

DOCKETED

Docket Number:	15-IEPR-05
Project Title:	Energy Efficiency
TN #:	205273
Document Title:	Valerie Winn Comments: Pacific Gas and Electric Company_Plug Load Comments
Description:	N/A
Filer:	System
Organization:	Pacific Gas & Electric
Submitter Role:	Public
Submission Date:	7/7/2015 2:34:51 PM
Docketed Date:	7/7/2015

Comment Received From: Valerie Winn

Submitted On: 7/7/2015

Docket Number: 15-IEPR-05

Pacific Gas and Electric Company_Plug Load Comments

Additional submitted attachment is included below.

July 7, 2015

**VIA E-MAIL DOCKET@ENERGY.
CA.GOV**California Energy Commission
Dockets Office, MS-4
Docket No. 15-IEPR-05
1516 Ninth Street
Sacramento, CA 95814-5512Re: Docket 15-IEPR-05: Energy Efficiency – Comments of Pacific Gas and Electric Company on Plug Load Efficiency**I. Introduction**

Pacific Gas and Electric Company (PG&E) appreciates the opportunity to provide comments on the June 18, 2015 Workshop on Plug Load Efficiency. PG&E has previously provided comments on this topic in its comments related to Section 1.6 (Plug Load Efficiency) of the California Energy Commission's (CEC or Commission) Draft of California's Existing Buildings Energy Efficiency Action Plan (the Plan or Draft Action Plan),¹ which were submitted to the CEC on April 21, 2015.²

Since the 1970s, PG&E has been a leader in energy efficiency and has worked closely with government, nonprofit, and private sector partners to design and implement programs and policies that allow Californians to do more with less energy. PG&E's energy efficiency portfolio includes a robust suite of rebates, incentives, services, and tools to provide every customer choices from a comprehensive set of tools and technologies through multiple delivery channels to help them reduce energy usage and save money. These programs and services are supported by utility staff, government partnerships, trade professionals, retailers, distributors, manufacturers, and other third-party providers. From 2010-2014, PG&E's energy efficiency programs helped customers avoid the release of more than 2,000,000 metric tons of carbon dioxide (CO₂), which is equal to the annual greenhouse gas emissions from nearly 460,000 passenger cars or more than 1,400,000 homes in PG&E's service territory.³

¹ California Energy Commission. (2015) Existing Buildings Draft Energy Efficiency Action Plan. Sacramento, CA. Retrieved from <http://www.energy.ca.gov/ab758/>

² PG&E Comments to the CEC on AB758 Existing Buildings Draft Energy Efficiency Action Plan, April 21, 2015, pp. 6-7

³ PG&E Customer Data Warehouse, 2010-2014 inclusive

The key points of PG&E's comments are:

- PG&E agrees with Commissioner McAllister's statement that "innovative program models are needed" in the Plug Load Efficiency space. PG&E's current Retail Plug-Load Portfolio (RPP) Pilot Program is an example of such a model.
- For innovative program models to be truly impactful, they need to operate under a policy framework that is conducive to market transformation.
- A new evaluation approach – where impact is assessed by an independent party, with stakeholder input, and with an independent mediator for dispute resolution – is needed to allow innovative program models to achieve their full potential.
- To truly move the market, the number of energy efficient devices available to consumers needs to increase. To this end, challenge programs such as the "Golden Carrot" program and the "X-Prize", that offer a prize for technology advancement that allows a "luxury"-type product with all the features that is *also* energy efficient *and* affordable, have been demonstrated to be effective in the past, and new challenge programs should be investigated. To be successful, California should collaborate not only statewide, but also nationally or internationally, and leverage existing relationships.

II. Definition of "Plug Load"

There were several definitions of "Plug Load" used by presenters at the Workshop on June 18. Consistent with language in California Public Utilities Commission (CPUC) Decision (D.) 12-05-015: "Plug load, appliances, and "miscellaneous" uses comprise about 66% of current California home electricity usage, with plug loads (televisions, personal computers, and office equipment) accounting for about 20% of home electricity usage alone"⁴, There is the need for the industry to agree to the definition of plug-load. PG&E considers "Plug Load" to be plug-in equipment that is an electrical device that plugs into a power outlet. This may include, but is not limited to: household appliances (including refrigerators, clothes washers and dryers), electronic products (like TVs, game consoles, tablets), miscellaneous electrical loads (like vacuum cleaners, power tools, coffee makers), portable and other plug-in HVAC equipment, and commercial plug-in appliances.⁵ The following types of products are not part considered plug-load equipment: non-plug in HVAC equipment, built-in lighting, infrastructure loads wired directly to building electrical system, electrical vehicles.

⁴ California Public Utilities Commission, *D.12-05-015: Decision providing guidance on 2013-2014 Energy Efficiency Portfolios and 2012 Marketing, Education, and Outreach*, May 18, 2012. p. 202

⁵ As defined in Assembly Bill 1094 and by the Natural Resources Defense Council.

III. State of the Plug Load Market

As the energy performance of other electricity end uses improves, plug loads will consume an increasingly larger share of electricity in residential and commercial buildings. This will impact stakeholders in various ways.

A. Utility

Utilities face declining cost-effective savings for delivering downstream residential product interventions through traditional resource acquisition programs for a number of reasons. First, there is a growing amount of miscellaneous plug load caused by an increasing number of electronic products used in the residential space. Each product may have a low incremental usage, but the sheer number of products is causing the aggregate load of the products to increase. In addition, the improvements in federal standards for large consumer appliance products yield limited incremental savings, precluding larger incentives that might affect the buying decisions of end-use consumers. These facts point toward the need for innovative, midstream-focused programs.

B. Retailer

Because there are smaller per-unit rebates available, retailers are having increasing difficulty justifying participation in traditional energy efficiency programs for all products. Furthermore, a highly concentrated group of retail decision makers can influence major changes in what retailers are stocking, selling to customers, and demanding from manufacturers. Therefore it is becoming increasingly important to influence this group of decision makers to effect change in plug-load consumption.

New trends amongst millennial purchasers are changing the way retailers think about their businesses. In particular, the practice of *Webrooming* (shopping online, but buying store) provides an opportunity for midstream program models, because they can connect the in-store experience to leverage both online and offline channels (such as through the Marketplace platform discussed later). Traditionally, retailers have focused on the practice of *showrooming* - consumers shopping online after (or during) experiencing the product in physical stores. While showrooming is a real concern for many retailers, they will benefit from paying much greater attention to webrooming, because a study of smartphone users found that nearly 70 percent of people with smartphones have webroomed, while only 50 percent have showroomed.⁶

C. Consumer

A comprehensive study of California households showed that energy use is not a high priority for buyers of consumer electronics.⁷ This suggests that educating customers about the energy use

⁶ Merchant Warehouse. May 9, 2014. *A Retailer's Guide to Webrooming*. <http://merchantwarehouse.com/a-retailers-guide-to-webrooming>

⁷ Opinion Dynamics. 2012. *2011-2012 General Households Population Study in California*. http://www.calmac.org/publications/GPS_Report_08302012_FINAL.pdf: This study found that awareness of ENERGY STAR® in general is high (~75%); however, customers who bought a TV or desktop

of consumer electronics can be important when the customer is seeking product information when making a new purchase, yet it will be a challenge. In addition to education, making the efficient product choice the easiest decision could increase uptake of efficient products. Retailers demand and assortment changes and product promotion and placement can lead to changes in consumer buying behavior. Targeting incentives at the midstream level, which bypasses the consumer decision making process, can also be an effective solution - particularly in cases where consumers do not understand or connect with energy efficiency language or terminology used in marketing documents.⁸

III. PG&E Response to June 18, 2015 Plug Load Efficiency Questions

PG&E appreciated the variety of stakeholder opinions put forth at the Plug Load Efficiency Workshop on June 18, 2015.

In the Workshop Notice,⁹ several specific questions were presented. PG&E responds to each as follows:

1) What should be the Energy Commission's focus when identifying, considering and developing new appliance efficiency standards?

Manufacturers make what consumers want to buy. Unfortunately, efficiency and reduced greenhouse gas emissions (GHGs) are not high on the priority list for many consumers, and therefore, the number of innovative energy efficient plug load products on the market is small. This has resulted in a stalled market, and only true innovation will change the paradigm. Therefore, the CEC should place its focus on various stages of the product life cycle and value chain to break the stalemate in the marketplace.

a. Product Development and Testing

In the Research and Development (R&D) phase, policymakers should signal to inventors, manufacturers, and product testing laboratories that change is required and is coming. Policymakers should create incentives to motivate inventors and manufacturers to reimagine their products and product components with efficiency built into their designs, at price points that will motivate the consumer to upgrade. A "Golden Carrot" type of competition, as discussed in PG&E's response to Question 3, may facilitate this.

After a product completes the R&D phase, it moves into the Emerging Technology (ET) phase, and is able to be field tested through specifically designed ET projects and programs. If slightly

computer were less likely than those who bought an appliance to report intention to buy an energy-efficient version of these products.

⁸ Energy Pulse 2013

⁹ Notice of IEPR Staff Workshop on Plug Load Efficiency, p. 2 Retrieved from:

<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=15-IEPR-05>

less mature products were allowed into the ET phase, iterative product development and deployment could happen more quickly.

Once the product goes to market, efforts should focus on influencing impactful areas of the value stream, including consumers and distributors.

b. Consumers

For consumers to be motivated to discontinue use of a fully-operational, yet inefficient appliance or technology, the newer, more efficient products need to be offered at a price-point the consumer can justify – one with less bells and whistles, yet uses less energy. As an example, there are currently four refrigerators that qualify for a CEE Tier 3 rebate. Only two can be found via online search, and both are at a price-point above \$2,000. PG&E’s rebate for the CEE Tier 3 refrigerators was \$75 for the new unit, and \$50 for recycling the old, working unit (if the consumer still has one). These rebates are minimally impactful in light of a \$2000 purchase price.

Additionally, the current policy requirements, which call for a closed-loop attribution process for savings credit, put the burden of proof on the consumer. The consumer must purchase the precise rebated appliance, complete the necessary application, and provide the correct documentation, all within the specified timeframe. Then and only then, the customer can take advantage of the \$75 rebate and the utility can get the savings credit. Adoption of more efficient appliances could be increased by either modifying and simplifying the way downstream incentives are applied or, in the absence of a downstream incentive, by allowing utilities to earn credit for influencing the purchase of the most efficient product that aligns with the consumer’s desired features (such as through a behavior program via *Marketplace* – discussed below).

Finally, *Miller’s Law*¹⁰ reveals that humans can only maintain approximately seven thoughts at any one given time. When a typical customer is in a retail environment considering four different product choices, while trying to take into account desired usage, features, aesthetics, price, energy usage, and rebate paperwork needs, this can result in decision paralysis. The consumer will have already exceeded their cognitive capacity to consider all of the relevant information and choose wisely, and instead will choose what is easiest. It is necessary to simplify the decision making process and make the energy efficient choice *also* the easiest choice.

c. Distributors/Retailers

Currently retailers have little incentive to help consumers make the “right” choice (the most efficient product purchase) the easiest choice. They stock what consumers are purchasing, not necessarily those that consume the least amount of energy. Midstream approaches, such as RPP, which insert incentives in the midstream retailer channel, aim to influence demand and stocking behaviors of retailers and reduce the choice burden on consumers.

¹⁰ Miller, G. A. (1956). The magical number seven, plus or minus two: some limits on our capacity for processing information. *Psychological review*, 63(2), 81.

Additionally, retailers' accounting processes, and the utilities' need for customer data (to comply with policy attribution requirements) make it difficult to implement Point of Sale offers. Midstream incentive programs would eliminate the steps consumers must take to capture the rebate.

2) How can the Energy Commission/California move the plug load market towards more energy efficient products?

In the near-term, the CEC could encourage appliance and electronics manufacturers to move towards more energy efficient products by requiring that products sold in the state default to the most efficient settings at each time of use (not only at the time of shipment). This could include clothes washers that default to "Cold/Cold" and require manual override every time the consumer wants to use a different setting, and game consoles and set-top boxes that default to built-in energy savings modes rather than requiring consumers to access custom energy management settings.

The CEC and California could encourage manufacturers to include an LED light on the device-end of chargers and adapters, to prompt consumers that the charger is still drawing power even in the absence of the device (similar to various laptop manufacturers, but could be incorporated into additional plug-load equipment). An advertising campaign could then remind consumers to make sure that light is off if it is not actively charging something. To take this further, the adapters themselves could include technology to stop drawing power when the device is "full", or the outlets themselves could hold this functionality.

In some cases, the CEC and California can encourage manufacturers to transition functionality that already exists in some devices into other plug load devices. For example, to preserve batteries, some smart phones have a feature that powers the screen off when the device registers that eyes are not on screen. This feature could be built into televisions and monitors to allow the screen to significantly dim after a specified time if it registers that eyes are no longer on the screen.

To truly move the market, the number of energy efficient devices available to consumers needs to increase. To this end, challenge programs such as the "Golden Carrot" program and the "X-Prize", that offer a prize for technology advancement that allows a "luxury"-type product with all the features that is *also* energy efficient *and* affordable, have been demonstrated to be effective in the past, and new challenge programs should be investigated. To be successful, California should collaborate not only statewide, but also nationally or internationally, and leverage existing relationships. This is discussed in more detail below.

3) How can California influence more stringent federal efficiency standards and ENERGY STAR® specifications?

PG&E notes that the federal efficiency standards and ENERGY STAR® specifications apply more directly to appliances than to miscellaneous plug loads, but offers the following thoughts:

A challenge approach, such as a “Golden Carrot” type competition could be effective in influencing federal efficiency standards, and California could lead the way by collaborating with other states on such an initiative. PG&E is in the initial stages of investigating a revival of the Golden Carrot prize that was developed more than 20 years ago in coordination with at least 30 U.S. utilities. The Golden Carrot was an effort to award and recognize an organization for accomplishing a specific goal desired by the sponsors. At the time, the mission was to push appliance manufacturers to develop a refrigerator that exceeded Federal Appliance Standards by 30 percent and was also chlorofluorocarbon free. PG&E is currently testing interest in a new Golden Carrot competition to potentially focus on a broader set of technologies, developers and purpose. This could include a highly efficient refrigerator at a low consumer cost, game consoles, washing machines, dishwashers and even certain HVAC technologies. National stakeholder engagement and coordination is critical to the success of such an initiative. This will not only provide the market coverage needed, but also a significant enough cash prize to pique the interest of manufacturers and developers. This collaboration should include other national or international utilities, Department of Energy (DOE), Environmental Protection Agency (EPA), Consortium for Energy Efficiency (CEE), Natural Resources Defense Council (NRDC), and other interested parties.¹¹

In addition, the CPUC should adopt long-term market transformation program policies. With approved, long-term market intervention policies, California Program Administrators can offer midstream incentives to retailers (through the RPP Program), which are expected to accelerate and increase program-qualifying product adoption. This midstream market intervention strategy can, in turn, accelerate ENERGY STAR® specifications and State/Federal standards that are more stringent than would have occurred without the RPP Program.

4) How can the Energy Commission encourage demand response capability in Plug Loads?

The CEC should follow ENERGY STAR® connected criteria for demand response (DR) capability. The connected criteria stress interoperability and the use of open protocols while also reflecting a flexible approach that allows for multiple paths of implementation. This approach provides a basis upon which to consider products with connected functionality as they begin to enter the market and make more prescriptive changes to the requirements, based on real-world market experience, as warranted. In particular, PG&E supports the connected criteria in the following categories:¹²

¹¹ PG&E Response To Administrative Law Judge’s Ruling Re Comments On Phase II Workshop 3 (Statewide And Third Party Energy Efficiency Programs), CPUC Rulemaking 13-11-005. April 13, 2015, pp.74-75. Retrieved from <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M151/K170/151170285.PDF>

¹² From the ENERGY STAR® Connected Criteria specifications for Pool Pumps, March 30, 2015. Retrieved from: http://www.energystar.gov/products/spec/pool_pumps_specification_version_1_0_pd The connected criteria for pool pumps also leverage connected criteria recently developed through close work with a

a. Communications

Connected devices shall use open standards for all communication layers to enable functionality required by Energy Consumption Reporting, Operational Status, and Demand Response

b. Energy Consumption Reporting

Connected devices shall be capable of transmitting energy consumption data representative of its interval energy consumption to consumers and consumer authorized third parties via a communication link.

c. Remote Management

Connected devices shall be capable of responding to consumer authorized signals received via a communication link.

d. Demand Response

- Type 1 Response: a longer-duration but smaller load reduction;
- Type 2 Response: a shorter-duration but larger load reduction; and
- Type 3 Response: a temporary increase in energy consumption

IV. Innovation in PG&E's Retail Plug Load Portfolio

As Julie Colvin from PG&E presented at the workshop, PG&E is the investor-owned utility (IOU) lead for the statewide Retail Plug Load Portfolio (RPP) Pilot Program. The Theory, Objectives, and Proposed Evaluation Approach for this Program are outlined below.

a. Program Theory

- A combination of incentives and engagement will motivate retailers to promote, assort, sell, and demand more energy efficient (EE) models than they would have absent the program.
- 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.

b. Program Objectives

- Transform markets in targeted categories by streamlining and harmonizing energy efficiency programs with retailers, making them less complex to retailers and customers and more cost-effective to the utility, and by increasing the availability of efficient models in targeted categories through increased demand from manufacturers by retailers.

- The resulting shift in product availability will generate energy savings as utility customers purchase and install more efficient models in their homes.
- These objectives will be achieved through a *market transformation* approach, a program design to make 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.¹³

c. Proposed Evaluation Approach for the RPP Program

- A new evaluation approach, where impact is assessed by an independent party, with stakeholder input, and with an independent mediator for dispute resolution, is needed to truly move RPP and other such programs forward.
- PG&E recommends a statewide task force to assess market transformation program evaluation possibilities. Specifically, PG&E recommends the following:
 - Evaluations of market transformation programs must account for savings estimates with longer timeframes and greater uncertainty than those for resource acquisition programs.
 - Since the RPP program involves a complex set of market actors (e.g., utilities, governmental agencies, retailers, manufacturers, and end-users) and may extend up to ten years in length, conventional evaluation approaches are not well suited.
 - The RPP program requires a theory-driven evaluation approach that relies on gathering data from multiple sources—and analyzing it using multiple techniques—to triangulate savings estimates. Theory-driven evaluation approaches have been used in a number of fields over the years to assess market transformation affects.
 - The theory-driven, mixed methods approach proposed for the RPP program relies on these data drawn from the program implementation logic model to triangulate on a savings estimate:
 - Comparison of forecasted higher efficiency unit sales prior to implementation to post implementation actual sales using segmented regression techniques for participating stores;
 -
 - Interviews of retailers, contractors, manufacturers, and services providers who participate and/or promote the program;

¹³ California Public Utilities Commission, “Decision Approving 2010 to 2012 Energy Efficiency Portfolios and Budgets” (Decision 09-09-047, September 24, 2009), <http://www.cpuc.ca.gov/NR/rdonlyres/A08D84B0-ECE4-463E-85F5-8C9E289340A7/0/D0909047.pdf>, p. 89.

- Non-experimental, theory-driven assessment: development and tests of the logic model to assess whether the program is functioning as intended and supports reliable conclusions about the associations between short-term activities, outputs, outcomes, and, mid- and longer-term metrics in the model;
- Visual data inspection to establish trend of program influence.

d. Success of RPP Program to-date

PG&E has demonstrated leadership on the RPP Program and, with continued policy support, is confident that it can continue to push this innovative program approach. On June 18, PG&E received a letter of commendation from the US Environmental Protection Agency's (EPA) Climate Protection Partnerships Division. The letter read, in part:

“Most recently, PG&E has assumed a critical leadership role in designing and launching the ENERGY STAR Retail Products Platform (RPP), a nationally coordinated midstream program being developed by a group of utilities with facilitation by EPA. Under the auspices of the ENERGY STAR RPP, PG&E is collaborating with EPA and other leading utilities to evolve traditional retail-based energy efficiency program design, delivery, and evaluation to reflect the changing nature of the residential products market and capture remaining, hard-to-reach energy savings. Now 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 California in 2014, and the first pilots are expected to launch in 2016.

We commend PG&E on your significant contributions to transforming the market for efficient products and practices and protecting the environment for future generations.”¹⁴

V. PG&E Plug Load Marketing Efforts

PG&E's overall residential energy efficiency (EE) marketing objective is to increase education, engagement, participation, and retention in Energy Management actions. The associated marketing goals are to increase education of key energy efficiency programs and priorities, as well as increase program engagement. Within the EE residential portfolio, there are a number of sub-programs. The PG&E marketing team works closely with its EE Programs and Products counterparts to determine specific priorities and goals for each of the sub-programs.

Two of those sub-programs are Plug Load and Appliances (PLA) and Energy Advisor. The marketing efforts associated with the PLA sub-program have been focused on driving awareness and participation in a number of rebate programs, historically including refrigerators, clothes washers, water heaters and more recently have expanded to pool pumps. The PLA sub-program

¹⁴Email correspondence from Ann Bailey, Chief, ENERGY STAR Labeled Products, Climate Protection Partnerships Division, US EPA, to Aaron Johnson, Vice President of Customer Energy Solutions, PG&E. June 18, 2015

also includes recycling programs such as the Appliance Recycling Program that focuses on recycling refrigerators and freezers. Alternatively, the Energy Advisor program includes the Home Energy Reports program and the Home Energy Checkup tool. While both PLA and Energy Advisor are both part of the overall residential EE portfolio, and ladder up to the same marketing objectives and goals and may deploy some similar tactics, the marketing strategy developed is unique. (PG&E notes that the CPUC's June 18 presentation,¹⁵ at Slide 5, incorrectly suggested that the Energy Advisor program falls under the Plug Load marketing umbrella. It does not.)

For each key marketing effort, a multi-touch, multi-channel strategy is developed based on key customer and research data along with any historical marketing efforts insights. Tactics included in the PLA marketing strategy range from education on pge.com, residential digital newsletters to highly targeted direct-to-customer communications and often are coupled with media. One distinct advantage of the PLA product offerings is the additional opportunity to engage customers in the retail space both online and in the brick-and-mortar locations. PG&E partners with a number of retailers including Home Depot and Sears, and has been able to leverage an "in-store" presence to highlight the products offering rebates. PG&E is currently working on retail refresh to drive a more consistent overall look and feel within the retail footprint.

PG&E's Customer Insights and Marketing teams keep pace with changing customer preferences and habits. Nearly 70 percent of consumers conduct research online before making a purchase decision on products such as appliances and electronics.¹⁶ In addition, 45 percent of utility customers want personalized advice on products and services that they can purchase to help them reduce their bill.¹⁷ PG&E fills both of those needs for our customers with our online portal, Marketplace.¹⁸ With Marketplace, PG&E serves as our customers' energy advisor at a time when they are seeking product advice and information -, providing them a one-stop-shop for the information they say is most important: price, appliance features, size, sales, and energy efficiency.¹⁹ Customers can conduct relevant research in real-time, and can compare features, images, reviews, price, retail locations, and tips for use. They can also access rebates *and* understand the energy efficiency of the products they're considering. With the information presented in an easily accessible way, the decision barriers that often face customers during an online search are reduced. It is important to note that this consumer engagement channel with the

¹⁵ Peter Franzese, CEC Plug-load Standards Development - Residential EE Programs. Presented to the CEC on June 18, 2015. Retrieved from <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=15-IEPR-05>

¹⁶ Vikram Sharma. "Webrooming" Trumps Showrooming: Three Ways Brand Retailers Can Win. Wired Magazine Online: Innovation Insights. June 11, 2014. Retrieved from <http://insights.wired.com/profiles/blogs/webrooming-trumps-showrooming-3-ways-brands-retailers-can-win#ixzz3QG0uaLDy>, and Harris Polls. Showrooming and Webrooming: A Tale of Two Trends. December 3, 2013. Retrieved from <http://www.harrisinteractive.com/NewsRoom/HarrisPolls/tabid/447/ctl/ReadCustom%20Default/mid/1508/ArticleId/1339/Default.aspx>

¹⁷ Accenture. The New Energy Consumer Handbook 2013

¹⁸ <http://marketplace.pge.com>

¹⁹ PG&E Retail Strategy Team Quantitative Research

Marketplace addresses a different market barrier than the RPP program, which is to directly influence the retailers buying decisions to demand and stock efficient products in brick and mortar locations. The Marketplace, however, supports the customer to consider the most efficient product when researching product information online to address the growing rate of *webrooming*. The Marketplace portal currently lists residential appliances and electronics, and can be enhanced to include items for Small and Medium Businesses (SMB), as well as water efficiency products.

Under the current policy framework, IOUs claim only claim plug-load and appliance savings credit for rebates redeemed on qualifying purchases. PG&E's Marketplace is an avenue that can advise and influence the customers' online buying decision when webrooming. In the absence of rebates or under a new evaluation framework that allows for IOUs to claim credit for influencing energy efficient purchases (rather than needing to demonstrate closed-loop attribution on rebate submissions), web tracking capabilities are a simple way to track IOU influence on customer decisions. Should a closed-loop process continue to be required by policy, PG&E believes that additional motivation will be needed to increase the chances that a customer will confirm their purchase and submit the rebate paperwork. One way to increase motivation would be through a "sweepstakes" for customers who shop to win entries for a chance to win prizes. For example, customers who browse the site could win an entry; if they share their thoughts via social media, they could win another entry; and if they submit proof of purchase, they could win another entry. This method could increase engagement on the site and could also increase awareness of energy efficient product options. PG&E plans to introduce a similar sweepstakes program later this year.

Program Administrators are also interested in determining which devices and appliances account for which amount of the consumer's usage (an area of study known as load disaggregation). Load disaggregation is useful for policymakers and Program Administrators to understand potential in the state and to design targeted programs and outreach strategies to tackle that potential. PG&E would like to note that load disaggregation is a relatively nascent field with varying levels of quality and accuracy.²⁰ Validating load use by product in the home is difficult beyond the large appliance level. There are a variety of tools on the market that attempt disaggregation, but they vary in quality. PG&E is working with market-leading data analytics firms to continually refine our load disaggregation technologies and to share this knowledge with our customers and other stakeholders, in order to drive informed consumer decisions.

²⁰A recent PG&E test of three disaggregation suppliers reveals that accurate estimates of energy usage in individual households cannot yet be produced. For example, in the category of "Refrigerators & Freezers" 6 households were monitored; the disaggregation estimators' estimates of energy usage were fairly close in two homes, but energy usage was significantly over-estimated in two homes, while being under-estimated in the remaining two homes. Usage estimates were also provided in some sectors even though there was no actual usage in the monitored homes. Disaggregation suppliers were also unable to recognize energy usage in some important categories like air conditioning, clothes washers, dishwashers, electric vehicles, and lighting, among others). While there are some categories where estimations are closer than others, and some disaggregation suppliers appear able to more accurately estimate some types of energy usage in some households, PG&E's initial finding is that the overall effort to disaggregate energy usage needs much improvement.

VI. Cost-effectiveness of PG&E's Plug Load Programs

The CPUC's June 18 presentation²¹ pointed out important challenges with addressing Plug Loads under the current policy framework. PG&E notes that the focus of the presentation, on cost-effectiveness of certain measures as defined under the Total Resource Cost (TRC) Test, may unintentionally imply that every measure should be cost-effective. However, this is not the case. When designing IOU programs, the CPUC intentionally decided to measure cost-effectiveness only at the entire Portfolio level, not on an individual measure basis. This was to allow for a range of measures to be cost-effective in total, while allowing for some individual measures or programs to be non-cost-effective in the name of working toward broader policy objectives, including statewide goals, GHG reduction, and Market Transformation. Certainly, examining cost-effectiveness at a program and measure level may be useful for helping to drive improvements, but the overall portfolio cost-effectiveness metric is currently used to measure IOU performance.

As per D.07-09-043, the Total Resource Cost (TRC) test is calculated using the following formula:

$$\text{TRC} = \frac{\text{Benefits} * \text{NTG}}{\text{Admin} + \text{Marketing} + \text{DINI} + \text{Free Rider Incentives} + \text{Non-Free Rider Measure Cost}}$$

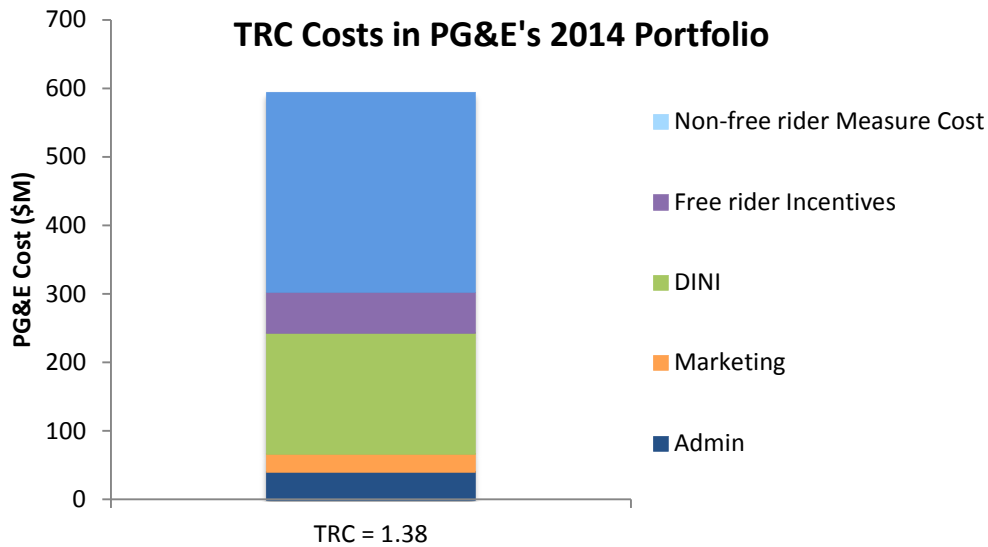
where

- Free Rider Incentives = (1 – NTG) * Incentives
- Non-Free Rider Measure Cost = NTG * Measure Cost

Notes: DINI = Direct Implementation Non Incentives NTG = Net to Gross (non-free rider participants).

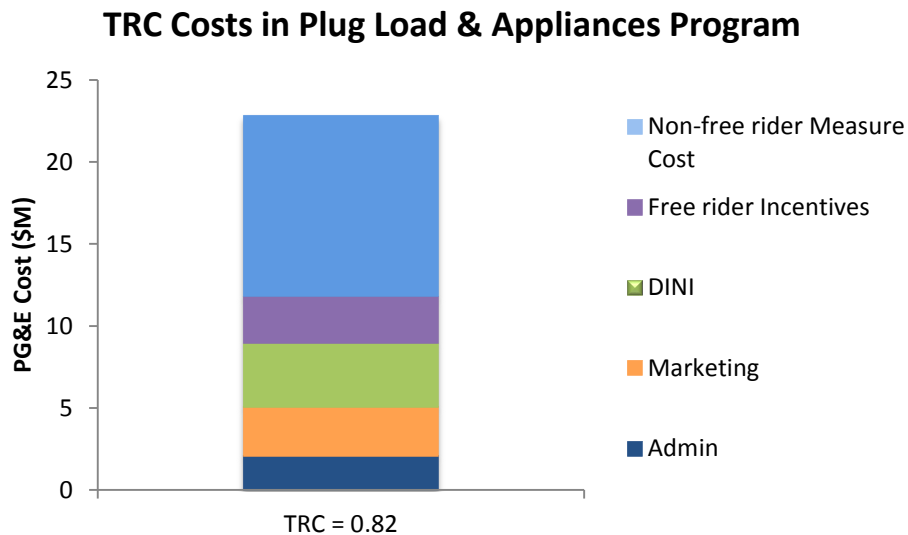
Measure Cost makes up a large component of the costs associated with the Total Resource Cost test. In fact, as shown below, for the entire Portfolio, the Measure Costs account for 49 percent of the entire TRC cost to PG&E. In comparison, Administrative costs account for 7 percent, Marketing for 4 percent, Direct Implementation Non-Incentives for 30 percent, and Free-Rider Incentives for 10 percent.

²¹ Peter Franzese, CEC Plug-load Standards Development - Residential EE Programs. Presented to the CEC on June 18, 2015. Retrieved from <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=15-IEPR-05>



Source: 2014 Portfolio with Spillover. PG&E Annual Report filed on 6/1/2015.

This proportional breakout also holds true when examining individual measures and programs. For example, for the Plug Load Appliance Program shown below, Measure Costs account for 48 percent of the costs to PG&E, while Administrative costs account for only 9 percent, Marketing for 13 percent, DINI for 17 percent, and Free-Rider Incentives for 12 percent.



Source: 2014 PLA Program. PG&E Annual Report filed on 6/1/2015

PG&E would like to note that because the measure cost plays a large role in overall TRC costs, the upcoming proposed DEER cost updates are extremely important, and will have significant impacts on our programs, products, and portfolio. As such, the accuracy and regularity of

updates for these measure costs is critical to the cost-effectiveness of not only individual measures, but to the portfolio as a whole.²²

VII. User Behavior and Plug Loads

PG&E agrees with the points made by Joy Pixley in her presentation about the importance of understanding user behavior and making energy efficiency decisions easy and simple for consumers.²³ As discussed in PG&E's responses to Questions 1 and 2 above, product developers and manufacturers should aim to reduce EE decision barriers in their products. They should require appliances and technologies to be defaulted to the most efficient setting, and should require override each use rather than allowing permanent override of the energy efficient setting. The more the user has to think and take action, the less likely that action is going to occur.

VIII. Market Transformation

PG&E reiterates the need for policies conducive to market transformation. As Pierre Delforge from the Natural Resources Defense Council stated, "Plug loads are a major component of electricity use; we need cross-cutting policies to address and to achieve market transformation" in the space.²⁴

Market transformation programs require a longer-view policy framework for several reasons. In particular, the timeframe for both costs and benefits is much longer, and is dynamic. The initial costs can be significant but are expected to decrease over time, while the incremental costs will decline over time (examples of where this has happened with other technologies include CFLs, rooftop PVs and LEDs). By comparison, the initial benefits, while relatively small in the short-run, are expected to grow over time as market share of program-qualified measures increases. Therefore, using the current policy framework, which requires basing the benefit-cost ratio on short-term costs (which are substantial) and short-term benefits (which are small) would be misleading and would not result in market transformation because of the mismatch in costs and benefits. Instead, benefits and costs over the full program period (which can be 10 to 15 years) must be considered. In addition, market transformation market forecasting techniques (Bass Diffusion modeling) are identical to those used for evaluating Codes and Standards programs, which do operate under a specially-designed policy framework. Market transformation programs should be afforded the same policy considerations.

IX. CONCLUSION

²² Pacific Gas and Electric Company. Comments on the updated methodology for the database for energy efficiency resources. Submitted to the CPUC on June 29, 2015 under Rulemaking 13-11-005.

²³ Joy Pixley, UC Irvine Plug Load Center, "Incorporating User Behavior into Standards for Plug Load Efficiency", presented at the CEC on June 18, 2015. Retrieved from:
<https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=15-IEPR-05>

²⁴ Pierre Delforge, NRDC, "Plug Load Efficiency Strategies", presented at the CEC on June 18, 2015. Retrieved from: <https://efiling.energy.ca.gov/Lists/DocketLog.aspx?docketnumber=15-IEPR-05>

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PG&E thanks the CEC for the opportunity to review and provide comment on the Plug Load Efficiency Workshop. PG&E looks forward to continued collaboration with the CEC on this subject in the future.

Sincerely,

/s/

Valerie Winn

cc: J. Nuffer by email (john.nuffer@energy.ca.gov)