
Int26	-0.066	0.157	-0.420	0.676
Time26	0.099	0.100	0.991	0.326
PartInt26	0.040	0.234	0.173	0.863
PartTime26	0.011	0.149	0.073	0.942
Int29	-0.119	0.203	-0.589	0.559
Time29	-0.064	0.078	-0.826	0.412
PartInt29	-0.039	0.294	-0.134	0.894
PartTime29	0.008	0.113	0.072	0.943
Int34	-0.067	0.338	-0.198	0.844
Time34	0.009	0.196	0.043	0.966
PartInt34	0.032	0.483	0.067	0.947
PartTime34	-0.048	0.281	-0.172	0.864

TABLE 152: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) — DVD/BLU-RAY PLAYERS (DVD)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
19%	19%	1%

FIGURE 56: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)
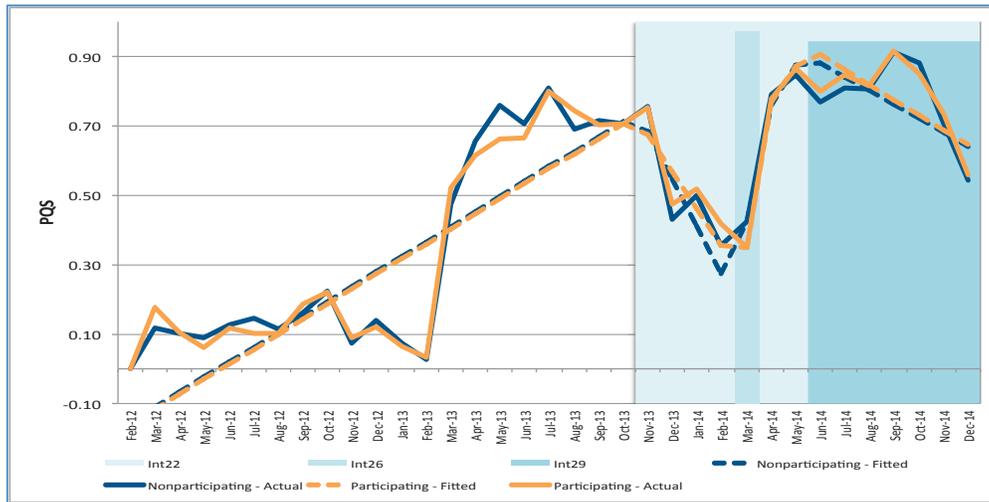

TABLE 153: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)

	Sum of Square	df	Mean Square	F	Sig.
Regression	41.333	14.000	2.952	16.895	0.000
Residual	9.611	55.000	0.175		
Total	50.944	69.000			
R-Square			0.811		
Adjusted R-Square			0.763		

TABLE 154: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.197	0.063	-3.115	0.003
MoNo	0.043	0.005	9.105	0.000
isPart	-0.006	0.048	-0.130	0.897
Int22	0.109	0.140	0.780	0.438
Time22	-0.180	0.059	-3.043	0.004
PartInt22	-0.034	0.198	-0.171	0.865
PartTime22	0.031	0.086	0.357	0.722
Int26	-0.216	0.211	-1.025	0.310
Time26	0.253	0.085	2.983	0.004
PartInt26	-0.102	0.297	-0.345	0.731
PartTime26	-0.044	0.121	-0.364	0.718
Int29	0.048	0.176	0.273	0.786
Time29	-0.156	0.046	-3.362	0.001
PartInt29	0.029	0.258	0.110	0.913
PartTime29	0.010	0.067	0.153	0.879

TABLE 155: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – DVD/BLU-RAY PLAYERS (BLU-RAY)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
68%	66%	1%

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FIGURE 57: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)
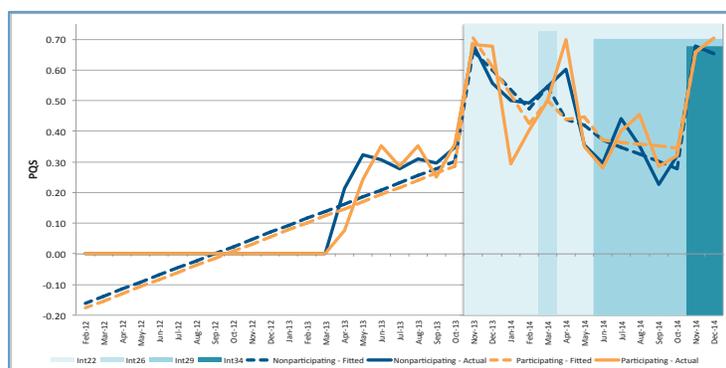

TABLE 156: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

	Sum of Square	df	Mean Square	F	Sig.
Regression	13.021	18.000	0.723	30.766	0.000
Residual	1.199	51.000	0.024		
Total	14.220	69.000			
R-Square			0.916		
Adjusted R-Square			0.886		

TABLE 157: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.184	0.052	-3.573	0.001
MoNo	0.023	0.003	6.710	0.000
isPart	-0.015	0.035	-0.433	0.667
Int22	0.424	0.074	5.742	0.000
Time22	-0.086	0.030	-2.829	0.007
PartInt22	0.088	0.104	0.850	0.399
PartTime22	-0.031	0.046	-0.671	0.505
Int26	0.091	0.118	0.774	0.442
Time26	0.045	0.061	0.732	0.467
PartInt26	-0.023	0.173	-0.132	0.896
PartTime26	0.056	0.091	0.616	0.540
Int29	-0.024	0.112	-0.214	0.831
Time29	-0.005	0.045	-0.118	0.907
PartInt29	-0.045	0.162	-0.277	0.783
PartTime29	-0.008	0.065	-0.124	0.902
Int34	0.427	0.131	3.247	0.002
Time34	-0.003	0.075	-0.040	0.968
PartInt34	-0.160	0.184	-0.870	0.388
PartTime34	0.056	0.106	0.531	0.598

TABLE 158: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – HOME-THEATERS-IN-A-BOX (SOUND BARS)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
49%	47%	1%

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**FIGURE 58: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)**
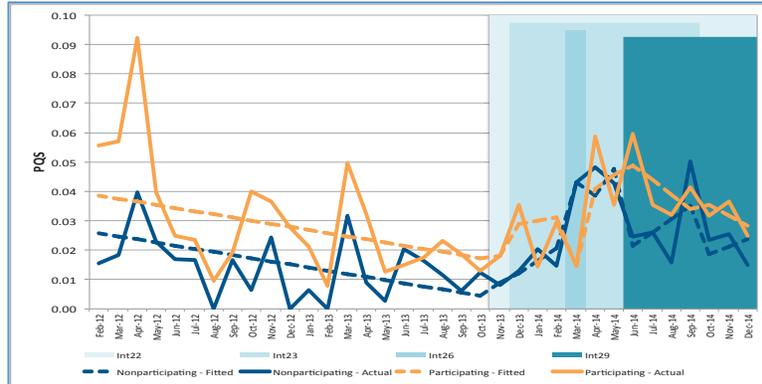
TABLE 159: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.040	18.000	0.002	2.976	0.001
Residual	0.038	51.000	0.001		
Total	0.077	69.000			
R-Square			0.512		
Adjusted R-Square			0.340		

TABLE 160: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.027	0.005	5.055	0.000
MoNo	-0.001	0.000	-3.117	0.003
isPart	0.013	0.004	3.190	0.002
Int22	0.002	0.016	0.150	0.882
Time22	0.003	0.009	0.374	0.710
PartInt22	-0.004	0.021	-0.192	0.849
PartTime22	0.000	0.012	0.032	0.974
Int23	-0.001	0.025	-0.041	0.968
Time23	0.002	0.003	0.719	0.476
PartInt23	0.011	0.034	0.316	0.753
PartTime23	-0.003	0.004	-0.931	0.356
Int26	0.013	0.017	0.810	0.422
Time26	0.005	0.015	0.327	0.745
PartInt26	-0.035	0.022	-1.608	0.114
PartTime26	-0.001	0.020	-0.057	0.955
Int29	-0.031	0.018	-1.697	0.096
Time29	-0.004	0.008	-0.541	0.591
PartInt29	0.039	0.024	1.632	0.109
PartTime29	-0.005	0.011	-0.490	0.626

TABLE 161: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – FREEZERS (CHEST)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
3%	3%	1%

FIGURE 59: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)
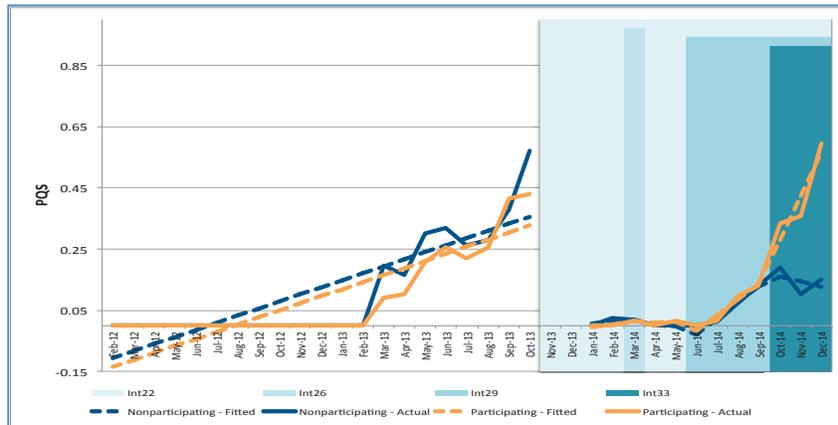

TABLE 162: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)

	Sum of Square	df	Mean Square	F	Sig.
Regression	5.823	17.000	0.343	21.502	0.000
Residual	0.765	48.000	0.016		
Total	6.587	65.000			
R-Square			0.884		
Adjusted R-Square			0.843		

TABLE 163: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.129	0.030	-4.342	0.000
MoNo	0.023	0.002	12.345	0.000
isPart	-0.029	0.023	-1.267	0.211
Int22	-0.376	0.367	-1.025	0.310
Time22	-0.014	0.103	-0.135	0.893
PartInt22	0.016	0.106	0.152	0.880
Int26	0.008	0.117	0.066	0.947
Time26	-0.015	0.129	-0.116	0.908
PartInt26	0.003	0.147	0.022	0.983
PartTime26	0.009	0.052	0.174	0.863
Int29	-0.079	0.124	-0.638	0.526
Time29	0.058	0.053	1.088	0.282
PartInt29	0.000	0.166	0.002	0.999
PartTime29	-0.011	0.066	-0.158	0.875
Int33	0.050	0.100	0.504	0.617
Time33	-0.068	0.051	-1.335	0.188
PartInt33	-0.049	0.130	-0.379	0.706
PartTime33	0.161	0.066	2.433	0.019

TABLE 164: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (COMPACT)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
13%	6%	7%

FIGURE 60: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)
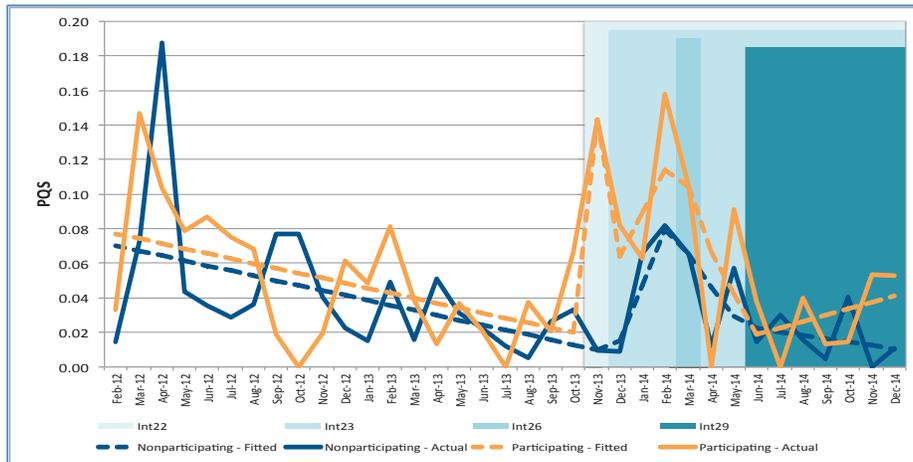
**TABLE 165: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)**

	Sum of Square	df	Mean Square	F	Sig.
Regression	0.105	16.000	0.007	3.645	0.000
Residual	0.096	53.000	0.002		
Total	0.201	69.000			
R-Square			0.524		
Adjusted R-Square			0.380		

TABLE 166: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.073	0.012	6.087	0.000
MoNo	-0.003	0.001	-3.812	0.000
isPart	0.007	0.009	0.786	0.435
Int22	0.000	0.034	-0.004	0.997
PartInt22	0.126	0.045	2.779	0.008
Int23	-0.027	0.058	-0.472	0.639
Time23	0.035	0.022	1.617	0.112
PartInt23	-0.077	0.078	-0.982	0.331
PartTime23	-0.007	0.030	-0.239	0.812
Int26	0.002	0.033	0.068	0.946
Time26	-0.049	0.033	-1.490	0.142
PartInt26	0.011	0.044	0.258	0.798
PartTime26	0.000	0.045	-0.004	0.997
Int29	-0.005	0.039	-0.136	0.892
Time29	0.015	0.016	0.896	0.374
PartInt29	-0.022	0.052	-0.426	0.672
PartTime29	0.013	0.022	0.596	0.554

TABLE 167: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (MEDIUM)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
6%	3%	3%

FIGURE 61: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)
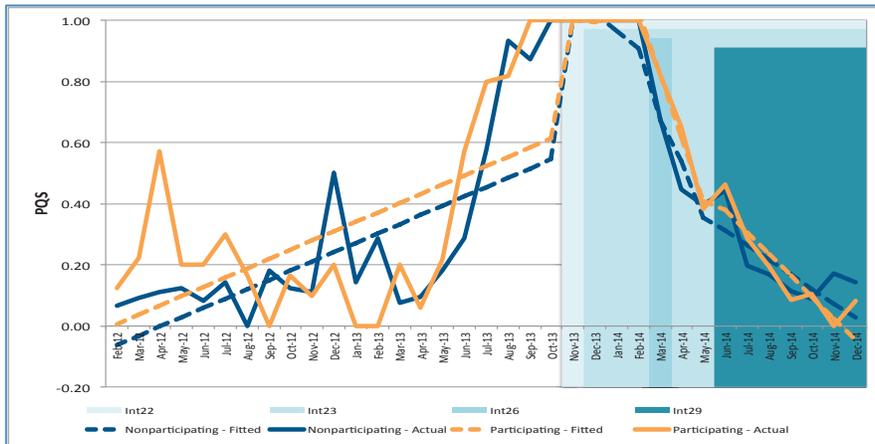
TABLE 168: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)

	Sum of Square	df	Mean Square	F	Sig.
Regression	3.074	16.000	0.192	8.646	0.000
Residual	1.177	53.000	0.022		
Total	4.251	69.000			
R-Square			0.723		
Adjusted R-Square			0.639		

TABLE 169: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	-0.092	0.090	-1.025	0.310
MoNo	0.030	0.006	5.244	0.000
isPart	0.068	0.068	1.004	0.320
Int22	0.424	0.295	1.437	0.157
PartInt22	-0.068	0.556	-0.123	0.903
Int23	0.080	0.500	0.159	0.874
Time23	-0.088	0.171	-0.516	0.608
PartInt23	-0.102	0.777	-0.132	0.896
PartTime23	0.075	0.225	0.335	0.739
Int26	-0.051	0.163	-0.312	0.756
Time26	-0.126	0.226	-0.555	0.581
PartInt26	0.046	0.224	0.206	0.837
PartTime26	-0.099	0.298	-0.332	0.741
Int29	0.004	0.135	0.030	0.977
Time29	0.136	0.080	1.696	0.096
PartInt29	0.036	0.199	0.182	0.857
PartTime29	0.000	0.109	0.000	1.000

TABLE 170: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – REFRIGERATORS (VERY LARGE)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
50%	47%	3%

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FIGURE 62: COMPARISON-BASED PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)
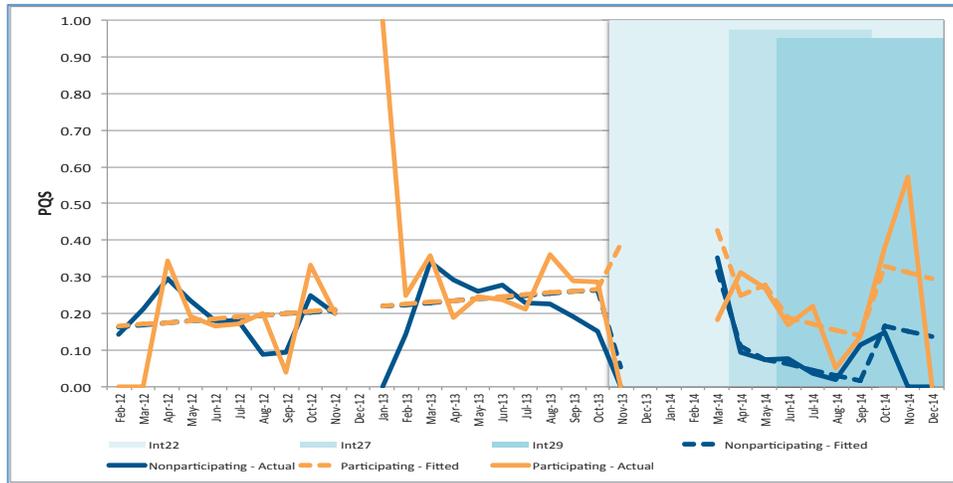
TABLE 171: ANOVA TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)

	Sum of Square	df	Mean Square	F	Sig.
Regression	2.062	14.000	0.147	6.742	0.000
Residual	1.070	49.000	0.022		
Total	3.132	63.000			
R-Square			0.658		
Adjusted R-Square			0.561		

TABLE 172: COEFFICIENTS TABLE FOR COMPARISON-BASED PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)

Coefficient	Estimate	Std. Error	T Value	Sig.
(Constant)	0.158	0.023	6.864	0.000
MoNo	0.005	0.002	3.264	0.002
isPart	0.002	0.018	0.105	0.917
Int22	-0.274	0.644	-0.426	0.672
Time22	0.060	0.138	0.436	0.665
PartInt22	0.387	0.948	0.408	0.685
PartTime22	-0.055	0.203	-0.274	0.785
Int27	-0.165	0.158	-1.048	0.300
Time27	-0.104	0.165	-0.626	0.534
PartInt27	-0.042	0.214	-0.195	0.846
PartTime27	0.122	0.247	0.494	0.623
Int29	0.003	0.064	0.045	0.965
Time29	0.023	0.081	0.288	0.775
PartInt29	-0.074	0.095	-0.777	0.441
PartTime29	-0.068	0.122	-0.558	0.579

TABLE 173: NET EFFECTS USING COMPARISON-BASED PQS REGRESSION (SEGMENTED) – ROOM AIR CONDITIONERS (<12,000 BTU)

Mean Participating Store PQS	Mean Nonparticipating Store PQS	Net Effect
28%	11%	17%

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Appendix C

Retail Products Platform (RPP) Product Introduction and Transition Guidance

Retail Products Platform (RPP)
Product Introduction and Transition Guidance

November 18, 2015

Table of Contents

List of Tables

List of Figures

Executive Summary

The Retail Products Platform is a collaborative initiative of ENERGY STAR energy efficiency program sponsors and retailer partners, facilitated by the U.S. Environmental Protection Agency (EPA). This document seeks to propose and establish a generalized framework for how RPP products and their program product tiers are initially selected and change over time, and how these changes are communicated to program stakeholders, including retailers, manufacturers, EPA, and sponsoring utilities and efficiency organizations.

Products that are considered for the RPP should:

- Provide program sponsors with an ample opportunity to reduce product unit energy consumption (UEC) and achieve large energy savings in aggregate, based on existing UEC calculation methods.
- Be a designated ENERGY STAR product with transparent test methods and performance criteria.
- Have available historic sales or shipment data from industry sources such as CEA, AHAM, NPD and/or AHRI.
- Have widespread residential applicability, demonstrated participation interest from national retailers and retail sales that are forecasted to be substantial based on regional potential studies (as applicable).
- Have an efficient product (measure case) market share less than 35% in order to reduce free ridership.
- Have a clear opportunity to either update an existing State or Federal standard or result in the creation of a new standard.

When setting product efficiency levels to qualify for RPP incentives, RPP product tier requirements should:

- Ensure sufficient product availability and maintain retailer program engagement.
- Provide consistent program messaging to retailers, manufacturers and all other RPP stakeholders through a transparent product tier selection and revision process.
- Align product tier levels with existing and future ENERGY STAR specifications and/or State and Federal Standards, where possible. If product tier levels do not directly align with ENERGY STAR specifications, clearly define the technical parameters of tiers.
- Provide ongoing support to EPA to inform and accelerate ENERGY STAR product specification revisions.

This framework is applicable for managing existing products that have already been chosen and selecting new RPP products beginning in 2017.

1. Background and Rationale for a Product Selection and Transition Strategy

The Retail Products Platform (RPP) is a collaborative initiative of ENERGY STAR energy efficiency program sponsor and retailer partners, facilitated by the U.S. Environmental Protection Agency.

RPP is based on the concept of developing a national structure for the design of program delivery and engagement with retailers. RPP gives program sponsors new access to a relatively low-cost retail program through national coordination. The goal of the RPP is to transform appliance and electronics markets by streamlining and harmonizing energy efficiency programs with retailers, making them less complex and more cost-effective. The shift in product availability will generate energy savings as utility customers purchase and install these more efficient models in their homes.

In September 2014, a group of leading energy efficiency program sponsors representing the most populous regions of the U.S. came together with EPA to discuss the viability of a nationally coordinated

midstream retail-based efficiency program. The group decided to form a series of informal task forces to develop critical aspects of such a program. One task force is dedicated to defining products to be included in the program, and the method for selecting, revising, and transitioning measures within the portfolio of products.

This document seeks to establish a general framework for how RPP products and their program product tiers are initially selected and change over time. Because RPP consists of an evolving portfolio of products and product tiers, it is important to have an explicit strategy that clearly incorporates stakeholder considerations when selecting RPP products and qualifying criteria, and conveying this information in a timely manner to all stakeholders. Stakeholders include retailers, manufacturers, EPA, and program sponsors.

2. RPP Product Selection Strategy

Products that are considered for the RPP should:

- Provide program sponsors with an ample opportunity to reduce product unit energy consumption (UEC) and achieve large energy savings in aggregate, based on existing UEC calculation methods
- Be a designated ENERGY STAR product with transparent test methods and performance criteria
- Have available historic sales or shipment data from industry sources such as CEA, AHAM, NPD and/or AHRI
- Have widespread residential applicability, demonstrated participation interest from national retailers and retail sales that are forecasted to be substantial based on regional potential studies (as applicable)
- Have an efficient product (measure case) market share less than 35% in order to reduce free ridership.
- Have a clear opportunity to either update an existing State or Federal standard or result in the creation of a new standard.

Additional qualitative considerations for product selection include national buy-in from RPP sponsors, climate neutrality[1], and supporting the strategic interest of program stakeholders.

The timing of product selection should take into account the timing of natural retail sales cycles and the best time to communicate new product selections and product eligibility criteria to RPP retail partners (see Table 1). For the two primary RPP product categories, appliances and consumer electronics, the best time to communicate program specifications and product decisions is in early Fall or late Winter.

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[1] Climate neutrality is defined as a product that does not cause substantial unintended GHG impacts during its life cycle, such as the production of CFCs or HFCs during the manufacturing phase of its product lifecycle.

Table 1: Retail Program – Retailer Program Communication and Collaboration Schedules

Product Category	Best Time To Engage SPOC	Best Time To Collaborate on Program Design	Best Time To Communicate Program Specifications	Best Time To Initiate Program Implementation	Key Retailing Events
Lighting	Nov-Dec	Jan-Feb	April	Sept-Oct	Day Light Savings Time, Jan 2014 due to legislation
Appliances	Sept-Oct	Nov-Dec	Jan	Apr-May	Major Holidays; primarily Independence Day, Labor Day, Memorial Day
Electronics	Jan-Feb	Apr-May	Sept	Mar-Apr (new product introductions)	Nov-Feb Major Holiday; primarily Black Friday, Super Bowl
Water Heaters	Jan-Feb	Feb-Mar	Dec	November and Spring (weather conditionality)	Seasonal with regional weather conditions
Windows/Insulation	Dec-Jan	Jan	Feb	Mar	Spring

Source: ENERGY STAR® Retail Action Council [2]

The ENERGY STAR Retail Action Council (RAC) has suggested timing of retailer engagement for the two primary RPP product categories: appliances and consumer electronics. This timing generally coincides with the annual October ENERGY STAR Products Partner Meeting, the largest gathering of energy efficient retail products program staff, retailers, manufacturers, and EPA ENERGY STAR Products Program staff in the US. EPA and RPP sponsors should convene an annual meeting of the RPP sponsors during which they would finalize updates for existing RPP products and announce new products being added to the program.

Sponsor Consensus and Product Selection Planning for 2017 and beyond
Group consensus was used to set the initial set of products for the 2016 pilot. However, beginning in 2017, it is expected that a 'menu' of products will be created by the program sponsors, allowing each sponsor to select their own individual mix of products.

Data Collection to Support Product Selection Planning
The level of data availability to support program decision making varies widely for each product. As a starting point, program sponsors can use potential studies and market trends to inform program strategy and product selection, as well as market data collected by industry organizations such as CEA, NPD, AHAM and AHRI. In addition, retail sales data may also be incorporated as it becomes available from participating retailers. This information can be used to support the following on-going program functions:

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[2] Partnerships in Energy Efficiency with Retailers (PEER) Guidance: Retailer Guidance for Streamlining ENERGY STAR® Partner Collaborations on Energy Efficiency Programs, ENERGY STAR® Retail Action Council (RAC) 2013, Prepared by: Navitas Partners, Inc.
https://www.energystar.gov/ia/partners/downloads/5_ENERGY_STAR_RAC_2013_PEER_Guidance.pdf?0544-2a1e

- Identify and analyze new products that may be of interest for inclusion in RPP.
- Identify the prevalence of new product features that may impact energy consumption.
- Identify total sales volume and savings potential for products to prioritize them.
- Assess the historical rate of UEC improvement for products, which can inform the creation of roadmaps for each product and the development of new product tiers.
- Identify technology and market trends that can positively or adversely impact UEC, for example Ultra High Definition TV technology.
- Match sales data with online product features to identify ongoing relationships between product features and price.

3. Establishing RPP Product Eligibility Criteria

RPP Program interventions are expected to accelerate and increase program-qualifying product adoption, which in turn accelerates ENERGY STAR specifications and State/Federal standards that are more stringent than would have occurred without the RPP program.[3] When setting product efficiency levels to qualify for RPP incentives, RPP product tier requirements should consider the following:

- Ensure sufficient product availability and maintain retailer program engagement
- Provide consistent program messaging to retailers, manufacturers and all other RPP stakeholders through a transparent product tier selection and revision process.
- Align product tier levels with existing and future ENERGY STAR specifications and/or State and Federal Standards, where possible. If product tier levels do not directly align with ENERGY STAR specifications, clearly define the technical parameters of each tier.
- Provide ongoing support to EPA to inform and accelerate ENERGY STAR product specification revisions.

Initial Setting of Product Tiers

With the direction of participating program sponsors, EPA will facilitate the launch of the RPP national pilot. Product tiers are initially based on existing ENERGY STAR market share data, which is self-reported manufacturer shipment data. Over time, this is expected to shift towards data sources that are more rigorous, granular, and flexible. Product tier levels should be set based on market share/penetration data from one of the following sources:

- The preferred data source is regional retail sales data. This source should be used it if is available.
- If sales data is not available, large-scale data collection of model information from online sources should be used if available. This may involve harvesting data from retailer websites or collecting data from industry organizations.
- If neither of the above sources are available, the ENERGY STAR qualified products list can be used to approximate the market share of a specific product tier using the number of models qualifying for the tier as a proxy.

When a product is introduced into RPP, the RPP Program team will develop two product tiers, 'basic' and 'advanced', when possible:

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[3] While it is difficult to predict the timing and efficiency of new specifications, we plan to use EPA historical product specification version to project future specification development cadence and estimated changes in product efficiency. The Program Sponsors can claim the savings impacts associated with the difference between the projected and actual development cadence and estimated changes in product efficiency.

- The basic tier should serve to increase the total volume of efficient models being sold, and in many cases will align with the existing ENERGY STAR specification. Generally the sales of these models have a starting market share less than 35%.
- The advanced tier should be established to promote increased adoption of the most efficient products on the market and to signal future ENERGY STAR specification levels. When an ENERGY STAR Most Efficient designation or an ENERGY STAR Emerging Technology Award exists, the advanced tier specification should be aligned with these specifications. In the absence of these designations, advanced tier specifications should be chosen to encompass a selection of products that represent a best in class product and ideally a starting market share less than 15%.
- Both tiers should be clearly defined relative to an ENERGY STAR specification or designation. If a tier contains a percentage change from an ENERGY STAR specification (e.g. ENERGY STAR +50%), the metrics that are affected by this change should be clearly defined as well.

In practice, establishing basic and advanced tier levels that meet the stated market share targets may not always be feasible. In cases where proposed tiers have market share either above or below the stated market share threshold, program sponsors must consider additional criteria in selecting tier levels such as retailer engagement and the strategic goals of accelerating future ENERGY STAR product tiers.

Product Tier Duration and Revision of Product Tiers
For each product, the RPP program sponsors will evaluate market share each year based on the optimal program design times stated in Table 1. Tier specification reviews are triggered once product category sales achieve an aggregate market share greater than 35%[4] for 6 consecutive months (or the appropriate product-specific buying season duration) across all program sponsor territories or when the ENERGY STAR specification is updated.[5] When a product tier specification review is triggered, the program sponsors may decide on one of the following policy options for the tier specification:

- Transition the current advanced tier levels to the following year's basic tier qualifying levels and redefine the advanced tier level.
- For the following year, revise the tier specification(s) to a higher level to capture higher efficiency models that lower the category market penetration to between 15-35%.
- For the following year, continue with the tier level(s) as currently defined in order to maintain specific strategic program objectives, such as data access, ability to conduct in-store marketing, and continuity of retailer relationships. In this case, it is recommended that per unit incentives be reduced to account for larger market share and higher free ridership. This approach may be particularly suited for products with longer product lifecycles.
- In the case of a new ENERGY STAR specification, it may be necessary to lower the advanced tier level to ensure that there are products available on the market that meet the advanced tier requirements.
- In the case of a new ENERGY STAR Most Efficient or Emerging Technology Award specification, the advanced tier definition may be changed to align with the new ENERGY STAR specification.

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[4] EPA's Vision and Guiding Principles document outlines that for rapidly advancing products, specifications tend to be revisited every two years. For more slowly advancing products, specifications are revisited every three years or when market penetration reaches 35%.

[5] In cases where the program tiers are not achieving uptake, the Program Team will prioritize other program levers, such as refining the Retailer Marketing Strategy or modifying incentive levels ahead of decreasing the stringency of a product tier.

RPP program sponsor collaboration with EPA on ENERGY STAR specification revisions

When EPA begins a product specification revision (per the guidance outlined in the Vision and Guiding Principles document), program sponsors will work with EPA to review current market share trends and provide aggregated product sales data from RPP programs to assist EPA in identifying whether a specification revision is warranted. If product trends support the need for a specification revision, program sponsors will work with EPA to accelerate the process to revise the ENERGY STAR specification and release a new, more stringent version within 2 years.

Figure 1 provides a high-level example of a transition strategy. Depending on the product lifecycle and the rate of change in product UEC, the timeframe for this product transition scenario may be longer than illustrated. In the example, EPA opens the specification revision once the ENERGY STAR product market share reaches 35% in 2015. In 2016, RPP continues to incentivize ENERGY STAR at the basic tier level throughout the specification revision process or until the market share of basic tier products reaches 35%, but revises advanced tier to provide program sponsors with an option to shift incentive dollars toward higher-efficiency, lower-market share products.[6] To plan for the 2017 program, RPP program sponsors submit comments and data supporting the recommendation that the 2017 ENERGY STAR specification be aligned with the 2016 advanced tier levels. The 2017 ENERGY STAR specification is set equal to the RPP 2016 advanced tier and is finalized in Q3 2016, with an effective date of Q3 2017. Once the new specification is finalized, RPP program sponsors communicate that they will begin incentivizing the new ENERGY STAR specification (2017 RPP basic tier) in Q1 of 2017, six months ahead of the effective date.

Figure 1: Key Events in the Product Transition Strategy (Tier 1 = Basic Tier, Tier 2 = Advanced Tier)

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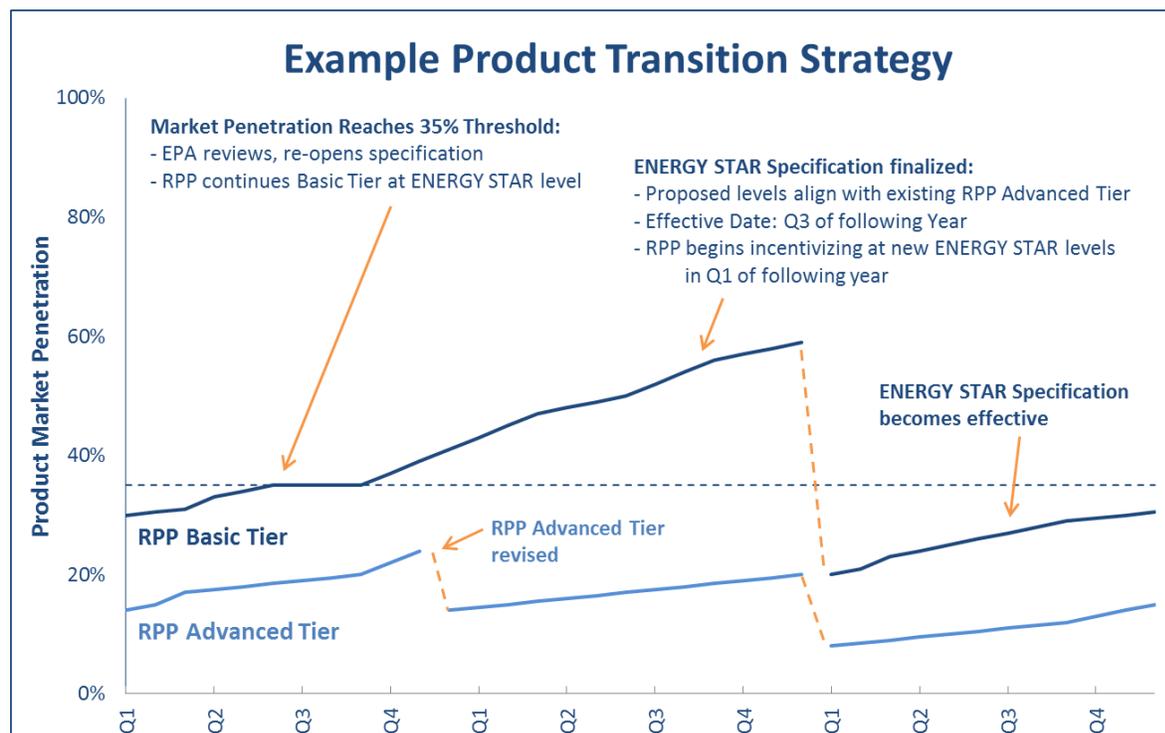
[6] The advanced tier option reduces evaluation risk if incentive dollars are shifted away from basic tier, but lowers the near term energy savings attributed to the sales of basic tier products, which will continue to be captured by the RPP program.

Finally, criteria should be developed for suspending a product once it has reached its maximum market potential. However, even after the suspension of a product, the RPP should continue to monitor the product, as lack of attention by the RPP might result in changes in consumer preferences—and a corresponding response from manufacturers—toward product features that could reverse the energy efficiency gains[7] achieved in a given product over time.

Data Collection to support Product Tier and ENERGY STAR Specification Revisions:
RPP program sponsors can utilize aggregated program sales data to work with EPA to set new ENERGY STAR product specifications and program tiers. Such collaboration efforts may include:

- Provide EPA and DOE with quarterly, updated market share data that can result in a more accurate characterization of the existing state of the market and provide a linkage between ENERGY STAR model availability and market share.
- Apply the lessons from historical market share trends to help EPA and DOE set their specifications. In addition, track how the market responds to the announcement of effective dates of new ENERGY STAR / DOE / CEC specifications.
- Track market shares of ENERGY STAR products and identify when the exploration of new specifications should be triggered.
- Develop product roadmaps to identify the long-term product efficiency goals for each product.

4. Example Program Transition Strategy – Televisions:
The Business and Consumer Electronics (BCE) program began in 2008, and quickly established a two tier process, which served three key program objectives:

- Set specifications which would last multiple years and send clear demand signals to retailers and manufacturers.
- Modulate program incentive levels between the two tiers as needed.
- Establish demand for an 'advanced tier' which could serve as the basis of future ENERGY STAR specifications.

As part of the planning process for each program year, market share data was collected to help set appropriate basic and advanced tier qualifying levels. Target market penetration ranges for the advanced tier were 5-15% and 15-35% for the basic tier. When possible, the advanced tier from the previous year would become the subsequent year's basic tier, thereby creating a consistent annual program for retailers follow. In cases where a new ENERGY STAR specification level was coming into place, the program attempted to set the advanced tier levels to form the basis for new ENERGY STAR specifications. For example, the BCE tier for ENERGY STAR V5 +20% closely aligned with ENERGY STAR Version 6, and BCE tier for ENERGY STAR V6 +20% was aligned with ENERGY STAR Most Efficient 2013.

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[7] An example of this is the transformation of the television market to highly efficient LED backlit LCD technology, and the emergence and consumer demand for large 4K televisions.

Figure 2: Television Market Penetration by ENERGY STAR and BCE Program Qualifying Level, 2008-12
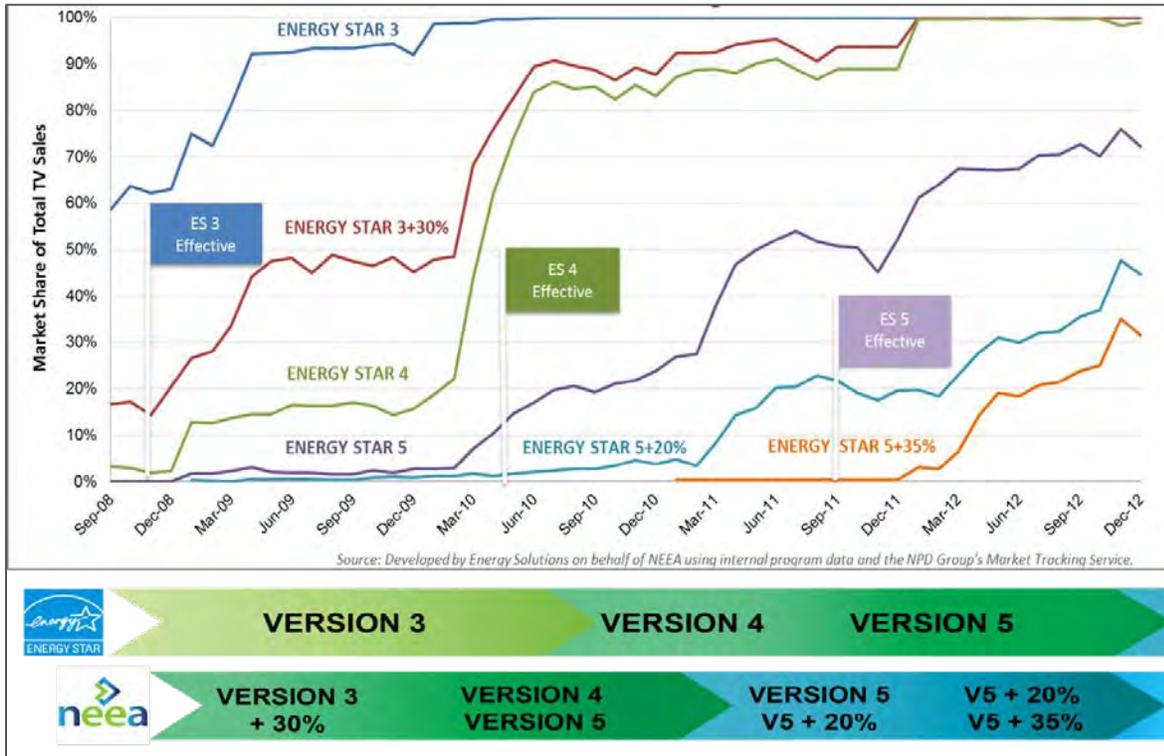
Appendix A: Proposed Product Tiers and Selection Rationale

Product tiers must strike the right balance in order to:

- Maximize unit energy savings
- Maximize retailer engagement and participation
- Accelerate the adoption and revision of ENERGY STAR specifications
- Allow for program funders to have the flexibility to incentivize varying efficiency levels
- Align with ENERGY STAR brand (including the Most Efficient designation and Emerging Technology award)

Informed by input from and with the agreement of all participating sponsors, the RPP Product Task Force determined that in the first pilot period (2016), the RPP would launch as a pilot with a suite of six (6) product categories, all of which have active ENERGY STAR specifications. The products included in the 2016 RPP pilot are:

- **Air Cleaners**
- **Soundbars**
- **Gas Clothes Dryers**
- **Electric Clothes Dryers**
- **Freezers**
- **Room Air Conditioners**

Table 2 and Table 3 outline RPP's proposed product tiers for each initial product. For each product, the tables provide an overview of the proposed basic tier and advanced tier products. The product tier details and the rationale involved for selecting each tier level are described below.

Table 2: Proposed RPP Product Basic Tiers

Product	Proposed Basic Tier Q3	Est. Savings (kWh/yr)	Total Models	2015 Market Share	IMC
Air Cleaners	Energy Star	222.4	180	32%	$80
Soundbars	Energy Star + 15%	54.0	24	36%	$0
Standard-Sized Dryers – Electric	Energy Star	163.9	47	13%	$84
Standard-Sized Dryers – Gas	Energy Star	5.88 therms/yr	9	5%	$84
Freezers	Energy Star	24.7	87	30%	$0
Room AC	Energy Star	49.9	0[8]	0%	$22

Table 3: Proposed RPP Product Advanced Tiers

Product	Proposed Advanced Tier Q3	Est. Savings (kWh/yr)	Total Models	2015 Market Share	IMC*
Air Cleaners	Energy Star + 30%	351.3	107	17%	$80
Soundbars	Energy Star + 50%	58.4	10	4%	$0
Standard-Sized Dryers – Electric	Energy Star Emerging Tech Award	314.0	4	-	$84
Standard-Sized Dryers – Gas	Energy Star Emerging Tech Award (Not Yet Proposed - Considering)	8.83 therms/yr	-	-	$84
Freezers	Energy Star + 5%	35.8	5	2%	$0

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[8] While there are no models on the current ENERGY STAR list that meet the ENERGY STAR Version 4 specification (effective October 2015), it is expected that qualified models will be available for the start of the 2016 cooling season. Similarly, it is expected that market share will increase as more models are available in 2016.

| Room AC | Energy Star + 10% (Not Yet Proposed) | 87.3 | 95.5 | - | $22 |

*IMC for advanced tiers not in original scope to identify for program. Advanced tiers IMC currently assumed to be equivalent IMC of basic tier until further data is available.

Air Cleaners
Recommended Product Tiers:

- Basic Tier: ENERGY STAR Version 1.2
- Advanced Tier: ENERGY STAR Version 1.2 + 30%

ENERGY STAR Version 1.2 was selected as the basic tier level based on relatively low national market penetration of ENERGY STAR air cleaners (31%), which aligns with the broader goal to have basic tier specifications begin at 15-35% market penetration and seeks to maximize program sponsor participation. An advanced tier of ENERGY STAR V1.2 + 30% was selected. For air cleaners, ENERGY STAR + 30% means 30% higher efficiency (CADR/Watt rating) than the ENERGY STAR minimum. This tier level was chosen for the advanced tier because preliminary, 2014-15 retail sales data from a regional sponsor indicates that participating retailers have high ENERGY STAR market penetration, which is significantly higher than the intended the national average and would result in high free ridership. Most participating retailers have a relatively low market penetration of ENERGY STAR +30%. Given the variability in ENERGY STAR market penetration by retailer, there are some inherent limitations, but this two-tiered approach strikes a good balance and allows for flexibility for program funders.

Electric Clothes Dryers
Recommended Product Tiers:

- Basic Tier: ENERGY STAR Version 1.0
- Advanced Tier: ENERGY STAR 2014 Emerging Technology Award

The ENERGY STAR Version 1.0 dryer specification, which took effect on January 1, 2015, was selected as the basic tier level. Because of the recent effective date of this specification, there is a low likelihood that free ridership for this product will be high. The advanced tier was set as ENERGY STAR's Emerging Technology Award specification. There are currently 4 models that meet the Emerging Technology Award specification, so this advanced tier is a reach goal and the RPP team does not expect significant sales of these models in the first year of the program.

Gas Clothes Dryers
Recommended Product Tiers:

- Basic Tier: ENERGY STAR Version 1.0
- Advanced Tier: ENERGY STAR 2014 Emerging Technology Award

The ENERGY STAR Version 1.0 dryer specification, which took effect on January 1, 2015, was selected as the basic tier level. Because of the recent effective date of this specification, there is a low likelihood that free ridership for this product will be high. The advanced tier was set as ENERGY STAR's Emerging Technology Award specification. There are currently 4 models that meet the Emerging Technology Award specification, so this advanced tier is a reach goal and the RPP team does not expect significant sales of these models in the first year of the program.

Freezers
Recommended Product Tiers:

- Basic Tier: ENERGY STAR Version 5.0
- Advanced Tier: ENERGY STAR Version 5.0 +5%

The current ENERGY STAR Version 5.0 specification went into effect September 2014, and is designed to be 10% more stringent than the 2014 Federal Standard. The basic tier is set at the current ENERGY STAR specification. The advanced tier is set at ENERGY STAR V5.0 + 5%. For freezers, ENERGY STAR + 5% is defined as 5% lower energy consumption than the ENERGY STAR maximum. Because there is such a strong history of ENERGY STAR and federal regulation of freezers, a 5% improvement over ENERGY STAR represents a significant decrease in energy consumption, and the vast majority of ENERGY STAR models are clustered at or just above the ENERGY STAR requirements. Currently, there are only 4 models on the September 16, 2015 QPL meet ENERGY STAR +5%, which we estimate at 2% overall market penetration.

Soundbars
Recommended Product Tiers:

- Basic Tier: ENERGY STAR Version 3.0 +15%
- Advanced Tier: ENERGY STAR Version 3.0 +50%

ENERGY STAR Version 3.0 +15% was chosen as the basic tier based on an analysis of model availability per the May 2015 version of the Audio / Video QPL. For soundbars, ENERGY STAR + 15% means 15% lower power draw for all power draw allowances listed in the ENERGY STAR specification as well as a 15% increase in amplifier efficiency. Based on estimates from NEEA sales data, this tier had 36% market share from January – August 2015. While this is slightly higher than the basic tier target penetration range of 15-35%, setting +15% as the basic tier level errs on the side of having more qualified models available on the market, which is important to maximize retailer engagement and participation. Using a similar approach for the advanced tier, we estimate that ENERGY STAR V3.0 +50% has a market penetration of 32%.

Room Air Conditioners
Recommended Product Tiers

- Basic Tier: ENERGY STAR Version 4.0
- Advanced Tier: ENERGY STAR Version 4.0 +10%

ENERGY STAR Version 4.0 will become effective October 26, 2015. This makes the specification effective in time to impact the 2016 cooling season, which begins in early Spring 2016. Due to the fact that the room AC Federal Standard update became effective in 2014, the ENERGY STAR Version 4.0 specification is particularly aggressive for the current market. Due to the lack of the available models currently meeting the Version 4.0 specification, 2016 room AC market share is uncertain but is expected to be below 30%.[9] However, it is expected that a number of models will meet the Version 4.0 requirements in time for the 2016 cooling season. The advanced tier is set at ENERGY STAR +10%. For room ACs, ENERGY STAR +10%, means 10% higher efficiency (CEER) than the ENERGY STAR minimum. Because there are no models currently on the market that meet even the basic tier level (ENERGY STAR V4.0), this advanced tier is a reach goal and sales of these models in the first year of the program are uncertain.

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[9] The 30% market share value is based on the EPA's most recent internal estimates of 2016-2018 market share for ENERGY STAR products, including room ACs.

<u>Appendix D</u>

Letters of Support

OFFICE OF
AIR AND RADIATION

Janice Berman
Senior Director Strategy, Research and Analytics, Customer Energy Solutions
Pacific Gas and Electric Company
245 Market Street, Mail Code N9K
San Francisco, CA 94105

Dear Ms. Berman:

I wanted to take this opportunity to recognize the important role that Pacific Gas and Electric (PG&E) has played in transforming the market for energy efficient products and practices in the past few decades, and to raise an important issue regarding your participation in a national energy efficiency effort.

In addition to our longstanding work on energy efficiency, for the past year we have been working closely with you to launch a new national energy efficiency program called the ENERGY STAR Retail Products Program (RPP). We are excited about the prospects for the future of this program because of the multiple advantages that the RPP offers, here are just a few:

- The heart of the effort is to help evolve traditional program design, delivery, and evaluation approaches to retail-based energy efficiency programs to reflect the changing nature of the residential products market and capture remaining, hard-to-reach energy savings through market transformation.

- What makes the ENERGY STAR RPP unique is the consistency of the program design and implementation and the scalability that comes with consistent program design—including product categories, specifications, data requirements, and midstream delivery.

- This consistency drives down administrative costs and complexity for retailers, creating a strong value proposition for participation and motivating retailers to make changes in stocking, promotion, and pricing practices.

- Representing many regions of the country, the ENERGY STAR RPP builds on the structure and learnings of an innovative pilot PG&E first tested in 2014. Next year we were anticipating that PG&E would be one of the national lead members of a pilot program that includes: Connecticut, the District of Columbia, Maryland, New York, Vermont, the Pacific Northwest, Wisconsin and Colorado.

- In the future, the ENERGY STAR RPP is expected to offer a gateway for energy efficiency programs to capture energy savings in the growing "miscellaneous/plug load" product categories at a significantly lower cost than current programs incur.

The significant benefits of the program rely on active coordination around the RPP, since any single region has a limited impact. The real value of the effort is for pilot members to work together to move the national market. In recent discussions with your staff we have become aware that you still do not have regulatory approval for your program. We believe that any delay in the program launch in California could have serious consequences for California utilities including: loss of retailer participation, cost effectiveness penalties, reduced manufacturer participation, marketplace confusion and loss of program momentum. It is important that PG&E joins the initial group of program sponsors at the outset since any delay in your launch could force you into a difficult catch-up mode which could result in you missing important energy savings goals and program milestones.

If you have any questions, or would like to discuss this matter further, please don't hesitate to contact me,

Sincerely,

Ann Bailey
Chief, ENERGY STAR Labeled Products
Climate Protection Partnerships Division
Bailey.ann@epa.gov

December 23, 2015

California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3214

Re: Proposed Retail Products Platform (RPP) Pilot Program

To Whom It May Concern:

The purpose of this letter is to convey NEEA's full support of PG&E's Retail Products Platform (RPP) pilot program. RPP is a collaborative effort to build the scale necessary to create leverage with key market actors and cost effectively address the remaining energy saving potential in the residential sector. PG&E's collaboration with NEEA, other California utilities and utilities around the country is critical for transforming the market for energy efficient products for residential customers.

Over nearly two decades, NEEA has demonstrated that the concept of market transformation not only works, but can be successfully replicated in many different markets and situations. NEEA is committed to advancing RPP as its core market transformation initiative in the residential sector; helping the Pacific Northwest meet its current and future energy needs. It is important to get started now because market transformation and innovation in industries with regulatory oversight, such as energy efficiency, takes time. NEEA is moving forward with its RPP program in first quarter of 2016 and has included the participation of PG&E and other utilities in our plans to transform this market.

NEEA is looking forward to working with PG&E on this endeavor. NEEA has successfully partnered with PG&E in a market transformation initiative for efficient televisions (also known as the Business and Consumer Electronics program – BCE). The combination of the NEEA market with PG&E's service territory and other segments of the US market created a scale large enough to influence buying behaviors at key national retailers. This led to faster introduction of efficient televisions as well as more stringent specifications for ENERGY STAR qualified products. Changes in these specifications resulted in television manufacturers introducing more efficient technologies, which is a desired outcome in market transformation programs.   The market transformation outcomes of NEEA's television initiative were confirmed by multiple independent evaluations.

NEEA has been working closely with PG&E for almost two years to build the key components of the RPP program design. PG&E and NEEA have agreed to work together because we both recognize the challenges of capturing efficiency savings opportunities in appliances and the growing market for plug-load products. Our collective experiences in the television initiative and relationships with retailers have given us a foundation for cost-

effectively reaching a greater number of customers with a broad range of energy efficient products. We view the proposed RPP as a logical expansion of this successful collaboration under the BCE program to other consumer product categories.

The consumer products market is national in scope with global suppliers and, as we learned during our earlier partnership, a large program scale is required to influence key actors in this market. As demonstrated in the earlier BCE program, the combined size of NEEA and PG&E's customer base at over 10% of the national market was a critical factor in gaining leverage with these national retailers and international manufacturers. We strongly believe that the RPP effort will be significantly more successful with a partnership between PG&E and NEEA than without.

NEEA completely supports PG&E plans for RPP, and appreciates PG&E's full commitment to a March 1, 2016 program launch (pending regulatory approval), which will position us to transform plug-load and appliance markets and produce significant energy savings for our customers.

As always, NEEA's team is available to share market transformation knowledge and experience to assist in a rapid evaluation and approval of PG&E's RPP program. Let us know how we can help advance this important market transformation program.

Sincerely,

Jeff Harris

Chief Transformation Officer

December 16, 2015

Mr. Peter Skala   via email: ska@cpuc.ca.gov
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3214

Re: Proposed Retail Products Platform (RPP) Program: SUPPORT

Dear Mr. Skala:

The California Retailers Association is the only statewide trade association representing all segments of the retail industry including general merchandise, department stores, mass merchandisers, restaurants, convenience stores, supermarkets and grocery stores, chain drug, and specialty retail such as auto, vision, jewelry, hardware and home stores. CRA works on behalf of California's retail industry, which currently operates over 418,840 retail establishments with a gross domestic product of $330 billion annually and employs 3,211,805 people— one fourth of California's total employment.

The Retail Action Council was organized by retailer partners of ENERGY STAR® in 2012, with the objective of making energy efficiency incentive programs as cost-effective and productive as possible for Energy Efficiency Program Sponsors (EEPS) and retailers.   To achieve this objective, CRA member companies Best Buy, Home Depot and Sears have been working together to institutionalize best practices developed through ENERGY STAR, EEPS and retailer collaborations. This group of retailers authored a set of guidelines informing EEPS about retailers' business issues and requirements for successful energy efficiency programs in the retail channel. ENERGY STAR published the Partnerships in Energy Efficiency with Retailers (PEER) Guidance document in late 2013.

PG&E introduced their RPP concept around the same time ENERGY STAR issued the PEER Guidance document. We were pleased to see that this approach addressed many of our concerns and needs, including lowering costs, increasing sales and managing the customer experience. In early 2014, PG&E asked the Retail Action Council to participate in a panel session with the CPUC

to discuss energy efficiency opportunities in the retail channel and we gladly accepted. Encouraged by the potential of RPP in the California market and California's role as a leader in energy efficiency, we supported PG&E, ENERGY STAR and other EEPS in the design and testing of this program.

Together with utilities, ENERGY STAR and our manufacturer partners, we have made a lot of progress in making our country more energy efficient. However, there is much more to be done to achieve our sustainability objectives. Innovative programs such as RPP give us opportunities to sell new and more efficient products and save our customers even more energy.

California Retailers Association is pleased to strongly support the proposed RPP program. The program will provide significant energy savings for consumers in California and will substantially reduce greenhouse gas emissions and we respectfully urge you to move forward with the program. Thank you for your consideration of our support, and for the opportunity to express it.

Sincerely,

Pamela Boyd Williams
Executive Vice President

December 16, 2015

Peter Skala
Branch Manager, Energy Efficiency
Energy Division
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3298

Re: NRDC Support for California Participation in the Retail Products Platform Program (RPP)

Dear Peter,

Governor Brown has recently called for a doubling of current energy efficiency savings and a 40 percent reduction of greenhouse gas emissions below 1990 levels by 2030. In order to meet these ambitious energy efficiency savings targets, California will need to dramatically ramp up its efforts to meet this target and as such the CPUC should be looking to the investor owned utilities (IOUs) to move beyond their traditional programs and to pursue new savings opportunities. We believe significant savings opportunities exist for consumer electronics and other plug load equipment and encourage the CPUC to be supportive of new program designs such as the Retail Products Program (RPP) which is described below.

Plug-in equipment in California homes is a clear target for accelerating energy savings

Electric devices connected to the typical household's electrical sockets, plug-in equipment is responsible for more than half of all electricity use in California homes. Unfortunately, much of this energy is wasted through high standby power levels when the devices are not in active use, and through equipment that is not as energy efficient as best practices allow. Given the explosion in the number of devices in the modern home, plug-in equipment is projected to account for most of the growth in electricity demand in the coming decade.

As some of the products have relatively short lives or their annual energy savings levels are not as large as those typically provided by large

appliances such as refrigerators, rebate levels that pass cost effectiveness and other tests/screens may only be $10 or so. While these small rebates may not be sufficient to cause consumers to buy the more efficient models, they may have a dramatic impact if offered to the retailer via a mid-stream rebate. For those retailers who sell thousands of qualifying units the incentives add up, and can dramatically influence the retailer's stocking and promotional practices. In other words, the retailer will be further motivated to purchase, stock and sell the more efficient models as the incentives for qualified models can dramatically increase their profits, especially for those products with low margins.

Retail Products Platform (RPP) is a viable strategy to capture savings from plug-in equipment

To help capture these savings the US Environmental Protection Agency has been working closely with leading retailers and utilities across the country to develop a national coordinated program, the RPP.

I have attended various national RPP program meetings and believe this program is worthy of CA IOU participation and support. By participating in this national program, the CA IOUs will benefit greatly from this coordinated approach and will be able to leverage the efforts of others. The program will also include detailed model-specific sales tracking that will facilitate evaluations at the state and service territory levels.

While we recognize programs like these face challenges in terms of attribution and free ridership, we think these issues can be addressed through establishment of baselines and creative and timely evaluations.

Sincerely,
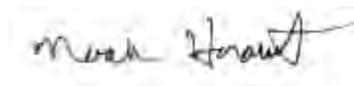
Noah Horowitz
Senior Scientist
Natural Resources Defense Council
nhorowitz@nrdc.org

cc: Janice Berman

California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3214

Re: Proposed Retail Products Platform (RPP) Program

To Whom it May Concern:

The Retail Action Council (RAC) was organized by retailer partners of ENERGY STAR® in 2012 with the objective of making energy efficiency incentive programs as cost-effective and productive as possible for Energy Efficiency Program Sponsors (EEPS) and Retailers. To achieve this objective, Best Buy Co., Inc., The Home Depot, and Sears Holdings Company have been working together to institutionalize best practices developed through ENERGY STAR, EEPS and retailer collaborations. This group of retailers authored a set of guidelines informing EEPS about retailers' business issues and requirements for successful energy efficiency programs in the retail channel. ENERGY STAR published the Partnerships in Energy Efficiency with Retailers (PEER) Guidance document in late 2013.

PG&E introduced us to their RPP concept around the same time ENERGY STAR issued the PEER Guidance document. We were pleased to see that this approach addressed many of our concerns and needs, including lowering costs, increasing sales and managing the customer experience. In early 2014, PG&E asked the RAC to participate in a panel session with the CPUC to discuss energy efficiency opportunities in the retail channel and we gladly accepted. Encouraged by the potential of RPP in the California market and California's role as a leader in energy efficiency, we began our support of PG&E, ENERGY STAR and other EEPS in the design and testing of this program design.

The RAC companies, as well as most of our peers, have made energy efficiency an important strategy in our corporate sustainability goals. Recently, Best Buy joined the American Business Act on Climate Pledge and pledged to provide an assortment of energy-efficient products and solutions to enable consumers to minimize their own carbon footprint. In 2014 alone, The Home Depot reduced greenhouse gas emissions by 3.6 million metric tons through the sale of 125M ENERGY STAR certified products, which saved their customers over $630M in energy costs. Sears and Kmart sold more than 5.3 million ENERGY STAR certified products in 2014 reducing their customers' carbon footprint and saving these customers more than $100 million in electricity costs. It is clear to us, the RPP concept is very well aligned with our sustainability goals.

With the help of utilities, ENERGY STAR and our manufacturer partners, we have made a lot of progress, in making our country more energy efficient. However, there is much more to be done to achieve our sustainability objectives. Innovative

programs such as RPP give us opportunities to sell new and more efficient products and save our customers even more energy.

Members of the RAC add our strong support for the proposed RPP program. The RPP will provide significant energy savings for our mutual customers in California and will substantially reduce greenhouse gas emissions to address climate change.

Market forces are necessary for creating lasting change in the efficiency of consumer products and will come from large-scale programs encompassing our national footprint. We believe PG&E's and California's leadership are very important in the adoption and implementation of the RPP concept.

Thank you for your consideration of our comments, and we urge you to quickly move forward and allow the RPP program to proceed.

Sincerely,

Hugh Cherne Senior Manager, Environmental Sustainability, Best Buy

Mike Cook Sr. Manager Utility and Government Rebates The Home Depot

Paul Campbell, Director-Sustainability/Green Leadership, Sears Holdings Corporation

<u>Appendix E</u>

The Energy Star® Retail Products Platform

THE ENERGY STAR® RETAIL PRODUCTS PLATFORM

The simple choice for energy efficiency.

ENERGY STAR

Executive Summary

Transform the way energy efficient products and messages are delivered through a coordinated national retail platform.

The landscape of energy efficiency programs is shifting due to the success of ENERGY STAR-focused programs, the evolution of products, dramatic changes in the way products are used and sold, as well as other factors. The energy efficiency community is calling for a new approach to traditional retail-based energy efficiency programs that reflect these new dynamics to effectively capture remaining energy savings and continue to advance energy efficiency.

The ENERGY STAR Retail Products Platform

The ENERGY STAR® Retail Products Platform (ESRPP) is a collaborative initiative of ENERGY STAR, energy efficiency program sponsors, and retailer partners, facilitated by the U.S. Environmental Protection Agency.

The ESRPP is based on the concept of developing a national-level structure for the design of program delivery and engagement with retailers. The ESRPP gives program sponsors new access to a low-cost retail-based program through national coordination. The goal of the ESRPP is to transform markets by streamlining and harmonizing energy efficiency programs with retailers, making them less complex and more cost-effective. Increasing the availability of ENERGY STAR products will generate energy savings as utility customers purchase and install these more efficient models in their homes.

Schedule

Launch coordinated pilots in 2016 on the East and West coasts; pilots pave the way for a broader national program in 2017. The national program will include more program sponsors, products, and retailers to help consumers save energy.

ESRPP: Looking Forward

- Program sponsors agree to adopt a common set of retail-based products for promotion.
- By 2017, a sufficient number of program sponsors use the ESRPP and achieve critical scale, serving more than 25% of the US population.
- Critical scale is achieved through consistent program design—including product categories, specifications, data requirements, and general approach (i.e. midstream incentives)—and lower per-unit incentive and administrative costs for both program sponsors and retailers.
- Retailers agree to provide unprecedented access to critical sales and market share data to program sponsors in exchange for targeted product categories, consistent and streamlined data, and reporting requirements from program sponsors.
- Retailers and program sponsors work together to tailor local go-to-market strategies built on the national framework allowing for some flexibility in local markets.
- EPA, NRDC, retailers and leading regulatory experts support program sponsors in developing and promoting

> "Electricity demand by U.S. homes is forecasted to climb by as much as 21 percent by 2040. With ENERGY STAR, you can save approximately 35% or more than $760 on your household energy bills, while saving more than 8,000 pounds of greenhouse gas emissions."
>
> *-- U.S. EPA, 2015*

EPA United States Environmental Protection Agency

For more than 20 years, EPA's ENERGY STAR program has been America's resource for saving energy and protecting the environment. Join the millions making a difference at energystar.gov.

THE **ENERGY STAR**® RETAIL PRODUCTS PLATFORM

The simple choice for energy efficiency.

ENERGY STAR

October 2015

supportive policy and innovative EM&V approaches.

Retailers Approve

Retailers are the most important channel for delivering energy efficient products to residential consumers, selling almost 2 billion energy consuming products that use 80 million MWh per year.

Retailers are becoming less interested in participating in traditional energy efficiency programs—they are not core to their business, they introduce cost and complexity, and consumer incentives offer reduced value and efficacy as a tool for driving sales.

Members of the ENERGY STAR Retail Action Council, including contacts from Best Buy, Sears, and The Home Depot approve of the ESRPP (as stated in Scottsdale, AZ on October 28, 2014):

✓ We support EPA's efforts to build scale and be more effective and efficient with the ENERGY STAR Retail Products Platform.

✓ We believe this is the future of energy efficiency programs, and the future is now!

✓ We are offering to help regulators recognize the energy saving opportunities.

✓ We are excited and wish to assist innovative Program Sponsors who join together with the EPA to transform the energy efficiency market.

Getting Involved

- Contact EPA to discuss program concept and potential role
- Join the current team and develop a pilot
- Help shape discussions with regulators and evaluators
- Prepare to field a pilot in 2016
- Prepare for full program launch in 2017

Current Participants

2016 Pilot Participants*
- CA: PG&E, SCE, SoCalGas, SDG&E, SMUD
- CO & MN: Xcel Energy
- CT: Eversource CT, UIL Holdings
- DC: DC SEU
- ID, MT, OR & WA: NEEA
- MD: BGE, SMECO, PEPCO, Delmarva Power
- MI: DTE Energy
- NY: Con Ed
- VT: Efficiency Vermont
- WI: Focus on Energy
  some finalizing the approval process

Other Key Stakeholders
- NEEP and NRDC

Retailers Participating in 2016
- Best Buy
- Sears
- The Home Depot

National Planning, Facilitation, Monitoring & Support
US EPA
(Navitas Supporting)

⬇

Local/Regional Planning & Execution
Pilot Sponsors
(Implementation Contractors Supporting)

Questions or Comments? Contact:

Peter Banwell, Director of Product Marketing
Banwell.peter@epa.gov, 202-343-9408

EPA United States Environmental Protection Agency

For more than 20 years, EPA's ENERGY STAR program has been America's resource for saving energy and protecting the environment. Join the millions making a difference at energystar.gov.

THE **ENERGY STAR**® RETAIL PRODUCTS PLATFORM

Hewan Tomlinson, Energy Efficiency Program Manager
Tomlinson.hewan@epa.gov, 202-343-9082

EPA United States Environmental Protection Agency

For more than 20 years, EPA's ENERGY STAR program has been America's resource for saving energy and protecting the environment. Join the millions making a difference at energystar.gov.

Appendix F

PG&E RPP Metrics and Targets

PG&E RPP Metrics and Targets

As of 12/16/2015

Using a preponderance of evidence approach that is appropriate to judge market transformation efforts, the below key leading indicators and targets will be used quarterly to monitor and review RPP progress and inform plans for any adjustments or other actions needed in a timely manner.

These selected short- and medium-term metrics, from the RPP logic model found in Appendix A RPP Program Theory and Logic Model, are proposed to be used as the basis for tracking and monitoring of RPP by PG&E, CPUC Staff and interested stakeholders. PG&E's proposal is consistent with fellow RPP Program Administrator NEEA in the use of these metrics as key leading indicators for the early stages of the RPP MT effort.

Additional metrics are also provided in Appendix A and will help contribute to the quarterly reviews of RPP to track progress using a preponderance of evidence. If determined in these regular reviews, updates and additions can be made to the set of key leading indicators.

These key leading indicators and associated targets for each metric are expected to help identify RPP design and implementation improvements as RPP proceeds to keep it on-track to meet its objective, and ultimately they collectively serve to determine if the program should continue to be funded.

As noted below for two of the indicators, targets for those metrics will be set in Q1-2015 after necessary initial data is analyzed after receipt from participating retailers at launch. Also, after the first year of RPP program data and additional research is completed and available, these key leading indicators and associated targets will be re-evaluated and updated to reflect the additional data and learning.

Selected Key RPP Key Leading Indicators and Targets

Logic Model Component	Concept	Calculation	Notes	Targets															
				Q1-2016	Q2-2016	Q3-2016	Q4-2016	Q1-2017	Q2-2017	Q3-2017	Q4-2017	Q1-2018	Q2-2018	Q3-2018	Q4-2018	Q1-2019	Q2-2019	Q3-2019	Q4-2019
C2: Program Administrator Sponsors recruited	Reach of recruited PAs	Percent of U.S. population of utility customers served by all PAs in national RPP effort	We want to achieve sufficient PAs so as to reach 30% of the U.S. population after the first year of the program launch.	15%	15%	18%	18%	20%	20%	20%	20%	25%	25%	25%	25%	30%	30%	35%	35%
F3: Signed contracts between PAs and retailers.	Market share of all in-store units sold (in US and by PA) for participating retailers, by retailer, by product category	Initial: Count of major retailers or major retail buying groups (serving smaller retailers, such as Nationwide which is a major buying group)	After initial data collection, this metric and target can be changed to be calculated as: Participating Retailer Market Share of all sales, by product category p, by retailer r, for a specific time period t: PRMSp,r,t = Total Salesp,r,t / US (and PA) Total Salesp,r,t	3	3	3	3	3	6	6	6	6	7	7	7	7	7	7	7
E2: Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.	Number of targeted product categories	Cumulative number of targeted product categories	Program is designed so that product categories will be retired from RPP when qualified share reaches a predetermined level, so it is expected that products will move in and out over time.	6	6	6	6	8	8	8	8	10	10	10	10	10	10	12	12
Output G: PAs approve retailers' marketing plans including sales forecasts of program-qualified models within each product category.	Clearly defined and measurable sales goals for targeted product categories	Count of retailer implementation plans that have clearly defined and measurable sales goals for targeted product categories	Essentially a qualitative assessment of retailer implementation plans.	1	2	3	3	5	5	6	6	6	6	7	7	7	7	7	7
Output H: Retailers implement plans employing various strategies and update as necessary	Participating retailers faithfully executing implemention plans	Count of participating retailers confirmed to be faithfully executing their implementation plans	See more detail in the draft evaluation plan. Confirmation of faithful execution is expected to be conducted in the quarter after finalization of a retailer's implementation plan.	0	2	3	3	4	5	6	6	6	6	6	7	7	7	7	7
I1: Reduction in customer market barriers to purchase products that are more energy efficient	Product availability: proportion of program-qualified models available to customers	Initial: Percentage point total, of program qualified models for all product categories on sales floor, based on initial shelf survey After initial data collection in Q1-2015, plan to break out by category and set targets by category.	After initial data collection, this metric and target can be changed to be calculated as: Proportion of models on sales floor, within each product category, that are program qualified. Efficient product availability planned to be broken by specific product category and targets set for each based on the initial historical sales data and retailer implementation plans.	0%	0%	2%	2%	5%	5%	6%	6%	8%	8%	9%	10%	10%	12%	12%	14%
M1: Increased share of efficient models sold in targeted product categories among participating retailers	Program-qualified share for participating retailers, by product category	Participating Retailer Program-Qualified Share (PQS) by product category p, for a specific time period t : PQSp,t = Program-Qualified Salesp,t / Total Salesp,t	Targets to be set in Q1-2015 after necessary initial data is analyzed after receipt from participating retailers at launch. ICF will be the party receiving, aggregating, and coding participating retailer data. Energy use coding will be sub-contracted to Planet Ecosystems.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

N1: Increased share of efficient models sold in targeted product categories among nonparticipating retailer	Program-qualified share for nonparticipating retailers, by product category	Nonparticipating Retailer Program-Qualified Share (PQS) by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified Sales$_{p,t}$ / Total Sales$_{p,t}$	Targets to be set in Q1-2015 after necessary initial data is analyzed after receipt from participating retailers at launch.	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD
V1: In the mid-term and/or long-term, more stringent mandatory and voluntary	New Codes and/or standards planned and/or adopted	Cumulative count of new codes and/or standards planned and/or adopted	Only use as a positive indicator for pilot, since 0 in this timeframe does not mean pilot is not working. Essentially an acceleration of the codes and standards process.	0	0	0	0	0	0	0	0	0	0	1	1	1	1	2	2

<u>Appendix G</u>

California 2016-2019
Retail Products Platform Program Pilot

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California 2016-2019 Retail Products Platform Program Pilot

December 16, 2015

Evaluation
Plan

Presented To:

Brian Smith
Strategic Research and Evaluation
Customer Energy Solutions
245 Market St.
San Francisco, CA 94105

Presented By:

Todd Malinick, PhD
EMI Consulting
&
Richard Ridge, PhD
Ridge & Associates

TABLE OF CONTENTS

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LIST OF TABLES

LIST OF FIGURES

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APPENDICES

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1. INTRODUCTION

This document presents the evaluation plan that EMI Consulting and Ridge & Associates have prepared for the California Program Administrators[1] and California Public Utilities Commission-Energy Division (CPUC-ED) to evaluate the California 2016-2019 Retail Products Platform (CA RPP) Program Pilot.[2] A previous RPP[3] Program *Trial* was conducted by the Pacific Gas and Electric Company (PG&E) and the Sacramento Municipal Utility District (SMUD) in 2013-2014 with a single retailer in a limited number of their stores. This document is the evaluation plan for a continuation and expansion of the Trial, for an RPP Pilot will be scaled up for 2016-2019 to cover a longer time period and include more and larger retailers, as well as additional Program Administrators beyond California.

Importantly, the RPP Program concept is one of the first programs of its type aimed at longer-term market transformation in the State of California and beyond through an intervention strategy with a midstream emphasis. As such, the evaluation plan proposed herein is targeted at evaluating a market transformation program and not a resource acquisition program (more on market transformation in Section 2 of this plan). Evaluating market transformation programs such as the RPP Program is a challenging effort. While there are no predefined standards or procedures for evaluating a market transformation program in the State of California, the plan proposed here attempts to align with recent efforts in the State to better conceptualize this area (especially see Prahl and Keating, 2014).[4]

Because the CPUC-ED is responsible for conducting ex post impact evaluations in California, this evaluation of the CA RPP should be viewed an Early EM&V effort as permitted for pilot programs in California. However, this plan incorporates the significant number of lessons learned from leading the evaluation of the initial 2013-2014 RPP Program Trial,[5] and is also designed to be flexible and adaptive to support the development of emergent and refined

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[1] *Program Administrators* are the organizations that are offering the program and paying the incentives. These can include independently-owned utilities (IOUs), municipal utilities, and regional bodies (such as NEEA and the Energy Trust of Oregon).

[2] This version of the evaluation plan was developed over an extended period of time with significant input from a wide range of stakeholders. The Pacific Gas and Electric Company (PG&E) evaluation team presented the initial draft of the evaluation plan to various stakeholders including the Northwest Energy Efficiency Alliance (NEEA), the U.S. Department of Energy (DOE) ENERGY STAR and its consultants, and other potential Programs Administrators in early 2015. After incorporating comments the evaluation team then presented a revised draft to the CPUC-ED and other California IOUs in mid 2015. We received comments and questions back from that review and developed a revised draft of the evaluation plan in October 2015 (CPUC-ED and IOU comments are provided in Appendix F). On October 28, 2015 PG&E conducted a public presentation of the revised plan evaluation plan for interested parties. The only additional comments we received back from this presentation were from representatives of the Office of Ratepayer Advocates (ORA) (PRA comments are included in Appendix G). PG&E responded to the ORA comments in writing (included as Appendix H) and also held an informational meeting with representatives of the ORA on November 30, 2015.

[3] Note that for the 2013-2014 Trial, RPP stood for "Retail Plug-Load Portfolio" Program. For the 2016-2019 Pilot, RPP will now stand for "Retail Products Platform" Program Pilot. This change is to align the naming with the current national RPP efforts.

[4] Prahl, R. and K. Keating. 2014. *Building a Policy Framework to Support Energy Efficiency Market Transformation in California.* Final Review Draft. California Public Utilities Commission.

[5] Malinick, T. and Ridge, R. 2015. *Pacific Gas and Electric Company Retail Plug-Load Portfolio (RPP) Trial: Evaluation Report.* April 24, 2015.

2016-2017 RPP Pilot Evaluation Plan

evaluation methods, as well as providing useful and rapid feedback to further refine program design and implementation moving ahead. As such, it should also be viewed as a second-phase developmental evaluation.[6].

Ultimately, the goal of this evaluation is to assess the efficacy and performance of the CA RPP including the validation of the program theory. More specifically, the intent of evaluation plan proposed herein is to present a *theory-driven evaluation*[7] framework that:

- Identifies key indicators (both program performance and market transformation) to be developed, collected, and tracked as part of the evaluation,
- Suggests the frequency at which these indicators should be collected not only to evaluate and assess short-term program activities, outputs, and outcomes, but also to establish baselines for mid- to long-term outcomes that will serve as valid and reliable indicators of market transformation, and
- Provides the conceptual and theoretical foundation upon which future evaluation methods and analyses are built to support defensible conclusions regarding the efficacy of the RPP Program.

The primary audience for the evaluation results will be California Program Administrators (all IOUs and SMUD), the third-party program implementers, and regulatory bodies such as the CPUC-ED and its consultants. However, it is important to note that, although this document addresses the evaluation of the CA RPP Program Pilot, efforts are well underway to expand the implementation of the RPP Program Pilot beyond California to other regions, which will dramatically increase the likelihood that the markets targeted by the RPP Program will be transformed. The California Program Administrators and a group of other Program Administrators, including but not limited to, the Northwest Energy Efficiency Alliance (NEEA), the Northeast Energy Efficiency Partnerships (NEEP), Efficiency Vermont, DC Sustainable Energy Utility, and New York's ConEd are working with the U.S. Environmental Protection Agency's (EPA) ENERGY STAR® Program to leverage scale and develop a coordinated approach to align energy efficiency programs at a national level with retailers' business models using the RPP Program design.[8] We refer to this collective effort as the multi-region RPP Program (MR RPP). The involvement of these multiple Program Administrators is expected to provide the critical mass needed to influence enough retailers to alter their product assortments, which in turn is expected to eventually alter the demand manufacturers face for their products causing them to shift their production to a larger proportion of energy efficient products.

While there are multiple Program Administrators outside of California, *the primary focus of this evaluation plan is on the performance of the CA RPP*. However, for each *local* implementation of the RPP Program to be fairly assessed, the multi-region evaluator must assess the extent to which the combined efforts of all the Program Administrators have produced measureable

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[6] Patton, M.Q. 2010. *Developmental Evaluation. Applying Complexity Concepts to Enhance Innovation and Use.* New York, NY: Guilford Press.
[7] Chen, H.T. 1990. *Theory-Driven Evaluations.* Thousand Oaks, CA: Sage.
[8] In addition to the Program Administrators mentioned above, EmPOWER Maryland (including Baltimore Gas and Electric, and the Potomac Electric Power Company, and the Southern Maryland Electric Cooperative, Focus on Energy of Wisconsin, and XCEL Colorado and Minnesota are also preparing filings to participate in RPP Program, though these effort may not be completed in time for the March 2016 proposed launch.

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market effects[9] and what portion of these market effects should be allocated to each of the Program Administrators. That is, the efficacy of the RPP Program for any given Program Administrator must be based on the results of their local RPP evaluation as well as the results of the MR RPP evaluation; conceptually, they are inseparable.

The mechanics of how the evaluations of local RPP programs such as the CA RPP will inform the evaluation of the multi-region evaluation – and how the evaluation of the MR RPP will inform the evaluations of the local RPP programs – have yet to be fully developed. However, this plan provides some thoughts in Section 7 as to how this could be accomplished.

As such, a secondary objective of this evaluation plan is to coordinate California evaluation efforts with those evaluation efforts that will be conducted at the multi-regional level by the yet-to-be-announced multi-region evaluator. In addition, because the evaluation and implementation of the CA RPP is generally more mature than it is in many other regions, we expect this evaluation plan will also provide insights, inputs, and direction into how the RPP Programs in these other jurisdictions might be evaluated to meet the needs of other audiences, including other Program Administrators, advocacy groups, regulators, and evaluators.[10]

We emphasize that the exact evaluation methods proposed herein might not be appropriate for all other jurisdictions – this is ultimately a question that needs to be answered by the regulators of each jurisdiction in terms of what will be accepted as credible evidence for energy savings claims and attribution. Nevertheless, implementation and evaluation of the CA RPP Program Pilot will be overseen by the CPUC-ED, and the methods proposed in this evaluation plan are aimed at meeting their evidentiary standards, which may or may not be similar to other jurisdictions.

Should the CPUC-ED approve a future program rollout, it is expected that they will eventually conduct a multi-year ex post evaluation to assess the ultimate efficacy of the program. Of course, this ED-led impact evaluation should be done in close collaboration with the IOUs participating with the 2016-2019 RPP Program Pilot. PG&E looks forward to collaborating with the Program Administrators, as well as the CPUC-ED, and sharing the methodological lessons we have learned throughout this evaluation.

The remainder of this first chapter provides more detailed discussion of the RPP Program, introduces the logic model, and outlines some program and evaluation goals for the 2016-2019 CA RPP Program Pilot. The second chapter introduces the concept of market transformation and provides a detailed discussion of how it relates to the evaluation of the RPP Program Pilot. The remaining chapters outline the proposed process and impact evaluation approaches.

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[9] Market effects have been defined as: "A change in the structure of a market or the behavior of participants in a market that is reflective of an increase in the adoption of energy efficient products, services, or practices and is causally related to market interventions" (p. 9). (Eto, Joe, Ralph Prahl and Jeff Schlegel. (1996). *A Scoping Study on Energy Efficiency Market Transformation by California Utility DSM Programs*. Berkeley, CA: Ernest Orlando Lawrence Berkeley National Laboratory.)

[10] One can think of the evaluations of the RPP within each program administrator region (i.e., a *local* evaluation) as being nested within the evaluation of the MR RPP.

1.1 RPP Program Rationale and Description

Because plug loads represent a significant proportion of residential electricity consumption, reducing plug load energy consumption is a critical step on the path towards achieving California's residential Zero Net Energy (ZNE) goals. The 2012 ZNE Technical Feasibility Report stated that "…minimizing plug loads will be critical to meeting ZNE goals",[11] and recommended that utilities "continue equipment efficiency incentive programs" and "aggressively promote equipment efficiency regulations at the state and federal level".[12]

In response, PG&E helped develop and launch the Retail Products Platform (RPP) Program. The RPP Program uses a mid-stream design aimed at influencing retailers to stock, sell, and demand more energy efficient models of home appliances and consumer electronics in targeted product categories. Retailers are paid per-unit incentives for every program-qualified unit that they sell in the targeted product categories during the program period. Program-qualified models are typically models that meet or exceed the minimum ENERGY STAR specification in each product category. By increasing the sales of energy efficient models over less efficient models, the RPP Program will generate gross energy and demand savings for utility customers in the short- and mid-term through participating retailers, while transforming the overall market towards higher efficiency in the long-term. The broader RPP Program strategy is discussed in detail in the PG&E document *Retail Plug-Load Portfolio Trial Plan.*[13]

The CA RPP was initially tested in a trial with a single participating retailer in 24 of its 41 stores located in the PG&E and SMUD service territories that took place from November 2013 to December 2014. The 2013-2014 RPP Trial incented six product categories, including: (1) air cleaners, (2) DVD/Blu-Ray players, (3) home theaters-in-a-box (HTIBs), (4) freezers, (5) refrigerators, and (6) room air conditioners.

The CA RPP is being expanded with plans to launch as a Pilot in March 2016 and run through December 2019.[14] Plans include starting with three retailers in 2016 (Sears Holding (including Sears and Kmart), Home Depot, and Best Buy), with a goal of recruiting additional retailers over time. In contrast to the 2013-2014 Trial, all of the participating retailers stores within Program Administrator service territories will participate in the Pilot. The 2016-2019 RPP Pilot will include incentives for six candidate targeted product categories, including: (1) air cleaners, (2) sound bars, (3) freezers, (4) electric clothes dryers, (5) gas clothes dryers, and (6) room air conditioners. As shown in Table 1-1, the 2016-2019 RPP Pilot will begin by incenting basic tiers (defined by meeting or exceeding the minimum ENERGY STAR specifications for the product categories, except for soundbars, which will be ENERGY STAR +15%); advanced tiers will follow with the goal of attaining greater levels of energy efficiency. The current expectation is that the 2016-2019 RPP Pilot will launch in March 2016 incenting only the basic tiers as the final

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[11] Arup, Davis Energy Group, Sun Light & Power, New Buildings Institute, Engineering 350, and Sustainable Design + Behavior. 2012. *The Technical Feasibility of Zero Net Energy Buildings in California.* Page 8. Developed on behalf of Pacific Gas & Electric Company. Retrieved from: http://www.energydataweb.com/cpucFiles/pdaDocs/904/California_ZNE_Technical_Feasibility_Report_Final.pdf

[12] Ibid. p. 51.

[13] Navitas. 2013. *PG&E Retail Plug-Load Portfolio (RPP) Trial Plan.* Prepared for PG&E by Navitas.

[14] Note that the CA RPP Program is being conceived as a 10-year program, and given adequate performance of the CA RPP Pilot, are expecting that there will be no gap between the pilot period and the remaining six years of the program period. This is important as obtaining continued an ongoing commitment from the participating retailers will be key for the program to be able to attain its market transformation goals.

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details regarding the advanced tiers are still being worked out among the ENERGY STAR/Program Administrator collaborative. The goal is to begin incenting the advanced tiers by roughly the middle of 2016.

Table 1-1: 2016-2019 RPP Program Incentives for Basic and Proposed Advanced Tiers for Candidate Targeted Products

Product Category	Draft Efficiency Specification	Draft Per-Unit Incentive
Air Cleaners		
Basic Tier	ENERGY STAR V1.2	$20
Advanced Tier	ENERGY STAR V1.2 + 30%	$30
Sound Bars		
Basic Tier	ENERGY STAR V3.0 + 15%	$10
Advanced Tier	ENERGY STAR V3.0 + 50%	$20
Freezers		
Basic Tier	ENERGY STAR V5.0	$20
Advanced Tier	ENERGY STAR V5.0 + 5% [1]	$50
Electric Clothes Dryers		
Basic Tier	ENERGY STAR V1.0	$50
Advanced Tier	ENERGY STAR 2015 Emerging Tech Award	$250
Gas Clothes Dryers		
Basic Tier	ENERGY STAR V1.0	$50
Advanced Tier	ENERGY STAR 2015 Emerging Tech Award [1,2]	TBD
Room Air Conditioners		
Basic Tier	ENERGY STAR V4.0 [3]	$20
Advanced Tier	ENERGY STAR V4.0 + 10% [1,2]	TBD

[1] Though included here, there are not yet models available in the market meeting or exceeding the advanced tiers, though some are expected in the near future.

[2] Note that the advanced tiers for gas clothes dryers and room air conditioners are aspirational at this point and will not be included in the program launch in March. They are shown here indicate that they will likely be proposed as advanced tiers in the near future.

[3] The ENERGY STAR V4.0 specification for room air conditioners will be effective on 01/01/2016.

As part of the RPP Program, after signing contracts, participating retailers are expected to commit to creating and implementing a Retailer Implementation Plan for increasing the sales of energy efficient models in the targeted product categories. Examples of strategies to be incorporated in retailer-created implementation plans for increasing sales of energy efficient models include the following:

   • Product assortment changes (e.g., displaying additional qualified models)[15]

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[15] A retailer's assortment is defined by the set of products carried in each store at each point in time. The goal of assortment planning is to specify an assortment that maximizes sales or gross margin subject to various constraints,

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- Product pricing strategies (e.g., reducing prices or initiating price promotions for the most efficient model in a product category)
- Product promotion strategies (e.g., increasing the promotion/advertisement of energy efficient models)
- Product placement strategies (e.g. devoting "prime" shelf and/or store locations to energy efficient models)
- Staff training (e.g., educating sales associates and managers on the benefits of energy efficiency products)
- Educating customers about the benefits of purchasing energy-efficient products

However, it is critical to emphasize that this is not a prescriptive program, and retailers are given the flexibility to put together the plan they expect to be most suited to sell the targeted products. These plans may include all or a subset of the above-mentioned tactics.

1.2 RPP Program Logic Model

Logic models go hand-in-hand with program theory in the market transformation literature. Rosenberg and Hoefgen state: "program logic models are graphic representations of the causal links between program activities, short-term responses to those activities among market actors, and longer-term market effects."[16] The elements used to describe or represent a logic model include inputs, activities, and outputs, which in combination loosely form a program process theory, short-term outcomes (sometimes called initial, proximal, or immediate outcomes), mid-term outcomes (sometimes called intermediate or proximal outcomes), and long-term outcomes (sometimes called distal outcomes or impacts), which are intended to represent a program impact theory.[17,18,19,20] In these logic models, activities are the actions undertaken to bring about a desired end, outputs are the immediate results of an action, and outcomes are the anticipated changes that occur directly or indirectly as a result of inputs, activities, and outputs.

The RPP Program concept is built upon a series of hypothesized causal linkages between program activities, outputs, and intended program outcomes that are depicted in the program logic model as illustrated in Figure 1-1. The development of this logic model evolved over more than a year and is based on three sources of information:

1. Prior theory and research (e.g., economics of the firm, retailer behavior, consumer behavior, etc.)

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such as a limited budget for purchase of products, limited shelf space for displaying products, and a variety of miscellaneous constraints such as a desire to have at least two vendors for each type of product.

[16] Rosenberg, M. and L. Hoefgen. 2009. *Market Effects and Market Transformation: Their Role in Energy Efficiency Program Design and Evaluation.* Prepared for the California Institute for Energy and Environment. p. 48. Available at: http://uc-ciee.org/downloads/mrkt_effts_wp.pdf

[17] Donaldson, S. I. 2007. *Program Theory-Driven Evaluation Science.* New York, NY: Lawrence Erlbaum

[18] Donaldson, S. I., & Lipsey, M. W. 2006. "Roles for Theory in Contemporary Evaluation Practice: Developing Practical Knowledge." *In:* I. Shaw, J. C. Greene, & M. M. Mark (Eds.), *The Handbook of Evaluation: Policies, Programs, and Practices* (pp. 56-75). London, UK: Sage.

[19] Lipsey, M. W., Rossi, P. H., & Freeman, H. E. 2004. *Evaluation: A Systematic Approach* (7th ed.). Thousand Oaks, CA: Sage.

[20] Patton, M. Q. 2008. Utilization-Focused Evaluation (4th ed.). Thousand Oaks, CA: Sage.

2. Implicit theories of those close to the program (e.g., PG&E program managers, the experience of experts in the retail industry, experience of CPUC-ED and its consultants, and PG&E EM&V staff and its consultants), and
3. Observations of the program in operation during the 2013-2014 Trial.

Figure 1-1: RPP Logic Model
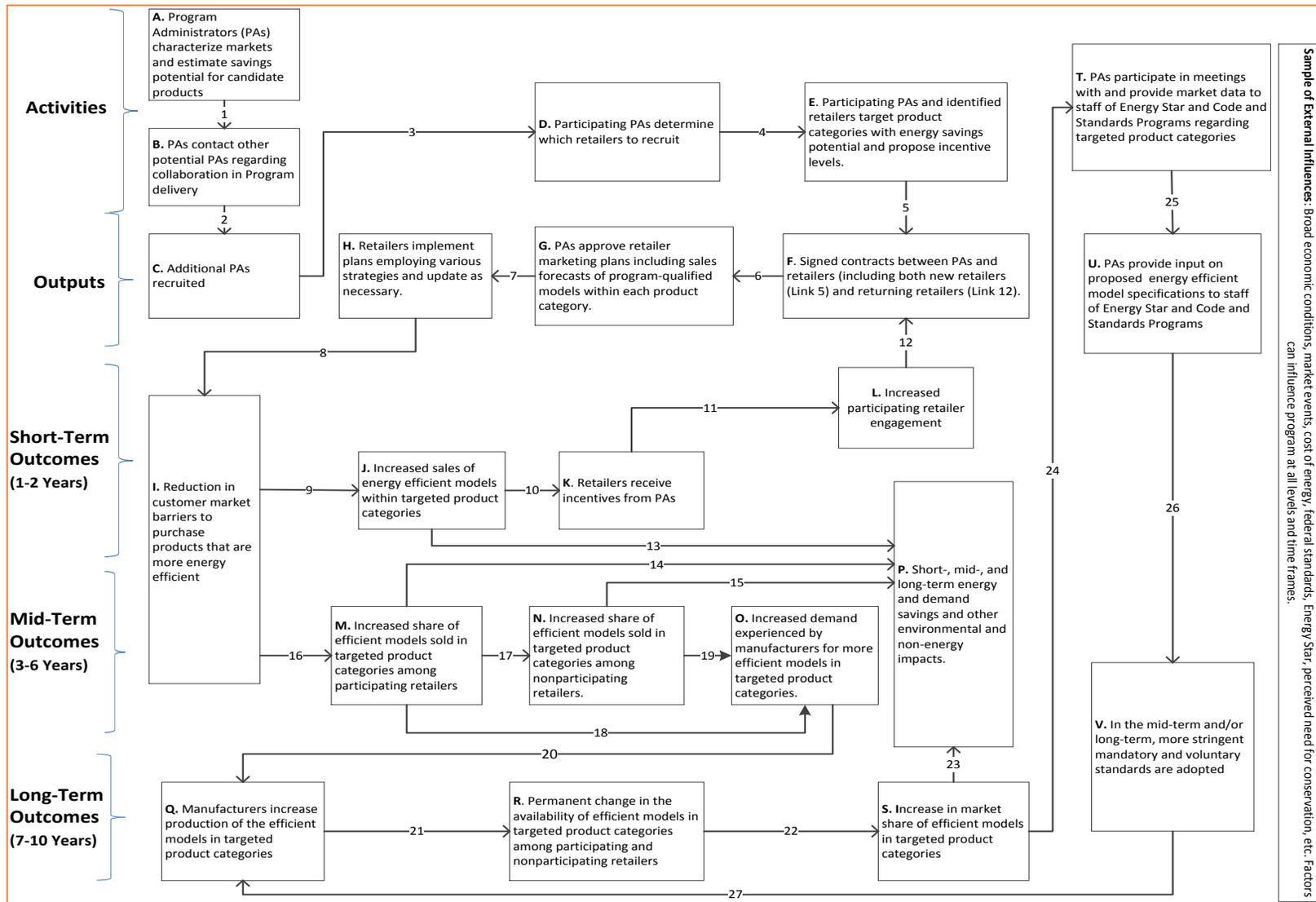
Importantly, the RPP Program concept is one of the first programs of its type aimed at longer-term market transformation in the State of California and beyond through an intervention strategy with a midstream emphasis. As a result, outcomes of the program are expected to occur over different time frames involving different market actors.

As we noted in Section 1, for each *local* implementation of the RPP Program to be fairly assessed, the multi-region evaluator must assess the extent to which the combined efforts of all the Program Administrators have produced measureable market effects and what portion of these market effects should be allocated to each of the Program Administrators. That is, the efficacy of the RPP Program for any given Program Administrator must be based on the results of their local RPP evaluation as well as the results of the MR RPP evaluation; conceptually, they are inseparable.

Thus, this logic model illustrates the implementation of the RPP Program at two levels: (1) the local level, and (2) the multi-regional level. The activities, outputs, and outcomes (represented as A through M in Figure 1) are ones for which a local Program Administrator will be primarily responsible and will, therefore, be the focus of local RPP evaluators. As we discuss in more detail in Section 3.5, the activities, outputs, and outcomes (represented as N through V in Figure 1) are ones that are expected to be achieved through the collective efforts of all the Program Administrators and therefore will be the focus of the multi-region RPP evaluator. How the local RPP evaluations and the multi-region evaluation are combined to support conclusions regarding RPP Program efficacy is discussed in Sections 3 and 7. *As we noted earlier, the focus of this evaluation plan is on how well the CA RPP was implemented and the extent to which the expected activities, outputs and outcomes in California were realized.*

Initial program activities are aimed at characterizing the market and savings potential for candidate product categories (A), developing the Program Administrator teams (B and C) and determining and recruiting participating retailers (D),[21] and determining which product categories to target and the associated incentive levels (E). Next, the Program Administrators sign contracts with the participating retailers (F). Once contracts are signed, the retailers develop Retailer Implementation Plans including strategies for selling more energy efficient products (G) and then the retailers implement these plans (H.)

In both the short and mid-term, the activities implemented by the retailers are expected to reduce various barriers to purchasing more energy-efficient products faced by the customers (I). Here, it is important to emphasize that the most significant market barrier targeted by the RPP Program design is *product unavailability*. That is, a fundamental component of the program design is the expectation that retailers will begin to alter their product assortments over time (i.e., start stocking a larger proportion of energy efficient models). However, notable assortment changes are not likely to occur in the first year or two of the program (i.e., the "short-term"), as retail purchasing decisions are typically made well in advance of the time the products actually hit the sales floor. In the short-term, retailers will still aim to increase the sales of program-qualified models, but will be limited to activities such as promotion, pricing, and unique placement. While these activities are expected to increase unit sales of program-qualified units (J), they will be limited to altering sales within their current assortment of products. However, retailers are profit maximizing entities and will strive to sell as many units as they can at any

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[21] Over time, nonparticipating retailers, sensing market signals that suggest that selling more efficient products are profitable, might also approach Program Administrators and request to join the Program (D).

given time, regardless of whether they are program-qualified or not. Thus, while they may strive to increase sales of program-qualified models through promotions and other marketing efforts, they will almost certainly be conducting promotions for non-qualified models at the same time. Consequently, significant changes in the *share* of program-qualified units sold are not expected until the mid-term (M), once the retailers have the opportunity to change their assortments favoring more efficient models. Nevertheless, it is expected that the short-term sales lifts experienced by the retails (J), along with the incentives they will receive for selling program-qualified units (K), will sustain and even increase their level of engagement with the program (L).

In the mid-term, once retailers have implemented assortment changes that affect the product availability barrier, the relative share of energy efficient products sold within participating stores (M) is expected to increase, as is the proportion of efficient products sold in *non*participating retailer stores (N). With regard to the *non*participating retailers, the expectation is that as appealing as the program may be to retailers, some large retailers will ultimately decide not participate in the program. The retail industry is highly competitive and this competition will drive nonparticipants to join the program only when the financial incentives meet their business goals. The number of participating retailers is also constrained by the size of the program budget, which will be managed in a way that strikes a balance between seeking sufficiency for program success but not overinvestment, particular during the pilot period of the program. Further, many smaller retailers may simply decide not to participate, as they may not have the logistical or administrative systems in place to support participation in the program.[22] Nevertheless, the expectation is that a critical mass of retailers will participate having enough influence in the marketplace to send signals to nonparticipating retailers that they should begin selling more energy-efficient products. Also in the mid-term, the actions of both the participating and nonparticipating will result in manufacturers beginning to experience changes in demand for efficient products (O)

In the long-term, both demand pressures experienced by manufacturers (O) as well as policy-related effects on standards (T, U, and V) are expected to alter manufacturer production and supply of efficient products (Q), which ultimately will result in permanent changes in the availability and sales of efficient models in the marketplace (R and S).

Notably, though this is a market transformation program, energy and demand savings, as well as other environmental and non-energy benefits will amass in the short, mid, and long-terms (P). For the purposes of this program, *gross* energy and demand savings are simply computed as the unit energy savings (UES) and unit demand savings (UDS) for each product subcategory times the number of program-qualified units sold. However, because this is a market transformation program with a sophisticated design, the estimation of *net* energy and demand savings is more complex and will rely multiple data points and a preponderance of evidence approach. More detailed discussion of gross and net energy and demand estimation is provided in later chapters of this plan. A more detailed description of the program theory and logic is provided in Appendix A.

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[22] For example, participation in the program will require participating retailers to develop the Retailer Implementation Plans and have the ability to implement them, which may not be practical for smaller retailers. Also, meeting the data requirements for participation in the program may not be practical for smaller retail entities.

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Market Barriers

As discussed above, the RPP Program is a complex and dynamic program that is expected to have a wide range of potential impacts, over differing time frames, with an array of market actors. As such, the RPP Program is also aimed at confronting an array of potential barriers that exist in the market that are preventing wider saturation of energy-efficient products in the residences. In the following we summarize some of the general market barriers that the RPP Program is expected confront. We categorize these as: (1) supply-side market barriers, (2) market infrastructure barriers, and (3) demand-side market barriers.

Supply-side market barriers (manufacturers, distributors, and suppliers of residential energy-using equipment) include:

- Manufacturers may be uncertain about the response of customers to their new products or retailers might be reluctant to promote products for which their performance is uncertain. To the extent that this is a problem, the supply of these products at reasonable prices will be suboptimal

- Products and services may be unavailable because manufacturers, distributors, and service providers have difficulty accurately predicting customer demand for their products/services, and may respond to this uncertainty in a risk-adverse manner, thereby limiting the availability of their products/services. Often this limited availability is associated with new products/services and the uncertainty of market response. Or, they might not perceive sufficient demand for energy efficiency and new energy technologies in multifamily buildings.

- Lack of information and awareness among upstream market actors regarding the benefits of energy efficient equipment.

Market infrastructure barriers include:

- Low levels of awareness and knowledge regarding product specifications or differentiation regarding efficiency levels among retail merchandizers.

- Limited experience with energy efficient equipment.

- Perception of risk with stocking or installing efficient appliances when customer demand or product quality has yet to be proven (uncertainty about product performance and profit potential).

- Undervaluing energy efficiency and sustainability and their impact on economic development, denial of climate change, and low sense of urgency regarding adoption of energy efficient technologies.

- Information or search costs. Specifically, the lack of expertise among equipment sales staff due to the lack of energy efficiency training opportunities.

- Institutional policies and practices might prevent some retailers from shifting their assortment to the more energy efficient products simply because they never have. Energy use is not always an attribute that retail merchandizers consider when buying products from manufacturers.

- Lack of differentiated product marketing by retailers to motivate customers to make more efficient purchasing choices.

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- Market lacks experience in determining the best way to create a profitable long-term business model

Demand-side market barriers include:

- Customers often unaware and lack knowledge and understanding of energy-efficient products and services

- Information costs associated with understanding the energy related features and associated benefits of energy-efficient technologies and services.

- Because energy efficiency is rarely valued by the customer more than the requested functionality, efficient models do not always receive consumer attention.

- Sometimes the energy-efficiency attributes of a product or service may not be packaged with other features customers desire. For example, some energy-efficient options may only be available on high-end products, such as on high-end or large refrigerators.

- Many customers and some businesses in the distribution chain are uncertain about the performance of energy-efficient products and services, and may not trust the performance claims made by manufacturers and vendors. Many customers also have difficulty assessing the value of energy efficiency as an investment, because the costs are paid upfront but the less certain benefits accrue over time.

- Incremental costs may be higher for the more efficient models.

- Resistance to new or innovative technologies

Notably, however, the actual assortment of market barriers that will be confronted via the program will depend on a range of factors that cannot be entirely known before the launch of the program, such as the scale at which the RPP Programs is able to expand at the national level, how retailers decide to implement the program (i.e., what marketing strategies they decide to implement), and how manufacturers decide to react to market signals. A more comprehensive assessment of market barriers is being conducted by the PG&E as part of the initial launch of the program. This research will attempt, through a literature review and interviews with retail merchandisers and marketers and manufacturers, to assess these market barriers and how they might vary across product categories. The results of this research will be shared with participating retailers so that they can customize, to the extent possible, their Retailer Implementation Plans.

1.3 RPP Pilot Objectives

The objectives for the 2016-2019 RPP Pilot fall into two categories: (1) SMART (**s**pecific, **m**easureable, **a**mbitious, **r**ealistic, and **t**ime-bound) [23] performance objectives and (2) operational objectives.

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[23] Poister, Theodore H. (2003). *Measuring Performance in Public and Nonprofit Organizations.* San Francisco, CA: Jossey-Bass.

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SMART Performance Objectives

SMART *performance objectives* will be established in close collaboration with the CPUC-ED and used to assess the performance of the pilot to ensure it is meeting expectations and is on-track to succeed as a program. These SMART performance objectives will be carefully tracked over the life of the CA RPP Pilot, and will be reported to the CPUC-ED and Program Administrators on an ongoing basis to ensure the regulators are well informed regarding the Pilot's implementation and progress.[24] The final list of SMART performance objectives were still under development at the time of the drafting of this plan, and will be included in the RPP *Advice Letter* being submitted to the CPUC-ED in December 2015. Other performance metrics, while not formally defined as SMART objectives, will also be tracked and incorporated into our assessment of the CA RPP efficacy.

Operational Objectives

The *operational objectives* are facilitated by the program team and the implementers and build upon the lessons learned from the evaluation of the 2013-2014 RPP Program Trial and are aimed at building a robust framework for program implementation and evaluation that could support the further scaling up of the RPP program concept from a pilot to a full program. For the 2016-2019 RPP Program Trial, these include:

- Conduct activities that are expected to lead to outputs (see Figure 1-1), including:
    - Activities A, B, D, and E
    - Outputs C, F, G, and H
- Determine the level of retailer support needed to ensure program is implemented effectively.
- Refine data collection, processing, and management protocols, as well as identify responsible parties for each stage and task (e.g., retailers, utility staff, evaluators).
- Extend proof of concept to multiple retailers and Program Administrators to extend test and validation of program operations, evaluation methods, and incentive structures.
- Refine the necessary data infrastructure, including quality control protocols, to administer incentives in an accurate and cost-effective manner.
- Collaborate with the other Program Administrators and ENERGY STAR in the development and implementation of the multi-region *program* efforts.

1.4 Evaluation Objectives

Because the RPP Program concept is one of the first programs of its type aimed at longer-term market transformation in the State of California, the evaluation will focus heavily on assessing various program processes in addition to identifying and measuring performance and market transformation indicators. Evaluation objectives for the 2016-2019 RPP Program Pilot are listed below.

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[24] Different means of communicating progress towards the performance objectives are being considered, but current thoughts are that this effort may involve the development of a dashboard ED members and other relevant stakeholders can access real-time to observe and assess progress towards meeting the objectives.

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- Test the hypothesized causal linkages illustrated in the program theory and logic model.
- Identify, operationalize, collect, track, and analyze key short and mid-term program performance indicators (PPIs).
- Working with the multi-region evaluator, identify and operationalize key long-term market transformation indicators (MTIs) in order to develop baselines that can be tracked over time.
- Estimate gross and net energy and demand savings.
- Continue to test various methods to evaluate the RPP Program.
- Collaborate with the other Program Administrators and ENERGY STAR in the development and implementation of the multi-region *evaluation* efforts.

To the extent possible, the evaluation of the RPP Program Pilot will comply with the *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals*[25] and *The Program Evaluation Standards: A Guide for Evaluators and Evaluation Users.*[26] However, because of the diversity of evaluation objectives that exist for the RPP Program, no single methodology is suitable for assessing all objectives. Some objectives are more qualitative in nature and will involve assessing and evaluating operational activities and processes to ensure that the program is being implemented as planned and functioning as expected. Other objectives are more quantitative in nature and ill involve defining, measuring, and analyzing specific indicators that will serve as indicators of program progress, attribution, and/or success. Also, since this is a relatively new and novel program concept aimed at market transformation, an additional objective of the evaluation process includes assessing the array of potential approaches to evaluating the program to identify which approaches are most effective, informative, and feasible to apply moving forward should the program be further scaled up in ensuing years.

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[25] TecMarket Works Team, 2005. *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals.* Prepared for the California Public Utilities Commission.
[26] Yarbrough, D. B., L. M. Shulha, R. K. Hopson and F. A. Caruthers. 2011.*The Program Evaluation Standards: A Guide for Evaluators and Evaluation Users.* Los Angeles, CA: Sage Publications.

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2. MARKET TRANSFORMATION AND THE RPP PROGRAM

The CPUC has defined market transformation as:

> "[L]ong-lasting, sustainable changes in the structure or functioning of a market achieved by reducing barriers to the adoption of energy efficiency measures to the point where continuation of the same publicly-funded intervention is no longer appropriate in that specific market. Market transformation includes promoting one set of efficient technologies, processes or building design approaches until they are adopted into codes and standards (or otherwise substantially adopted by the market), while also moving forward to bring the next generation of even more efficient technologies, processes or design solutions to the market."[27]

However, there has been movement recently to move away from viewing market transformation as an end point, but instead to view it as an intervention strategy or policy tool:

> "This alternative approach is based on the concept that market transformation efforts are most effective when they emphasize thorough consideration of which specific markets have leverage points that will yield to market transformation, and then promote the development of systematic but flexible long-term strategies for influencing those leverage points. We call this approach "Targeted Market Transformation," which is in turn advanced by "Targeted Market Transformation Initiatives." This approach can in turn be defined as follows: *[Targeted] market transformation interventions are designed to induce sustained increases in the adoption and penetration of energy efficient technologies and practices through structural changes in the market and in behaviors of market actors.*"[28]

The design of the RPP Program is consistent with this definition of a targeted market transformation program. The fundamental program theory is that, with the right combination of incentives and engagement, market barriers for both retailers and consumers—and eventually manufacturers—can be reduced.[29] As a result, retailers will increase their sales of more energy efficient models (models that meet and/or exceed ENERGY STAR specifications) to

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[27] CPUC Application – Decision: 08-07-021, Filed 7/21/08 Section 4.6.1. Defining Market Transformation – page 2; updated in D.09-09-047[27] at page 88-89. Updates from definition in the California Long Term Strategic Plan are in italics.

[28] Prahl, R. and K. Keating. 2014. *Building a Policy Framework to Support Energy Efficiency Market Transformation in California.* Final Review Draft. California Public Utilities Commission. Italics added.

[29] Note that the RPP is not a "lift" program, which pays an incentive only for the number of units sold that is greater than the forecasted number of units that would have been sold normally. That is, in a lift program design, incentives are paid only for the incremental, or net, units above this baseline forecast. Rather, with the RPP Program, an incentive will be paid for every program-qualified unit sold by the participating retailers. In this sense, RPP is no different from a standard utility rebate program, which pays an incentive for every qualified measure, e.g., a refrigerator. Some portion of program participants are always free riders, the proportion of which is estimated as part of an ex post evaluation. To mitigate the risk of high freeridership, program designers must determine incentive levels which result in the promotion of energy-efficient measures that have relatively low sales and market shares within the participating retailers, use less energy, and cost more than the standard efficient units.

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more informed customers than they would have absent the program, thereby generating energy savings, and with sustained engagement, transforming the retail channel market in delivering energy efficient plug load products and appliances.

In the short term, the RPP Program is intended to motivate participating retailers to promote and sell more efficient models. Over time, other retailers and Program Administrators outside of California will collaborate in this effort to get retailers to regularly stock, sell, promote, and demand the most efficient models available. This broader scale will be necessary because the markets for these types of products are complex and world-wide and it may be difficult for a single utility—or even a state or region—to significantly influence the market forces to affect how manufacturers and mid-stream players act. Peters and colleagues underscored this fundamental program design principle:

> "Manufacturers design and market products for a national, even international market. They are already faced with country-specific requirements and strongly dislike "patchwork" requirements. In fact, many manufacturers stated they were unlikely to comply with energy efficiency program requirements that apply at municipal levels. Thus, programs will have the greatest impact on the electronics market if they coordinate with one another in setting energy efficiency targets, incentive levels, and program participation requirements."[30]

The resulting increase in regional and/or national retailer demand for these models will eventually cause manufacturers to permanently shift a greater proportion of their production to these models, thus transforming the market and reversing the trend of increasing energy use due to plug loads and appliances.

Thus, in the current environment where plug load energy consumption is growing, "low hanging fruit" for energy savings are diminishing, and regulatory scrutiny is intensifying, the RPP Program offers a number of advantages:

- **Aggregation** – Applies considerable resources and experience of multiple Program Administrators to a portfolio of measures, reducing administrative costs over a single product category-based approach and creating a more attractive financial value proposition for retailers.
- **Collaboration and Negotiation** – Brings Program Administrators and retailers together during critical retailer planning periods to determine energy-efficient product assortments and program options.
- **Transformation** – Promotes retailer behavior change towards energy efficiency, while acquiring energy savings by changing product (and potentially facility) energy profiles. Shapes the market while interacting at multiple organizational levels to elevate of energy efficiency as an enterprise-wide initiative.

The RPP Program as a multi-regional program presents unique challenges. Peters and colleagues note that: "Successful intervention by utilities and government agencies will require new strategies, exceptional adaptability, and unprecedented cooperation among efficiency

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[30] Peters, J.S., M. Frank, J. Van Clock and A. Armstrong. 2010. *Electronics and Energy Efficiency: A Plug Load Characterization Study.* Prepared for Southern California Edison. p. 45

organizations."[31] Working with manufacturers is also a critical component of any mid-stream program:

> "Manufacturers praise ENERGY STAR for its inclusive specification development process and nearly all interviewees were interested in working with utilities to promote energy-efficient products. Programs should draw on manufacturers' expertise and leverage their distribution channels."[32]

Finally, while PG&E has worked with many of the retailers targeted by this program for participation, most recently in the Upstream Lighting Program, and most are ENERGY STAR Partners, there is continued focus on prioritizing the retailer relationships by the utility, and the RPP Program helps facilitate this. This was a specific recommendation to the program in KEMA's Impact Evaluation Report for Business and Consumer Electronics Program (WO34): "Maintain retailer relationships. Retailers are a key player in the supply chain for most plug load products. Thus, programs should seek to build long-term relationships with retailers and design program elements with the retailer's business case in mind.[33]"

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[31] Ibid. p. 2
[32] Ibid. p. 45
[33] KEMA, Inc. Impact Evaluation Report Business and Consumer Electronics Program (WO34). Oakland, CA. April 15, 2013. http://calmac.org/publications/WO34_BCE_Impact_Evaluation_Report_-_Phase_1_FINAL_2013-04-15.pdf.

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3. OVERVIEW OF EVALUATION APPROACH

In this section, a theory-driven evaluation approach is proposed, methodological challenges are identified, the need to minimize the various sources of error is acknowledged, and management and communication protocols are presented.

3.1 Theory-Driven Evaluation

The RPP Program involves a diverse group of market actors including utilities, regional bodies, government agencies, manufacturers, retailers, and end users. The relationships among these market actors are complex, and the program is expected to extend over a ten-year period in an environment in which other federal, regional, and state efficiency program also are affecting the broader market. These factors combine to make the assessment of program attribution for the RPP Program similarly complex and uncertain. Traditional evaluation approaches, which typically estimate whether net outcomes[34] have been achieved over a relatively short period of time, are not equipped to address such complex situations. For a complex program such as the RPP Program, plausible causal mechanisms must be identified and related hypotheses tested in order to build a case for attribution. This challenge requires a very different evaluation approach. A theory-driven evaluation is well suited to evaluate such programs.[35] For this evaluation, *theory-driven evaluation* is defined as:

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[34] Net outcomes are those that would not have been achieved absent the program.
[35] For detailed descriptions of theory-driven evaluation see:

Chen, H.T. 1990. *Theory-Driven Evaluations*. Thousand Oaks, CA: Sage.

Rogers, P.J. 2000. "Program Theory Evaluation: Not whether programs work but how they work." *In:* D.L. Stufflebeam, G.F. Madaus, and T. Kelleghan (Eds.), *Evaluation Models: Viewpoints on Educational and Human Services Evaluation*, (pp. 209-232). Boston, MA: Kluwer.

Rogers, P.J. 2008. "Using Program Theory to Evaluate Complicated and Complex Aspects of Interventions." *Evaluation*. 14: 29-48.

Rogers, P.J., Petrosino, A., Huebner, T.A., & Hacsi, T.A. 2000. "Program Theory Evaluation: Practice, Promise, and Problems." *In*: P.J. Rogers, T.A. Hacsi, A. Petrosino, & T.A. Huebner (Eds.), *Program Theory in Evaluation: Challenges and Opportunities* (pp. 5–14). New Directions for Evaluation, No. 87. San Francisco, CA: Jossey-Bass.

Weiss, C.H. 1995. "Nothing as Practical as Good Theory: Exploring Theory-based Evaluation for Comprehensive Community Initiatives for Children and Families." *In*: J. Connell, A. Kubisch, L.B. Schorr, & C.H. Weiss (Eds.), *New Approaches to Evaluating Community Initiatives: Volume 1, Concepts, Methods, and Contexts* (pp. 65-92). New York, NY: Aspen Institute.

Weiss, C.H. 1997a. "How Can Theory-based Evaluations Make Greater Headway?" *Evaluation Review*, 21: 501-524.

Weiss, C. H. 1997b. "Theory-based Evaluation: Past, Present and Future." *In*: D.J. Rog & D. Fournier (Eds.), *Progress and Future Directions in Evaluation: Perspectives on Theory, Practice and Methods* (pp. 55-41). New Directions for Evaluation, No. 76. San Francisco, CA: Jossey-Bass.

Weiss, C.H. 2004a. *On Theory-based Evaluation: Winning Friends and Influencing People*. The Evaluation Exchange, IX, 1-5.

Coryn, C.L., L.A. Noakes, C.D. Westine, and D.C. Schröter. 2011. "A Systematic Review of Theory-Driven Evaluation Practice from 1990 to 2009," *American Journal of Evaluation*, 32(2).

"[A]ny evaluation strategy or approach that explicitly integrates and uses stakeholder, social science, some combination of, or other types of theories in conceptualizing, designing, conducting, interpreting, and applying an evaluation."[36]

Coryn and colleagues systematically examined 45 cases of theory-driven evaluations published over a twenty-year period to ascertain how closely theory-driven evaluation practices comport with the key tenants of theory-driven evaluation as described and prescribed by prominent theoretical writers. One output from this analysis was the identification of the core principles and sub-principles of theory-driven evaluation (see Figure 3-1), which will provide the basic framework for the evaluation of the 2016-2019 RPP Program Pilot.

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[36] Coryn, C.L., L.A. Noakes, C.D. Westine, and D.C. Schröter. 2011. "A Systematic Review of Theory-Driven Evaluation Practice from 1990 to 2009," *American Journal of Evaluation*, 32(2):, p.201.

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Figure 3-1: Core Principles and Sub-Principles of Theory-Driven Evaluation

1. Theory-driven evaluations/evaluators should formulate a plausible program theory
   a. Formulate program theory from existing theory and research (e.g., social science theory)
   b. Formulate program theory from implicit theory (e.g., stakeholder theory)
   c. Formulate program theory from observation of the program in operation/exploratory research (e.g., emergent theory)
   d. Formulate program theory from a combination of any of the above (i.e., mixed/integrated theory)
2. Theory-driven evaluations/evaluators should formulate and prioritize evaluation questions around a program theory
   a. Formulate evaluation questions around program theory
   b. Prioritize evaluation questions
3. Program theory should be used to guide planning, design, and execution of the evaluation under consideration of relevant contingencies
   a. Design, plan, and conduct evaluation around a plausible program theory
   b. Design, plan, and conduct evaluation considering relevant contingencies (e.g., time, budget, and use)
   c. Determine whether evaluation is to be tailored (i.e., only part of the program theory) or comprehensive
4. Theory-driven evaluations/evaluators should measure constructs postulated in program theory
   a. Measure process constructs postulated in program theory
   b. Measure outcome constructs postulated in program theory
   c. Measure contextual constructs postulated in program theory
5. Theory-driven evaluations/evaluators should identify breakdowns, side effects, determine program effectiveness (or efficacy), and explain cause-and-effect associations between theoretical constructs
   a. Identify breakdowns, if they exist (e.g., poor implementation, unsuitable context, and theory failure)
   b. Identify anticipated (and unanticipated), unintended outcomes (both positive and negative) not postulated by program theory
   c. Describe cause-and-effect associations between theoretical constructs (i.e., causal description)
   d. Explain cause-and-effect associations between theoretical constructs (i.e., causal explanation)
      i. Explain differences in direction and/or strength of relationship between program and outcomes attributable to moderating factors/variables
      ii. Explain the extent to which one construct (e.g., intermediate outcome) accounts for/mediates the relationship between other constructs

Coryn goes on to state:

"All in all, the perceived value of theory-driven evaluation is, in part, generating knowledge such as not only knowing whether a program is effective or efficacious (i.e., causal description; *that* a causal relationship exists between A and B) but also

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explaining a program's underlying causal mechanisms (i.e., causal explanation; *how* A causes B)."[37]

Within a theory-driven framework, the assessment of program performance through the use of multiple research designs and analyses of key leading indicators of program performance is the best way to manage risks faced by each stakeholder.[38] Such early and regular feedback from the various evaluation teams will allow timely course corrections increasing the likelihood of achieving the ultimate objectives of the RPP Program.

Within this theory-driven framework, an effective evaluation of the RPP Program requires a robust, yet flexible design that takes into consideration several challenges:

- **Program effects will be challenging to assess in the short-term (e.g., the first or second year of retailers' participation).** The greatest impacts from the program will result from retailers altering their product assortment over time, thus increasing the proportion of energy-efficient models available for sale to customers, while simultaneously reducing the availability of less efficient models. During the first year of participation, retailers will have very limited opportunity to alter their assortments due to retail buying cycles. That is, for many or most product categories, retailers will have already made stocking and purchasing decisions *prior* to the start of their participation in the program. Notable assortment changes are expected to emerge after the first year, gaining pace after the second year, once retailers have had the opportunity to fully recognize the benefits of participating in the program. As a result, during the first and second years, the main program effects are expected to result almost exclusively from marketing efforts aimed at increasing sales of program-qualified models. However, detecting increases in sales due to these marketing efforts are more challenging to assess because total sales volumes tend to be lower than they would be with an assortment change, and changes in indicators such as the proportion of program-qualified units sold are sensitive to any other efforts a retailer may make to also promote the sales of any non-qualified models.
- **Attribution of program impacts will likely be complex.** In addition to the impacts the RPP Program are expected to have on the sales of program-qualified models, there are other market pressures and trends that will also be happening at the same time independent of the program that can also affect the sales of energy efficient products. For example, increasing of federal efficiency standards for some products is driving an increase in the sales of more efficient products. Thus, it will be important to be able to determine which market effects are attributable to the program versus natural market trends.
- **The mid- and longer-term effects on the broader marketplace need to be assessed by developing reliable market baseline indicators to support evaluating change in future years.** The RPP Program is aimed at transforming the overall market for targeted products. However, this transformation will not be immediate. While some program effects are expected in the short-term (i.e., one to two years), some program outcomes

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[37] Ibid, p.203

[38] Ridge, R., S. Kromer, S. Meyers, D. Mahone, J. Luo, V. Richardson, and R. Friedmann. *Energy Efficiency Portfolio Risk Management: A Systematic, Data-Driven Approach for Timely Interventions to Maximize Results.* A paper presented at the International Energy Program Evaluation Conference in August, 2007.

are not expected until the mid-term (three to six years), while other, longer-term outcomes are not expected until the long-term (i.e., seven to ten years). The evaluation design needs to ensure robust and reliable baselines are developed for key indicators to ensure changes can be assessed moving ahead in order to ensure all the benefits of the program are accurately measured.

This theory-driven approach relies on a mixed methods approach involving the collection and analysis of both quantitative and qualitative data covering program inputs, activities, outputs and outcomes. In Section 1.2, we noted that this evaluation will focus on the California RPP. This evaluation will include both a process evaluation, which will focus on program implementation, and an impact evaluation, which will focus on short-term and selected mid-term outcomes. We also noted that the multi-region evaluator will focus on selected mid-term outcomes and all of the long-term outcomes. *This implies the need for a comprehensive, integrated analysis of the results of the CA RPP evaluation and the results of the multi-region evaluation, both of which extend over the life of the program.* We will incorporate the results of the multi-year evaluation of the MR RPP as they become available.

The CA RPP process evaluation will be focused on assessing key components of the logic model, i.e., the extent to which the program activities were successfully conducted and whether the expected outputs and outcomes occurred. The CA RPP impact evaluation, while also intended to validate aspects of the program theory, will be focused on measuring the more quantitative program effects, such as changes in the proportion of program-qualified units sold, total sales volumes of program-qualified units sold, and energy and demand impacts. Also, incorporated into both the impact and process evaluations will be the determination and measurement of key market transformation indicators intended to baseline the marketplace to support assessing the transformation of the market over the longer-term.

Though the process evaluation and the impact evaluation are presented separately, it is important to emphasize their interdependence. Given the complex and dynamic plug load market that the RPP Program is intended to effect over a ten-year period, estimating program impacts from the RPP Program solely through traditional evaluation methods runs the risk of misstating the true scale of effects or possibly misattributing effects to the program. Thus, key to the evaluation design is the ability to validate the activities, outputs, and outcomes – as well as their causal linkages – as denoted in the RPP Program logic model to draw well-supported conclusions regarding the performance and efficacy of the program in a way that also supports plausible estimates of attribution. One important implication of a theory-driven approach is that a single net-to-gross ratio presenting program efficacy will not be produced, but rather an internally consistent, coherent and plausible story about the efficacy of the RPP Program. In order to assess the cost-effectiveness of the RPP Program using the CPUC Benefit-Cost Calculator, a range of plausible NTGRs, consistent with this story can be provided in order to see their effect on the Total Resource Cost (TRC) Test.

Because of this complexity and the relatively novel program and evaluation design, PG&E and the evaluation team look forward to the opportunity to share findings and collaborate with the CPUC-ED to ensure this works informs future ED-led ex post evaluations, and also facilitates integration of the ex post evaluations with future utility-led process evaluations.

3.2 Level of Rigor

In California, any measure that is expected to represent 2% or more of total IOU portfolio savings is referred to as a high impact measure (HIM). Evaluations aimed at estimating the savings for HIMs, due to their relative importance to the portfolio, are typically designed at a higher level of methodological rigor. The question is whether the savings associated with the 2016-2019 RPP bundle of measures represents 2% of any California IOUs estimated net savings. If not, given the 10-year time frame for the program, the question still remains as to whether the bundle is likely to achieve HIM status at some point in the future. Since in 2016-2019 only a few retailers are currently expected to participate in the Pilot, which is incenting only six product categories, achieving HIM status in 2016 or 2017 is unlikely. However, going forward, as more retailers engage with the RPP Program and the number of product categories that it covers potentially increases, the chances of achieving HIM status at some point in the future increases. Given this likelihood, this evaluation plan for the RPP Program is set at the *enhanced* level of rigor. This represents a "no-regrets" evaluation design since we do not want to be in a position of failing to establish robust baselines for key performance and market transformation indicators for a program that may eventually achieve HIM status.

3.3 Error Minimization

In the design and implementation of the evaluation activities that are part of this plan, we will attempt to cost-effectively mitigate various sources of error in estimating program impacts. Figure 3-2 presents a typology of some of the most important sources of error.

Figure 3-2: Sources of Error in Estimating Energy and Demand Savings.
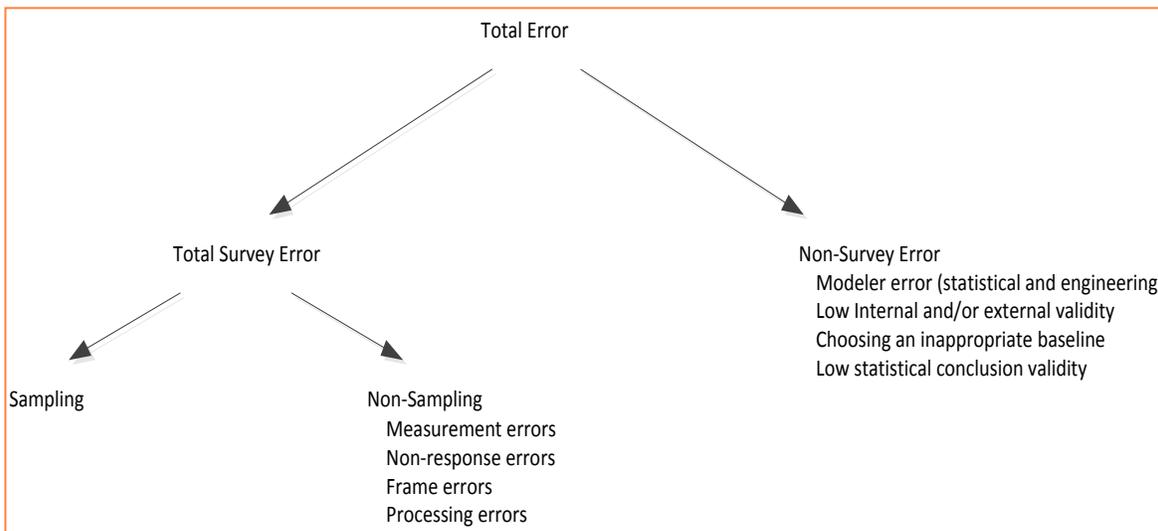
With respect to sampling error, for program-level samples, the minimum standards for confidence and relative precision are targeted at 90/10 for estimating gross energy and demand savings; in-store verifications/shelf surveys target 80/20.[39] If the planned or achieved

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[39] The less stringent 80/20 target for in-store verifications/shelf surveys was deemed practical after weighing the overall evaluation costs for a more stringent goal against the feasibility and practicality of being able to manage and

confidence and precision cannot meet the goals, we will clearly indicate the reasons it was not practical and offer a detailed justification.

However, in any given study, the potential for bias could be much more important than sampling error.[40],[41],[42],[43],[44] Unfortunately, some evaluators make the mistake of focusing almost exclusively on reducing sampling error by insisting on large samples while devoting relatively little attention to addressing the many other sources of error. As a result, some studies achieve a high level of confidence and precision around a biased estimate, which compromises the objective of obtaining reliable estimates of energy and demand impacts. As appropriate, we will attempt to mitigate the various sources of error in this evaluation. To do so, we will be flexible in responding to data issues as they arise in order to maximize the reliability of the savings.

3.4 Management and Communication

In order to ensure that the evaluation team is able to provide timely and useful information to regulators, program staff, the third-party implementation team, and other statewide and multi-regional Program Administrators to facilitate program improvement, representatives of the evaluation team will attend periodic team meetings so that we can share emergent findings, information, and recommendations with other project team members in a timely manner. Periodic, interim meetings may be requested specifically with the CPUC-ED, as needed, to share key findings or seek collaboration and input on critical issues.

A monthly reporting process will also be developed around the indicators and information that will be collected to inform the program performance objectives. Though the final method of providing this monthly reporting is still open to discussion, in an effort to minimize the overall evaluation costs, we envision that the development of a real-time dashboard that can be accessed online may be useful. The final determination as to what will be reported on a monthly basis, and the method for reporting it, will be made in close consultation with the various stakeholders, including the CPUC-ED and its consultants and other Program Administrators in the state.

Annual Progress Reports will also be developed in close consultation with the project team, the CPUC-ED, and other Program Administrators, which will provide a more thorough summary of preliminary findings across the majority of the indicators we will be collecting as part of this study. The Annual Progress Reports, however, will not be comprehensive, and will be intended to provide a snapshot of select findings to allow the evaluation and project teams, as well as the CPUC-ED, to begin to gauge progress to-date. The final evaluation report to be completed at the end of the Pilot will present the comprehensive findings and analyses of all results.

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implement a large number of in-field visits across the entire state, along with the ultimate utility of the information these efforts are expected to provide.

[40] Groves, R.M. 2004. *Survey Errors and Survey Costs.* Hoboken, New Jersey: John Wiley & Sons, Inc.

[41] Biemer, P., R.M. Groves, L.E. Lyberg, N.A. Mathiowetz, and S. Sudman. 2004. *Measurement Error in Surveys.* Hoboken, New Jersey: John Wiley & Sons, Inc.

[42] Lyberg, L., P. Biemer, M. Collins, E. de Leeuw, C. Dippo, N. Schwarz, and D. Trewin. 1997. *Survey Measurement and Process Quality.* New York: John Wiley & Sons.

[43] TecMarket Works. 2004. *The California Evaluation Framework.* Prepared for the Southern California Edison Company.

[44] TecMarket Works Team. 2006. *California Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals.*

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3.5 Coordination with Multi-Regional Implementation and Program-Administrator-Specific Evaluations

As noted earlier, the RPP Program is being expanded and launched at the multi-regional level in cooperation with ENERGY STAR and other Program Administrators. This poses both challenges as well as opportunities in terms of evaluating this program.

For example, a significant component of the process and impact evaluations for the RPP Program consists of in-depth interviews with retailer, manufacturer, and program staff members. However, separate evaluation teams attempting to conduct independent interviews with all these market actors is an unreasonable expectation and would unduly burden retail, manufacturer, and program staff members. Also, for the purposes of impact evaluation, it is likely that certain data analysis and synthesis of results will need to be conducted across all Program Administrators. Here too it is probably unreasonable to expect all the individual evaluation teams for the various Program Administrators will be able to effectively communicate in a consistent and reliable manner. Hence, a multi-region evaluator will almost certainly need to be designated in order to facilitate a number of the evaluation tasks for this program.

However, while the coordination of the local and multi-regional evaluation activities will certainly pose some challenges, the situation also poses some opportunities that are directly in-line with the RPP Program theory, which argues that such a large scale program should target maximizing administrative and operational efficiency as much as possible. Consolidation and collaboration, while initially costly in terms of the time that will be needed to define processes and protocols, will ultimately prove to be more efficient and less costly as extensive redundancy and overlap in evaluation efforts will likely be eliminated. Of course, while it is important that evaluation tasks are consolidated wherever possible, it is equally important that the unique needs of the various stakeholders also be carefully considered.

These efforts will likely occur through the ENERGY STAR RPP EM&V Task Force[45] that has been developed and operating to communicate evaluation methods and processes across the various stakeholders. Throughout this plan, data collection efforts that we recommend be conducted at the multi-regional level are denoted as such, where appropriate. However, these plans have not yet been finalized with the collaborating partners and may be subject to change as efforts to coordinate these activities progress and the multi-regional evaluator is determined and contracted.

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[45] The ENERGY STAR RPP EM&V Task Force has been composed primarily of representatives of ENERGY STAR and Program Administrators that are expecting to launch the RPP program in 2016, as well as key consulting staff that are working for ENERGY STAR and the Program Administrators. ENERGY STAR staff is leading the effort.

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4. PROCESS EVALUATION

This section of the plan presents the proposed process evaluation for the 2016-2019 RPP Program Pilot. However, though we denote this as a process evaluation, we want to strongly emphasize that readers should not be viewing this work through the lens of a traditional resource acquisition program evaluation. *This evaluation plan is targeted at evaluating a novel and complex market transformation program using a theory-driven evaluation framework.* As such, we argue that the process and impact evaluations need to be considered in conjunction with each other, as complementary pieces of a whole, and not as separate evaluation efforts. Much of the crux of evaluating this program will center on claims of attribution, and it is the totality of the evaluation tasks — both process and impact — that will be considered when assessing attribution. Unlike many other programs, though we may see positive effects on the ultimate indicators of success, this cannot be taken as evidence in itself that the program has succeeded. For example, we may see significant improvements in certain mid- to longer-term indicators of market transformation, but because of the long time frame, the large scale, and the dynamic complexity of the targeted markets, these changes may not be entirely — or even partially — a result of the program. It is only through a robust assessment of the program theory including a rigorous assessment of the activities, outputs, preceding outcomes, causal chains, and mechanisms that are posited in the logic model to bring about ultimate effects that a strong and defensible argument for attribution will be able to made.

The objectives of the process evaluation of the 2016-2019 RPP Program Pilot include:

- Assessing and informing the implementation of the program
- Validating key components of the program theory
- Providing data and information to aid the assessment of attribution

The process evaluation will consist of several primary data collection tasks. This evaluation team will conduct some of these tasks for Program Administrators within the State of California; other tasks will be conducted at the multi-regional level, where information will be collected for *all* Program Administrators throughout the country (the evaluation team that will be conducting the multi-regional research has not yet been defined). The tasks that will be conducted as part of the 2016-2019 RPP Program Pilot process evaluation include:

Program Administrator Data Collection Tasks
- Retailer Implementation Plan reviews
- Field team verification of implementation plan activities
- RPP Program staff interviews
- Customer barriers research
- Other program management/implementation data reviews

Multi-Region Data Collection Tasks
- Participating retailer interviews
- Manufacturer interviews
- RPP Program collaborators interviews

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The following sections outline each of these data collection tasks and associated tables present the specific indicators we propose collecting by each task. The tables include:[46]

- The RPP Program logic model components the indicators are intended to operationalize
- Designation of whether the indicator is short, mid, or long-term (as denoted in the logic model)
- Designation of whether the indicator is a Market Transformation Indicator (MTI) or Program Performance Indicator (PPI)
- The indicator ID
- A description of the concept the indicator is meant to represent
- The approach for calculating the indicator
- The proposed frequency of data collection and analysis

Note that though this evaluation plan is targeted at outlining data collection activities proposed for the 2016-2019 RPP Program Pilot evaluation, it also incorporates the longer-term, market transformation perspective by providing recommendations regarding the indicators that should be collected and tracked moving beyond 2020. It is important to note that not all of the indicators collected as part of this evaluation will be used to assess performance or effects for the 2016-2019 Pilot. Instead, some will be collected to serve as baselines for longer-term comparisons, which are crucial for assessing the degree to which the program is transforming the market over time. However, we recommend that all baselines be developed as early as possible in the program's life cycle.

It is also important to note that in each of the tables, and throughout this report, we differentiate between Market Transformation Indicators and Program Performance Indicators. We define a *Market Transformation Indicator (MTI)* as a metric that will ultimately serve as an indicator that the market for residential plug-load equipment is transforming. A *Program Performance Indicator (PPI)* is a metric that will be collected and computed as part of the evaluation, but is not directly, or in itself, indicative of market transformation. However, successful of attainment of the PPIs will be needed to attain market transformation under the RPP theory. Another way to view this is to say that the MTIs will be used to assess ultimate changes in the marketplace, while PPIs will be used, under the theory-driven framework, to assess the issue of attribution by ensuring the posited causal mechanisms are operating in the theorized manner.[47]

It is also worth noting that some components of the logic model appear in multiple tasks. This is intended to support the evaluation of different aspects of the logic model's activities, outputs, and outcomes. Further, because much of the evaluation is aimed at supporting reliable conclusions regarding attribution, some components of the logic model are covered in both the process and impact evaluation.

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[46] A single table presenting all the evaluation indicators is also included as Appendix B of this evaluation plan.

[47] It is important to note that not all RPP evaluators or Program Administrators are likely to subscribe to all the metrics we propose in this evaluation plan, because the level of rigor and the evaluation needs will vary from jurisdiction to jurisdiction. However, efforts are currently underway with the collaborative of Program Administrators to at least agree upon a set of metrics that should be common to all jurisdictions. We expect these are likely to be in general alignment with the MTIs we propose throughout this plan.

4.1   Program Administrator Data Collection Tasks

Retailer Implementation Plan Reviews

Each participating retailer is expected to develop strategies for marketing and assorting products incented through the program during their period of participation in the form of Retailer Implementation Plans. Though these plans are expected to include strategies that are aimed at overcoming some of the market barriers preventing energy efficient home appliances and consumer electronics from playing a more dominant role in the marketplace, it is not the retailers' responsibility to conduct an assessment of market barriers – they simply do not view their world this way. Rather, the Program Administrators will conduct a market barriers assessment, pointing retailers towards strategies that may be useful for increasing the sales of more energy efficient products. [48] However, it is important to emphasize that this is not a prescriptive program, and ultimately the strategies that the retailer include in the Retailer Implementation Plans will be up to the retailers, pending approval by the Program Administrators.

While these Retailer Implementation Plans are intended to be flexible and can be revised over time in accordance with retailers' operational and business needs, it is expected that they will include clear descriptions of the specific marketing and promotional activities that are planned for targeted product categories, and dates for when the activities are planned. Typical marketing plans might include plans for:

- Product assortment changes (e.g., stocking and displaying additional qualified models)
- Product pricing strategies (e.g., reducing prices or price promotions for the most efficient model in a product category)
- Product promotion strategies (e.g., promoting energy efficient models over standard efficiency models)
- Product placement strategies (e.g. devoting "prime" shelf and/or store locations to energy efficient models)
- Staff training (e.g., educating sales associates and managers on the benefits of energy efficiency products)
- Educating customers about the benefits of purchasing energy-efficient products

Retailers do not need to commit to all of these activities, and may actually plan additional activities not mentioned in the list above. Further, the planned activities can, and almost certainly will, vary across different product categories as the retailers see fit. Such flexibility is fundamental to the RPP Program concept. That is, the program is intended to allow retailers — those who should know the most about selling products — the flexibility to do whatever they see fit to best promote and sell these products.

As part of the process evaluation, the evaluation team will review each of the Retailer Implementation Plans and inventory the proposed marketing and promotional activities, by

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[48] It is certainly possible that the market barriers might vary by product category. Any information regarding how these market barriers might vary across product categories will be shared with participating retailers so that they can consider how their Retailer Implementation Plans might be modified or improved.

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retailer, including the type of activity (e.g., sale price, signage, unique placement, etc.) and the expected implementation dates. Further, the evaluation team will categorize the strategies contained in the plans by the market barrier they are expected to overcome, in order to support an assessment of the efficacy of the different strategies.

Table 4-1 shows the components of the logic model that will be assessed through the retailer implementation plan reviews, along with the indicators proposed for operationalizing the logic model components.

Table 4-1: Logic Model Components and Proposed Indicators to be Assessed Through Retailer Implementation Plan Reviews

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Output G: PAs approve retailers' marketing plans including sales forecasts of program-qualified models within each product category.	Short	PPI	G1	Number, types, and dates of strategies and tactics (e.g., price, promotion, placement)	Inventory and schedule of planned marketing activities	Upon PA approval of plan
	Short	PPI	G2	Clearly defined and measurable sales goals for targeted product categories	Presence of clearly defined and measurable sales goals for targeted product categories	Upon PA approval of plan

For the 2016-2019 RPP Pilot evaluation, we plan to review each participating retailer's implementation plan upon approval by the Program Administrators. Because the implementation plans are flexible and subject to revision, we will also review any updates to plans. The same frequency is recommended for the longer-term program moving beyond 2017.

Verification of Implementation Plan Activities and Shelf Surveys

We propose conducting in-store visits (and potentially mystery shopping if training is included as an activity in the retailer plans) as a means of verifying the implementation of the Retailer Implementation Plans, as well as shelf surveys to assess product assortment changes over time. Verification of the activities denoted in the Retailer Implementation Plans will need to occur multiple times throughout the year in synch with the retailers' proposed activities; the shelf surveys will only be conducted twice each year to assess change in product assortment and availability. When possible, we plan to rely on the support of existing field services teams overseen by the Program Administrators to maximize evaluation cost efficiencies,[49] but expect we will also need to contract with a field services team for un-served areas.

 The evaluation team proposes a sample plan stratified by Program Administrator and retailer. At the start of the pilot period, we will randomly select four stores from each retailer in each

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[49] For example, PG&E program staff oversee a field team under contract to conduct periodic visits to retail stores participating in the array of various PG&E energy efficiency programs. These visits occur throughout the year with the exception of peak holiday season (about the second week of November though the end of the year).

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Program Administrator's service territory as shown in Table 4-2. We plan to conduct the first in-store visit in order to conduct baseline shelf surveys (and verify any activities denoted in the Retailer Implementation Plans) by the end of the first quarter of 2016 (i.e., March 31, 2016). We will conduct multiple store visits throughout the year with these same stores to ensure comparability over time. To ensure this task does not become excessively costly and burdensome, we recommend limiting the number of total visits to a maximum of three per store per year (though only two visits may be conducted with seasonal products like room air conditioners as they have a limited display period), for a total number of annual in-store visits not to exceed 144. The exact timing of visits will likely vary based on the specific cadence of activities denoted in the retailers' plans, but the evaluation team will aim to optimize the visits so that the field staff can assess activities targeting multiple products each visit. However, the evaluation team will strive to ensure the shelf surveys for seasonal products are completed in the appropriate months (e.g., during the summer for room air conditioners and possibly room air cleaners). For non-seasonal products, we will also strive to complete the final visit of the year in late October or early November prior to the Holiday blackout period during which retailers do not permit field teams in their stores (usually the second week of November through the end of the calendar year). Regardless of the product category, the follow-up shelf survey will be conducted on the last visit of the year.

Note that the implementation of the in-store verifications will be a very costly evaluation endeavor and the proposed sample plan is aimed at obtaining reasonably reliable information at a reasonable cost. By targeting 12 total stores per retailer we expect to attain roughly +/- 20% relative precision at the 80% level of confidence at the *retailer level*. This approach is proposed because we expect the most notable variability in the implementation of the Retailer Implementation Plans will occur between retailers rather than across stores of a particular retailer. However, the evaluation team will test this assumption as thoroughly as possible during the first year with the available number of cases to ensure the sample design is appropriate for future years.

Table 4-2: In-Store Verification Sample Design

Program Administrator	Kmart	Sears	Best Buy	Home Depot	Total
PG&E	4	4	4	4	**16**
SCE	4	4	4	4	**16**
SDG&E	4	4	4	4	**16**
TOTAL	**12**	**12**	**12**	**12**	**48**

For the Retailer Implementation Plan verification, the evaluation team will first inventory the promotional activities in each of the Retailer Implementation Plans, the evaluation team will then develop a schedule of expected promotional activities by retailer to ensure store visits are coordinated with the scheduled activities. During this effort the field team staff will examine the targeted product categories in the stores to assess the degree to which the planned activities are actually implemented. The field team staff will also photograph and log all relevant promotions, placement, and pricing of program-qualified models. This information will be reported back to the evaluation team for review and analysis. The results may also be communicated to retailer staff and remedial actions recommended if notable and systematic deviations from the implementation plan activities are found. These efforts will be ongoing during the duration of the Pilot period.

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For the shelf surveys, we will instruct the field team to count the number of different models on display in the stores.[50] The counts of models will be used to: (1) assess whether product assortment changes were implemented (indicator H1), and (2) assess the general availability of energy efficient products to customers (indicator I1). Because counting models is a much more onerous task than simply verifying promotional activities are implemented, we propose the shelf surveys only be conducted in the first and last in-store visit of the year. We will conduct the shelf surveys in the same stores we will be using for the in-field verification, which will help to facilitate paired comparisons.

If included in the Retailer Implementation Plans, the evaluation also proposes potentially including telephone-based mystery shopping to assess the efficacy of the retailers training efforts. For this task, the evaluation team would develop a series of questions that probes staff knowledge based on the elements of the training described in their plan, and call retailer posing as customers seeking information. For example, if the Retailer Implementation Plan states that staff would be trained on the general topic of ENERGY STAR as it relates to freezers, the mystery-shopping event might assess issues such as staff knowledge of ENERGY STAR, whether or not they have ENERGY STAR freezer models, the benefits of ENERGY STAR, etc. We would randomly sample from among all stores in the state, stratified by Program Administrator service territory. It is important to note that retailers do not *have* to include training as part of their plan, so mystery shopping may not be necessary. Also, the Program Administrators and regulators may want to weight the financial burden of collecting this costly information against the ultimate value of the information collected. If mystery shopping is included, the evaluation team will work with the Program Administrators and CPUC-ED to determine what level of confidence and precision to target with this effort in order to optimize the expenditure of evaluation resources.

Table 4-3 shows the components of the logic model and proposed indicators that will be assessed through the in-field verification and the shelf surveys.

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[50] Note that we propose only counting the number of different models within each product category and not the total number of units of each model on the shelves. The total number of different models will provide insight into whether the retailers have altered their assortment and will be directly indicative of the product assortment that is available to customers. While the total number of units on the shelves could add some detail, it is problematic for some products like appliances, where most retailers only have one model on display.

Table 4-3: Logic Model Components and Proposed Indicators to be Assessed Through In-Field Verification and Shelf Surveys

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H1	Product Assortment: Assortment of program-qualified models (if applicable)	Proportion of models on sales floor, within each product category, that are program qualified	Baseline needed for each product category; periodically thereafter (depending on sales cycle of product)
	Short	PPI	H2	Price: Size of price discount and frequency and duration of sales promotions for program-qualified models (if applicable)	Weighted-average price index reflecting the extent to which pricing plans (i.e., price, frequency, duration) were consistently implemented across participating stores, by retailer	Ongoing
	Short	PPI	H3	Placement: Preferential placement of program-qualified products (if applicable)	Weighted-average placement index reflecting the extent to which each of the components of the placement plan (i.e., frequency, placement) were consistently implemented across participating stores, by retailer	Ongoing
	Short	PPI	H5. 1	Training: Implementation of staff training to ensure staff can knowledgably sell energy efficient products to customer	Weighted-average training index reflecting the extent to which staff training was consistently implemented across participating stores, by retailer	Ongoing

Customer Barriers Research

The RPP Program has the ability to affect a range of different customer barriers associated with the markets for home appliances and consumer electronics. The immediate focus of the program is on affecting the product unavailability barrier by altering the selection of products available to customers by motivating retailers to increase the proportion of models that are energy efficient, at the expense of less efficient models. Thus, the initial focus of the customer barriers research will be on assessing the issue of product availability. However, other tactics (and barriers) could come into play as well.

For example, depending on the strategies retailers choose to pursue, one short-term outcome of the program may be an increase in awareness, knowledge, attitude, and behavior (AKA-B) of the participating retailer's customers in regards to more energy efficient products (either specifically ENERGY STAR products, or plug load in general). This will likely be the case if retailers pursue program strategies that explicitly target customer AKA-B. Examples of these strategies include increased promotion of energy efficient products, sales staff education, and

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general customer education about the benefits of energy efficiency. However, retailers are not *required* to implement program strategies that explicitly target customer AKA-B and it remains to be seen if they will. Thus, while over the mid- to longer-term it is expected that the RPP Program may reduce customer barriers to purchasing more efficient products by altering peoples' AKA-B with regards to ENERGY STAR products and plug load energy consumption in general, this is not the current focus of the RPP Program, and is not a proposed focus of the initial evaluation efforts.

Table 4-4, shows the components of the logic model and proposed indicators for assessing customer market barriers, though only the first (I1) is planned for the 2016-2019 Pilot, since affecting AKA-B is not a *current* focus of the program.

Table 4-4: Logic Model Components and Proposed Indicators Assessed Through Customer Barriers Research

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Outcome I: Reduction in customer market barriers to purchase products that are more energy efficient	Short	MTI	I1	Product availability: proportion of program-qualified models available to customers	Proportion of models on sales floor, within each product category, that are program qualified	Baseline needed for each product category; periodically thereafter (depending on sales cycle of product)
	Short	PPI	I2	Awareness, knowledge, and/or attitudes of customers regarding ENERGY STAR and energy use of targeted products	CA ENERGY STAR AKA-B index (0 to 100)	Annually [a]
	Short	PPI	I3	Awareness, knowledge, and/or attitudes of customers regarding residential plug load	CA Plug Load AKA-B question battery	Annually [a]

[a] Note that though the EM&V team proposes conducting annual data collection to assess AKA-B, customer data collection is not being proposed as part of this Pilot because it remains to be seen if any of the retailers will focus on this issue. Such data collection would be included if deemed necessary as retailer plans become available.

We propose assessing the issue of product availability at the start of the program, through the baseline shelf surveys discussed in the previous section, and then again with the follow-up shelf surveys that will be conducted towards the end of the year in order to determine if there is evidence of change (however, this periodicity may vary for certain products depending on the product sales cycles). Moving ahead, we propose that the shelf surveys be conducted annually towards the end of each year to ensure all potential assortment changes for the year get captured. If the program begins to incorporate a stronger focus on affecting customer AKA-B in terms of ENERGY STAR products or plug load, we recommend incorporating a data collection effort with customers – likely a general population survey to assess customer AKA-B; possibly mystery shopping to assess retailer staff training and AKA-B. The recommended cadence for this effort would be annually.

Other Program Management/Implementation Data Reviews

RPP Program staff and the third-party implementation team will also collect and track an array of other information that will be reviewed by the evaluation team as part of the 2016-2019 RPP Program Pilot process evaluation. This information will be used to assess and validate several components of the logic model as well as provide the evaluation team with the ability to provide early feedback and recommendations that can support mid-course corrections to improve program design and implementation. The sources of this information will be: (1) interviews with program staff and the third-party implementers, (2) review of documents provided by program staff and third-party implementation staff, and (3) analysis of secondary market data.[51] Table 4-5 shows the components of the logic model that will be assessed through the review of program management/implementation data, along with the proposed indicators.

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[51] Note that a more detailed explanation of the secondary market data that will be analyzed is included in the *Impact Evaluation* chapter of this evaluation plan.

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Table 4-5: Logic Model Components and Proposed Indicators to be Assessed Through Other Program/Implementation Data Reviews

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Activity A: Program Administrators (PAs) characterize markets and estimate savings potential for candidate products	Short	PPI	A1	Estimated sales volumes, market shares, and energy savings potential, by candidate product category	Critical review of information	Every third year
Activity B: PAs contact other potential PAs regarding collaboration in Program delivery	Short	PPI	B1	Number of PAs approached	Count of the number of PAs approached	Annually
Output C: Additional PAs recruited	Short	PPI	C1	Number of recruited PAs	Count of number of PAs recruited	Annually
	Short	MTI	C2	Reach of recruited PAs	Count of utility customers served by each PA	Annually
Activity D: Participating PAs determine which retailers to recruit	Short	PPI	D1	Number of retailers targeted for recruitment	Count of retailers targeted for recruitment	Annually
	Short	PPI	D2	Market share of all in-store units sold (in US and by PA) for potential retailers, by retailer, by product category	Potential Retailer Market Share of all in-store sales, by product category p, by retailer r, for a specific time period t: $PRMS_{p,r,t}$ = Total $Sales_{p,r,t}$ / US (and PA) Total $Sales_{p,r,t}$	Baseline needed for each product category; annually thereafter
Activity E: Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.	Short	MTI	E1	Energy-savings market potential for potential retailers, by product category, by retailer	Long-term forecast of market adoptions times UES values	Annually
	Short	PPI	E2	Number of targeted product categories	Count of product categories targeted	As needed
Output F: Signed contracts between PAs and retailers (including both new retailers via Link 5 and returning retailers via Link 12).	Short	PPI	F1	Number of signed contracts with *new* retailers	Count of signed contracts with new retailers	As needed
	Short	PPI	F2	Number of signed contracts with *returning* retailers	Count of signed contracts with returning retailers	Annually
	Short	MTI	F3	Market share of all in-store units sold (in US and by PA) for participating retailers, by retailer, by product category	Participating Retailer Market Share of all in-store sales, by product category p, by retailer r, for a specific time period t: $PRMS_{p,r,t}$ = Total $Sales_{p,r,t}$ / US (and PA) Total $Sales_{p,r,t}$	Annually
	Short	PPI	F4	Market share of all units sold (in US and by PA) for participating retailers, by retailer, by product category	Participating Retailer Market Share of all sales, by product category p, by retailer r, for a specific time period t: $PRMS_{p,r,t}$ = Total $Sales_{p,r,t}$ / US (and PA) Total $Sales_{p,r,t}$	Annually
	Short	PPI	F5	Energy-savings market potential for participating retailers, by product category, by retailer	Long-term forecast of energy and demand potential (market adoptions times UES and UDR values)	Annually
Outcome K: Retailers receive incentives from PAs	Short	PPI	K1	Error rate of incentive payment processing	Percent of incentives erroneously paid to retailers for non-qualified products; percent of qualified products for which no incentive was paid	Bi-Annually

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As shown in Table 4-5, different indicators and information will be tracked and analyzed over different time frames. Efforts to explore and characterize the market to ensure an understanding of market potential and what products may be targeted will be assessed roughly every third year as the information is not expected to change rapidly. Program Administrator interactions with potential participating retailers and actions centered on recruitment will be reviewed on an annual basis during the Pilot, or as new retailers are recruited. Finally, the evaluation team will review the incentive payment process and the amount of incentives paid to retailers twice yearly during the Pilot. In general, we recommend similar frequencies for future evaluations, with a focus on assessing issues related to new program participants as they enter the program, and continued tracking and assessment on an annual basis.

RPP Program Staff Interviews

As part of the overall process evaluation, in-depth interviews will also be conducted with relevant program staff including the third-party implementation team. These interviews will focus primarily on the operational aspects of the RPP Program and include topics such as:

- Lessons learned about the development and implementation of the program (e.g., what has worked, what has not? what have been the greatest hurdles? what have been the greatest successes?)
- Recommendations for change and improvement of the program
- Administrative processes and protocols–Are they appropriate and scalable?
- Frequency and effectiveness of the communication between the utility, implementers, and retailers
- Identify additional information that should be tracked for the RPP Program Pilot
- Assess the level of effort for all program activities illustrated in the logic model
- Assess the level of satisfaction with the quantity and quality of the outputs illustrated in the logic model

The evaluation team will develop interview guides that will be used for conducting these interviews. For the purposes of the 2016-2019 RPP evaluation, we propose conducting these interviews annually. For future evaluations, we recommend continuing to conduct these interviews on an annual basis to be able to gauge change.

4.2 Multi-Regional Data Collection Tasks

Retailer Staff Interviews/Surveys

Because of the mid-stream focus of the RPP Program design, the retailers play the central and most important role. Without retailers willing to participate in the program, the program would not exist. Retailers determine what products to assort and sell to their customers. Retailers design and implement the marketing strategies that are aimed at increasing sales of targeted products. Retailers are also the final conduit to the consumers, who ultimately decide to purchase — or not purchase — energy efficient products. As such, gaining an in-depth understanding of the retailers' perspectives, experiences, and expectations is a significant component of the process evaluation.

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Also, notably, it is worth mentioning that the evaluation team expects the interviews with retailer staff to play a significant role in the impact evaluation component of this plan. Our evaluation framework is premised on the fact that no single metric or evaluation task is likely to provide irrefutable evidence regarding attribution of effects and impacts to the program. Instead, the evaluation team will rely on multiple data points and sources of information to draw well-informed conclusions, using the preponderance of evidence, with regard to the programs overall efficacy. Interviews with retailer staff (as well as other actors such as manufacturer representatives, ENERGY STAR staff, and codes and standards staff) will likely provide key pieces of information to better understand the program impacts.

Thus, as part of the process evaluation of the 2016-2019 RPP Program Pilot, the evaluation team proposes that the multi-region evaluator conduct in-depth interviews with retailer buyers and marketers.[52] The following presents the main concepts that should be probed with the different audiences.[53]

The **buyer interviews** should focus on assessing:
- General awareness and knowledge regarding product energy efficiency
- Knowledge about energy efficiency initiatives underway at the retailer
- Degree of collaboration among departments within the retailer (e.g., buying, marketing, distribution, sales, etc.) regarding energy efficiency initiatives
- Degree of collaboration between the retailer and RPP Program staff and/or the 3rd-party implementer regarding energy efficiency initiatives
- Knowledge about energy efficiency as it relates to the targeted product categories part of the RPP Pilot
- Distribution of products purchased (i.e., do any program-qualified products go to non-participating stores outside a Program Administrator's service territory?)
- Awareness of the RPP Program Pilot
- Influence of the RPP Program Pilot on their purchasing and assortment decisions
- Estimated influence of the RPP Program on sales of targeted products during the program period
- Future plans to purchase and stock energy efficient products
- Experiences and satisfaction with the RPP Program Pilot as well as feedback on improvement

The **marketer interviews** will be focused on assessing:
- General awareness and knowledge regarding product energy efficiency
- Knowledge about energy efficiency initiatives underway at the retailer
- Degree of collaboration among departments within the retailer (e.g., buying, marketing, distribution, sales, etc.) regarding energy efficiency initiatives
- Degree of collaboration between the retailer and RPP Program staff and/or the third-party implementer regarding energy efficiency initiatives
- Knowledge about energy efficiency as it relates to the targeted product categories part of the RPP Pilot

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[52] *Retail buyers* are typically the retail staff members responsible for making purchasing and assortment decisions; *retail marketers* are typically the staff responsible for designing promotions and developing marketing materials. Sometimes, the same person may hold these responsibilities.

[53] Note that since these interviews will be conducted at the multi-regional level, the final topics to be covered by the interviews will need to be decided upon in close collaboration with the other Program Administrators.

- Targeted product marketing initiatives (i.e., pricing, placement, and promotion)
- Awareness of the RPP Program Pilot
- Influence of the RPP Program Pilot on their promotion decisions
- Future plans to promote energy efficient products
- Experiences and satisfaction with the RPP Program Pilot as well as feedback on improvement

Table 4-6 shows the components of the logic model and proposed indicators that will be assessed through the retailer interviews and surveys, along with the proposed frequency for collecting and analyzing this information.

Table 4-6: Logic Model Components and Proposed Indicators to be Assessed Through Retailer Staff Interviews

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Output H: Retailers implement plans employing various strategies and update as necessary	Short	PPI	H5	Indicator to whether sales staff training as outline in the implementation plan occurred (if applicable)	Indicator variable indicating whether staff training in implementation plan (if present) was conducted	Annually
	Short	PPI	H6	Retail buyer routine consideration of model energy use when considering assortment	AKA index reflecting the awareness and knowledge of retailer merchants regarding increasing plug-load energy use.	Annually
Outcome L: Increased participating retailer engagement	Short	PPI	L1	Participating retailer self-reported satisfaction with program	Battery of questions regarding satisfaction with the RPP Pilot/Program (1=Very Dissatisfied - 5=Very Satisfied)	Annually
Outcome S: Permanent change in the availability of efficient models in targeted product categories among participating and nonparticipating retailers	Long	MTI	R1	Self-reported retailer commitment to maintain and even increase the number of qualified products purchased and displayed	Qualitative assessment of retailer plans to continue assorting and promoting PQ models in the absence of the program, collected via in-depth interviews	Annually

For the 2016-2019 RPP Program Pilot process evaluation, as well as future process evaluations of the RPP Program, we recommend conducting interviews with retailer staff at the beginning of each retailer's participation in the program in order to derive baselines, and an annual follow-up to re-assess the issues and facilitate the evaluation of change. To help manage evaluation costs, we recommend these interviews be conducted as telephone-based in-depth interviews. Because each participating retailer will develop its own marketing implementation plans, the content of the interviews should be tailored separately for each participating retailer to the extent possible.

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Manufacturer Interviews

Though the effects are expected in the longer-term, changes in targeted product manufacturing play a key role in the RPP Program theory, especially in terms of market transformation. Market signals reflecting the success of participating retailers and their increased engagement in the program may direct non-participating retailers (inside and/or outside a Program Administrator's service territory), to either join the program, or simply adopt similar marketing strategies or assortment changes (even though they would not receive any incentives), to ensure they remain competitive in terms of promoting and stocking the same energy-efficient models as participants. These outcomes are expected to lead to increased share of efficient models in targeted product categories both among participating retailers as well as non-participating retailers. Ultimately, these forces, combined with the pressures brought upon by the RPP Program to support more stringent mandatory and voluntary standards, are expected to increase the demand for more efficient models. In response, manufacturers are expected to shift production to these more efficient models. Over time, this will result in a permanent change in the availability of more energy-efficient products in the marketplace, eventually leading to long-term energy and demand savings as well as environmental and other non-energy benefits. Of course, these are not short-term effects, but rather they are mid- to longer-term effects that will emerge over several years.

Given the above, the evaluation team recommends conducting in-depth interviews with select manufacturers to establish baselines and probe issues relevant to both the process and impact evaluations, such as:[54]

- Historical and current retailer purchasing trends
- Retailer buying practices
    - o Do retailers specifically request efficient products?
    - o What kind of pressure, if any, does this put on production or research and development?
- Manufacturer focus on energy efficiency research and development
- The influence of mandatory and voluntary standards on manufacturer production
- Forecasts for production of energy efficient products over the next few years
- The structure of the manufactures competitive marketplace (e.g., are there new entrants offering new efficient products? what do they think this will look like in the near future? etc.)

The evaluation team will need to conduct careful screening to ensure they speak with manufacturer representatives that are most informed and able to provide insightful responses to the questions. It is likely they may need to speak with more than one representative from the contacted manufacturers, as specific individuals may not have knowledge or insights to answer questions in all the topical areas.

Table 4-7 shows the components of the logic model and the proposed indicators. It is worth noting that we do not expect significant changes in manufacturing until the mid- to long-term. Thus, for the purposes of the 2016-2019 RPP Program evaluation, we propose conducting baseline surveys in the first year, but delaying the second round of interviews until year three.

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[54] Note that since these interviews will be conducted at the multi-regional level, the final topics to be covered by the interviews will need to be decided upon in close collaboration with the other Program Administrators.

Thereafter, we propose that the manufacturer interviews be conducted on an annual basis to track the transformation of the marketplace over time.

Table 4-7: Logic Model Components and Proposed Indicators to be Assessed Through Manufacturer Interviews

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Outcome P: Increased demand experienced by manufacturers for more efficient models in targeted product categories	Mid	MTI	O1	Manufacturer self-reported changes in demand of efficient product	Qualitative assessment of changes gathered via in-depth interviews	Baseline needed; annually starting in year three
Outcome Q: Manufacturers increase production of the efficient models in targeted product categories	Long	MTI	Q1	Manufacturer self-reported efforts to retool and shift production	Qualitative assessment of reported efforts gathered via in-depth interviews	Baseline needed; annually starting in year three
	Long	MTI	Q2	Number of new entrants to the market (if applicable)	Count of new manufacturers	Baseline needed; annually starting in year three

RPP Program Collaborator Interviews and Documentation Review

As part of the implementation of the RPP Program, Program Administrator staff and the implementation team are expected to network with an array of different organizations, such as other Program Administrator staff, retailers, ENERGY STAR staff, and Codes & Standards program staff. Many of these interactions will be targeted at topics such as disseminating information and raising awareness about the RPP Program, recruitment of additional Program Administrators and retailers, collaboration on program design and delivery, and decision-making regarding what products to target. However, another significant aspect of the collaborative interactions is expected to include participation in discussions on refining voluntary (e.g., ENERGY STAR) and mandatory standards (e.g., Codes & Standards).

The RPP Program is expected to influence ENERGY STAR policies and requirements in two main ways. First, from the bottom-up through the shear influence of the critical mass of participating retailers and their increased demand for efficient products, it is expected that standards and specifications will be driven higher as the assortments of products on the sales floors begin to move to more efficient models. That is, voluntary and mandatory specifications will need to change to stay apace with the market. Second, the RPP Program is expected to have top-down effects on specifications as the collaborative works with organizations such as ENERGY STAR and Codes & Standards bodies to define more stringent specifications. An example of this latter role is already occurring, where PG&E and other Program Administrators are beginning to work with ENERGY STAR to develop ENERGY STAR Most Efficient tiers for some of the products targeted through the program, which currently do not have such tiers.

Though the specific topics probed will be developed in close consultation with the other Program Administrators, we expect the RPP Program collaborator interviews and document reviews to cover issues such as:

- Who have the actors communicated with regards to additional Program Administrator or Retailer recruitment? Specification or standard setting?
- How many communications did they have with these other actors?
- What form were the communications (e.g., phone, in-person, email, etc.)?
- What topics or issues did they discuss?
- How effective do they think these communications/interactions were in attaining program goals and objectives?
- How much influence do they think the collectivity has had in affecting retailers? Manufacturers? ENERGY STAR? Codes & Standards setting bodies?
- What about the collaboration process has worked well? What has not worked?
- What recommendations do the actors have for improving the collaboration process?

Though this information can be collected via in-depth interviews, providing mostly qualitative information, the collaborator research could also be implemented in a more rigorous manner using methods such as social network analysis, which could provide quantitative metrics that could be more informative and tracked over time. The final determination of what information will be collected and how it will be collected will be determined in consultation with the other Program Administrators.

We recommend conducting periodic telephone-based in-depth interviews (possibly supplemented with web-based surveys) with various relevant actors to assess and validate key components of the logic model focused on the levels of collaboration and the efficacy and outcomes of the interactions. Additionally as part of this task, the evaluation team will collect and incorporate any documentation or other supporting evidence related to collaborative efforts (e.g., meeting agendas and minutes, emails, notes from phone conversations, work group plans and objectives, etc.), to assist in describing the extent to which the various actors worked together to attain program goals and objectives.

Table 4-8 shows the components of the logic model and proposed indicators that will be assessed through the program collaborator interviews and documentation review, along with the proposed frequency for collecting and analyzing this information.

Table 4-8: Logic Model Components and Proposed Indicators to be Assessed Through Program Collaborator Interviews

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Proposed Frequency
Activity B: PAs contact other potential PAs regarding collaboration in Program delivery	Short	PPI	Int1	Level of collaboration in program administration; number of PAs contacted	In-depth qualitative research with PAs with regards to program development, launch, and implementation activities. Focus will be on assessing interorganizational collaboration and the degree to which collaboration facilitated program-related outcomes.	Annually
Activity D: Participating PAs determine which retailers to recruit						
Activity E: Participating PAs and identified retailers target product categories with energy savings potential and propose incentive levels.						
Activity T: PAs participate in meetings with and provide market data to staff of ENERGY STAR and Codes & Standards Programs regarding targeted product categories	Short	PPI	Int2	Level of collaboration in voluntary and mandatory specification setting	In-depth qualitative research with PAs, ENERGY STAR staff, and C&S program staff with regards to interorganizational collaboration and other efforts in relation to influencing voluntary and mandatory energy efficiency specifications.	Annually
Activity U: PAs provide input on proposed energy efficiency model specifications to staff of ENERGY STAR and Codes & Standards programs						
Outcome V: In the mid-term and/or long-term, more stringent mandatory and voluntary standards are adopted	Mid & Long	MTI	V1	New codes and/or standards planned and/or adopted	Count of new codes or standards planned and/or adopted	Annually

In order to develop as complete a sample frame as possible, we recommend beginning with a list of key stakeholders and then conducting a snowball sample, by asking the stakeholders whom they have interacted with in the past year with regards to the RPP Program. The surveys should be designed so that they are brief and easy to answer, focusing on presenting the content in a systematic and structured manner that supports comparison over time.

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5. IMPACT EVALUATION

Since the primary performance objectives of the RPP Program are to increase sales of energy efficient products that will in turn affect gross and net reductions in energy consumption for targeted product categories, the 2016-2019 RPP Program evaluation includes an impact evaluation to inform savings claims,[55] which will be aimed at accurately:

- Measuring total program-qualified unit sales for participating retailers, by retailer and product category/subcategory
- Measuring program-qualified share (PQS), or the percentage of total unit sales that are program-qualified by retailer and product category/subcategory
- Computing gross program energy and demand savings
- Informing net program energy and demand savings

However, it is important to emphasize that the impact evaluation is complicated by the fact that the RPP Program is a market transformation program.

During the first year that a retailer participates in the RPP Program, the main impacts on indicators such as the proportion of qualified units sold (i.e., qualified units sold divided by total units sold for a targeted product category) are likely to be relatively small. Retail buying cycles vary from product category to product category but typically involve several months lag time. That is, the purchasing decisions affecting the product assortment that is on the sales floor today were made several months earlier. Thus, a retailer that begins participating in the program in, say, March of 2016 will have already purchased their inventory several months earlier and will have limited ability to affect the product assortment in the short term. ***Thus, the main effects of the program in the first year will likely be limited to marketing strategies such price reductions, improved placement, and increased promotion.***

However, it is important to note that while retailers may make good-faith efforts to sell more program-qualified models—and may succeed very well in doing so—they are still profit-oriented businesses and will be promoting and selling non-qualified models as well. Thus, though they may sell more program-qualified units in a targeted product category in a given month due to program-related marketing efforts, they may also sell increased numbers of non-qualified models through other marketing efforts. Hence, indicators such as the proportion of qualified units sold will be relatively volatile over the short term and likely not powerful indicators of program impacts in the first year. However, substantive improvements are expected once retailers have an opportunity to begin to fully recognize the benefits of participating in the program and more aggressively alter their product assortment (likely after the initial year or two of participation). Once they have a greater proportion of program-qualified models on the sales

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[55] Note that this is not an impact evaluation *per se*, as the CPUC-ED will lead any official impact evaluation of the RPP Program. The impact evaluation as discussed herein is intended to serve as an early M&V effort aimed at assessing and informing savings estimation and attribution prior to any actual ED-led impact evaluations.

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floor (with an associated reduction in the proportion of less-efficient models), indicators are expected to begin to reveal more substantial program impacts.[56]

5.1 A Note on the Influence of Specifications and Codes and Standards

Voluntary specifications (i.e., ENERGY STAR specifications) as well as mandatory efficiency standards (i.e., federal or state codes and standards) play a *critical* part in the RPP Program. Not only do ENERGY STAR specifications help to define the incented models within targeted product categories, but also for product categories that have them, codes and standards serve as baselines for estimating unit energy savings. Additionally, because of the influence that the RPP Program is expected to have on accelerating adoption of new voluntary specifications and mandatory codes and standards, some of the energy savings associated with these shifting specifications/standards will likely be attributable to the program. However, the evaluation of shifting codes and standards is a costly and complicated endeavor beyond the scope of this evaluation plan. If codes and standards for any of the RPP Program products do change, it is expected that a parallel evaluation effort aimed at assessing the impacts of these changes on unit energy consumption and savings will be needed–likely led by the CPUC-ED.

5.2 Impact Evaluation Data

Retailer Sales Data

As part of the contractual agreement between the participating retailer's and the Program Administrators, the retailer's agree to provide two main forms of data, including: (1) historical sales data, and (2) program-period sales data. A Data Services Provider (DSP) separate from the evaluation team is contracted to receive and process all program sales data (as well as facilitate the incentive payments between the Program Administrators and the retailers). Though much of the data processing described in this section will be conducted by the DSP, the evaluation team expects to work closely with the DSP to ensure the quality and consistency of the data, and to help ensure the correct data points are entered for the California RPP (e.g., California-specific UEC and UES values, IMCs, Net-to-gross ratios (NTGRs), etc.).

For all incented product categories, each participating retailer will provide *historical sales data* at a minimum covering the 12-month period immediately preceding their first month of participation in the RPP Program. Additionally, each participating retailer will also provide ongoing *program-period sales data* for the duration of their participation in the program. These data files will include all models sold within each targeted product category *regardless of whether it is an incented model or not*. At a minimum, the historical and program-period data files will include:[57]

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[56] For a more detailed discussion of this issue, see the results of the 2013-2014 PG&E RPP Program Trial: Malinick, T. and Ridge, R. 2015. *Pacific Gas and Electric Company Retail Plug-Load Portfolio (RPP) Trial: Evaluation Report.* April 24, 2015.

[57] It is worth emphasizing that if the participating retailers do not provide the historical and program-period sales data in the form discussed, the ability to evaluate the program using the methods presented herein will be compromised, and different approaches may be needed.

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- Model number
- Total monthly units sales
- Store ID

Each model appearing in the data will be coded as qualified or non-qualified by the DSP based on the relevant qualifying efficiency specification that defines payment of incentives and is in effect at the start of the retailer's participation in the program (i.e., the ENERGY STAR qualified products list or ENERGY STAR+ tiers). Also, unit energy consumption (UEC) and, for qualified models, unit energy savings (UES) estimates will be assigned to each unit appearing in the sales data based on the methods described in the RPP Program Workpaper, which is currently in its final stages of endorsement with the California Technical Forum (CalTF), after which it will be submitted to the CPUC ex ante team for approval,

Additional Data

Two important additional pieces of data are need for this evaluation: (1) program-qualified market shares at the market level, and (2) market actor assessments of changes in program-qualified sales attributable to the program.

Program-Qualified Market Shares at the Market Level

Additional data will be needed to estimate mid- to long-term program impacts at the market level. The primary indicator that will need to be tracked over time is program-qualified market shares within the targeted product categories (and subcategories) at the market level. For a given product, *market share* is defined as the percent of all models sold in a given year that meet or exceed the basic tier specification as it was defined in 2016 when the program launched.[58] While program-qualified share for participating retailers can be reliably calculated based on the retailer sales data that was discussed above, getting reliable and accurate estimates of the program-qualified share *at the market level*—in order to assess the impacts the program may be having on the broader market and to help establish robust baselines—is more challenging.

The program and evaluation teams still are assessing what data are available and a final determination has not yet been made in terms of which data most accurately reflects market conditions at a level that can be effectively used to draw inferences of RPP Program impacts. Several data sources are being assessed to determine its usefulness and cost including: (1) Syndicated data purchased from The NPD Group, (2) *Appliance Magazine* market research reports, and (3) Association of Home Appliance Manufacturers (AHAM), and (4) Consumer Electronics Association (CEA). Data issues we are probing are:

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[58] Over the program period, the reference point will be set and reset a number of times. How many times this occurs will probably vary by product category. Before any given reset takes place, the market share will include all models sold that meet or exceed the current reference point. During the period governed by a particular reference point, the incentives for some models will cease while incentives for some newer models will begin. Of course, during this period, savings associated with incented models will be counted. In addition, models for which incentives are no longer provided will also be tracked and savings claimed until they are no longer commercially available. While some believe that when the PQS has reached 70% a reset should be triggered, a formal threshold has not been established. It has been decided that when the PQS reaches 35% a formal discussion with standards-setting bodies should begin regarding new specifications.

- What level of disaggregation can we get data (i.e., model-level)?
- What service territory, state, regional, and/or national level of data is available?
- Can we request custom conditions for estimating energy efficient market share (i.e., will we be able to assess market share based on the ENRGY STAR specifications that were in effect in 2016 for all years moving forward)?
- At what type of frequency can we expect to get data?
- What would be the cost of these data?

Once we have greater clarity around these issues, the evaluation team will draft a brief memo and/or conduct a brief presentation with CPUC-ED staff and consultants to discuss the options and come to consensus on the best option for moving forward.

Market Actor Interviews

For the RPP Program Pilot, various market actors, especially retailer purchasing and marketing staff (and eventually manufacturers and codes & standards representatives), will be asked to report their assessments of changes in program-qualified sales or shipments attributable to the program.

5.3 Product Sub-Categorization

In order to facilitate fair comparisons and derive meaningful energy consumption and savings estimates, each of the six broad RPP targeted product categories will be divided into subcategories. Within a product category, different features, characteristics, and/or sizes can affect energy consumption—and ultimately energy savings estimates—across models. For example, for air cleaners, models with a higher clean air delivery rate (CADR) use more energy than models with lower CADRs. Likewise, different sizes and form of freezers (e.g., chest versus upright) drive very different amounts of energy consumption and energy savings. Table 5-1 shows the product sub-categorization scheme for the products included in the 2016-2019 RPP Program Pilot. Note that the Database for Energy Efficient Resources (DEER) classes will be used for targeted products that appear in DEER, which for the 2016-2019 Pilot only includes freezers.

Table 5-1: RPP Program Pilot Candidate Product Subcategories

Product	RPP Product Subcategories
Air Cleaners	1. <100 CADR 2. 100-150 CADR 3. >150 CADR
Soundbars	All
Freezers	12 DEER classes
Electric Clothes Dryers	1. Vented, Standard (>= 4.4 ft^3 capacity) 2. Vented, Compact, (120V) (<4.4 ft^3 capacity) 3. Vented, Compact, (240V) (<4.4 ft^3 capacity) 4. Ventless, Standard (>= 4.4 ft^3 capacity) 5. Ventless, Compact, (120V) (<4.4 ft^3 capacity) 6. Ventless, Compact (240V) (<4.4 ft^3 capacity)
Gas Clothes Dryers	All
Room Air Conditioners	1. With louvered sides, < 6,000 Btu/h 2. With louvered sides, 6,000 – 7,999 Btu/h 3. With louvered sides, 8,000 – 13,999 Btu/h 4. With louvered sides, 14,000 – 19,999 Btu/h 5. With louvered sides, 20,000 – 27,999 Btu/h 6. With louvered sides, ≥ 28,000 Btu/h 7. Without louvered sides, < 6,000 Btu/h 8. Without louvered sides, 6,000 – 7,999 Btu/h 9. Without louvered sides, 8,000 – 10,999 Btu/h 10. Without louvered sides, 11,000 – 13,999 Btu/h 11. Without louvered sides, 14,000 – 19,999 Btu/h 12. Without louvered sides, ≥ 20,000 Btu/h 13. With louvered sides, < 20,000 Btu/h 14. With louvered sides, ≥ 20,000 Btu/h 15. Without louvered sides, < 14,000 Btu/h 16. Without louvered sides, ≥ 14,000 Btu/h 17. Casement-Only 18. Casement-Slider

5.4 Savings Estimation Indicators

An array of data will be collected, computed, tracked, and analyzed as part of this evaluation effort. In accordance with the theory-driven evaluation paradigm, significant effort will be allocated to assessing the activities, outputs, and outcomes as denoted in the program logic model to validate program operations in support of estimating impacts and attribution.

Due to the extended timeframe associated with being a market transformation program, some indicators will be developed and analyzed to assess short-term effects (i.e., one or two years); other indicators will be developed to serve as mid-term (three to six years) and long-term (seven to ten years) baselines.

In accordance with recent efforts in California to build a policy framework for market transformation programs in the state, various indicators developed and collected in conjunction with these evaluation efforts—especially some of the mid- to long-term indicators—are meant to serve as indicators of market effects and market transformation. The final determinations regarding the appropriateness and applicability of these proposed market effects/market transformation indicators—as well as what entity or entities will be responsible for collecting and reporting these indicators in the future—need to be made in collaboration with the CPUC. PG&E

and the evaluation team look forward to the opportunity to collaborate with the CPUC staff and its consultants in examining these issues further in the coming months.

Table 5-2: Logic Model Components and Proposed Indicators to be Assessed Through the Impact Evaluation

Logic Model Component	Short, Mid, or Long-Term	MTI or PPI	ID	Concept	Calculation	Source	Proposed Frequency
Outcome J: Increased sales of energy efficient models within targeted product categories	Short	PPI	J1	Total sales volumes of targeted product categories by participating retailer	Total sales volumes of targeted product categories by participating retailer	Retailer Sales Data	Baseline needed; annually thereafter
Outcome M: Increased share of efficient models sold in targeted product categories among *participating* retailers	Mid	MTI	M1	Program-qualified share for *participating* retailers, by retailer, by product category	Participating Retailer Program-Qualified Share (PQS) by product category p, by retailer r, for a specific time period t : $PQS_{p,r,t}$ = Program-Qualified $Sales_{p,r,t}$ / Total $Sales_{p,r,t}$	Retailer Sales Data	Baseline needed; annually thereafter
b Increased share of efficient models sold in targeted product categories among *nonparticipating* retailers	Mid	MTI	N1	*Program-qualified share for nonparticipating* retailers, by product category	Nonparticipating Retailer Program-Qualified Share (PQS) by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$	Secondary Market Data	Baseline needed; annually thereafter
Outcome P: Energy and demand savings and other environmental and non-energy impacts	Short, Mid & Long	PPI	P1	Emissions benefits (tons of CO2 valued at market price)	(Tons of CO2/kWh)*Net Kwh Reductions	Secondary Market Data	Baseline needed; annually thereafter
Outcome P: Energy and demand savings and other environmental and non-energy impacts	Short, Mid & Long	MTI	P2	Gross and net kWh, kW (and potentially therm) impacts by product category	For each product category, Gross Saving = Total PQ sales volumes x UES; Net Savings = Gross Savings x NTGR	Retailer Sales Data	Baseline needed; annually thereafter
Outcome R: Permanent change in the availability of efficient models in targeted product categories among participating and nonparticipating retailers	Long	MTI	R2	Sustained program-qualified shares for targeted products post program-period	Market-Level Program Qualified Share (PQS), by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$	Secondary Market Data	Baseline needed; annually thereafter
Outcome S Increase: in market share of efficient models in targeted product categories	Long	MTI	S1	Increase in program-qualified shares for targeted products as compared to baseline	Market-Level Program Qualified Share (PQS), by product category p, for a specific time period t: $PQS_{p,t}$ = Program-Qualified $Sales_{p,t}$ / Total $Sales_{p,t}$	Secondary Market Data	Baseline needed; annually thereafter

This section introduces some of the quantitative impact indicators that the evaluation team will be deriving and analyzing as part of the 2016-2019 RPP Program Pilot impact evaluation. These indicators will be used to validate and quantify an array of logic model components, as shown in Table 5-2, as well as estimate program energy and demand impacts.

Program-Qualified Share (PQS)

In addition to total units sales volumes, as part of the impact evaluation for the RPP Program, the evaluation team will compute and track the *program qualified share (PQS),* or the proportion of total unit sales volumes within targeted product subcategories (*p*), for each retailer (*r*) over a specific time period (*t*), that are program-qualified, as shown in Equation 1:

$$PQS_{p,r,t} = Total\ Qualified\ Units\ Sold_{p,r,t} / Total\ Units\ Sold_{p,r,t} \qquad (1)$$

The PQS will be computed and tracked for individual participating retailers as a means of assessing short- to mid-term program effects,[59] but will also be assessed at the market level over the longer-term to assess the market-transformative aspect of the program. In general, the expectation is that the retailer-specific PQS values will increase over time as the participating retailers increase sales of energy-efficient models at the expense of less efficient models. Aggregate, market level effects should become evident over the mid to longer term as the array of participating retailers (and potentially non-participating retailers) begin to not only promote program-qualified units, but also alter their stocking behaviors to carry a larger proportion of energy-efficient models.

Notably, and as discussed elsewhere in this plan, the evaluation team does not expect substantial changes in the PQS in the short-term (initial year or two of participation). Retail seasonal buying patterns mean that in the first year of participation, retailers will likely have already made the stocking decisions. Thus, the first-year effects will likely be limited, and only result from promotional activities, which will be relatively smaller than the effects expected from assortment changes. It is also worth noting that though we do expect substantive changes in the PQS over the mid- to longer-term, additional factors outside of the program such as general market trends or changes in voluntary or mandatory product efficiency specifications will complicate interpretation of program effect upon PQS. We discuss the broader issue of program attribution in a later chapter of this plan.

Total Sales Volumes of Targeted Product Categories

As part of the RPP Program impact evaluation, the evaluation team will track the total sales volumes of models sold within targeted product categories for participating retailers. Regardless of the specific actions they implement to do so, the ultimate goal of the RPP Program is to motivate retailers to sell a greater quantity of more efficient products. Sales volumes will be the indicator most sensitive to detecting any potential changes, and can be analyzed at an array of different levels (e.g., the program, retailer, product category, or even model levels), depending

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[59] Due to disclosure agreements with the retailers, though the evaluation team will summarize many results by retailer, we will anonymize the data to ensure no data can be tied to any individual participating retailer (e.g., Retailer A, Retailer B, Retailer C, etc.). This may require that some data be aggregated or presented in some other manner if it appears to reveal a retailer.

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on what research questions are being probed. However, it should be noted that due to retailer concerns over revealing too much proprietary and competitive information, some constraints are placed on the level at which the Data Services Provider is permitted to provide raw sales values to the Program Administrators and their consultants. Thus, some analyses of total sales volumes may need to be conducted and presented at an aggregated level that masks sensitive information.

Unit Energy Consumption (UEC)

Unit energy consumption (UEC) is the average estimated annual electricity usage, in kilowatt-hours (kWh), for a specific product or device. Figure 5-1 shows the generalized method for computing UEC estimates. The estimate for annual hours of usage is multiplied by the measured power (in Watts) to derive the estimate for annual UEC in each of a device's operating modes. The UEC estimates for each mode are then summed to arrive at the estimate for total device UEC.[60,61] For products with a single operating mode, the estimate for total UEC is simply the annual hours of usage multiplied by the device's power draw.

Figure 5-1: Generalized Unit Energy Consumption (UEC) Estimation Methodology
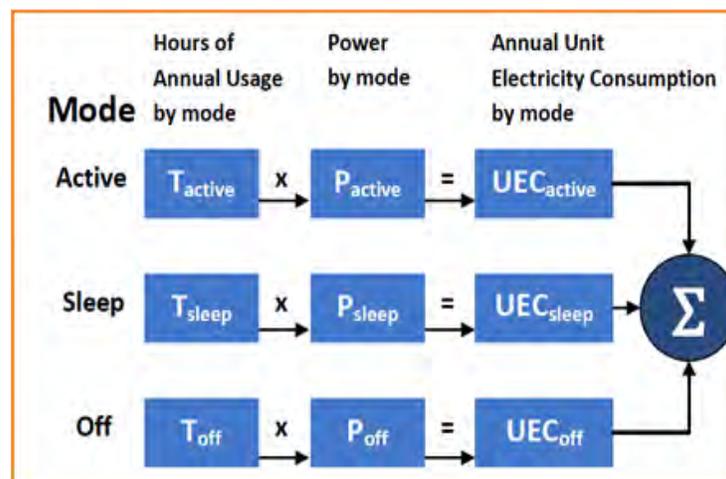
Unit Energy Savings (UES)

Though some details vary with regards to the final computation of UES estimates depending on the availability of data and the approach taken (e.g., some products use DEER, others use different approaches based) the basic premise is that the *unit energy savings (UES),* in kilowatt-hours (kWh), for an energy efficient model within a particular subcategory (*p*) for a particular period of time (*t*) is the difference between the average UEC for the non-qualified models and the average UEC for qualified models. This calculation is shown in Equation 2:

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[60] Roth, K. & K. McKenney. 2007. *Energy Consumption by Consumer Electronics in U.S. Residences.* Final Report to the Consumer Electronics Association (CEA) by TIAX, LLC. Retrieved from: http://www.ce.org/CorporateSite/media/Government-Media/Green/Energy-Consumption-by-Consumer-Electronics-in-U-S-Residences.pdf

[61] In the example shown, active mode also includes when a product is no longer being used but remains in a high-powered state, often referred to as idle mode.

$$UES_{p,t} = UEC_{Non-Qualified_{p,t}} - UEC_{Qualified_{p,t}} \quad\quad\quad (2)$$

Note that the time period (*t*) is incorporated to account for the fact that the UECs will change over time as either the retailers' product assortments change or the other sources of data (e.g., DEER) are updated. As a result, UES estimates will need to be recomputed periodically. We recommend that they be computed at the beginning of the Pilot period based on the historical sales data that will be provided by the participating retailers, held constant for a one-year period, and recomputed annually.

Ex Ante Gross Program Energy Savings

Ex ante gross program energy savings are derived by multiplying the UES, in kilowatt-hours (kWh), for a product subcategory (*p*) and time period (*t*) by the total number of units sold (*Q*) for that product subcategory and time period and then summing across all subcategories across all products, as shown in Equation 3.

$$Ex\ Ante\ G\quad oss\ Program\ Energy\ Savings = \sum(UES_{p,t} \times Q_{p,t}) \quad\quad (3)$$

Unit Demand Reduction (UDR)

In addition to energy savings, the RPP Program will also result in demand reductions that will be claimed by the IOUs. In order to estimate *unit demand reduction (UDR),* peak coincident factors (*CF*) will be derived for each product subcategory (*p*) as well as the average kilowatt (kW) demand for non-qualified models and the average kilowatt (kW) demand for qualified models for the product subcategory for a specific time period (*t*). This calculation is shown in Equation 4.

$$UDR_{p,t} = (CF_p\ x\ kW_{Non-Qualified_{p,t}}) - (CF_p\ x\ kW_{Qualified_{p,t}}) \quad\quad (4)$$

Ex Ante Gross Program Demand Savings

Ex ante gross program demand savings will be derived by multiplying the UDR, in kilowatts (kW), for a product subcategory (*p*) and time period (*t*) by the total number of units sold (*Q*) for that product subcategory and time period and then summing across all subcategories, as shown in Equation 5.

$$Ex\ Ante\ Gross\ Program\ Deman\quad Reduction = \sum(UDR_{p,t} \times Q_{p,t}) \quad\quad (5)$$

5.5 Analysis Methods

Because of the dynamic and complex nature of the RPP Program, and the added complexity resulting from non-program-related factors interacting with program-related effects, this evaluation will rely on multiple analyses to support conclusions regarding program performance, impacts, and attribution. This approach will utilize the concept of triangulation, or the attempt to get a fix on a phenomenon or measurement by approaching it via several independent routes, in order to converge on the most reliable and informed conclusions. The set of methods we propose include:

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- Quasi-Experimental Approaches
  - Comparison Group-Based Designs
    - Retailer level
    - Market level
  - Participant-Only Designs
    - Quasi-experimental forecasted baseline to recorded data
    - Quasi-experimental pre-post segmented regression
- Non-Experimental Approaches
  - Non-experimental self-report
  - Visual inspection

Quasi-Experimental Designs

A true experimental design is often considered the most rigorous of all research designs. A well-designed and correctly implemented experiment allows researchers to control for factors potentially affecting the outcomes of interest (i.e., PQS) by randomly assigning subjects to a treatment group (or in this case, the RPP Program) and to a control group that does not receive the treatment (i.e., nonparticipating retailers or nonparticipating stores for participating retailers). If designed well and certain constraints are upheld, any statistically significant differences in the PQS between the participating and nonparticipating retailers/stores at the end of the program should be attributable to the program.

However, the strength and validity of an experiment is highly dependent on certain design-related factors, the most important here being the ability to randomly assign retailers to treatment and control groups. In the case of the RPP Program, random assignment of retailers to treatment and control groups is not possible because retailers self-select into the program. Given that it is not possible to implement a *true* controlled experimental design, a variety of *quasi*-experimental designs are proposed that are still able to control for the effects of history. In this context, *history* refers to the possibility that some other event besides the program-related interventions might have caused some or most of the observed effects. One approach for reducing the effect of history includes a quasi-experimental design using a non-equivalent control group. When a suitable comparison cannot be formed, one can identify other points of comparison such as commercially available market-level data for relevant indicators such as sales or PQS. Both approaches are described in the following sections.

It is important to emphasize that the quasi-experiment approaches discussed below are aimed at assessing *short term market lift* associated with the retailers' implementation of various marketing strategies, *which is not the same thing as the overall program effects or overall net-to-gross ratios*.[62] The models are aimed at assessing the effects the different sets of retailer interventions have on PQS. However, these interventions are not the totality of the program, which also consists of factors such as, but not limited to, influence on voluntary and mandatory specifications and standards, the program's influence on manufacturer production and distribution tactics, and the influence of the combined efforts of the various Program Administrators on the larger market – all of which are expected to occur over various and extended frames. Consequently, the results of the modeling efforts will not be used in isolation

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[62] More on the estimation of the RPP Program NTGRs is included in Section 8, as well as Appendix C.

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to draw any conclusions about program effects or program efficacy – the results will simply function as another piece of the complicated puzzle that the evaluation team will use to draw conclusions.

Comparison Group Designs

Identifying a suitable comparison group of retailers against which to compare retailers who self-selected into the RPP Program is challenging. We first considered randomly assigning stores of participating California retailers to treatment and control groups, but this was infeasible since retailers wanted *all* their California stores to participate (i.e., they are unwilling to withhold any of their stores so that they could serve as a comparison group). Another option of using California retailers who chose not to participate as a comparison group was also deemed infeasible since they are very likely unwilling to provide the detailed sales data necessary for our analysis. Yet another option that we are still exploring is to use the non-participating *stores* of participating retailers outside of California as a comparison group. We expect that they might be willing to release the detailed sales data for these stores, which can be matched on key variables to participating stores. If this is possible, a segmented regression approach, discussed in the following section, will be used.

Retailer-Level Segmented Regression

Segmented regression analysis with a comparison group is a powerful statistical method for estimating intervention effects in interrupted time series studies.[63] Importantly, this approach incorporates a temporal component by considering the pre intervention and post intervention periods (of which there can be multiple interventions) for a metric such as the PQS, for both a treatment group and a comparison group, and attempts to compare the regression slopes at two or more points of intervention. Figure 5-2 illustrates this approach showing an idealized depiction. In this example, the analysis estimates the incremental market lift, or net effects, from the program by assessing the difference in slopes of, say, segments B and D after the retailers starts the program at Intervention 1 and implements a particular set of promotional activities (Intervention 1), and the period immediately after the intervention (comparing slopes B and D), or when they implement another set of promotional activities later in the year (Intervention 2), and the period after that (Slopes C and D). The level of the PQS at the point of intervention with the RPP Program is hypothesized to be different than the level of the PQS without the RPP due to initial product placement and in-store advertising. Or, the trend in the PQS estimated at some point after the point of intervention with the RPP Program might be different than the trend in the PQS without the RPP Program due to later changes in assortment.

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[63] A more detailed description of segmented regression is provided later in this document.

Figure 5-2: Illustration of Segmented Regression Approach with Treatment and Control Groups
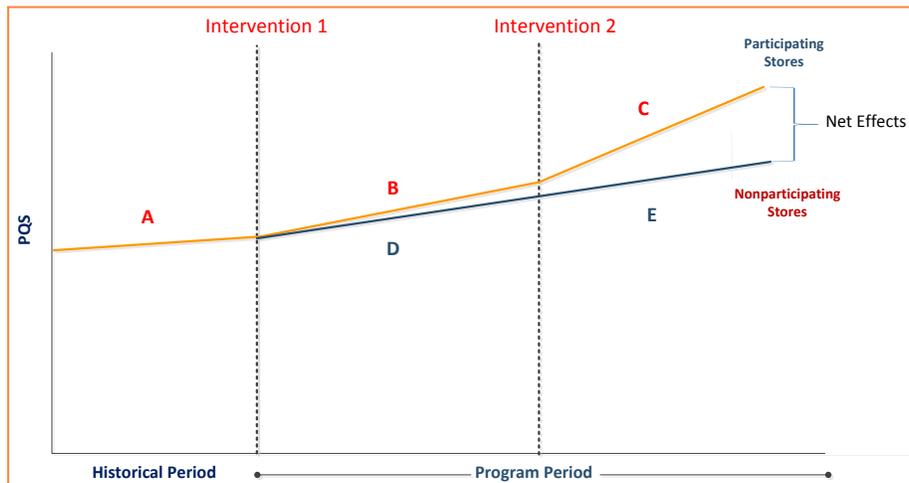
However, it is worth emphasizing that the depiction above is an idealized portrayal, and other outcomes are also possible. For example, if purchasing is conducted at the national level and retailers do not have the opportunity to alter their product assortment in the first year due to retail buying cycles, in the short-term another possible outcome is that the participating retailer PQS may present a notable *leap* right after implementation of the program, with a simultaneous *dip* in nonparticipating PQS. This might occur as retailers shift their *existing* inventory and reallocate it around the country to take advantage of the incentives. However, over the mid- to long-term we would still expect that *both* participating and nonparticipating store PQSs would begin to increase, as the retailers are able to implement assortment changes nationwide. Such complex interactions will require that the evaluation team commit great care to assessing the results of the modeling efforts, in conjunction with the retail staff interviews and other information gathered through the impact and process evaluations, to ensure the resulting patterns are clearly understood and accurate conclusions can be drawn about the program effects.

Market-Level Analysis

If a suitable comparison group cannot be formed, other points of comparison such as commercially available market-level data for relevant indicators such as sales of program-qualified products or the PQS will be explored. For example, quarterly market share data could be purchased from NPD and/or the Association of Home Appliance Manufacturers (AHAM) and be used to compare to quarterly market shares for each product observed for participating retailers. The NPD data could even be incorporated into a segmented regression as described above.

Participant-Only Designs

While comparison group-based designs offer the potential to derive the most reliable and accurate estimates of program impacts, the fact is that this is a complex program aimed at transforming the market for plug load products. Over the longer-term, the ultimate success of the program would be reflected in substantive changes to the product assortment of *both* participating *and* non-participating retailers. Further, because of the regional and even national level buying practices for many large retailers, coupled with the fact that there are plans to scale the RPP Program to the national level, means that defining a representative, unaffected set of

retailers to use as a comparison group in the future will become increasingly difficult, if not impossible. As a result, the evaluation team also proposes participant-only designs that can be used to assess program impacts in conjunction with the other methods.

Quasi-Experimental (Pre-Post) Participant-Only Forecasted PQS/Sales Volume Baselines

The simplest quasi-experimental approach to assessing program effects involves using the 12-month historical data series for participating retailers to forecast a counterfactual PQS and sales volume baseline over a 12-month horizon. These forecasted baselines would then be compared to the actual program-period sales data post implementation. The difference between the program-period data and the forecasted baseline is the net effect of the program. Figure 5-3 illustrates this approach.

Figure 5-3: Forecasted Monthly PQS versus Recorded
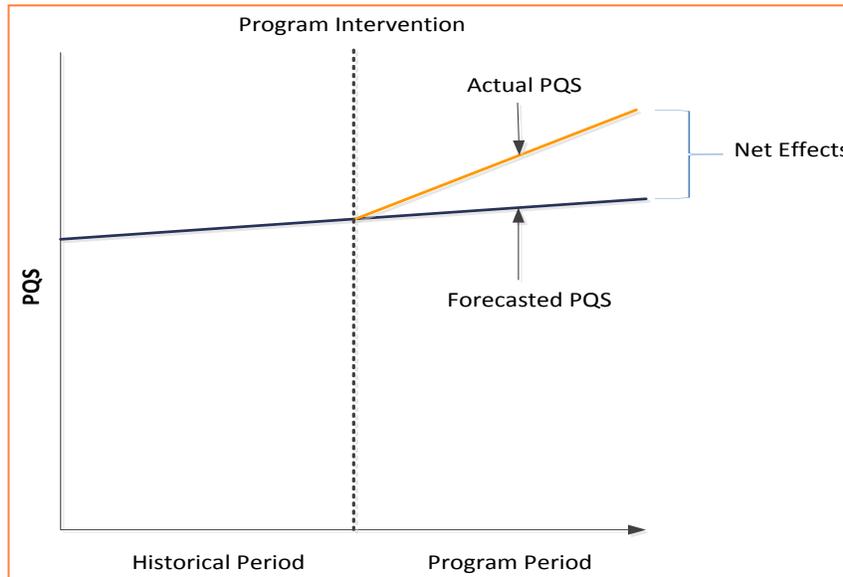
Various statistical models will be used to develop the forecasted PQS/sales volume baseline using the historical sales data. For each product subcategory, the general model form that will be used to forecast the baseline over a 12-month period as a function of time is shown in Equation 6.

$$\widehat{Y}_t = \beta_0 + \beta_1 \text{Time}_t + \varepsilon_t \tag{6}$$

where:

$\widehat{Y}_t$ = PQS/sales volume in month t

Time_t = The number of months from the start of the series

β_0 = The intercept

β_1 = Change in Y_t for a one month change in time

Other possible models include various versions of an exponential smoothing technique, which is a procedure for continually revising a forecast in the light of more recent experience. One example is the exponential-smoothing method in Equation 7.

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$$F_{T+1} = AX_T + (1-A)F_T \tag{7}$$

where:

F_{T+1} = Forecasted value for the next period
A = Smoothing constant $(0 \leq A \leq 1)$
X_T = Actual value of series in period T
F_T = Average experience of series smoothed to period T or forecasted value for last period

Numerous models will be tested to determine which one performs the best according to the Bayesian Information Criterion (BIC). Each forecast will be judged on its predictive accuracy. Overly complex models may fit the historic data well, but forecast poorly. The BIC rewards a good fit to the historic data but also penalizes model complexity. The smaller the BIC is the better. The BIC should not be used as an absolute measure of performance, but only as a means to compare different models from the same model family for the same data. The specific approach used may vary by product category since the historical series will likely vary with respect to variability or noise in the data.

It is worth noting, however, that the participant-only forecasted baseline approach has some limitations. Namely, this approach as described is likely limited to only assessing a retailer's first year of participation in the program. Once a retailer has participated for a year, any forward-looking forecast would be contaminated by the effects of that first year of participation. That is, any increases in PQS associated with program-related activities occurring in the first year will lead to next-year forecasts that are higher then they would have been in the absence of the program. As such, it is also worth noting that the forecasted baseline approach will likely only be used with the retailers that did not participate in the 2013-2014 Trial.

Quasi-Experimental (Pre-Post) Participant-Only Segmented Regression

Another approach that will be used to assess the influence of the program on PQS and program-qualified sales volume is a quasi-experimental pre-post participants-only design using interrupted time-series (segmented or piecewise regression). Segmented regression analysis is a powerful statistical method for estimating intervention effects in interrupted time series studies.[64] This approach also uses the participating retailers as their own control and analyzes the pre- and post-intervention measurements of the PQS/sales volume and attempts to measure the change in the slopes of the pre and post periods. Figure 5-4 illustrates this approach.

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[64] An autoregressive integrated moving average (ARIMA) model (Box and Jenkins, 1970), which employs only the past values of the series variable itself (e.g., PQS) and of its disturbance term as independent variables, was considered. The main advantage of such models over regression models is that they provide a nearly certain means of getting rid of autocorrelation, the presence of which violates a key assumption of ordinary least squares regression models. However, such models require more pre-intervention observations than will be available for this evaluation. At least 30, and generally closer to 50, observations are necessary to obtain reliable estimates (Veney and Luckey, 1982). Therefore, the ARIMA model option was rejected. Box, G. E. P. and G. M. Jenkins. 1970. *Time-Series Analysis: Forecasting and Control.* San Francisco: Holden Day. Veney, J.E. and J.W. Luckey. 1993. "A comparison of regression and ARIMA models for assessing program effects: An application to the mandated highway speed limit reduction of 1974." *Social Indicators Research*, 1983, Volume 12, Number 1, Pages 83-105.

Figure 5-4: Illustration of Segmented Regression Approach with Treatment Group Only
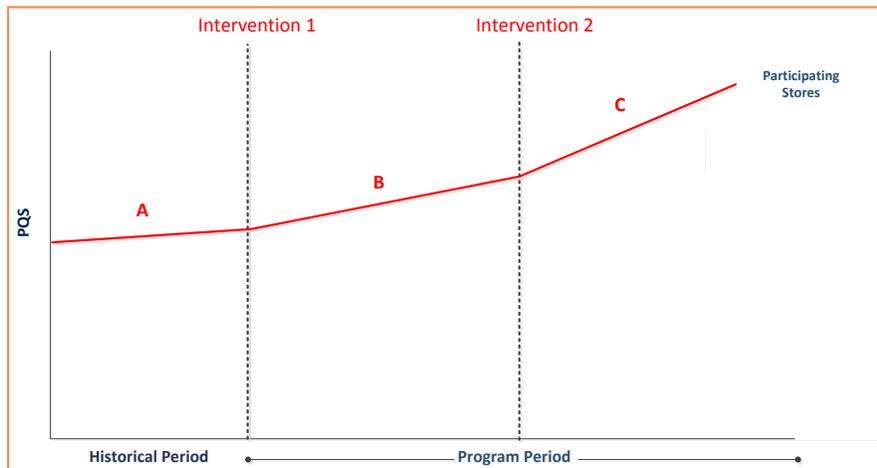
As shown in Figure 5-4, the evaluation team will attempt to determine whether Slope B and/or C differ from the baseline Slope A. For example, depending on the retailer's implementation strategy, Slope B may be different than Slope A due to initial product placement and in-store advertising; Slope C might be different than Slope A or B due to later changes in assortment.

The general form of the segmented regression model to be used for this evaluation is illustrated in Equation 8:

$$\widehat{Y}_t = \beta_0 + \beta_1 \text{Time}_t + \beta_2 \text{Intervention}_t + \beta_3 \text{Time\_After\_Intervention}_t + \varepsilon_t \tag{8}$$

$Y_t=$	PQS/sales volume in month t
$\text{Time}_t=$	Indicates the number of months from the start of the series
$\text{Intervention}_t=$	A dummy variable taking the values 0 in the pre-intervention segment and 1 in the post-intervention segment
$\text{Time\_After\_Intervention}_t=$	0 in the pre-intervention segment and counts the months in the post-intervention segment at time t
$\beta_0=$	Estimates the base *level* of the outcome at the beginning of the series
$\beta_1=$	Estimates the base *trend*, i.e. the change in outcome per month in the pre-intervention segment
$\beta_2=$	Estimates the change in *level* in the post-intervention segment
$\beta_3=$	Estimates the change in *trend* in the post-intervention segment
$\varepsilon_t=$	Estimates the error

Once the models are estimated, they will be evaluated *without* and *with* the program, using Equations 9 and 10, respectively:

Without Intervention:
$$\widehat{Y}_t = \beta_0 + \beta_1 \text{Time}_t \tag{9}$$

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With Intervention:
$$\widehat{Y}_t = \beta_0 + \beta_1 \text{Time}_t + \beta_2 \text{Intervention}_t + \beta_3 \text{Time\_After\_Intervention}_t \qquad (10)$$

The difference between Equations 9 and 10 is Equation 11, which represents the net reduction in the PQS/sales volume.

$$\widehat{Y}_t = \beta_2 \text{Intervention}_t + \beta_3 \text{Time\_After\_Intervention}_t \qquad (11)$$

The basic model in Equation 8 can be extended to add more time variables to also assess incremental change at various time points after program implementation. For example, two interventions could be incorporated, one in April 2015 at the time of RPP launch and one at April 2016 when program-qualifying models appear on the shelves. This could be helpful for assessing incremental change over time.

Non-Experimental Methods

The evaluation team expects that self-report information will play a critical role in the evaluation of the RPP Program Pilot. While useful for assessing trends and detecting the impact of marketing and promotional interventions, the quasi-experimental also suffer limitations in addition to those mentioned in the previous section. For example, the models discussed above will not be able to entirely isolate out broader market trends that are *not* related to the program that can have significant impacts on the PQSs. Also, the usefulness of any comparison-based design – assuming participating retailers are able and willing to provide data for non-participating regions – will diminish over time as national-level purchasing decisions (and potentially marketing and promotional strategies) start to spillover into nonparticipating regions. Thus, in addition to the quasi-experimental methods the evaluation team will also rely heavily on non-experimental methods to collect information from various market actors such as retailer staff, manufacturer staff, and other key players to draw conclusions about the effects and impacts of the RPP Program.

Self-Report Approach

In 1993, the recognition that methods involving comparison groups were not always feasible was first formalized in the energy efficiency field in California in the *Protocols and Procedures for the Verification of Costs, Benefits, and Shareholder Earnings from Demand-Side Management (DSM) Programs.*[65] Self-report approaches also have widespread acceptance as tools for assessing net-to-gross ratios.[66,67] For budgetary, timing, statistical, and research design issues, the more traditional designs and analyses must sometimes be replaced or supplemented with the self-report approach. The self-report approach can include both quantitative and qualitative information and can consist of data collection efforts such as surveys and in-depth interviews.

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[65] http://www.calmac.org/events/PROTOCOL.pdf
[66] Ridge, R., K. Keating, L. Megdal, and N. Hall. 2007. *Guidelines for Estimating Net-To-Gross Ratios Using the Self-Report Approach.* Prepared for the California Public Utilities Commission.
[67] Ridge, R., P. Willems, and J. Fagan. 2012. *Framework for Using the Self-Report Approach to Estimating Net-to-Gross Ratios for Nonresidential Customers.* Prepared for the California Public Utilities Commission.

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For the RPP Program Pilot, various market actors, especially retailer purchasing and marketing staff (and eventually manufacturers and codes & standards representatives) will be asked to report their assessments of changes in program-qualified sales attributable to the program. These actors will also be probed in terms of likely behaviors absent the RPP intervention, the influence of the RPP Program Pilot on their behaviors, as well as the extent to which the program was successfully implemented. Though the results will not be used on their own to make any claims of attribution, they will be used as another piece of evidence to support the more comprehensive and holistic assessment within the theory-driven evaluation framework. As noted in Section 4.2, these impact-related interviews can be most effectively conducted by the multi-region evaluator.

Visual Inspection

One should not discount the value of visual inspection of the PQS/sales volume trends for participating retailers and nonparticipating retailers both inside and outside California. Though wide confidence bands and uncertainty over the influence of factors such as future code changes will likely make the detection of program-induced differences difficult to detect from a strict statistical perspective, especially in the shorter-term, from a practical and longer-term perspective graphical representations will be quite helpful for detecting early trends that may not be significant now, but visual evidence might suggest could become statistically significant in the future. Through visual inspection, one often obtains an immediate and strong impression of the trend just by noting whether the series seems flat or moves generally up or down over time. As such, prior to conducting any of the more rigorous quantitative analyses or statistical models, as a first step, the EM&V team will also examine plots of the data to assess trends or highlight issues.

6. PROGRAM ATTRIBUTION

Due to the multifaceted and long-term nature of the RPP Program, an array of different evaluation methods has been proposed to assess the efficacy of the each local RPP Program as well as the multi-region RPP Program. It is also worth re-emphasizing the role that theory-driven evaluation will play in the overall evaluation of the Program and assessment of attribution.

Theory-driven evaluation will bring together the results of the process evaluation and the impact evaluation. As discussed earlier, this approach generally involves operationalizing the key performance indicators associated with key causal linkages in the logic model (i.e., converting the performance indicators into quantifiable and measureable indicators). That is, the results of evaluation efforts will be combined and if the predicted steps between program activities, outputs, and outcomes can be confirmed in implementation, then this matching of the theory to observed outcomes lends a strong argument for causality. As presented throughout this plan, the logic model and underlying program theory will guide the evaluation in order to develop measurable indicators that will be used to assess whether the RPP Program is functioning as intended. While some of these analyses will support reliable conclusions about short-term activities, outputs, and near-term outcomes, other, mid- to longer-term indicators will be baselined to support comparisons with the results of future evaluations. As noted in Section 1.2, for each *local* implementation of the RPP Program to be fairly assessed, the multi-region evaluator must assess the extent to which the combined efforts of all the Program Administrators have produced measureable market effects and what portion of these market effects should be allocated to each of the Program Administrators (Section 7 proposes a possible method). That is, the efficacy of the local RPP Program for any given Program Administrator must be based on the results of their local RPP evaluation as well as the results of the MR RPP evaluation; conceptually, they are inseparable.

At various points throughout the life of the RPP Program, the preponderance of evidence will be systematically examined to assess the extent to which the program is on track to achieve its ultimate objectives. The data relevant to each hypothesized cause-and-effect relationship in the logic model will be analyzed to see whether each hypothesis can be rejected or accepted. The results of all of the hypotheses testing will be reviewed to determine the extent to which a case for attribution can be made. As Weiss states: "If the evaluation can show a series of micro-steps that lead from inputs to outcomes, then causal attribution for all practical purposes seems to be within reach."[68]

To be credible, the preponderance of evidence approach must be rule-based, transparent, and repeatable. For each causal hypothesis, an objective case for causality must be constructed based on all quantitative and qualitative data analyzed. Each case must include, at a minimum, a summary of the data collected and analysis approach and results, an assessment of the validity and reliability of the data, and a discussion of the level of uncertainty surrounding the

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[68] Weiss, C.H. 1997. "Theory-based Evaluation: Past, Present and Future." *In*: D.J. Rog & D. Fournier (Eds.), *Progress and Future Directions in Evaluation: Perspectives on Theory, Practice and Methods* (pp. 41-55).

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conclusions (i.e., a presentation of the achieved levels of confidence and precision—either a quantitative assessment or a qualitative assessment).

Once the evidence for each hypothesis is presented, an assessment should be conducted as to whether all of the evidence warrants the conclusion that the entire network of cause-and-effect relationships depicted in the logic model have combined to achieve the ultimate objectives of the RPP Program. This assessment must be organized around a set of rules about how to combine these data into a coherent, internally consistent story about the efficacy of the program. During the 10-year program period, the use of a Delphi panel,[69] conducted according to best practices, should be considered as one way to organize this assessment.

Finally, it is important to note that this evaluation will not slavishly adhere to the program theory and logic model but will also step outside the model to explore other competing hypotheses and unanticipated outcomes. Other local, state, regional, and national interventions that share many of the same objectives as the RPP Program will be examined and their effects accounted for.

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[69] Linstone, H.A. and M. Turoff. 1975. *The Delphi Method: Techniques and Applications.* London: Addison-Wesley Publishing Company.

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7. ATTRIBUTION ACROSS MULTIPLE PROGRAM ADMINISTRATORS

The MR RPP Program is a multi-regional program that will be implemented simultaneously by a number of Program Administrators across the U.S. Inherent in the program theory is a high level of interorganizational collaboration among the various Program Administrators—as a matter of fact, the program is unlikely to succeed without the scale that an array of Program Administrators can provide. A critical mass will be needed to influence enough retailers to alter their product assortments, which in turn is expected to also influence non-participating retailers to start stocking more energy efficient products. Such large-scale shifts are expected to alter the demand manufacturers face for their products and will shift their production to a larger proportion of energy efficient products. At the same time, the critical mass of Program Administrators will be working together to influence voluntary (ENERGY STAR) and possibly mandatory (codes & standards) specifications. Taken together all these outcomes are expected to transform the market by leading to permanent shifts (i.e., increased availability) in the proportion of energy-efficient home appliances and consumer electronics that will be available in the marketplace. This cycle is shown in Figure 7-1.

Figure 7-1: Multi-Regional Collaboration and the RPP Program

The high degree of collaboration across the array of Program Administrators also adds a level of complexity to the evaluation of the MR RPP Program. Figure 7-1 shows that evaluations will occur within each region and across all regions. Each region will be responsible for evaluating the RPP Program in a way that meets their region's evidentiary standards. However, a multi-region evaluator will have to assess the net effect of the collective multi-region effort on the net overall change in the market share for all products.[70] Ultimately, as a critical part of the MR RPP evaluation, a method for crediting the net overall market effects to each region must be developed. One proposal for allocating these net overall market effects for *each* product category is shown via Equations 12, 13, 14, and 15.

$$Gross\ Market\ Effects_{US,PQ} = \Delta Market\ Share_{US,PQ} \times (Total\ Units_{US,PQ} - Total\ Units\ Sold_{US,PQ,PA}) \quad (12)$$

$$Net\ Market\ Effects_{US} = Gross\ Market\ Effects_{US} \times Attribution\ Score_{Multi-Region} \quad (13)$$

$$Net\ Market\ Effects_{CA} = Net\ Market\ Effects_{US} \times Sales\ Share_{CA} \quad (14)$$

$$Total\ Net\ Savings_{CA} = (NTGR_{CA} + \frac{Net\ Market\ Effects_{CA} \times UES_{CA}}{Gross\ Savings_{CA}}) \times Gross\ Savings_{CA} \quad (15)$$

We start by estimating the gross market effects for the entire U.S. (Equation 12), which is computed as the product of: (1) the change in market share in the U.S. for a given program-qualified product (PQ), and (2) the total number of units sold in the United States for that program-qualified product *minus* the total number of program-qualified units sold by RPP Program Administrators in the United States. This subtraction is done to avoid double counting.

Next, as shown in Equation 13, the gross market effects in the United States are multiplied by the multi-region attribution score to yield the net market effects for the United States. Estimating the multi-region attribution score will involve estimating the net influence of the collective effort of all the participating regions on any observed changes in the overall market share.

Next, as shown in Equation 14, to estimate the net market effects at the California level, we simply take the net market effects at the U.S. level and multiply it by the California share of all program-qualified units sold by RPP Program Administrators.[71]

Finally, in Equation 15, the total net savings in California is computed by first adding the net-to-gross ratio (NTGR) estimated by the evaluator of the California RPP Program and the market-effects rate ($\frac{Net\ Market\ Effects_{CA} \times UES_{CA}}{Gross\ Savings_{CA}}$) to produce the market-effects-adjusted NTGR (MEA_NTGR). The MEA_NTGR is then multiplied by the gross kWh savings to produce the total net kWh savings.

The net energy savings are then summed across all product categories to produce total California RPP Program net savings.

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[70] We recommend a theory-driven evaluation of the MR RPP since it is the same program as the local RPP Programs but viewed from an even more complicated multi-region perspective.

[71] Note that the Equations 14 and 15 can also be generalized to any individual Program Administrator by simply changing the CA subscript to PA. Thus the gross market effects and net savings for each IOU in the state can be computed the same way as described above.

8. COST-EFFECTIVENESS ANALYSIS

In some earlier resource acquisition evaluations, cost-effectiveness analyses were typically conducted retrospectively as part of an impact evaluation. For market transformation interventions like the RPP Program, the assumptions of the prospective cost-effectiveness analysis will be reviewed and tested periodically and will be included in the market progress evaluation reports that will be prepared periodically over the ten years.

Not all cost-effectiveness assumptions include the same level of risk nor is the risk located in the same component. In a resource acquisition intervention, the level of risk lies primarily in whether the kWh savings per participant are reliable. The analysis, therefore, often focuses on savings and what would have been achieved with and without the intervention. In a market transformation intervention, the risk lies primarily in whether the market will respond at the anticipated level and in the expected time period.

In addressing cost-effectiveness issues for market transformation, infrastructure, and research and development interventions, the evaluation team will collect data to assess whether the prospective cost-effectiveness assumptions hold or need to be revised. Market transformation programs such as the RPP Program often assume 10-15 years for the ultimate indicators. This takes into account the duration of the program and the fact that some savings from the sale of energy efficient products will likely persist after the utilities exit the market. Therefore, a final cost-effectiveness analysis cannot be conducted for a long time. Relying on an approach to test assumptions provides an interim method for deciding if the intervention is meeting cost-effectiveness expectations.

Thus, the cost-effectiveness analysis will focus on testing market assumptions. As part of this analysis, the following indicators will be tracked: (1) sales of program-qualified products, (2) energy and demand impacts, (3) program-qualified share (PQS) at the retailer level, (4) the short-term lift in the PQS for participating retailers, (5) the promotion and adoption of new codes and standards, (6) retailer implementation of their marketing plans (7) California market share, (8) national market share, (9) incremental costs, (10) UESs, and (11) program-level NTGR. Note that this evaluation will estimate and track the first eight of these indicators while the remaining three will be estimated and tracked in separate studies conducted by other contractors.

Each year, these data will be used to modify key inputs of the Generalized Bass diffusion model to re-estimate the NTGR for the full ten-year RPP Program and long-term forecasts of sales for each product category. Detailed documentation of this approach is provided in Appendix C. Each year, this re-estimated NTGR along with the revised forecast of sales and other tracked indicators will be input into the E3 Calculator to derive a revised estimate of the TRC. Detailed documentation of this approach is provided in Appendix D.

The long-term forecasts of gross and net sales, gross and net energy and demand savings, the NTGR, the TRC, and the PAC are important MT metrics that should also be regularly monitored in addition to the metrics listed in earlier tables in this plan in order to assess whether the RPP Program is on track to transform the market in a cost-effective manner. If necessary, based on

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these results, modifications will be made to the design and delivery of the RPP Program to increase its long-term cost-effectiveness.

9. REPORTING

Note that after 2017 and continuing through the next eight years, we expect that the ED-led impact evaluations will begin to assess progress on these mid- and long-term outcomes. Market progress evaluation reports (MPERs) can be used to track the progress of the RPP Program. MPERs will be conducted annually, or possibly less frequently, depending on the targeted product category, the resources available, and the criticality of the information for decision-making.

MPERs contain a variety of information and do not neatly fall into the process, cost-effectiveness, or impact categories common to resource acquisition evaluations. Each MPER for a given product will likely to contain common tracking information, but each will also include information unique to that reporting period based on the market stage of the intervention and the decisions that are pending. Because the reports track market progress, they will focus on timely and relevant information for intervention managers and decision makers.

Typically each MPER will include a review of findings, conclusions, and recommendations from previous MPERs, provide a description of the current progress of the intervention relative to the established criteria for success and progress indicators, compare market penetration to baseline, review cost-effectiveness assumptions, provide a best estimate of energy impacts, and provide an assessment, based on the theory-driven approach, of the extent to which the program is influencing participating retailers and the larger market. In assessing program influence, evaluators will rely on all available information at any given point during the ten-year period. Given the short duration of the RPP Pilot, an MPER framework will be established for each product and one MPER for each of the product will be prepared in early 2017 (covering 2016). The final evaluation report will incorporate the MPER for 2017. These results will also be shared with the CPUC-ED in order to support ED-led ex post evaluation development, analyses, and reporting.

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10. SCHEDULE

Though this evaluation plan covers a four-year period, it should not be viewed as four one-year evaluations. Rather, evaluation activities will be spread over the entire four years.

Initial activities in the first year will be aimed heavily at developing streamlined processes and protocols for conducting the research, facilitating efficient analyses, and reporting. The first year is when baselines will be developed and in-field verification will occur throughout. Notably, the first year will also consist of significant collaboration with the multi-regional evaluator and other stakeholders to coordinate the multi-regional evaluation efforts.

While some of these kick-off activities will also occur in subsequent years, the second year and on is when many of the analyses will be conducted in order to assess Pilot progress. Each year the evaluation team will develop an MPER that summarizes findings to-date and the final Pilot Program report will be developed during the first quarter of 2020.

The basic schedule of key evaluation activities to be conducted in 2016-2019 is provided in Table 10-1.

Table 10-1: RPP Program Pilot Evaluation Activities

Task	2016	2017	2018	2019
Establish Data Reporting Protocols (both content and frequency)	X			
Establish Baselines for Key PPIs and MTIs	X			
Establish Protocols for Data Request from the Central Data Services Provider	X			
Assessment of Marketing Plan Implementation (site verification and shelf surveys)	X	X	X	X
Establish Coordination Protocols with Multi-Region Evaluator	X			
Assessment of Program Short-Term Lift for Participating Retailers	X	X	X	X
Assessment of Assortment Changes	X	X	X	X
RPP Program Staff Interviews	X	X	X	X

Appendix H

**CPUC-IOU Program and Evaluation Plan
Questions/Comments, Responses & Feedback**

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title:	Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program:	Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
CPUC Staff & CPUC Consultant Questions					
1	Product Transition and Introduction Guidance 6-26-15 V2	Peter/Paula	Product Categories	According to the Product Transition and Introduction Guidance 6-26-15 V2: Products will be selected, among other criteria, based on 'demonstrated participation interest from national retailers and retail sales that forecasted to be substantial based on regional potential studies' – ED would like to understand what data informed the choice of existing product mix.	The existing product mix was developed based on discussion with NEEA, partner utilities across the nation, EPA, and retailers to create a trial set of products that meet all the guidelines for product selection outlined in the RPP Product Transition and Introduction Guidance document. Also, given that the next few years would be a pilot period, PG&E aims to seek a balance in scope; we seek to test some breadth across types of products and to generate enough interest among retailers and still to keep the product set limited in scope and thereby to keep the budget reasonably limited, in keeping with Commission guidance for pilots. Fundamental in choosing product categories is that they are designated ENERGY STAR product categories, as listed and described at https://www.energystar.gov/products?s=mega. As noted in the EPA's description about "How a Product Earns the Label," the EPA ensures that product categories must contribute significant energy savings nationwide. Data from EPA about the product categories is a key source. Data sources also included the CPUC's 2015 Potential & Goals Study, done by Navigant and found at http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/Energy+Efficiency+Goals+and+Potential+Studies.htm., although the level of detail about specific product categories in the plug load and appliances area is limited.
2	Product Transition and Introduction Guidance 6-26-15 V2	Peter/Paula	Product Categories	According to the Product Transition and Introduction Guidance 6-26-15 V2: Products will be selected, among other criteria, based on 'a market share of less than 35% in order to reduce free ridership'. The document says that a task force, composed by sponsors (?), defined the product mix for 2016. What is this task force?	"Task force" members include the relevant staff from the IOUs, NEEA and other utility program partners, members of EPA's Products team, and industry experts with relevant retail, evaluation and program implementation expertise on an as-needed basis.
3	Product Transition and Introduction Guidance 6-26-15 V2	Peter/Paula	Product Categories	The highlighted products [Soundbars, Air Cleaners, Food Freezers, Gas Dryers, Electric Dryers] were mentioned in the RP as the selected product mix. Room AC does not have a market share mentioned and is not part of the original product mix. Please provide Room AC market share information and discuss why HTIB's were removed from the product mix after apparently meeting the requirements for inclusion throughout 2015 until the most recent iteration of the research plan.	The EPA August, 2015 estimate for 2016 ENERGY STAR® spec Room AC market share is 30%, which PG&E considers to be relatively aggressive, given that there are yet no existing models currently certified to the ENERGY STAR version 4.0 specification (as of Sept, 2015). PG&E is considering to use a market share of 20%-30%, and then make updates after more data is available in 2016. Re Room AC addition and drop of HTIB: Generally, by design, the product mix should be expected to change over time, and that is a positive feature of the RPP design since we will want to adjust to national partnership needs, product market evolution and progress of the program with individual products for transitioning products in and out. The summary matrix in the second tab that Peter put together showing our RPP measure mix over time demonstrates well a natural and expected evolution of measure mix, starting with our initial draft plan that we used for discussions among national partners and which was tuned to a degree to our focus on Kmart. The matrix also illustrates our subsequent learning and adjustments for partner needs and program plan needs. Specifically, - Room ACs have always been of interest to us and other program and retail partners for inclusion in this program. We included them in our initial proposal, but decided to delay including them, since some of our national program partners had Room ACs as downstream measures and were concerned about confusion and eating into those savings. We are now at a stage when we think we can mitigate that former concern with inclusion of Room ACs. - HTiB was removed after recent engagement with Energy solutions, NEEA and EPA to determine there was limited product availability for HTiB and some technical definition overlap with the Sound bars. Also, HTiB had been more important at the time for Kmart than other retailers, which is of less concern now that we are expanding to other retailers. Sound bars take up 90% of the energy star home audio equipment, so we think we have sufficient coverage in that product category at this time by including only a sound bar category.
3.2	Product Transition and Introduction Guidance 6-26-15 V2	Paula (From 9/15 check-in call)	Product Specifications/Tiers	Please explain the expected decision process related to identifying a need to change the specification for a product's Basic Tier and Advanced Tier, including after program launch, such as when the program is not seeing uptake of a product at a certain Tier. What criteria would be used *to determine a need to adjust* specifications/tiers *and what criteria would be used to set a new specification/tier*?	We are updating the Product Introduction and Transition Guidance document with the following to include how Tiers will be adjusted if market share grows and requires a more stringent tier. For each product category, the RPP Program Sponsors will evaluate market share each year based on the optimal program design times stated in Table 1 of the Product Guidance document. 'Basic' Tier specification reviews are triggered once product category sales achieve an aggregate market share greater than 35% for 6 consecutive months across all Program Sponsor territories. EPA's Vision and Guiding Principles document outlines that for rapidly advancing products, specifications tend to be revisited every two years. For more slowly advancing products, specifications are revisited every three years or when market penetration reaches 35%. When a Basic Tier product specification review is triggered, the Program Sponsors may decide on one of the following policy options for the Basic Tier specification: • Transition the current Advanced Tier levels to the following year's Basic Tier qualifying levels. • For the following year, revise the Basic Tier specification to a level to capture higher efficiency models that lower the category market penetration to between 15-35%. • For the following year, continue Basic Tier levels in order to maintain specific strategic program objectives, such as data access, ability to conduct in-store marketing, and continuity of retailer relationships. In this case, it is recommended that per unit incentives be reduced to account for larger market share and higher free ridership. This approach may be particularly suited for products with longer product lifecycles. Advanced Tier qualifying levels will be reviewed on an annual basis, coinciding with EPA's Most Efficient product review. At that time, the Program Sponsors may decide on one of the following policy options: • Maintaining the existing Advanced Tier levels. • Revising the Advanced Tier levels to align with the updated Most Efficient designation or other level. • Revise the Advanced Tier levels to a new specification which meets the market share threshold below 15%. Please note that low program uptake may be driven by a number of factors, including stringency of Program Tier, retailer incentive level, and retailer marketing strategy. In cases where the Program Tiers are not achieving uptake, the Program Team will prioritize other program levers, such as refining the Retailer Implementation Plan or modifying incentive levels ahead of decreasing the stringency of a product tier. After the first year, Program Tiers will be set using retail sales data and tiers should be generally reflective of the current market. Revising Product Tiers downwards is an option of last resort because sends a conflicting message on product efficiency and does not work to build a long-term path towards efficiency improvements.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
4	Product Transition and Introduction Guidance 6-26-15 V2	Valerie	Product Categories	Given the importance of margins to retailers, did the task force consider the margins retailers earn per product category? If so, what are the retailer profit margins on these products versus the non-qualifying products in the same category? What is the logic for retailers to continue to promote qualifying products after incentives cease if margins are similar? How will the PAs address/account for the very high probability that non-participating retailers (or mfrs.) of the competing non-qualifying products running promotions at the around the same time as the retailer's promotions to counter the threat to their market share/position? (this is a regular tactic with sales promotions.) I'm sure there is the expectation that the retailer should address this, but the outcome could be no increase in sales versus the product category. It can create havoc when trying to identify/control for events in any regression modeling.	No, it is not practical for us to consider the margins the participating retailers earn per product category for each retailer, since that information is proprietary and confidential and therefore not available. We do know that the small incentive may be equal to or greater than the gross profit margin on the purchase since U.S. Census data indicate that the gross profit, expressed in percentage terms as gross margins, for appliance and consumer electronics stores are also among the lowest in the retail industry. For consumer electronics, we know that the industry-wide average profit margin is in the low single digits at best and negative at worst. For major appliances, major household appliances struggle to achieve even a 10% gross profit margin, often relying on manufacture's rebates for high volume sales, to make the category profitable and financially sustainable. Given this, even a relatively small incentive can significantly influence the retailer's promotional efforts. How will these efforts eventually lead to a sustainable shift in the supply and demand of energy efficiency products? Each retailer has a profit maximization function for each product, the key inputs of which include cost, price, price elasticity and sales volume. While we do not, and cannot, know the specifics of these functional forms for each retailer, we understand that there are a number of factors that would cause a retailer to promote, stock and assort efficient products, even those that that have profit margins smaller than other competing models. The first factor is that the efforts of the retailers are expected to increase the demand for efficient products leading to higher volume sales and higher profits. The second is the value associated with being an ENERGY STAR partner. A retailer's only objective is to maximize corporate profit. However, if being an ENERGY STAR partner can increase store traffic and customer loyalty, they can increase sales of all items throughout their stores, even though they might be selling some energy efficient products that have smaller profit margins. The third mechanism is to restrict what retailers can sell through the adoption of mandatory energy efficiency standards. Over the ten-year program period, retailers are expected to learn that, even without incentives, profit maximization is consistent with the routine promotion, stocking and assortment of energy efficient products. Finally, we understand and accept that there is some uncertainty about how nonparticipating retailers will respond to the participating retailers' emphasis on the promotion, pricing, product placement and assortment of program-qualified products. They could respond by holding sales of standard efficient models which, if price were the only concern of the typical consumer, could reduce the program-qualified share for participating retailers and the overall market. On the other hand, nonparticipating retailers could respond by trying to compete by promoting the same efficient models as participating retailers. Our program theory assumes the latter. We will monitor the PQS for participating retailers and nonparticipating retailers to assess these complex market dynamics. Ultimately, the PQS for participating retailers must increase and, if market effects are to be claimable, the PQS at the market level must also increase.
5	Product Transition and Introduction Guidance 6-26-15 V2	Valerie	Product Categories	The proposed process evaluation approach includes multiple data collection strategies where information will be collected via interviews; in-store visits, baseline assessments, etc. With this approach, it seems there is an expectation to collect data to assess/validate each retailer's marketing plans/strategies for each product category, regardless of the retailer's implementation schedule. Given this, there are many challenges for implementing the "one-size fits all" data collection activities. The plan should include more discussion on the challenges and potential approaches for how it will address the multiple products with multiple marketing strategies with multiple timelines; maybe even consider multiple process evaluations either by product categories or by type of strategy, etc.	In the sections of the evaluation plan titled "Retailer Implementation Plan Reviews" and "Field Team Verification of Implementation Plan Activities and Shelf Surveys, " we describe the approach to address handling multiple products with multiple marketing strategies with multiple timelines. In summary, we will review all retailer implementation plans and develop an inventory of what activities are planned (e.g., sales pricing, unique placement, signage, etc.) and the exact dates they will be implemented. The field team will visit the stores and be directed to assess the degree of implementation of the different activities on the relevant dates. The type of product should not matter; all products can be assessed the same way. That is: Are the right models on sale? Are the right models displayed as expected? Is the appropriate signage in place? The variability issue will be dealt with by ensuring the field team is only assessing the specific promotions for the specific product categories for the specific retailers on the specific dates the implementation plans said they would be in effect.
6	Product Transition and Introduction Guidance 6-26-15 V2	Peter/Paula	Product Categories	Provide retail market share for room AC	EPA August, 2015 estimate for 2016 ENERGY STAR® spec Room AC market share is 30%, which PG&E considers to be relatively aggressive, given that there are yet no existing models currently certified to the ENERGY STAR version 4.0 specification (as of Sept, 2015). PG&E is considering to use a market share of 20%-30%, and then make updates after more data is available in 2016.
7	Product Mix Table (see tab 2 in this worksheet)	Peter	Product Categories	One question of note has to do with the product mix. In PG&E's presentation to the CalTF, the mix still included HTIB's. However, in the recent evaluation plan submitted this week, HTIB's are out and replaced by Room AC's, which haven't been in the product mix since January 2015. More generally, I'll note that the product mix has changed over time (see attached, taken from materials presented to either CalTF or CPUC). This presents some general questions about the process behind the measure list composition, and what's motivated changes at each of the dates noted, and more specifically how this affects work paper development.	Generally, by design, the product mix should be expected to change over time, and that is a positive feature of the RPP design since we will want to adjust to national partnership needs, product market evolution and progress of the program with individual products for transitioning products in and out. The summary matrix showing our RPP measure mix over time demonstrates well a natural and expected evolution of measure mix, starting with our initial draft plan that we used for discussions among national partners and which was tuned to a degree to our focus on Kmart. The matrix also illustrates our subsequent learning and adjustments for partner needs and program plan needs. Indeed the work paper will also adapt over time, and we will need to continue our discussion with your team about how the work paper process will be able to address this, such as through regular annual updates. The work paper that we are reviewing with CalTF and will subsequently submit to the ED for approval will be up-to-date with the latest product mix at that point in time and what we expect into 2016. As the need to adjust the mix comes into play, we will want to have a work paper approval process agreed with you in advance that will be able to handle this need over time, such as through regular annual updates. Specifically, - Room ACs have always been of interest to us and other program and retail partners for inclusion in this program. We included them in our initial proposal, but decided to delay including them, since some of our national program partners had Room ACs as downstream measures and were concerned about confusion and eating into those savings. We are now at a stage when we think we can mitigate that former concern with inclusion of Room ACs. - HTiB was removed after recent engagement with Energy solutions, NEEA and EPA to determine there was limited product availability for HTiB and some technical definition overlap with the Sound bars. Also, HTiB had been more important at the time for Kmart than other retailers, which is of less concern now that we are expanding to other retailers. Sound bars take up 90% of the energy star home audio equipment, so we think we have sufficient coverage in that product category at this time. - The CalTF work paper review process will be able to flexibly adjust to our adjustments, so that they will have considered our most-current product mix offering prior to our work paper submission to ED. As mentioned above, we have adjusted and will further adjust the work paper for CalTF review, so that they are considering our current planned mix. The 9/24 meeting will include basic tiers for the latest product mix – air cleaners, room ACs, food freezers, electric dryers, gas dryers and soundbars. For the 10/22 meeting, we plan to focus on the addition of Advanced Tiers for air cleaners, room ACs and soundbars.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
8	Market Barriers	Peter/Paula	Market barriers and Retailer Marketing Plan	A key tenet of Keating/Prahl's work on market transformation is the need for a clear analysis of market barriers. With RPP, we still have not seen an analysis of the barriers for the two markets addressed in this pilot: appliances and electronics. Customer barriers are the primary focus of the discussion, and yet markets consist of the interactions among customers, retailers, and manufacturers, among others.	While we have supply-side, market infrastructure, and demand-side market barriers that could conceivably affect consumer electronics and appliances, we did not attempt to identify how these barriers might be different for consumer electronics versus appliances. We will add a discussion of the market barriers specific to consumer electronics versus appliances and include a table that assesses how these market barriers might vary across these two general product categories.
9	Section 4.1, p18	Peter/Paula	Market barriers and Retailer Marketing Plan	The PTLM and Research plan propose that the marketing plan be developed by the retailers. How do you know the retailers have the expertise and understanding of the barriers to change the status quo? Do retailers have enough information to understand the market barriers that the marketing plans need to address?	Participating retailers will be provided with our assessment of the market barriers, how they might vary by product category, and ideas about how to address these barriers. We will then rely on their best professional judgment and available resources to address these barriers. Their implementation plans, including marketing plans, will be reviewed by RPP program staff to make sure that they can plausibly overcome these market barriers. These retailers have survived/thrived in a competitive market and have demonstrated that they have the expertise to address the key market barriers we have identified and sell products.
10	Section 4.1, p18	Peter/Paula	Market barriers and Retailer Marketing Plan	The RPP logic model places PG&E/PA's in the role of approving retailer marketing plans. However, in the absence of comprehensive market barrier analysis, which PG&E has described as the responsibility of the retailer, how will PG&E be able to approve these retailer marketing plans? We understand that retailers may run campaigns to promote the products. How will you monitor the success of the campaign? What is the expected outcome of campaigns? Should changes in sales patterns continue after the campaign? Not continue?	We do not hold that a comprehensive market barrier analysis is the responsibility of the retailer. As noted above, while we have supply-side, market infrastructure, and demand-side market barriers that could conceivably affect consumer electronics and appliances, in our original plan we attempted to identify how these barriers might be different for consumer electronics versus appliances. To the latest evaluation plan, we will add such a discussion of the market barriers specific to consumer electronics versus appliances and include a table that assesses how these market barriers might vary across these two general product categories. We also hold that we should not dictate the specifics of the market plan, but would rely on the retailers' considerable expertise to sell program-qualified products. As we noted above, participating retailers will be provided with our assessment of the market barriers, how they might vary by product category, and ideas about how to address these barriers. However, we will then rely on their best professional judgment and available resources to address these barriers. Their implementation plans will be reviewed by RPP program staff to judge if we think they can plausibly overcome these market barriers.
11	General	Valerie	Market barriers and Retailer Marketing Plan	In the documents there is the assumption that the key barrier to stocking more EE products is a lack of awareness among retailers regarding EE. However, the document is vague as to whether the lack of awareness is a customer issue where they are unaware or do not value EE as a feature over the non-EE products; or a delivery channel barrier where retailers are not aware that EE as a strong selling feature they are not using to encourage more sales. One barrier may call for an internal strategy of training and the other may call for more promotions/advertising directed to customers (retail advertising usually focuses on sales promotion versus product branding). Or they may call for both. However, it would help if the plan could more clearly articulate the "key" barrier(s) this program theory is addressing. It's not enough to have the retailers specify barriers in the marketing document, since the PAs have determined a pilot is needed to address a barrier specific to retailers.	In our next evaluation plan update, we will more clearly articulate the "key" barrier(s) that this program theory is addressing. See response to Item #10 above.
12	Market Barriers	Valerie	Market barriers and Retailer Marketing Plan	Also, may want to add to the PTLM the potential threat of non-participating retailers/ mfrs. conducting counter campaigns if they perceive a threat to their market share.	See response to Item #4 above.
13	General	Peter/Paula	Timeframe of the pilot	The research plan explains that very little result or impact will be noticed in the first two years of the pilot. How can we judge success in order to determine that this pilot should be scaled to a program?	Goals tied to key program indicators will be included as part of the advice letter requesting approval to conduct the pilot; they are not yet finalized. Also, as is under discussion, the pilot period of the program is expected to run for three or four years.
14	General	Peter/Paula	Timeframe of the pilot	You allude at this being a pilot but make references to activities happening after the period. Expansion of the pilot to a program is not a given and should be done based on pilot results. As the 2 year period is not going to show substantial results or results that may point to success, is the 2 year period an adequate timeframe?	We agree and accept that a pilot period is needed before authorization would be given or denied to continue further on the long-term plan for the program or to modify or end it; however, long-term planning is needed for a market transformation effort, so it is appropriate to discuss activities envisioned for the longer-term effort, IF it would continue. We agree that a two-year period is not an adequate timeframe for the pilot test period of the program. We are now suggesting a pilot period of the program to be four years, so that we can allow sufficient time to see effects from not only the first set of participating retailers, but also retailers that begin to participate in January 2017. We would then have three years of information from a more-full set of participants. This timeframe also allows for some implementation learnings and adjustments during the first year of the pilot period. The evaluation of the RPP pilot (and possible longer-term program continuation) will be a complicated, multi-year effort. The approach proposed for evaluating the RPP Program is also relatively new and novel, at least in the State of CA. While the pilot period itself will only last three or four years, the evaluation plan is presented in a way that allows us to capture the longer term perspective that will be needed to evaluate the pilot period of the program and the potential long-term program. However, throughout the plan we try to clarify what will be assessed during the pilot period of the program and what will need to be assessed over the longer term of the program. The EM&V team has recommended that a *minimum* of two or three years will be needed to observe at least some changes in retailer product assortments--the behavior change that will likely result in the largest impacts from the program. However, even a two or three year pilot period will pose challenges. For instance, if retailers know the pilot will be ending at the end of the second or third year, they may not commit to sustained changes in product assortments. Also, this is a market transformation program where mid-term outcomes are expected in roughly years 3-6, long-term outcomes in roughly year 7 and on. Thus, results from a two- or three-year pilot period cannot be used to **fully** assess the performance of the program and draw robust conclusions regarding to program's longer term potential. The results of the pilot will need to be considered carefully in the context of the expected, hypothesized outcomes in order to assess if the program appears to be operating as expected.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
15	General	Peter/Paula	Timeframe of the pilot	Budget. The annual expenditures have been discussed, but we've only seen a general estimate that has increased over time (our last discussion with PG&E revealed a range of $3 million to $5 million in annual expenditures). Please provide specific budget information for this pilot.	Budget information will be provided separately and included as part of the advice letter coming in the next few weeks. We will seek to provide some information prior to the AL filing, if that can be finalized sooner.
16	Section 1.1, p3	Peter/Paula	Number of participants	The pilot will start with 3 participants in year 1 and add other retailers by year 2. How will this impact the control groups?	Different start dates among participants can be managed and still deliver meaningful evaluation results. Two control groups are possible with this program: (1) nonparticipating *retailers* (these could be in CA or from another region/state), and (2) participating *retailers* non-participating *stores* (these would need to be from another region/state). The former will be captured via the market-level data analysis; the latter will be captured via the retailer sales data analyses (if we are able to get the requisite data from the retailers). However, regardless of the comparison group analysis, it is important to point out that for any given time period, each retailer or store can be classified as a participant or nonparticipant. Most all of our quantitative analyses will focus on proportions, meaning the number of participants and non-participants (i.e., the size of the treatment and control groups) will not be a problem and can vary over time. That said, one thing to consider as the program moves ahead is that once a sizable proportion of the retailers are participating in the program, a useful control group of nonparticipating *retailer*s will be of less and less value. Also, depending on the degree to which retailers conduct their purchasing, assortment, and promotions at the national level (which we have been led to believe is the case), the harder it will be to derive a useful nonparticipating *store* control group. This is why we have proposed both quasi-experimental comparison-based *and* participant-only designs; the usefulness of the approaches will likely vary based on when, in the life of the program, the analysis is conducted, and the availability of requisite data. Finally, it is also important to emphasize that the evaluation plan is designed in a way that no single result will drive the overall findings. Instead, in accordance with a preponderance of evidence perspective, final interpretations of program effects will need to be considered in conjunction with the array of other information (e.g., in conjunction with other models and analyses, in coordination with retailer and manufacturer self-report information gathered through in-depth interviews, etc.) gathered through the evaluation.
17	Section 1.1, p3	Peter/Paula	Number of participants	Which non-participants will remain to be influenced by the program when all major players are intended to be on board by the end of year 2?	Ideally, if the program meets it maximum potential, there will be no sizable nonparticipating retailers remaining after the first couple years, but we would not consider this to be a problem. See also the response to Item 16 above. An inherent component of the program theory is that the number of participating retailers will increase over time. Of course, taken to the extreme this would mean that there will be no nonparticipating retailers remaining after a few years. While it is desirable to get as many retailers on-board as soon as possible, it still remains to be seen when and if all the major retailers will ultimately join. If all sizable retailers do join the program in a couple years along with an increase in the number of program administrators, then the demand signal to manufacturers should be strong enough for them to shift production to these more efficient products.
18	Section 4, p17	Peter/Paula	Frequency of PPIs/data collection	Most PPIs are tracked annually. We request the sales data be tracked monthly to provide indication of changes in trends during the pilot implementation.	We agree that program progress should be monitored and discussed regularly by the PAs and CPUC Staff, with the benefit of tracked metrics to inform the reviews. We expect to jointly agree to a set of key metrics and periodicity of review. Full monthly evaluation reports would be very costly. However, we plan to develop a set of metrics that will be updated on a monthly basis-- possibly as a dashboard -- in order to provide timely information on program progress.
19	General	Peter/Paula	Savings/workpaper	It is clear that the program will not see substantial, if any, savings impacts in the first 2 years. This issue needs to be well clarified in workpapers and information provided to CalTF for analysis.	PG&E agrees with the importance of identifying and communicating savings expectations with the CalTF, and we are doing that. PG&E has had numerous meetings with the CalTF where we have presented a array of different aspects of the RPP Program. Among the things we have discussed were the results of the Phase I evaluation, which resulted in in-depth discussions regarding how and when energy savings would result front his program. We believe this has been made quite clear to the CalTF and is mentioned in detail in the workpaper.
20	Section 3.2, p14	Peter/Paula	Savings/workpaper	Keating and Prahl highlight the fact that MT initiatives should not seek resource savings as a short-term objective, if at all. However, PG&E identifies resource savings as just that – a short-term objective – which Commission staff believes sets the pilot up for failure when those savings do not materialize or fail to meet projections. Please explain whether and how PG&E will maintain a focus on short-term resource savings for this pilot.	The program is designed for, and will be implemented with, a primary focus on long-term MT effects. For this program gross energy savings are simply computed as the quantity of program-qualified units sold times the unit energy savings (UES) for particular subcategories of products. As such, energy savings will accrue continually over the life of the program -- in the short, mid *and* long terms and be reported, including during the pilot period of the program. However, we do not expect energy savings to be sizable in the first year or two because the retailers will not yet have had the opportunity to alter their product assortments. It is the assortment changes that will likely result in the greatest energy savings from the program. In the first year or two, any effects of the program will be predominantly a result of price, placement, and promotions. Nevertheless, even though this is a market transformation program and the savings are not expected to be sizable in the short-term during the pilot period, this does not mean that any energy savings attributable to the pilot period of the program should be disregarded. Energy savings simply result from the sales or program-qualified units, and are not tied to a specific time period. What the logic model does not clearly depict is the fact that the energy savings are expected to increase over time, from the short to mid to long terms.
21	Section 5.2, p31	Valerie	Savings/workpaper	The proposed approach to calculating UES for some of the basic measures (where hours of use, etc. already exist) and to use this to estimate savings if/when participant sales data is available is reasonable. The PAs have asked for a more flexible process to the current workpaper process since retailers will most likely change their product mix during the pilot. However, given that they would like to use UES as the estimator of energy consumption, they should be able to provide HOU for known measures quickly (hopefully, that can address some concerns in this area).	We agree and have always planned to update UESs on an annual basis.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
22	Section 5.2, p31	Valerie	Savings/workpaper	However, determining NTGR and market share is not so straightforward. These require having access to non-participant sales data. So far, the document is proposing an approach of gaining this information via accessing secondary data (same approach as specified in many other market effects studies for consumer electronics/lighting, etc.) This has been an ongoing issue for over a decade. It would help if the PAs could provide more information on what sources or a strategy for securing this information from the nonparticipating retailers (I know wishful thinking). However, if they cannot be more definitive in gaining access to this information, then it is highly possible that at the time the information is needed it may not be available, and much effort and money would have been spent with no way to address this key metric.	We are currently negotiating with NPD and AHAM regarding the purchase of data. The goal is to obtain data with sufficient granularity to calculate PQS at the market level.
23	Appendix B	Peter/Paula	PPIs success criteria	The PPIs have no success criteria. It is impossible to determine if progress is happening as planned if there are no milestones. Please develop milestones for PPIs necessary to determine success of the pilot.	We agree that program progress, including success criteria, should be monitored and discussed by the PAs and CPUC Staff, with the benefit of tracked metrics to inform the reviews. We expect to jointly agree to a set of key metrics and periodicity of review. We plan to provide our proposal separately and it will also be included as part of the advice letter coming as soon as possible in the next week or so.
24	General	Peter/Paula	PPIs success criteria	Keating/Prahl state: "An initial proposal for a market transformation initiative should provide specifics regarding how and when this will happen."	We agree, and plan to incorporate success metrics and timing information into program plan materials to be submitted soon for approval.
25	Appendix B	Peter/Paula	Interviews	Will interviews happen at the onset of the program to assess the level of knowledge of the retailers?	Yes, ideally interviews will be conducted with retail buyers and merchants as close to the start of the program as possible in order to develop baselines.
26	Appendix B	Peter/Paula	Interviews	Who is the marketer? You ask questions to assess the level of EE knowledge in general and in relation to qualified products. How will this influence the retailers marketing plans?	Corporate retail staff typically consists of buyers and marketers. In general, the buyers are responsible for making purchasing decisions; marketers are responsible for developing promotions and marketing collateral. Implementation of the RPP Program will require that both the buyers and marketing staff work together, likely both providing input into the retailer implementation plans. Buyers will need to make decisions about what products to stock, pricing levels, and ensure that inventory levels are adequate; marketers will need develop promotions for appropriate products, and possibly include energy efficiency as a promotional tactic.
27	Appendix B	Peter/Paula	Codes and Standards	The research plan mentions that RPP expects to claim savings from C&S 'because of the influence that the RPP Program is expected to have on accelerating adoption of new voluntary specifications and mandatory codes and standards, some of the energy savings associated with these shifting specifications/standards will likely be attributable to the program'. It is important to distinguish that the activity carried out under RPP is data collection that can be used to support C&S, however, C&S savings are attributable to activity directly related to C&S development – code language, test procedures, compliance specifications and cost-effectiveness. Unless RPP engages directly in these activities, savings cannot be attributable to the program. As this type of activity is not described in the PTLM this expectation is not supported.	This activity is described in in the PTLM related to the activity T and output U.
28	Section 5.5, p41	Peter/Paula	Quasi-Experimental Evaluation	The quasi-experimental comparison designs do not appear likely to produce unbiased and/or reliable results. - California is a national outlier in a number of ways and past evaluations that have compared CA to other states have had substantial issues. Given the reasonable possibility of retailer purchasing decision spillovers to other states from this intervention (and indeed the intent to go national), the retailer-level segmented regression is unlikely to be useful. - The market-level analysis is vague and underdeveloped. Exactly what the comparison group is and how non-program induced differences will be controlled for effectively is wholly unclear. This isn't a plan so much as wishful thinking	See response to Item #16. Further, evaluating this program will be challenging (see Ralph's comment in Item #34). We recognize the risks involved with our proposed design, but we do not want to rule out the efficacy and/or usefulness of the comparison group design until we have much better information on how retailers that will be participating in the Pilot period of the program purchase and assort products across regions. It may be that they do purchase and assort nationally or that there is significant spillover from CA to other areas, which would limit the usefulness of the participating retailer nonparticipating store modeling results. However, until we have the opportunity to talk with the retailer staff as part of the evaluation, we will not be certain. Also, we feel it is important to emphasize that the results of the modeling efforts will not be used in isolation to draw any final conclusions about the efficacy or performance of the program, including its pilot period. Rather, the modeling efforts need to be considered in careful conjunction with the array of other information and data that will be collected as part of the evaluation (e.g., the various modeling efforts, retailer staff interviews, manufacturer interviews, etc.). Regarding, the comment about the market-level analysis, we recognize that it is relatively underdeveloped because we have not yet seen the sales/shipment data we are hoping to receive from third-party sources (e.g., NPD, AHAM, CEA), and as a result cannot yet provide a detailed description of how we propose analyzing the data. We tried to provide a high-level description of what we predict we might be able to do given the unknowns. A more detailed description of the market-level analyses will be provided once we obtain some example data from NPD/AHAM/CEA.
29	Section 5.5, p41	Peter/Paula/ Valerie	Quasi-Experimental Evaluation	The 'quasi' experimental participant only designs are even less reliable/useful. - The classic pretest-posttest forecast is even more problematic for this program given how many things may affect the variable(s) of interest that are not controlled for between periods (I totally agree with this assertion regarding the pre-post-test analysis/forecast). Without a comparison group to give an indication of what would have in the time 2 in the absence of the intervention, it is quite possible that any observed difference will result entirely from non-program factors and yet be attributed to the program. This is a VERY weak quasi design. The models described performed very poorly in a recent PG&E paper comparing them to RCTs. - The pre-post segmented regression suffers from the same problems as the one above but introduces even more uncertainty/error in the determination of the segments. The effect of an intervention likely lags substantially the intervention itself, requiring an interpretation of when to segment the trend line.	See response to Item #16. Also, to be clear, a true RCT was never a part of the research design -- not even for the Phase I Trial; the designs have always been quasi-experimental (e.g., non-equivalent control group designs, participant-only pre-post designs).

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
30	Appendix B	Peter/Paula	Quasi-Experimental Evaluation	The footnotes on data collection and availability are very troubling. Failing to acquire at least a couple of years of weekly sales data means that all models will be subject to an extraordinary degree of error.	Obtaining proprietary market data of independent companies should not be expected to be simple and easy, such that a realistic and practical approach must be expected to balance the interests of voluntary participants with program data collection ideals. Even two years of weekly historical data would result in models with substantial error bounds. Addressing the plug-load challenge in CA is a recognized challenge, and there is a shortage of other viable program models targeting plug loads, as noted by Ralph in Item #34.
31	Appendix B	Peter/Paula	Program attribution	The proposed adjustment of national market share by funding share is not suitable to adjust sales to CA territory. Gross market effects should be adjusted to CA using sales which is more representative of the CA share of a national market. 〖Gross Market Effects〗_CA=〖Gross Market Effects〗_US 〖× SalesFunding Share〗_CA (13)	We revised the equation to rely on unit sales and will update the attribution section in the evaluation plan.
32	Section 6, p49	Peter/Paula	Program attribution	Attribution score should be determined based on PA having fulfilled the commitments and targets for each activity and reaching expected outputs. this calls for success criteria to be attached to indicators to enable assessment. (I also concur with this assessment)	Success criteria for key metrics are being developed by the RPP Program team and will be included program material updates. Monitoring activity is helpful in ongoing management of a program, but in the end success with outputs is primary, and activity level assessment is less important.
33	Section 5.5, p41	Peter/Paula	Baseline	It is not clear what are the relationship and/or role of the various proposed quasi-experimental evaluation designs described in the analysis methods and the Bass Diffusion model only briefly mentioned in the cost-effectiveness section. Explain what the application of each approach is and how they relate, or not.	The various quasi-experimental evaluation design will assess the extent to which any differences in the PQS of participating retailers and nonparticipating retailers are statistically significant. This is focused on testing the causal hypothesis associated with link #9 between outcomes I and J. The overall assessment of the efficacy of the RPP Program will be based on the theory-driven approach which takes into account all of the analysis of all metrics associated with program activities, outputs, and outcomes at any given point in time over the ten-year period. That is, the overall assessment takes into account the evidence collected at any given point in time for each of the causal hypothesis depicted in the logic model.

The initial Bass diffusion model produces an estimate of the NTGR for the each product category and the overall program over the full ten-years of the program. The diffusion model will |
| 34 | General | Ralph | General | In general, I think this evaluation plan is well-considered and consistent with the national body of knowledge and experience regarding the evaluation of MT initiatives. My comments for the most part are not major, although I would say a number of them rise to the level of being substantive.

However, I think nobody should be under any illusions that this program is going to be anything other than exceptionally difficult to evaluate. In general, I believe RPP is worth trying despite these evaluation challenges, due to the shortage of other viable program models targeting plug loads, and the significant traction that has been achieved in gaining national collaboration. | Points well taken. |
35	Section 4.1, p20	Ralph	Program attribution	"PG&E has the largest geographic service territory in the state, which will allow us to capture a large number of stores, and there is little reason to believe that the retailers' actions within the PG&E service territory would be systematically different than the retailers' activities in other service territories." - This all makes little sense to me. If there is really no geographic variation to be expected in retailer's responses, then there would be no need for a national evaluation at all, and PG&E's (or any other single program sponsor's) evaluation would be sufficient. But this is of course not the case. There will be regional differences in what gets promoted, how it gets promoted, how the program gets administered, the responses of regional-level market actors, the presence of retail chains, etc, etc. Reading between the lines, this reads as if the other IOUs have signed on, but subject to the agreement that they not be bothered with evaluation requirements. This does not seem like a good omen.	We have revised the plan to include field verification and shelf surveys across the state.
36	Section 4.1, p20	Ralph	Program attribution	" Finally, any notable and systematic deviations from the implementation plan activities will be noted by the field services team and communicated to the program staff so that the retailer buyers and marketing staff can be informed and remedial actions will be advised . Since most retailer buying, promotional, and stocking activities are managed at a regional or national level, we expect deviations from the plan would be addressed statewide ." - But if you're focusing solely on what happens in PG&E's service territory, you won't be able to observe any such deviations that are occurring outside of that	See response to Item #35.
37	Section 4.2, p27	Ralph	Frequency of PPIs/data collection	"Table 4 6 shows the components of the logic model and the proposed indicators. It is worth noting that all of the data collected with respect to the proposed indicators shown in the table will not support the evaluation of the 2016-2017 RPP evaluation—the information is being collected in order to develop baselines and changes are not expected for several years—but we recommend that they also continue to be collected every third year or so to track the transformation of the marketplace over time ." - It seems to me that every 3 yrs for manufacturer interviews is not nearly often enough given the centrality of changes in manufacturing practices in the program theory. Also, given that you're proposing that interviews with manufacturers be centralized in a national evaluation team, it doesn't seem like there are likely to be any issues with over-interviewing due to multiple entities trying to contact manufacturers. I'd advocate doing this every year.	While our revised the evaluation plan now suggests annual interviews with manufacturers, we note that structured interviews with manufacturers are difficult because manufacturers have more motivation to claim benefits for themselves than to attribute these benefits to a third party. There are alternatives to understand the programs influence on manufacturers. One is to measure the change in qualified products by manufacturers using data collected by the program. Another alternative is to monitor manufacturer participation at RPP meetings and related events.
38	Section 4.2, p28	Ralph	PPIs success criteria	For Outcome P, the proposed frequency of every third year after the baseline dara collection is not often enough.	See response above to Item #37.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
39	Section 5, p30	Ralph	Program attribution	*"Thus, the main effects of the program in the first year will likely be limited to marketing strategies such price reductions, improved placement, and increased promotion ."* - But how can these strategies have any effect at the national level given that they've already purchased their inventory? It can only move the inventory around. (Actually, retailers initially moving efficient inventory from non-participating to participating stores in response to the program almost seems predictable enough that it might be worth incorporating into the program theory as an early indication that the program is working as expected.)	We are not necessarily supposing that these particular shorter-term marketing and promotional effects will occur at the national level. Instead, we are expecting that the retailers will develop strategies and tactics to promote program-qualified products in the *participating stores* (i.e., stores in service territories for which they will receive incentives) .
40	Section 5.2, p32	Ralph	Evaluation	*"For a given product, market share is defined as the percent of all models sold in a given year that meet or exceed the Tier I specification as it was defined in 2016 when the program launched."* - I gather the intent here is to permanently freeze the reference point based on current ES qualifying standards. If I've got that right, I'm not sure I agree that's a good approach. In my experience changes in ES qualifying standards often have effects on what gets manufactured and sold that are sufficiently profound that after a couple years it may get difficult to even interpret what's going on if you stick to a frozen initial reference point. Let EPA make a major change in the qualifying standard for product category X in 2015, and by 2017 you may no longer be seeing any sales at all below the current qualifying standard. So I think it might make more sense to be prepared to shift the reference point based on changes in ES qualifying standards. (This comment meshes with a comment I make later that I think in general there may not be enough attention here to the importance of changes in ES qualifying standards.)	We agree that this definition should be clarified. Over the program period, the reference point will be set and reset a number of times. How many times this occurs will probably vary by product category. Before any given reset takes place, the market share will include all models sold that meet or exceed the current reference point. During the period governed by a particular reference point, the incentives for some models will cease while incentives for some newer models will begin. Of course, during this period, savings associated with incented models will be counted. In addition, models for which incentives are no longer provided will also be tracked and savings claimed until they are no longer commercially available. While some believe that when the PQS has reached 70% a reset should be triggered, a formal threshold has not been established. It has been decided that when the PQS reaches 35% formal discussion with standards-setting bodies should begin regarding new specifications.
41	Section 5.4, p34	Ralph	Evaluation	I'm unclear on the distinction between [M1 and M2 in the logic model]. They appear to be identical except one says MTI and the other says PPI. Is this intended to indicate that the indicator is used for both purposes? Or is it just a typo?	M1 (the PPI) is by retailer, while M2 (the MTI) is in aggregate. In terms of assessing market transformation, we are interested in the overall market, thus the MTI is in aggregate. However, we will also likely be interested in understanding how retailers may differ from a program performance perspective, thus the retailer-specific PPI.
42	Section 5.4, p34	Ralph	Evaluation	For MTI S2, Shouldn't change in availability be measured based on manufacturing, purchasing and stocking practices? You seem to have it based on sales.	We are limited by what data is available. Some of the data will be sales data (e.g., participating retailer data, NPD data), some of it will be shipment data (AHAM, CEA). Manufacturers are very unlikely to offer any data as this program does not provide clear benefits to them. We assume that sales/shipment data is a reasonable representation of the availability of products under the assumptions that retailers will not be selling what they do not stock, and will not be stocking models they cannot sell.
43	Section 5.4, p35	Ralph	Baseline	*"Thus, the first-year effects will likely be limited, and only result from promotional activities, which will be relatively smaller than the effects expected from assortment changes . "* - And over the longer term, there are of course lots of other factors driving changes in PQS. How will you sort out the causes? (You discuss this at length later. I think you may just need to telegraph here that the issue is discussed in a later section.)	We will revise the text in the evaluation plan as recommended.
44	Section 5.5, p39	Ralph	Quasi-Experimental Evaluation	*"Or, the trend in the PQS estimated at some point after the point of intervention with the RPP Program might be different than the trend in the PQS without the RPP Program due to later changes in assortment . "* - At this point the program theory for RPP seems to unambiguously hypothesize nation-wide changes in the purchasing patterns of participating retailers over the mid-term (and little change in sales at all over the short term). I think any use of this approach needs to take this fact into account, and this discussion does not currently seem to do that. However, one could envision participating stores "taking off" before non-participating ones, as efficient stock already purchased or committed to by the retailer gets redistributed from non-participating to participating stores. This would suggest a different-looking curve than the example shown here: you would see P and NP stores ending up at roughly the same PQS, but participating stores getting thee more quickly, and perhaps non-participating stores first showing a decrease in PQS as stock gets shifted.	We will revise the text in the evaluation plan to clarify the possible outcomes and effects on PQS.
45	Section 5.5, p39	Ralph	Evaluation	*"For example, quarterly market share data could be purchased from NPD and/or the Association of Home Appliance Manufacturers (AHAM) and be used to compare to quarterly market shares for each product observed for participating retailers . The NPD data could even be incorporated into a segmented regression as described above."* - I'm a little skeptical that it will be possible to get market-level data at a level of granularity that is close enough to that provided by participating retailers for meaningful comparisons to be possible. I would love to be proved wrong on this. Perhaps the program should make some effort to get those manufacturers who benefit the most from RPP to provide national, all-channels sales data. We're heading toward there being enough $$ at stake here that they may stand up and take notice.	As denoted throughout our comments, we also have concerns and questions over the availability/quality/usefulness of the third-party data (e.g., NPD/AHAM/CEA). We will consider the recommendation of trying to obtain manufacturer data. However, we also believe many of the quality/usefulness concerns will remain.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
46	Section 5.5, p39	Ralph	Evaluation	*"Further, because of the regional and even national level buying practices for many large retailers, coupled with the fact that there are plans to scale the RPP Program to the national level, means that defining a representative, unaffected set of retailers to use as a comparison group in the future will become increasingly difficult, if not impossible . As a result, the evaluation team also proposes participant-only designs that can be used to assess program impacts in conjunction with the other methods."* -But it seems to me that it should still be possible to look for changes in the timing of changes in efficient market share. For example, do participating retailers show a systematic tendency to pick up before non-participating ones. Similarly, within a particular retailer, efficient market share for incentivized product categories might be expect to pick up before that for non-incentivized product categories.	Actually, the segmented regression approaches do tie in the temporal variability when we code in the intervention activities for the analyses. For example, the results of the Phase I Trial evaluation showed that the models were able to effectively detect the effects of specific intervention activities for the participating stores. With regard to the last sentence of the comment: we will not be able to assess incentivized product categories versus non-incentivized product categories because we will not have access to the retailer sales data needed to implement such an analysis on non-incentivized products.
47	Section 5.5, p40	Ralph	Evaluation	*"The difference between the program-period data and the forecasted baseline is the net effect of the program. Figure 5 3 illustrates this approach."* - I think we need to consider the effects of changes in ES qualifying standards here. In my experience those tend to have sudden dislocating effects on efficient market share, as manufacturers respond to and anticipate them.	If the baseline is reset every time there is a change in the ES qualifying standards, the market share for that product will drop, probably dramatically. We have a perhaps different way of thinking about PQS that does not involve changing the reference point every time there is a change in ES qualifying standards. As we noted above in Item #40, over the program period, the reference point will be set and reset a number of times. How many times this occurs will probably vary by product category. Before any given reset takes place, the market share will include all models sold that meet or exceed the current reference point. During the period governed by a particular reference point, the incentives for some models will cease while incentives for some newer models will begin. Of course, during this period, savings associated with incented models will be counted. In addition, models for which incentives are no longer provided will also be tracked and savings claimed until they are no longer commercially available. When the PQS has reached 70%, for example, the market has been transformed with respect to all models that meet or exceed the applicable reference point. At this point, a reset should be triggered. While the level of PQS that triggers a reset has not been proposed, it is proposed that when the PQS reaches 35% a formal discussion with standards-setting bodies should begin regarding new specifications.
48	Section 5.5, p43	Ralph	Evaluation	*"This could be helpful for assessing incremental change over time."* - I think in general this discussion of quasi-experimental methods could stand to pay more heed to the likely confounding effects of history – notably, the effects of changes in ES qualifying standards, which in my experience tend to have sudden and major dislocating effects on efficient market share.	We agree that history is the principal threat to internal validity not only for the pre/post participant design but also for any comparison group design if one cannot incorporate relevant covariates. However, given our comments in Item #47, we do not expect the regression models to be affected by sudden and major dislocating effects due to changes in ES qualifying standards.
49	Section 5.5, p43	Ralph	Quasi-Experimental Evaluation	*"Though the results will not be used on their own to make any claims of attribution, they will be used as another piece of evidence to support the more comprehensive and holistic assessment within the theory-driven evaluation framework."* - I think given the substantial limits to the use of quasi-experimental design for this program, self-reports are likely to play a critical role.	Agreed. We place more emphasis on this point in the revised plan.
50	Section 8, p48	Ralph	Cost-Effectiveness Analysis	NTG- I know what you mean by this term from other pieces, but I don't think you've defined it as of yet in this piece.	Will revise text accordingly.
51	Appendix A, pA-1	Ralph	Program Theory and Logic model	*"A more complete program theory and logic model is being developed and will follow as a separate document ."* - Is this still true?	Yes. It should be available around the end of September.
52	Appendix A, pA-2	Ralph	Evaluation	*"Holding meetings and working groups to target products ripe for new standards, and"* - I might have missed something, but one evaluation activity that I think may tend to get somewhat short shrift in this piece is simply documenting all the meetings and discussions that take place over the years. Having a full paper trail on this proved to be something of an issue in the BCE evaluation.	More detail has been added to the plan with regards to this issue.
53	Appendix A, pA-3	Ralph	Evaluation	This comment is placed here mainly just because this where it occurred to me: in general, I think this piece could stand to give a little more recognition to the fact that there are likely to be differences in the way different product categories need to be evaluated, stemming from differences in market conditions. The recent dialogue between Peter F/Paul G and the IOUs regarding attention to market barriers is an example of this issue. Peter and Paula asked why there is not more focus on documenting market barriers and progress toward addressing them, and the IOU response was basically that market barriers were likely to be specific to individual product categories and thus need to be driven at that level. That response made sense to me, but it highlights the broader fact that this evaluation will to some extent need to be performed at the product category level, with consideration of differences in market conditions across product categories, and with the retailer implementation plans being a major input. The retailer implementation plans should be a good indicator of what market barriers the retailers think apply that they can do anything about, and the evaluation should then adapt to those hypothesized market barriers. I think the impact eval section perhaps does not focus quite as much as it should on this issue.	We will more clearly articulate the "key" barrier(s) that this program theory is addressing. See Item #10 above. As noted in Item #9, participating retailers will be provided with our assessment of the market barriers, how they might vary by product category, and ideas about how to address these barriers. We will then rely on their best professional judgment and available resources to address these barriers. Their implementation plans will be reviewed by RPP program staff to make sure that they can plausibly overcome these market barriers. We agree that the set of market barriers could vary by product category and that the evaluation should track progress towards overcoming these barriers on a regular basis. We will include such a discussion in the evaluation plan.
54	Appendix A, pA-5	Ralph	Program Theory and Logic model	*"This would be expected for any participating retailers who make assortment decisions at a regional (or even national) level instead of assorting high-efficiency products at only the participating store locations within PA service territories ."* - I think this passage may be out of date: this is now a central part of the program theory, is it not?	We agree. A major goal of the program staff is to add program administrators so that the expected demand for program-qualified products would be sufficient for retailers to make regional and national stocking and assortment changes for the products. This specific element was not incorporated into the logic model because it would have made the logic model exceptionally complex. We will be more explicit that this is a central part of the program theory.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

| Program Title: | Retail Products Platform (RPP) Program (Pilot Period) |
| EE Portfolio Program: | Residential Program, Plug Load and Appliances (PLA) subprogram |

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
55	Appendix A, pA-5	Ralph	Program Theory and Logic model	*"That is, non-participating retailers might adopt some of the same marketing strategies used by participating stores as a way of increasing sales and profits . "* - I think there has been some fluctuation over time in the extent to which increased efficient market share among NP retailers is hypothesized as being driven in the manner described here, vs being driven by manufacturers changing what they produce in response to changes in purchasing behavior by P retailers. My sense is that the program theory has evolved more toward the latter, and that this passage may be a bit out of date. To the extent that reactions by NP retailers is still envisioned as a major, direct causal mechanism, I think we need a better explanation as to why NP retailers would feel any need to adopt the same practices as P retailers.	The retail industry is highly competitive and this competition will drive non-participants to join the program when the financial incentives meet their business goals. The number of participants is constrained by the size of the program budget, which is planned to be managed to strike a balance seeking sufficiency for program success but not overinvestment, particulary during the pilot period of the program. Broad participation reinforces manufacturer decisions to make qualified products. When the market share of the participating retailers is exceeds 70%, manufacturers pay close attention to specifications of qualified products. Many of the remaining retailers in the remaing 30% of the market are independent, regional businesses who are aggregated in buying groups. These buying groups also coordinate marketing activities and represent their members at industry events including ENERGY STAR.
56	Appendix A, pA-6	Ralph	Program Theory and Logic model	*"ENERGY STAR® policies and requirements"*- As discussed in earlier comments, I think this issue gets sort of short shrift in the impact discussion.	Evaluation plan will include a set of evaluation activities to specifically address the influence of ENERGY STAR policies and requirements on changes in efficiency standards and PQS. Via its leading role in design and implementation of the national RPP effort, PG&E is also influencing ENERGY STAR policies and requirements.
57	Appendix B, pB-1	Ralph	PPIs success criteria	The RPP Program Indicators: I agree with Peter and Paula that it would be useful for PG&E to commit to some specific changes in leading program indicators by the end of the first two-year period that would be viewed as go/no-go criteria for continuation of the program.	Success metrics for key indicators that would be agreed with CPUC Staff are being developed that will be used assess performance for the pilot period of the program to determine the extent to which the program is on track to achieve its longer-term objectives and used for a go/no-go decision.

IOU Questions

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
58	page-4	SoCal IOUs	Program operations	*One of the evaluation findings from the prior BCE program design is program's inability to quickly ratchet up to the latest above-and-beyond standards as the existing standards rachet-up.*	Agreed. The product transition strategy has been developed taking into consideration the need to have more stringent tiers as the need arises (i.e., market share reaches a pre-defined level).
59	Chapter-4	SoCal IOUs	Limitations of shelf survey	Actual in-person field verification and shelf stock analysis are helpful and interesting, but it may be too expensive and slow. How about using a web-crawler to gather information in addition to the standard shelf verification activity.

The web-crawler information is not meant to illustrate the development of the entire market place, but it is indicative of the market development and price points, etc.

The data gathered from the web crawler is indicative to the market dynamic of product and price changes. | We have actually been using a web crawlers to gather information on IMCs. However, while the web crawler approach is proving useful for that effort, it does not allow us to separate out brick-and-mortar sales. The use of a web crawler for assessing product assortment changes is not something we have fully considered as of yet. Also, a web crawler will not capture all aspects of the retailers implementation plans, such as unique placement, staff training, promotional materials (e.g., flyers, signage, etc.). |
| 60 | p23 | SoCal IOUs | Limitations of shelf survey | Shelf survey may be too slow, too expensive, and too incomplete.

Web crawler could help add to this picture, but actual sales data analysis could add since not everything is stocked and represented on the showroom floor.

Is it possible to ask the retailers for their sales sku information to keep track of what skus are offered vs not. I also agree with the comment that the important thing is to measure the change in stocking behavior. This effort in shelf survey will not be able to discern the changes in stocking behavior. | We will be receiving monthly sales data from the participating retailers at the SKU level. We still feel that shelf surveys can provide useful information. It remains to be seen if the costs of conducting these are prohibitive, or if the value of the information collected will outweigh the financial costs. |
| 61 | table 4-2 logic model | SoCal IOUs | Limitations of shelf survey | Shelf survey will not give you a comprehensive view of product offering from the retailers. We want to know product sku offerings from each retailer location. | Agreed. However, we will have comprehensive SKU information because we will be get SKU-level monthly sales data from the participating retailers. |
| 62 | table 4-2 logic model | SoCal IOUs | Clarification | The definition of "placement" here is not clear. Are you talking about the "sales channel", which we know you have a known selection of channels for this phase of the pilot.
Are you using "placement" in a different context? | We are referring to where the product is placed in the store. For example is it placed in a bulk-stack display at the from of the store? Is it placed on the bottom shelf near the back of the store? Is it place on an end-cap? |
| 63 | table 4-3, logic model | SoCal IOUs | Clarification | What about the AKA-B of the retailers' sales staff--the person that is selling the products? How is this tracking overtime. | The AKA-B of sales staff could be an important metric to monitor if one or more of the retailers make a substantial effort to train their staff with respect to the program-qualified products. Mystery shoppers, either in-store or by telephone, could be done, budget permitting. It remains to be seen whether any of the participating retailers will include such training in their marketing and promotion plans. |

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
64	p28 & table 4-5, output H	SoCal IOUs	Clarification	Is this the retailer sales staff interviews? Would this be done at the store level per location? We also want to know the effectiveness of the in-store training efforts. Good, this answered my concern about the need to have retailer training. I understand why you make this into a short-term PPI, but for RPP to be successful, a more knowledgeable retailer sales force is necessary. From past retailer program implementation, we know this is a challenge for all concerned due to the transition nature of this job (i.e., high turn-over job).	Actually, a more knowledgeable retailer sales staff IS NOT necessary for this program to succeed. The greatest effects from the RPP Program are expected come from retailer assortment changes. That is, if today 25% of the products on the floor are energy-efficient and at some later date, due to the program, 50% of the products on the sales floor are energy-efficient models, customer choice has been constrained and a greater proportion of efficient models will end up in customers homes. That said, if sales force training is part of any retailer plans to implement the program, we will assess the degree to which the retailers' implemented the training.
65	Page 30	SoCal IOUs	program operations	This is important information to help the implementation program team to time the "offering ratchet".	The "ratcheting" will be driven by attained market share and not strict temporal timing. For example, a new qualifying tier would be introduced once market share for a product category reaches 70%.
66	Table 4-6, outcome Q	SoCal IOUs	logic model and indicator	I am not sure this is a long term indicator also. With annual product update, this should be an annual tracking indicator.	Even though this is denoted in the logic model as a long-term outcome, we will be tracking this annually. From a market transformation perspective, this outcome is about irreversibility. This is not about increasing production for short periods of time (e.g., pumping up production of a model by adding another shift), it is about permanent shifts in production (e.g., re-tooling, long term contracts for parts and materials, etc.).
67	Table 4-6, outcome P	SoCal IOUs	logic model and indicator	Are these really long-term MTIs when these products are expecting annual product updates in the market place. I think these should be annual indicators and tracked/measured on an annual basis.	Logic model has been revised accordingly.
68	p35	SoCal IOUs	indicator	Need to know % of sales in the product category (all less than, equal to, and greater than Energy Star qualification) The above metric can help measure market share of the RPP product/measure within the market place, thus monitoring market share, if tracked annually. In this case, we are also interested in knowing if RPP is reducing the sales for non-Energy Star qualified products within the same product category.	From the monthly sales data, we will know % of sales in the product category (all less than, equal to, and greater than Energy Star qualification). This metric will be tracked monthly and reported quarterly. This metric also captures whether the RPP is reducing the sales for non-Energy Star qualified products within the same product category
69	p38, Outcome O	SoCal IOUs	Indicator	More elaboration is needed here -- how do you plan to quantity the environmental and non-energy impact? How would you even define these variables?	We will propose metrics for environmental benefits. Non-energy benefits will require some additional thought.
70	p38, Outcome N	SoCal IOUs	Indicator	Thank you. This is important to track non-participating stores and retailers. How would you gather this data.	Assessment of changes in share of efficient products could be based on NPD, AHAM, and CEA data. We are currently negotiating with these organizations regarding the purchase of data. The goal is to obtain data with sufficient granularity to calculate PQS at the market level.
71	p39	SoCal IOUs	Indicator	Please also add the following: Total non-qualified units sold/total units sold (metric for non-energy star qualified products). Total above ES qualified units sold/total units sold (metric for above-energy star qualified products).	Isn't the *total non-qualified units sold/total units sold* metric simply *1- total qualified units sold/total units sold* , a metric which we are already tracking? We can track and report *total above ES qualified units sold/total units sold.*
72	p40	SoCal IOUs	UES	This is a good way to calculate energy savings. With this methods, we are assuming the average purchase will be below ES qualified unit. By now, this must be an approved method by the ED/CPUC. Can you confirm this? For qualified units, would you include ES and above ES products?	Yes, it's been approved with caveats added by Ralph Prahl. Note that the evaluation team has also noted some limitations regarding it use.
73	Chapter 6 & 7 & 8	SoCal IOUs	Clarification	More elaboration is required for this section. This is a good high level description.	Separate documents have been developed for your review including: 1) NTGR(V27).doc (*Estimation of Net-To-Gross Ratios for the PG&E RPP Program Using Generalized Bass Diffusion Model*), 2) Benefit-Cost Case Study The RPP Program(V1).doc (*Proposed Benefit-Cost Framework for Market Transformation Programs: The Case Study of the PG&E Retail Plug-Load Portfolio Program*) along with a series of spreadsheet including the modified E3 Calculator.
74	p36	SoCalGas	add reference to therms	formular (4) and (5), please add reference to therms	Done
75	p37	SoCalGas	reference to " stores of participating retailers outside of "	Would need similar weather patterns to look at room air conditioner sales comparison.	Agreed.
76	p38	SoCalGas	reference to " quarterly market share data could be purchased from NPD and/or the Association of Home Appliance Manufacturers (AHAM) "	Is this data by retailer or just totals by State, etc.?	Just totals by state.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

Program Title: Retail Products Platform (RPP) Program (Pilot Period)
EE Portfolio Program: Residential Program, Plug Load and Appliances (PLA) subprogram

Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
77	p. 1	SCE	"this evaluation should be viewed as a second-phase developmental evaluation "	It would be most appropriate to call this an Early EM&V effort. Per the evaluation protocol, the IOUs are explicitly permitted to conduct early EM&V on pilot projects.	Will revise text accordingly.
78	p. 8	SCE	"with the right combination of incentives and engagement, market barriers … can be reduced"	How will market barriers be identified?	See Items #9, #10 and #11 above.
79	p. 13	SCE	"retailers will have already made stocking and purchasing decisions prior to the start of their participation in the program"	This has often been a challenge for the upstream lighting program, especially in years when continued funding was an issue (e.g, due to delays in decisions). The pilot also has to be careful to concentrate activity at the right time of the year, when these decisions are made. Did the early ET pilot reveal information on this?	Such information is presented in the PTLM as part of the market characterization.
80	p. 15	SCE	"we will attempt to mitigate the various sources of error in this evaluation."	That is a good plan, but would like to see more information during data collection phase.	The market progress reports will address the potential sources of errors associated with the data collection and analysis associated with each market progress report.
81	p. 17	SCE	"This evaluation plan is targeted at evaluating a novel and complex market transformation program using a theory-driven evaluation framework . "	Yet much of the research plan still reads like an evaluation for an RA program (see comments above). This needs to be clearer. How does this evaluation plan specifically address the challenges of an MT program?	We disagree with this comment. While the program will be claiming energy and demand impacts once the program is launched, this plan focuses on the evaluation of a MT program using best practices to identify sustainable changes in the structure and functioning of the market.
82	p. 19	SCE	Field team verification	Shelf surveys are expensive and cumbersome, but are very much needed here. Web-scraping is useful to obtain an overall idea of pricing, but not to demonstrate changes in stocking. Especially at program outset, it is likely that offered products won't change online, as the websites are national. We think the evaluation team should ensure this effort goes beyond standard store visits by the field team. This is going to be key in establishing a baseline and attribution.	Shelf surveys are incorporated as part of the evaluation plan. We agree that web harvesting will not give us the information we need (web harvesting will likely only be useful for assessing pricing). In addition, the monthly SKU-level sales data we will be receiving from the retailers will be generally representative of the retailers product assortments--retailers will not be selling products they do not stock and they will not be stocking products they do not sell.
83	p. 20	SCE	"there is little reason to believe that the retailers' actions within the PG&E service territory would be systematically different than the retailers' activities in other service territories"	This is an unproven assumption.	We have revised the field verification and shelf surveys to sample from among the participating IOU service territories instead of relying just on the PG&E field team and service territory. This will be a logistically more complex--and much more costly effort--but is the only way to assess the validity of the assumption while confronting other reviewer concerns over the field research design.
84	p. 23	SCE	Table 4.4	A1 - sales volumes: Use of critical review of information to calculate this MI. This is unclear. Can the residential solution workbook support this calculation? D1 - number of retailers targeted: I would also suggest to tally the number of participating locations. One retailer could have many or few locations and that would be a more meaningful measure. E1 - Energy-savings market potential for potential retailers: Longterm forecast of market adoptions data will be very difficult to obtain at such resolution. Can you provide detail on how this would be implemented? F3 - Participating Retailer Market Share -See above – is market share data easily available? It is almost impossible to make this calculation for ULP. F5 - Energy-savings market potential for participating retailers and long term forecast. Suggest to consult RSW. This data is difficult to obtain/estimate.	A1. Shipment data from a variety of sources can be used, including the Residential Solutions Workbook. Other sources can include: NPD, Association of Home Appliance Manufacturers (AHAM), and the Consumer Electronics Association (CEA). Negotiations are under way with all three to obtain shipment data as well as customized sales forecasts for targeted product categories. D2 (also see D2). Note that D2 is a compliment to D1 and is intended to assess the reach of each of the participating retailers, which captures the same concept as the reviewers comment. E1. Market potential will be estimated using an extended generalized Bass diffusion model (see NTGR(V27).doc (*Estimation of Net-To-Gross Ratios for the PG&E RPP Program Using Generalized Bass Diffusion Models*) for more details. F3. The participating retailer market share will be based on the most recent 12 months of historical sales data provided by participating retailers. F5. This will be based on long-term forecast of energy and demand potential from E1 above times the appropriate UES and UDR values.

CPUC-IOU Program and Evaluation Plan Questions/Comments, Responses & Feedback (as of 9/24/2015)

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Item #	Page/Chapter in Eval Plan unless noted	Commenter	Topic	ED Review Comments	Response
85	p. 27	SCE	RPP Program Collaborator Interviews	The need for this activity is not clearly demonstrated. It could be preferable to concentrate resources elsewhere.	Several components of the logic model (Activities A-E) focus on PAs collaborating on the larger scale implementation of the program. Without such collaboration and scale the RPP Program is unlikely to succeed. Though costly, the resources allocated to this effort overlap with the resources that will be needed to understand the PAs collaboration to effect ES and C&S specs and standards.
86	p. 28	SCE	Table 4.7	Level of collaboration. There is no standardized measurement for level of collaboration, and the answers are going to be highly personalized. I am not sure this is worthwhile.	We disagree. Interorganizational relationships have been studied for a long time. While no standardized measurement of programs exactly like the RPP have been developed, there are a number of instruments that have been developed to measure cooperation/collaboration that could be adapted to our purposes.
87	p. 30	SCE	Retailer sales data	My experience with midstream pilot is that the historical data will be difficult to obtain, and/or not in a format conducive to comparison. Do the evaluators have a contingency plan if baseline data cannot be obtained from the retailers?	We expect that we will be able to obtain at least 12 months of historical data. This is one of the contractual stipulations being posed to the retailers during recruitment.

Appendix I

**Discussion of Market Barriers:
Review of Current Research**

Discussion of Market Barriers:

Review of current research

Jane Peters, Alexandra Dunn, Paul Schwarz, and Joe Van Clock
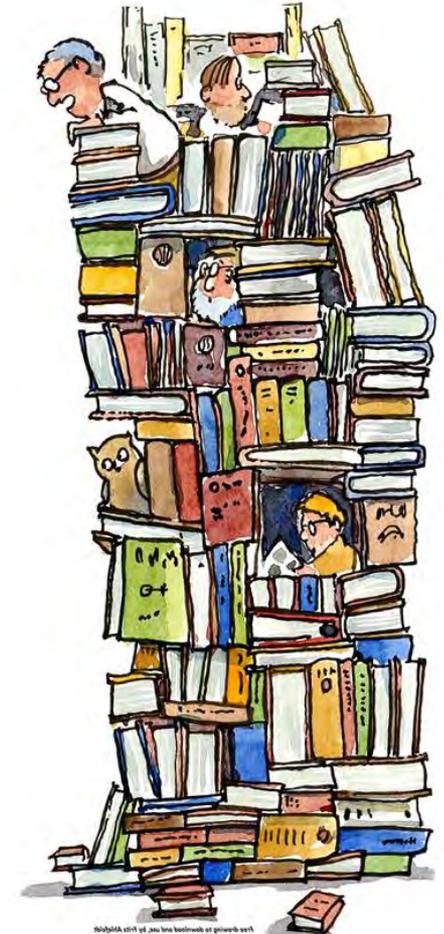
The plight of the "other" load

Plug loads account for virtually all of the 2013-2026 residential energy consumption growth, caused by an increasing growth forecast for "miscellaneous."

Tom Gorin, California Energy Commission
June 2015 presentation finding

44 %
Other

Space Heating

Water Heating

Air Conditioning
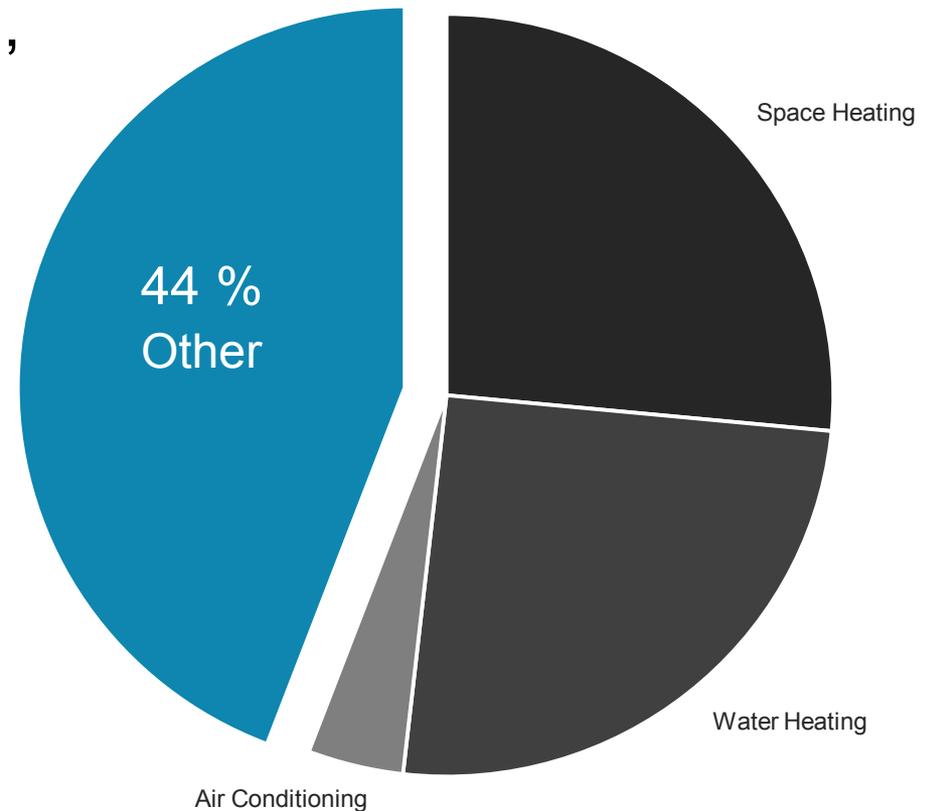
The plight of the "other" load

What is the best approach to address these "other" loads when…

… each "other" product uses a small amount of energy on its own but in aggregate "other" electric usage is high?

Source: RECS 2009 (Household Site End-Use Consumption in CA)

Answering your questions

Is the RPP design a "one size fits all" approach?

Why are retailers the key point of intervention in the PLA supply chain?

What role do the retailer marketing plans play in RPP?

What are the product category-specific market barriers that need to be addressed?

- Which market barriers is RPP designed to address? How?
- How will RPP increase consumer awareness of and demand for EE products?

What current market characterization data are available for the RPP product categories?

What additional research could support RPP?

Answering your questions

Design

Is the RPP design a "one size fits all" approach?

Why are retailers the key point of intervention in the PLA supply chain?

What role do the retailer marketing plans play in RPP?

Barriers

What are the product category-specific market barriers that need to be addressed?

- Which market barriers is RPP designed to address? How?
- How will RPP increase consumer awareness of and demand for EE products?

Research

What current market characterization data are available for the RPP product categories?

What additional research could support RPP?

We are…

Evaluators

- NEEA's TV Initiative
- NEEA's RPP Pilot
- CA IOUs HEER/BCE Programs
- NYSERDA's ES Products

Researchers

- Multiple consumer electronics MCAs
- Updated market inputs to RSW
- Emerging technology market assessments

Our perspective
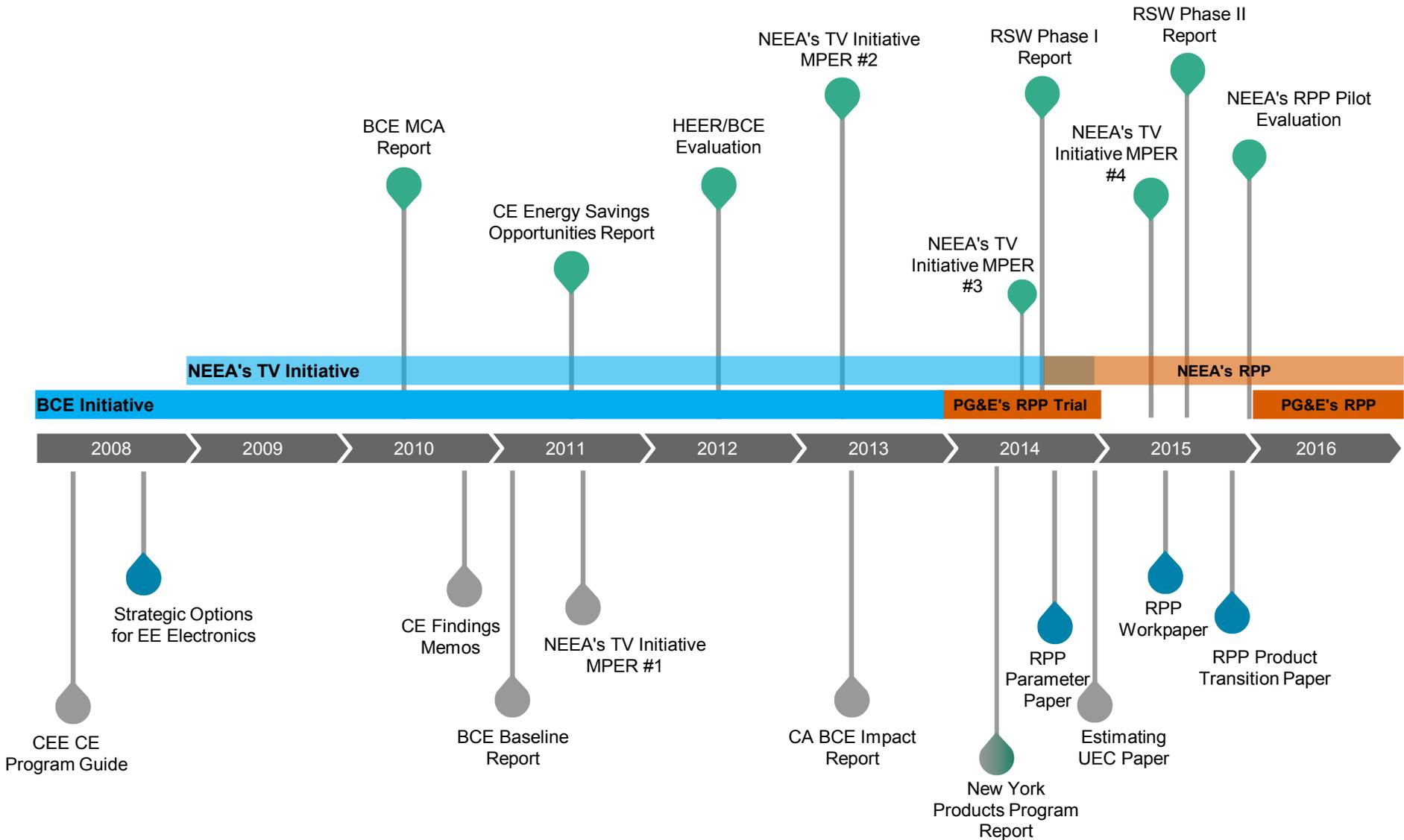
The sources we used

ODC STB findings

EMI BCE Evaluation findings

Methodology for calculating sales weighted UEC   Trial presentation

Workpaper presentation   Scoping study for MT programs   NTG presentation

RPP Workpaper NEEA TV MPER Evaluations

ODC Game Consoles findings

2014 RPP Trial evaluation   Product transition doc

BCE market characterization

MT policy paper   BCE HEER report

Strategic Options for EE electronics   BCE Baseline   RPP Parameter Report

Another RPP Trial presentation   NMR document on market transformation

Guidance on designing MT Initiatives   ODC Notebooks findings

RPP PTLM

Design

Program designs

	Upstream Manufacturer	Midstream Retailer	Downstream End-User
Goals	• ↑ manufacture of EE models • ↓ burden on retailers • Δ designs	• Δ retailer assortment selection behavior • Δ manufacturer designs • Motivate promotion	• ↑ sales of incented models
Product Pricing	• Incentive → lower price • Customer unaware of "true cost"	• Price may not change • Incentive too small to effect customer purchase decisions	• Incentive → lower price • Customer aware of "true cost" • Incentive IDs EE options
Target Product Categories	• Low saturation of EE models	• Many models • Model selection is complex	• Few models available • Models at many price points
Measuring Effects	• Qualitative results short-term • Use manufacturer shipment data to quantify LT	• Qualitative results short-term • Use market sales data to quantify LT	• Observe results quickly • Track incented sales
Determining Attribution	• Multiple methods needed to triangulate attribution	• Multiple methods needed to triangulate attribution	• Estimated from self reports & other methods (e.g., regression analysis)

The three "levers" of RPP

Supply Side

Manufacturers

Retailers

Demand Side

Consumers

Design EE models by request → Design EE models standard procedure

Request EE specifications

RPP

Assort more EE models

Implement choice architecture

Fewer non-efficient choices

Regular contact with EE products

EE products more visible

Increased awareness of EE
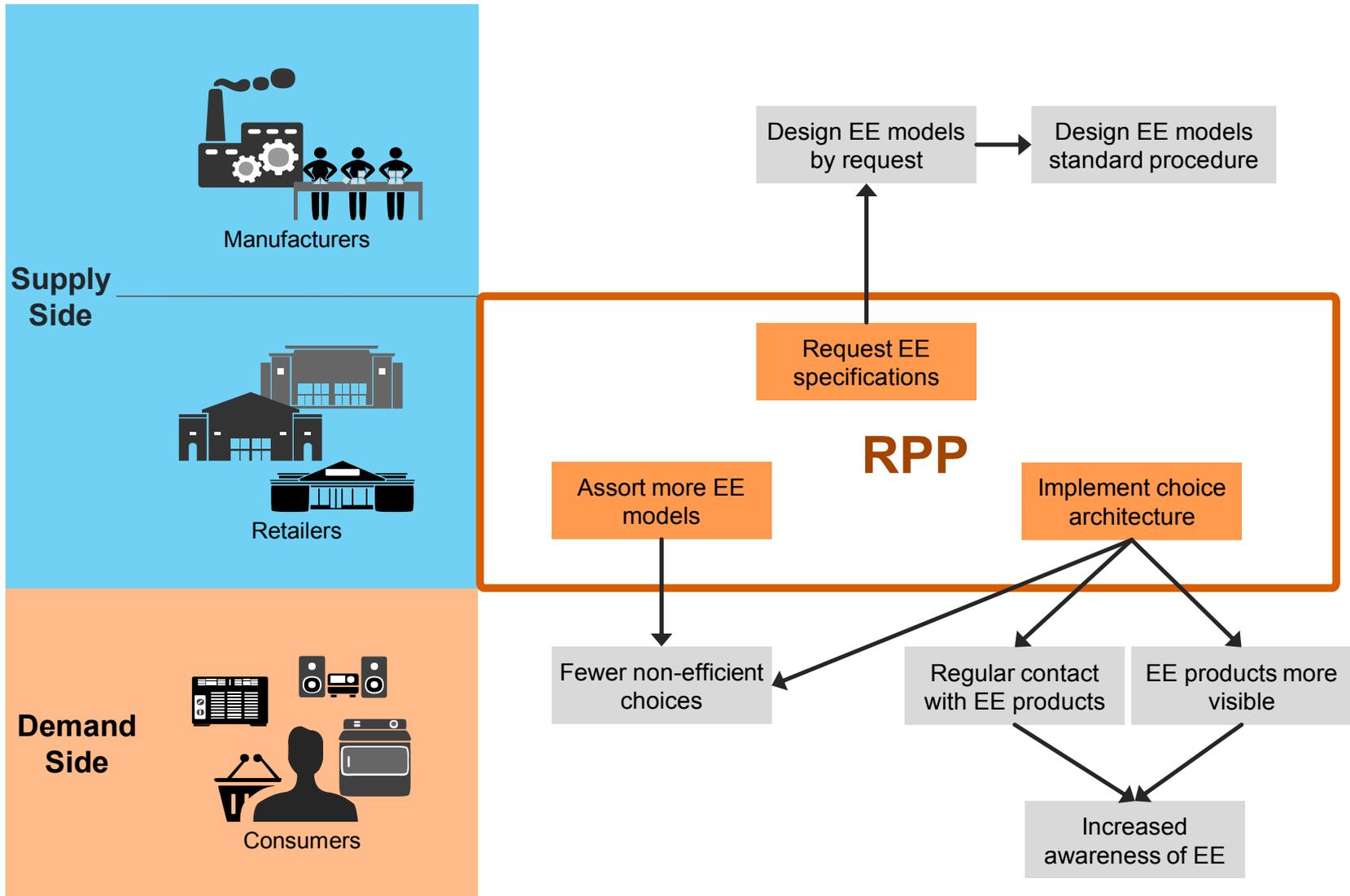
Retailer implementation choices

Assortment — Retailer merchant behavior change
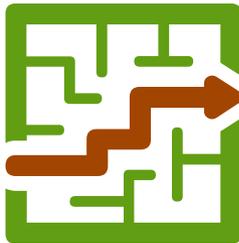
Choice Architecture — Nudges
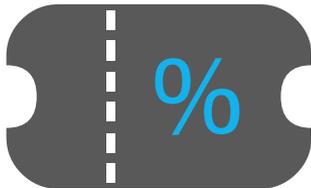
Pricing — Price signals

Are barriers minimized midstream?

Reasoning

- Retailers are the conduit connecting multiple manufacturers, brands and products with various types of consumers.
- They are the ideal entry point to increase access to efficient goods.

Upstream   Midstream   Downstream

Barriers

Barriers from RPP PTLM

Supply-Side Market Barriers	Market-Infrastructure Barriers	Demand-Side Market Barriers
S1. Manufacturers may be uncertain about the response of customers to new products or retailers might be reluctant to promote products for which their performance is uncertain…	M1. Low levels of awareness and knowledge regarding product specifications or differentiation regarding efficiency levels among retail merchandizers.	D1. Customers often unaware and lack knowledge and understanding of energy-efficient products and services
S2. Products and services may be unavailable because [of] difficulty accurately predicting customer demand …	M2. Limited experience with energy efficient equipment.	D2. Information costs associated with understanding the energy related features and associated benefits of energy-efficient technologies and services.
S3. Lack of information and awareness among upstream market actors regarding the benefits of energy efficient equipment.	M3. Perception of risk with stocking or installing efficient appliances when customer demand or product quality has yet to be proven …	D3. Because energy efficiency is rarely valued by the customer more than the requested functionality, efficient models do not always receive consumer attention.
	M4. Undervaluing energy efficiency and sustainability and their impact on economic development, denial of climate change, and low sense of urgency …	D4. Sometimes the energy-efficiency attributes of a product or service may not be packaged with other features customers desire…
	M5. Information or search costs. Specifically, the lack of expertise among equipment sales staff due to the lack of energy efficiency training opportunities.	D5. Many customers and some businesses in the distribution chain are uncertain about the performance of energy-efficient products and services ... Many customers also have difficulty assessing the value of energy efficiency …
	M6. Institutional policies and practices might prevent some retailers from shifting their assortment to the more energy efficient products …	D6. Incremental costs may be higher for the more efficient models.
	M7. Lack of differentiated product marketing by retailers to motivate customers to make more efficient purchasing choices.	D7. Resistance to new or innovative technologies
	M8. Market lacks experience in determining the best way to create a profitable long-term business model	

Eto, Prahl, & Schlegel's 14 Barriers

Eto, et al List of Market Barriers	Key Words/ Notes
Information search costs	Availability of information, Costs of acquiring information
Performance uncertainties	ROI, lack of energy savings information, personal experience, lack of trust
Asymmetric information	Consumers lack detailed information - retailers may mislead
Access to financing	Loans, financing for energy efficiency, value of EE not being factored in
Split incentives	Renters, equipment that consumers rent
Bounded rationality	Habit, net present value, newness of the product, unfamiliarity
Organizational practices	Norms, policies, organizational habits
Inability to separate product features	Coupling high end features with EE – few EE versions at lower prices
Irreversibility	Will efficiency matter in the long run
Hassle or transaction costs	Indirect costs (i.e., time) associated with EE products
Hidden costs	Installation costs, maintenance
Externalities not visible	Full costs not being accounted for
Mispricing due to regulation	Costs not reflective of actual price of fuel
Product availability	Few EE models available, low market share

Eto, Prahl, & Schlegel's 14 Barriers

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Mispricing due to regulation	Costs not reflective of actual price of fuel
Product availability	Few EE models available, low market share

Barriers affecting product suppliers

Barriers from LM

Supply-Side Market Barriers
S1. Manufacturers may be uncertain about the response of customers to new products or retailers might be reluctant to promote products for which their performance is uncertain…
S2. Products and services may be unavailable because [of] difficulty accurately predicting customer demand …
S3. Lack of information and awareness among upstream market actors regarding the benefits of energy efficient equipment.

Barriers from Eto et al.

Performance uncertainties

Product unavailability

Information or search costs
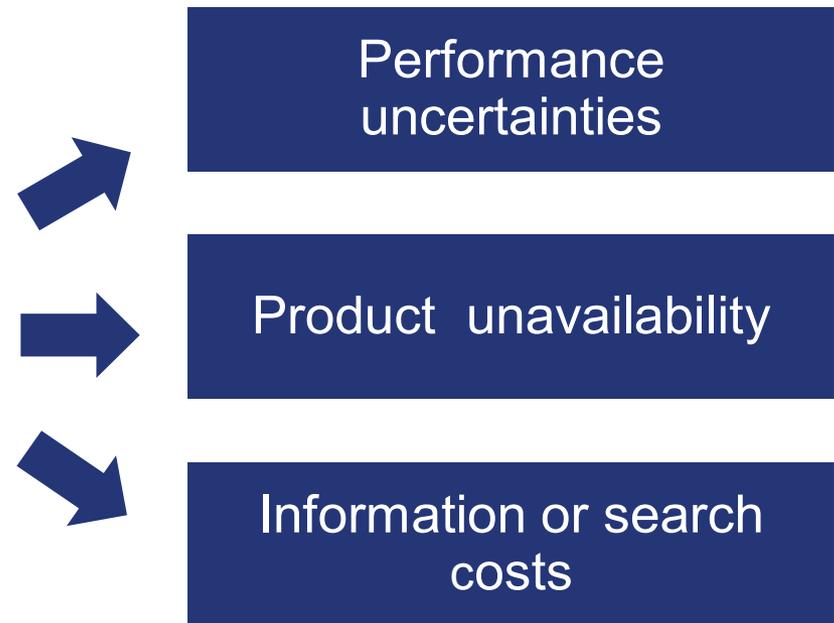
Barriers affecting product distribution

Barriers from LM

Market-Infrastructure Barriers
M1. Low levels of awareness and knowledge regarding product specifications or differentiation regarding efficiency levels among retail merchandizers.
M2. Limited experience with energy efficient equipment.
M3. Perception of risk with stocking or installing efficient appliances when customer demand or product quality has yet to be proven …
M4. Undervaluing energy efficiency and sustainability and their impact on economic development, denial of climate change, and low sense of urgency …
M5. Information or search costs. Specifically, the lack of expertise among equipment sales staff due to the lack of energy efficiency training opportunities.
M6. Institutional policies and practices might prevent some retailers from shifting their assortment to the more energy efficient products …
M7. Lack of differentiated product marketing by retailers to motivate customers to make more efficient purchasing choices.
M8. Market lacks experience in determining the best way to create a profitable long-term business model

Barriers from Eto et al.

- Information or search costs
- Organizational practices
- Product unavailability
- Inseparability of product features
- Bounded rationality

Barriers affecting end-use customers

Barriers from LM

Demand-Side Market Barriers
D1. Customers often unaware and lack knowledge and understanding of energy-efficient products and services
D2. Information costs associated with understanding the energy related features and associated benefits of energy-efficient technologies and services.
D3. Because energy efficiency is rarely valued by the customer more than the requested functionality, efficient models do not always receive consumer attention.
D4. Sometimes the energy-efficiency attributes of a product or service may not be packaged with other features customers desire…
D5. Many customers and some businesses in the distribution chain are uncertain about the performance of energy-efficient products and services ... Many customers also have difficulty assessing the value of energy efficiency …
D6. Incremental costs may be higher for the more efficient models.
D7. Resistance to new or innovative technologies

Barriers from Eto et al.

- Information or search costs
- Bounded rationality
- Performance uncertainties
- Inseparability of product features
- Irreversibility
- Product unavailability

Some barriers operate at multiple levels

Barrier	Supply-side	Market	Demand-side
Performance uncertainties	■		■
Product unavailability	■	■	■
Information or search costs	■	■	■
Organizational practices	■	■	
Inseparability of features		■	■
Bounded rationality		■	■
Irreversibility			■

Primary barriers to address with RPP

Barrier	Supply-side	Market	Demand-side
Performance uncertainties			
Product unavailability	🎯	🎯	🎯
Information or search costs	🎯	🎯	🎯
Organizational practices	🎯	🎯	
Inseparability of features			
Bounded rationality		🎯	🎯
Irreversibility			

Research questions
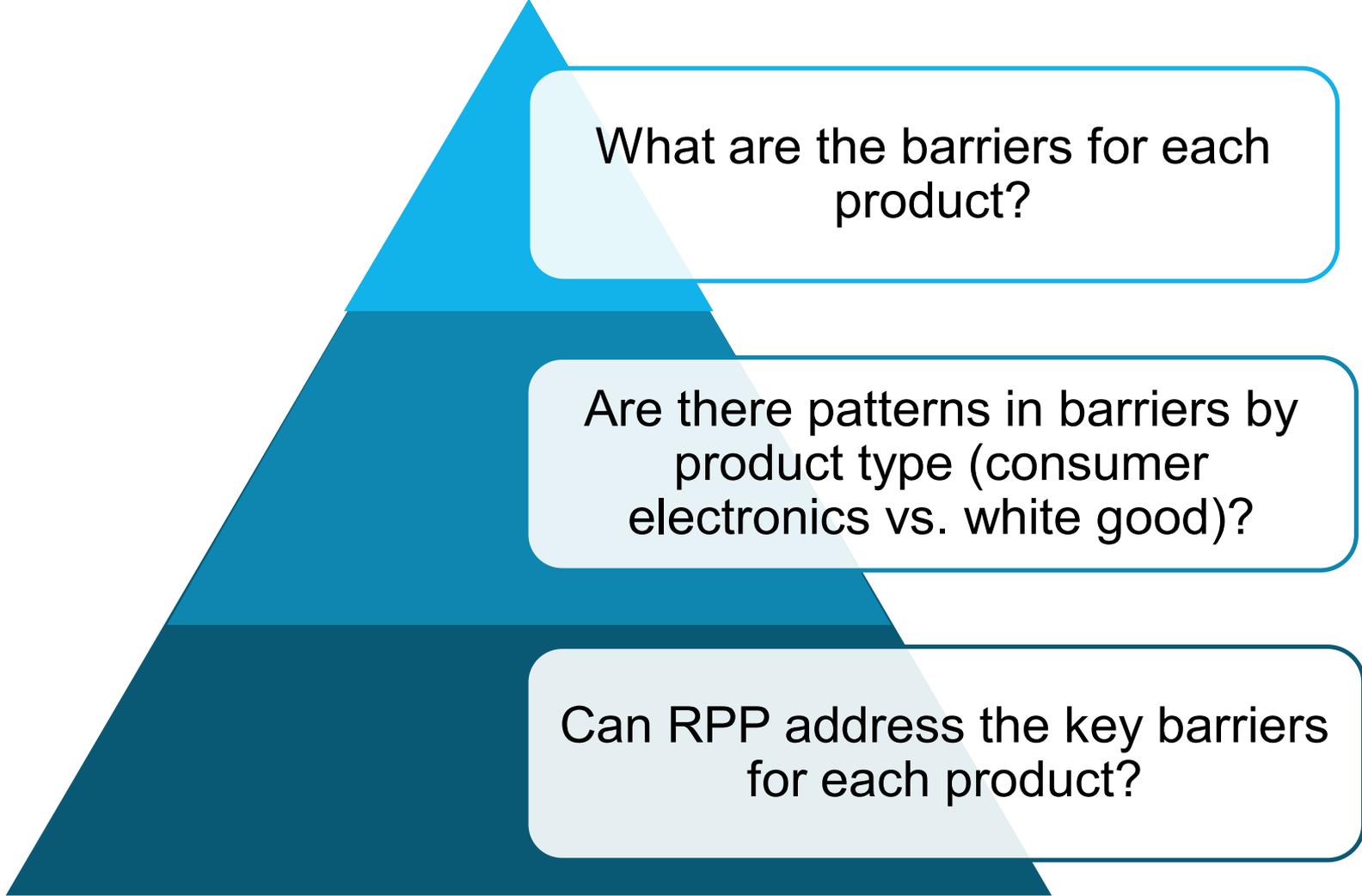
What are the barriers for each product?

Are there patterns in barriers by product type (consumer electronics vs. white good)?

Can RPP address the key barriers for each product?

Initial products in and out of RPP

In product mix

Dryers
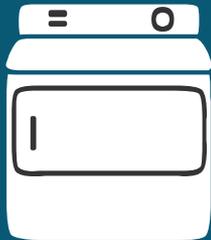
Soundbars

Air Purifiers
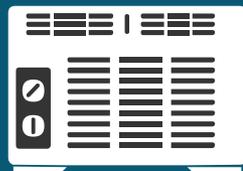
Room ACs

Freezers

## Other

HTIB

TVs

STBs

Game Consoles

Dishwasher
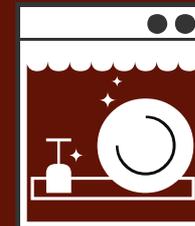
Laptops

Barriers for products included in product mix

Barrier	Supply-side	Market	Demand-side
Performance uncertainties			
Product unavailability			
Information or search costs			
Organizational practices			
Inseparability of features			
Bounded rationality			
Irreversibility			

Barriers for reviewed and excluded products

Barrier	Supply-side	Market	Demand-side
Performance uncertainties			
Product unavailability			
Information or search costs			
Organizational practices			
Inseparability of features			
Bounded rationality			
Irreversibility			

Reasons for exclusion

| Product	Barrier/Explanation	Next Step
	HTIBs: High information search costs – hard to differentiate audio product categories – soundbars have larger market share	Upstream
	TVs: They're efficient!	Monitor 4K
	STBs: Product availability – choice made by pay TV provider	Midstream
	Game Consoles: Performance uncertainties crucial, limited availability of models	Upstream Bounty
	Dishwashers: High saturation of EE models	Increase stringency of standards
	Laptops: High saturation of EE models	Focus on battery chargers

Similarities we see across PLA categories

Consumer Electronics

- Availability - variety of models with varying features
- Information search costs – awareness of need for EE low across market actors
- Information search costs – EE is a very low priority for consumers

White Goods
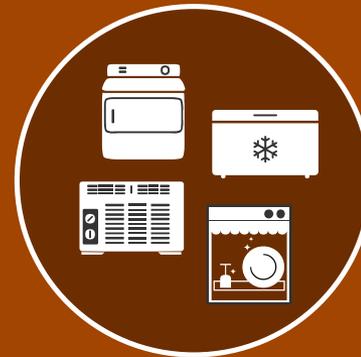
- Performance uncertainty – keeps retailers and manufacturers from promoting EE
- Inseparability of features – EE is often bundled in with premium features, fewer EE models at lower price points

There will always be barriers…

Typically the desired end state will not be a market that is free of all market barriers

Some market barriers cannot be permanently overcome

Markets are in a continuous state of evolution … so even as current market barriers are eliminated new ones may be developing.

Prahl and Keating, 2014

RPP selection story

Product Selected

Barriers addressed by other interventions

Barriers	RPP	Upstream Incentives	Midstream Buy-Down	Downstream Incentives
Performance uncertainties	■			
Product unavailability	■	■		
Information or search costs	■		■	■
Organizational practices	■	■		
Inseparability of features		■		
Bounded rationality	■			
Irreversibility				

The three "levers" of RPP
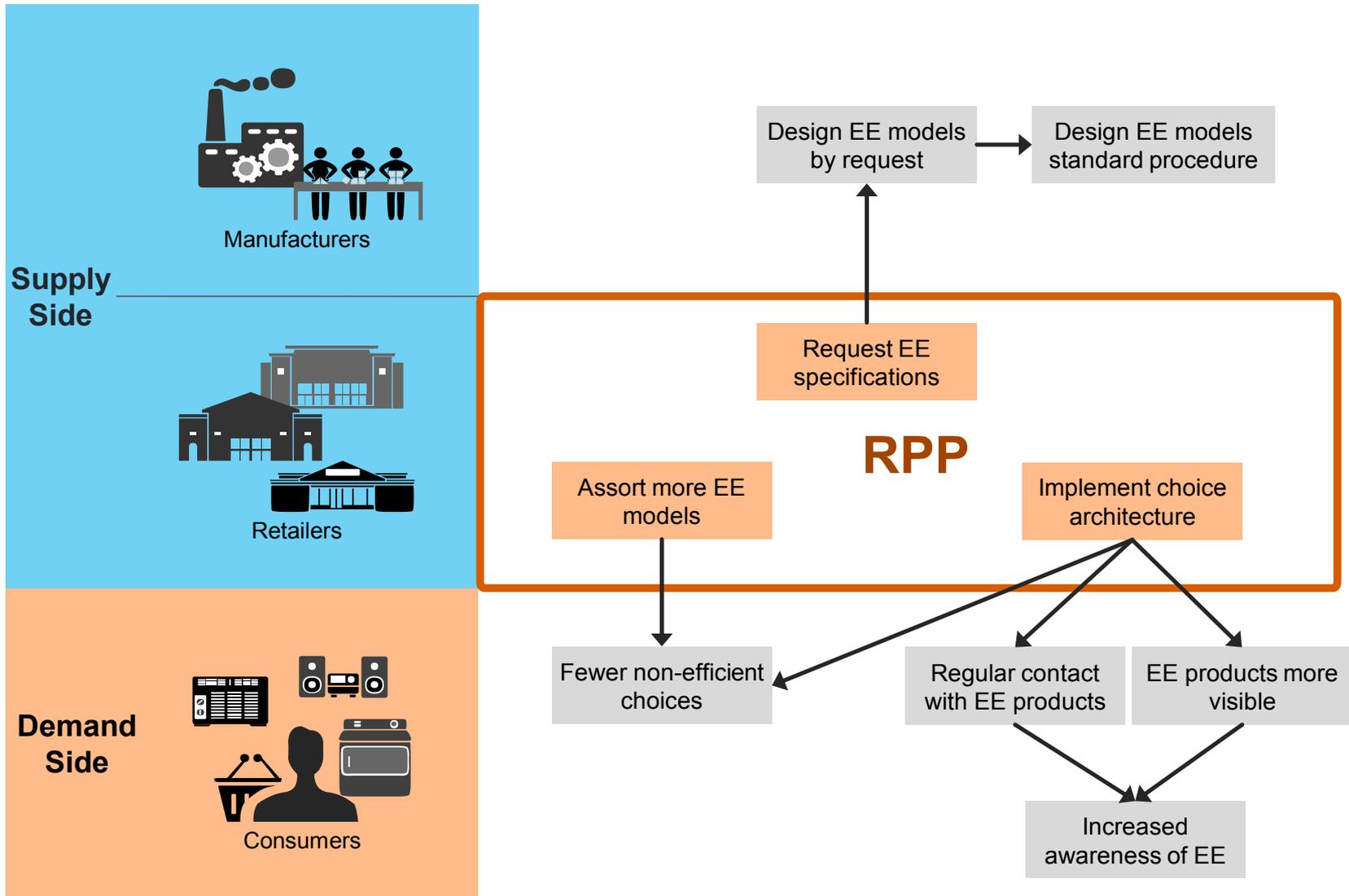
Retailers want to differentiate themselves

- "The NEEA message wasn't focused on driving sales. It was focused on landing a message about energy efficiency. It would have been difficult to create specific sales metrics around that message." [Explaining why they would have preferred a message designed to drive sales:] "We're publicly traded. We sell things."

- "[Retailer] is a publically-traded company, therefore Wall Street and shareholders will judge us based on two key criteria: one is the top-line revenue and the other is the bottom-line profitability of the business. ENERGY STAR helps drive top-line revenue [because efficient products are typically more expensive]. And, of course, mid-stream programs…help drive bottom-line profitability. Together, ENERGY STAR and the mid-stream programs make a perfect influencer on the business, both from top-line [revenue] and bottom-line profitability."

- "At the very least, there would be some indication [in marketing that a product meets ENERGY STAR]. As things get more standard, you don't call out that this [dishwasher] has a bar handle, [energy efficiency is] becoming a standard."

RPP has the potential to…

Change retailer's organizational practices

- *Essentially a retailer behavior change program*
- *Long-term change in decision making around energy-using products*

Influence assortment

- *Assortment is national*
- *Small changes in assortment can lead to large energy savings*

Offer greater autonomy to retailers

- *Retailers often reluctant to agree to prescriptive approaches*
- *Know what makes a product sell*
- *Can use different levers for different categories*

Attacking plug loads from the middle

Plug load is a growing problem

RPP provides a possible approach

Early and regular monitoring should confirm RPP is suitable

Track and learn from what retailers will do

Research = Search + Re-search

Sources

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