

# Frequently Asked Questions and Answers for the Smart Grid Investment Grant Program

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*SGIG Dynamic Pricing & Consumer Behavior Webinars*

April 20 and 22, 2010

## Frequently Asked Questions from SGIG Dynamic Pricing & Consumer Behavior Webinars – April 20 and 22, 2010

**Question:** *Our grant did not include funding for a consumer behavior study. Is there Department of Energy (DOE) funding to assist with the study?*

**Answer:** Your Technical Project Officer (TPO) at the Department of Energy is the appropriate person to discuss budgetary issues such as these.

**Question:** *I was under the opinion that Critical Peak Pricing (CPP) could also include a pre-determined tight window of peak pricing. Is this not a valid interpretation? I had seen a document (DOE?) that presented CPP as connected to a signal for pricing or rebating and also a tight window (1-4 hours) as sufficient to be considered a CPP rate.*

**Answer:** CPP is generally defined as a retail rate whereby a higher price signal is imposed on customer electricity consumption over a specified period of time (e.g., 2PM – 6 PM) during declared “critical events”. In most instances, both the price and period of time that price is active (i.e., event window) are pre-determined and fixed (e.g., 10 cents/kWh during events on weekdays between 2PM and 6 PM); however, there are some CPP designs where the price and/or event window may vary. Peak Time Rebate (PTR) is similar in nature to CPP with one main difference - instead of exposing a customer’s entire electricity consumption to a higher price during declared events, a payment is provided for the consumption deemed to have been reduced during the event window. Generally, this payment rate is fixed at some pre-determined level but there are some PTR designs where this payment rate may vary. Like CPP, the definition of the event window may vary as well.

**Question:** *In the process of pulling together your study, what information, if any, is available from DOE on low income families?*

**Answer:** DOE has not performed an exhaustive literature review on this sub-population and there have only been a few studies that have looked at effects from dynamic pricing on low-income customers.

- **California Statewide Pricing Pilot:** This large study included an evaluation of low-income customers’ response to a critical peak pricing rate. For a good summary, see: [http://www.eei.org/ourissues/electricitydistribution/Documents/appendixF\\_final.pdf](http://www.eei.org/ourissues/electricitydistribution/Documents/appendixF_final.pdf)
- **PEPCO PowerCentsDC™ Project:** This study included an evaluation of low-income customers’ response to a peak-time rebate. For a good summary, see: <http://www.powercentsdc.org/ESC%2009-11-02%20PCDC%20Interim%20Report%20FINAL.pdf>
- **Pacific Gas and Electric Smart Rate Tariff:** There have been two evaluations of this dynamic tariff, both of which included an assessment of the load impacts associated with low income customers who qualify for an alternative tariff called CARE. The 2008 load impact evaluation can be obtained at:

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[http://www.edisonfoundation.net/IEE/reports/PGE\\_SmartRate\\_Ex\\_Post\\_Analysis\\_12-30-08.pdf](http://www.edisonfoundation.net/IEE/reports/PGE_SmartRate_Ex_Post_Analysis_12-30-08.pdf).

The second report, which contains more detailed analysis of CARE customers, can be obtained from the author by sending an email to [StephenGeorge@fscgroup.com](mailto:StephenGeorge@fscgroup.com). The report can be cited as: George, Bode, Perry and Mayer. *2009 Load Impact Evaluation for Pacific Gas and Electric Company's Residential SmartRate—Peak Day Pricing and TOU Tariffs and SmartAC Program, Volume 1: Ex Post Load Impacts*. Final Report, April 1, 2010.

This is an area of research that DOE is interested in better understanding and hopefully will be included in some SGIG recipients consumer behavior study plans.

***Question:*** *Will there be any discussion on April 22 around "Before and After" effects (i.e. technology acquired or other changes over time producing a different impact)?*

***Answer:*** This topic will not be specifically discussed in the April 22<sup>nd</sup> webinar. However, it could indeed be interesting to study whether households change their behavior over time, perhaps because they learn how to better use and apply technology, increase their understanding of the new price structures and how to reduce their overall bills by responding accordingly, or alternatively tire of responding when bill impacts are not as large as expected. We believe better understanding the issue of persistence of response over time is critical, but one that is difficult to measure when experiments are run for only one or two years. There are ways of approaching the problem even during short duration experiments (e.g., surveying control and treatment customers about purchase decisions) but these can have very significant impacts on sample sizes and evaluation methods. DOE encourages SGIG participants to indicate if they plan to study persistence and, if so, how they will approach the problem.

***Question:*** *Why wouldn't you want the control group selected from the general population of interest instead of selecting them from the group of customers who have chosen to opt-out of the study?*

***Answer:*** It depends on what you want to know. If you are concerned principally with understanding the effects of the experimental treatment on the general population, then it is appropriate to compare the exposed population to the population that was not exposed (i.e., a control group from the general population). It is important in such an analysis to treat failed attempts to treat (i.e., those who decline the treatment or select themselves out of the exposure) to be included in the analysis as though they were treated. This is called an intention to treat (IT) analysis. This comparison will reveal the overall population effect of the treatment.

This comparison does not reveal the effects of the treatment on the population that actually received the treatment (i.e., those who accepted the specific treatment conditions). When customers are allowed to choose a given treatment (opt-in or opt-out) it is likely that the treatment group contains selection bias resulting from the fact that volunteers will be attracted to treatment options that they believe will benefit them (e.g., customers with preferable load shapes may be more likely to volunteer for an optional rate than would customers with more peak period loads). If such selection bias is not controlled in some manner, load impact estimates (for customers actually treated) will be biased. There are a number of research design alternatives for controlling for selection bias of this kind that were

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discussed in the webinars. These include: use of a randomized encouragement design; a regression discontinuity design; a delayed treatment design; and the use of non-equivalent control groups.

***Question:*** *For opt-in studies, how is the behavior of those people who opt-in to the study different from the behavior of those in the population as a whole? In this case, how is the control group from the whole population not biased?*

**Answer:** See above answer.

***Question:*** *Is it possible to use segmentation scheme, such as Claritas, when going through selection?*

**Answer:** Claritas segments on cycle metrics. If you want to understand whether customers in different segments either opt-in at different rates or respond, then yes. Any significant segmentation will have big impacts on sample size and you need to take that into account. You can use clusters after the fact in econometric models to test for different response patterns by customer segment.

***Question:*** *If post study participation is assumed to be optional, how can forced participation be the ideal design?*

**Answer:** Whether you use optional or mandatory participation depends on the question you intend to answer.

***Question:*** *What is "shadow billing"?*

**Answer:** A shadow bill is one that is calculated based on the usage of a customer who is on a chosen tariff (e.g., a critical peak pricing tariff) using the otherwise applicable tariff (e.g., the non-time varying default tariff). A shadow bill is intended to give customers information about whether or not they would be better off on the chosen tariff compared with the alternative tariff.

***Question:*** *What texts (e.g., books, papers, journal articles) specific to sample selection and analysis issues are recommended reading for SGIG recipients undertaking a dynamic pricing and consumer behavior study?*

**Answer:** See Guidelines for Designing Effective Energy Information Feedback Pilots: Research Protocols". [http://my.epri.com/portal/server.pt?Product\\_id=00000000001020855](http://my.epri.com/portal/server.pt?Product_id=00000000001020855). It is a good starting point that discusses the literature and provides an overview of the requirements and procedures for designing samples using repeated measures.

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**Question:** *What tools are available for data analysis other than SAS, Lodestar, MV-90 LR that may be reasonably priced?*

**Answer:** There are many different types of data analysis software applications and packages out in the marketplace. Each has their strengths and weaknesses, given the type of analysis your project is intending to do. Practically speaking, the best alternatives for analyzing results of repeated measures designs are Stata and SAS (in that order).

**Question:** *Can we get a copy of a submitted SGIG consumer behavior study plan to serve as a guide and for boilerplate language?*

**Answer:** We had not planned on distributing SGIG recipients' consumer behavior study plan, as there may be confidential and commercially sensitive information contained therein. Instead, we are hopeful that the topics included in the Dynamic Pricing and Consumer Behavior webinar presentations should suffice to identify the topics and details the Department of Energy's Technical Advisory Group (TAG) are most interested in seeing.

**Question:** *Will each SGIG recipient undertaking a dynamic pricing and consumer behavior study be assigned a specific TAG?*

**Answer:** Each SGIG recipient will get their own TAG, but some TAG members may participate in multiple TAGs. All TAG members have signed confidentiality agreements with Lawrence Berkeley National Lab. If there are further confidentiality issues or concerns, please feel free to contact your DOE Technical Project Officer, TAG Coordinator, and/or Peter Cappers of LBNL ([PACappers@LBL.gov](mailto:PACappers@LBL.gov)).

**Question:** *When will each SGIG recipient undertaking a dynamic pricing and consumer behavior study be notified of their assigned TAG?*

**Answer:** Most likely, the DOE Technical Project Officer will facilitate an initial introductory conference call between each SGIG recipient and their respective TAG. After that, the SGIG recipient and TAG Coordinator will interface directly.

**Question:** *Will a copy of the webinar presentations be made available?*

**Answer:** A copy of the webinar presentations in PDF form as well as a recorded version of both days' presentations will be made available on the SmartGrid.gov website. Each SGIG recipient undertaking a dynamic pricing and consumer behavior study will be sent an announcement indicating when this information is posted and where it can be found.

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**Question:** *Would a completed set of Electric Power Research Institute (EPRI) protocols on energy information feedback studies contained in the new report “Guidelines for Designing Effective Energy Information Feedback Pilots: Research Protocols” satisfy SGIG customer behavior requirements?*

**Answer:** The EPRI protocols referred to are a great place to start depending on the goals of your project. Many of the protocols can be extended to the type of analysis many SGIG recipients will undertake as part of their consumer behavior studies. Since these protocols are not prescriptive (i.e., they do not dictate study design decisions), the outcome research designs from using the protocols may not satisfy the SGIG study requirements per se. However, following these protocols will ensure that the design of the study is sufficiently thought through so that negotiations with DOE concerning the details of the proposed design will be easier.