PUBLIC UTILITIES COMMISSION
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July 21, 2015

Advice Letter 4731-G and 4731-G-A

Ronald van der Leeden
Director, Regulatory Affairs
Southern California Gas
555 W. Fifth Street, GT14D6
Los Angeles, CA 90013-1011

Subject: 2013-2015 Energy Advisor Program – 10-10-10+ Multi-Family Behavioral Pilot Program Pursuant to D.12-11-015 and Supplemental Filing

Dear Mr. Leeden:

Advice Letter 4731-G and 4731-G-A are effective July 19, 2015.

Sincerely,

Edward Randolph
Director, Energy Division

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

Russell G. Worden
Managing Director, State Regulatory Operations

June 19, 2015

ADVICE 3157-E-A
(Southern California Edison Company – U 338-E)

Advice 4731-G-A
(Southern California Gas Company – U 904-G)

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA
ENERGY DIVISION

SUBJECT: Supplemental Filing to Southern California Edison Company and Southern California Gas Company's 2013-2015 Energy Advisor Program –10-10-10+ Multi-family Behavioral Pilot Program Pursuant to Decision 12-11-015

PURPOSE

Southern California Edison Company (SCE) and Southern California Gas Company (SoCal Gas) together the "Utilities" hereby submit for filing a supplement to Advice 3157-E and Advice 4731-G, in part, in response to the Energy Division's request for additional information for the proposed 2015 10-10-10+ (Plus) Multi-Family Behavioral Pilot Program (Pilot), consistent with California Public Utilities Commission (Commission) direction in Decision (D.)12-11-015.

Since the initial Pilot program development, Governor Brown declared a state of emergency for water. The state has imposed restrictions to achieve a 25 percent reduction in residential water usage.[1] The Utilities have modified the title of this pilot to add a "plus" after the "10" related to water conservation (i.e. 10-10-10 to 10-10-10+ (Plus) to reflect the state policy that California residents reduce water usage by more than 10 percent (i.e. 25 percent). This filing incorporates a Randomized Control Trial (RCT) and Randomized Encouragement Design (RED) approach for the proposed pilot.

[1] Cite www.water.ca.gove/waterconditions/declaration.cfm.

All necessary supporting documentation and information are incorporated in the attached Program Implementation Plan (PIP).

BACKGROUND

On October 1, 2009, the Commission issued D.09-09-047 authorizing the IOUs[2] to initiate expedited approval of Evaluation, Measurement, and Verification (EM&V) methodologies to verify savings driven by behavior-based efficiency programs.[3]

On April 21, 2010, the Commission issued D.10-04-029 restricting IOU savings claims for behavior-based programs as those with the following characteristics:

1. Provides households with comparative energy usage information;[4]
2. Uses experimental design methodologies contained within the California Evaluation Protocols to determine net energy savings;[5] and
3. Uses ex post savings measurement to determine claimable energy savings.[6]

The existing definition for behavioral programs limits the IOUs' ability to claim energy savings to only those efforts meeting the above-referenced criteria.

However, on November 15, 2012, the Commission issued D.12-11-015 providing the following direction for expanding the current behavioral definition:

> "However, we also encourage the utilities to work with Opower, EHC, and other interested parties to initiate a process for expansion of the definition of behavioral programs as well as initiating additional program activities in this cycle. Nothing prohibits the utilities from going beyond this minimum level and definition. If there is consensus on additional types of activities in the behavioral areas that would be beneficial, the utilities may initiate them as soon as possible utilizing the program and administrative flexibility they have already been granted and/or they may seek specific authority from the Commission, if necessary."[7]

Subsequently, two additional behavioral change documents were issued – *Paving the Way for a Richer Mix of Residential Behavior Programs* and *A Behavior Straw-Proposal* – which offer a new, not formally approved, definition of behavior-based programs developed by the IOUs and the Commission's Energy Division staff.[8] These documents

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2 The Investor Owned Utilities (IOUs) are Pacific Gas and Electric Company, San Diego Gas & Electric Company, Southern California Edison Company, and Southern California Gas Company.
3 D.09-09-047, p. 304.
4 D.10-04-029, p. 37.
5 D.10-04-029, P. 40.
6 D.10-04-029, pp. 36-41.
7 D.12-11-015, pp. 76-77.
8 Http://www.calmac.org/publications/Residential_Behavior_White_Paper_5-31-13_FINAL.pdf

state that the IOUs and implementers should focus on using one or more underused behavioral strategies—commitment, feedback, follow-through, framing, in-person interactions, energy pricing, rewards or gifts, social norms, and multi-pronged strategies.

In March 2015, SCE had two discussions with the Energy Division to review the Pilot proposal after the initial submittal. Energy Division requested the following Pilot program modifications:

1) Modify the Pilot program to support an RCT design,
2) Provide detailed description of the Pilot program implementation process,
3) Provide detailed documentation for all data cleaning, sampling design and Energy Star (ES) Portfolio implementation so others could learn from it,
4) Update the Power Analysis to confirm the appropriate sample size once the multi-family (MF) load profile can be properly established,
5) Support interim Pilot check-in meetings as appropriate.

This supplemental advice filng incorporates the above-requested modifications, and supplements Advice 3157-E and Advice 4731-G, in part.

PILOT SUMMARY

This Pilot will be a collaboration between SCE and SoCal Gas to test behavioral change strategies in MF complexes within the Utilities joint service territory. The pilot seeks to reduce MF complexes' usage of electricity and gas by at least 10 percent, and water by more than 10 percent (i.e. up to 25 percent to achieve state goals) over a 12-month period utilizing the following behavioral strategies:

- **Competition** – the participating MF complexes will compete on three different levels (i.e., self-competition, MF complex-to-MF complex competition, and city-to-city competition);
- **Feedback/Benchmarking** – the comparative usage information for the participating MF complexes will be reported on a quarterly basis using the Multi-Family Energy Star Portfolio Manager Software;
- **Commitment** – seeking 10 pecent electricity, 10 percent gas, and 10 percent + (Plus) water usage reduction from baseline;
- **Follow-through** – the pilot will be asking the apartment renters and property owners/managers to exhibit behavior change to support at least a 10 percent reduction within a 12-month period; and
- **Rewards** – different levels of rewards will be made available for the three different levels of MF complex competitions.

This Pilot will meet the requirements specified in D.10-04-029 and D.12-11-015 as follows:

- Provides MF complexes with Comparative Usage information – this will be achieved through the use of the Environmental Protection Agency's (EPA) (i.e.,

Environmental Protection Agency) Multi-Family Energy Star Portfolio Manager that will enable all participants to be benchmarked against national multi-family property standards.
- Uses experimental design methodologies contained within the California Evaluation Protocols to determine net energy savings – this Pilot will overcome many data cleaning challenges to support a required Randomized Control Trial (RCT) with a Randomized Encouragement Design (RED).
- Supports ex-post savings measurement to determine claimable energy savings – The proposed Pilot has provisioned an early EM&V assessment effort to analyze energy savings for reporting purposes.

The Pilot seeks to expand the behavioral definition through (1) Testing different, underused behavior intervention strategies with innovative designs; (2) Using generally accepted social science research and behavior theories; and (3) Yielding evaluable effects to support energy savings. More importantly, this Pilot is targeting MF complexes (i.e., aggregation of renters, common area meters) for three different utility services (i.e., electricity, gas, and water).

ATTACHMENTS

This Advice Letter includes the following attachments:

- **Attachment A:** Program Implementation Plan (PIP)
- **Attachment A-1:** Program Non-Energy Objectives
- **Attachment A-2:** Pilot Criteria
- **Attachment A-3:** Preliminary Power Analysis
- **Attachment A-4:** Example of MF Complex Blueprint for Data Cleaning
- **Attachment A-5:** Illustrative Pilot Comparative Energy Report
- **Attachment A-6:** Bibliography
- **Attachment A-7:** PIP Changes Comparison Table

This advice filing will not increase any rate or charge, cause the withdrawal of service, or conflict with any other schedule or rule.

TIER DESIGNATION

Pursuant to General Order (GO) 96-B, Energy Industry Rule 5.2, this advice letter is submitted with a Tier 2 designation, which is the same Tier designation as the original filing, Advice 3157-E and 4731-G.

EFFECTIVE DATE

This advice filing will become effective on July 19, 2015, the 30th calendar day after the date filed.

NOTICE

Anyone wishing to protest this advice filing may do so by letter via U.S. Mail, facsimile, or electronically, any of which must be received no later than 20 days after the date of this advice filing. Protests should be submitted to:

CPUC, Energy Division
Attention: Tariff Unit
505 Van Ness Avenue
San Francisco, CA 94102
E-mail: EDTariffUnit@cpuc.ca.gov

Copies should also be mailed to the attention of the Director, Energy Division, Room 4004 (same address above).

In addition, protests and all other correspondence regarding this advice letter should also be sent by letter and transmitted via facsimile or electronically to the attention of:

Russell G. Worden
Managing Director, State Regulatory Operations
8631 Rush Street
Rosemead, CA 91770
Facsimile: (626) 302-4829
E-mail: AdviceTariffManager@sce.com

Michael R. Hoover
Director, State Regulatory Affairs
c/o Karyn Gansecki
Southern California Edison Company
601 Van Ness Avenue, Suite 2030
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There are no restrictions on who may file a protest, but the protest shall set forth specifically the grounds upon which it is based and must be received by the deadline shown above.

In accordance with General Rule 4 of GO 96-B, SCE is serving copies of this advice filing to the interested parties shown on the attached GO 96-B and A.12-07-001 et al, service lists. Address change requests to the GO 96-B service list should be directed by electronic mail to AdviceTariffManager@sce.com or at (626) 302-4039. For changes to all other service lists, please contact the Commission's Process Office at (415) 703-2021 or by electronic mail at Process_Office@cpuc.ca.gov.

Further, in accordance with Public Utilities Code Section 491, notice to the public is hereby given by filing and keeping the advice filing at SCE's corporate headquarters. To view other SCE advice letters filed with the Commission, log on to SCE's web site at https://www.sce.com/wps/portal/home/regulatory/advice-letters.

For questions, please contact Sheila Lee at (626) 302-5762 or by electronic mail at Sheila.Lee@sce.com.

Southern California Edison Company

/s/ Russell G. Worden
Russell G. Worden

RGW:sl:jm
Enclosures

ATTACHMENT A

10-10-10+ Multi-family Behavioral Pilot Program

Program Implementation Plan (PIP)

ATTACHMENT A

- **Pilot Program Name:** The Utilities 10-10-10+ Multi-family Behavioral Pilot Program

- **Sub-Program ID Number:** SCE-13-SW-001a & SoCal Gas 3701-SW-CALS-Energy Advisor

- **Type of Pilot Program: _x_Core __Third Party __Partnership**

- **Market sector or segment that this pilot program is designed to serve[9]:**
  - **a)** ☑ Residential pilot
    - i. Including Low Income? ☑ Yes __ No
    - ii. Including Moderate Income? ☑ Yes __ No
    - iii. Including or specifically Multifamily buildings ☑ Yes __ No
    - iv. Including or specifically Rental units? ☑ Yes __ No
  - **b)** __ Commercial (List applicable NAIC codes: N/A)
  - **c)** __ Industrial (List applicable NAIC codes: N/A)
  - **d)** __ Agricultural (List applicable NAIC codes: N/A)

- **Is this pilot program primarily a:**
  - **a)** Non-resource program ___ Yes ☑ No
  - **b)** Resource acquisition program ☑ Yes ___ No
  - **c)** Market transformation program ___ Yes ☑ No

- **Indicate the primary intervention strategies:**
  - **a)** Upstream ___ Yes ☑ No
  - **b)** Midstream ___ Yes ☑ No
  - **c)** Downstream ☑ Yes ___ No
  - **d)** Direct Install __ Yes ☑ No
  - **e)** Non Resource Yes ☑ No

- **Projected Sub-program Total Resource Cost (TRC) and Program Administrator Cost (PAC):** TRC ___ PAC ___

  Not applicable – the budget for this pilot is embedded in existing program budgets.

- **Projected Pilot Budget:**

Table 1A: Projected Pilot program Budget, by Calendar Year[10]

	Program Year		
Sub-Program	**2015**	**2016**	**Total**
Admin ($)	$0	$0	$0
General Overhead ($)	$0	$0	$0

[9] Check all that apply

[10] Individual utility specific information to be provided in this table

Incentives ($)	$0	$0	$0
Direct Install Non-Incentives (DINI) ($)	$0	$0	$0
Establish RCT MF population at MF complex level –this may include data cleaning, site visit, web verification, phone calls and linkage to other available data bases as necessary.	$125,000	$25,000	$150,000
Treatment-A: MF Benchmarking & Reporting:			
• Initial Logistic Shake-down: data analysis and testing to support prototype, beta and operational analysis	$50,000	$0	$50,000
• Data cleaning for electricity, gas and water billing data, alignment,	$70,000	$30,000	$100,000
• Including purchasing necessary third party databases such as county assessor tax records	$60,000	$0	$60,000
Reporting MF Portfolio Manager Results quarterly as feedback			
• Energy Usage Report Design		$35,000	$35,000
• MF Portfolio Manager data input, output, results database, print/mail (4 times, 720 treatment accounts only)		$216,000	$216,000
• Email follow-up—design, implementation (twice for 720 treatment accounts only)		$25,000	$25,000
• Complete reports but do not mail to control MF complexes (360 accounts)		$93,600	$93,600

Treatment-B: On-site Marketing Support, Competition/Reward			
• Marketing design and development		$35,000	$35,000
• Recruite and enroll tenants & complex-wide signage, tenant door hangers to participate in competition (360 MF complexes)		$500,000	$500,000
• Interim and final rewards for winning the competition		$75,000	$75,000
• Local government engagement		$30,000	$30,000
Contingency Budget		$130,400	$130,400
Total Budget	**$305,000**	**$1,195,000**	**$1,500,000**

SCE will contribute two-thirds (2/3) and SoCal Gas will one-third (1/3) for the pilot program budget, respectively. This pilot program expense will be further allocated to SCE and SoCal Gas' Home Energy Advisor Program, Multi-family Energy Efficiency Program, and Energy Upgrade California Multi-family Programs. Some fund shifting between 2015 and 2016 may be required.

The above budget also assumed the following:

- 2015 Activities:
    a. The data cleaning efforts for MF complex population and RCT sampling design will be completed in 2015.
    b. Some logistic shake-down activities will take place in 2015 to test the effectiveness of MF Portfolio Manager implementation and reporting with electricity, gas, and water.
    c. Some development effort for Comparative Usage Report and Competition/Reward logistics will take place in 2015.
    d. The pilot program will initiate 4 quarterly mailings of Energy Usage Reports, plus two email follow-ups.
- 2016 Activities:
    a. The actual application of Treatments will take place in 2016.
    b. Implementation of treatments for group-1 and group-2.
- For the pilot budget, we are using the following assumptions:
    a. Establish an initial qualified MF complex population of 1,100 buildings,
    b. Estimate 360 MF complexes for control,
    c. Estimate 360 MF complexes for Treatment-Group-1,
    d. Estimate 360 MF complexes for Treatment-Group-2.

Please refer to **Attachment A-3** for a power analysis and assumptions indicating the number of treatment and control samples required for the pilot. Since aggregated MF complex load profiles are not available, we are using two proxy load profiles: (1) single family residential load profile, and (2) a hotel load profile. We believe the hotel load profile is a better match to the MF complex load profile.

The purpose of this power analysis is to guide the data cleaning process so the pilot team can establish a sufficient number of qualified MF complexes in the general population prior to developing the sampling design. The pilot team has agreed to update this load profile and power analysis prior to final sampling design. We have also agreed to have a check-in meeting with ED/Consultant prior to full pilot implementation in 2016.

Table-1B: Phase-I Pilot Program Net Energy and Demand Impacts, by Calendar Year

	Program Years		
Energy Advisor Program	2015	2016	Total
Electricity	TBD	TBD	TBD
Gas	TBD	TBD	TBD
Water	TBD	TBD	TBD

The Utilities will file for energy savings on an ex-post basis, pending completion of early M&V evaluation.

To meet the requirements specified in Decision (D.) 09-09-047, please refer to the list of Pilot Program Questions in **Attachment A-2**. For program non-energy objectives, please refer to **Attachment A-1**.

- **Pilot Program Description, Objectives and Theory:**

  a) Pilot Program Description and Theory:

The CPUC has mandated that all statewide IOUs reach 5% of all residential customers with a behavior-based program by the end of 2014. For SCE, this requirement translates to 215,000 residential customers. In 2015, SCE will provide continuous behavior-based program engagement to 5% of all residential customer households. Existing Energy Advisor programs (i.e., Opower-1, Opower-2 and HEES Enhancement activities) are set to achieve the 5% mandate by December 31, 2014).

In D.12-11-015, the CPUC encouraged

> "the utilities to work with Opower, EHC, and other interested parties to initiate a process for expansion of the definition of behavioral programs as well as initiating additional program activities in this cycle. Nothing prohibits the utilities from going beyond this minimum level and definition. If there is consensus on additional types of activities in the behavioral area that would be beneficial, the utilities may initiate them as soon as possible utilizing the

program and administrative flexibility they have already been granted and/or they may seek specific authority from the Commission, if necessary."[11]

Additionally, two guiding documents have been developed to provide additional details for behavior change programs – the *Paving the Way for a Richer Mix of Residential Behavior Programs* whitepaper[12] (i.e., Behavior Whitepaper) and *a Behavior Straw-Proposal*, which offer a new, not formally approved definition of behavior-based programs developed by CA IOU and CPUC Energy Division staff. These documents direct CA IOUs to focus on one or more underused behavior change intervention strategies in their program designs. The underused strategies are commitment, feedback, follow-through, framing, in-person interactions, energy pricing, rewards or gifts, social norms, and multi-pronged strategies.

This pilot seeks to meet three behavior program best practices:

1. Test different, underused behavior intervention strategies with innovative designs;
2. Ground the pilot in generally accepted social science research and behavior theories; and
3. Yield evaluable effects, especially to support energy savings reporting.

Pilot Program Description

The 10 (Electricity) – 10 (Gas) – 10 (Water) + (Plus) Multi-family (MF) Behavioral Pilot Program is designed with a multi-year and multi-phased approach to engage MF complexes to reduce energy and water usage by 10%. However, during the pilot planning phase, Governor Brown declared a state of emergency for water conservation. The residents of California are asked to reduce water usage by 25%. We have modified the title of this pilot to add a "plus" after the "10" related to water conservation, (i.e. from 10-10-10 to 10-10-10**+** (Plus), to reflect the state policy that California residents reduce water usage by 25%.

The current pilot will use a Randomized Encouragement Design (RED), in a Randomized Control Trial (RCT). A traditional RCT design uses random assignment of participants to a control group and one or more treatment groups after eligibility has been determined. The control group serves as a baseline for comparison and thus, no treatment is applied to this group. A treatment group receives one or more levels of "treatments." Outcomes of the treatment group(s) are compared to the control group in order to infer causality (i.e., draw conclusions about the effects of treatments). In an RED, all eligible participants have the opportunity to participate in the treatment(s), but random subsets of these eligible participants are offered encouragement to participate (in contrast to a pure RCT, where participants do not self-select). That is, participants are allowed to decide whether or not they want to participate in the treatment(s) (see Behagel et al., 2013 and Bradlow, 1998).

The pilot approach includes the following:

1) Using a RED design, this pilot will have a control group and two different treatment groups. These groups include:

[11] Decision (D.) 12-11-015, PP. 76-77.

[12] http://www.calmac.org/publications/Residential_Behavior_White_Paper_5-31-13_FINAL.pdf

a. Control: MF complexes will be assessed “as is” to serve as a baseline for comparison to the treatment groups.
b. Treatment-Group-1, receiving treatment-A.
c. Treatment-Group-2, receiving treatment-A and treatment–B at the same time.

2) Pilot Program Treatments:

a. Treatment-A: Comparative Usage Report using ES Portfolio Manager data

i. The pilot will use the MF Portfolio Manager to track weather-normalized Energy Usage Intensity (EUI), energy costs, greenhouse gas emissions and water consumptions, against a portfolio of liked-MF buildings in the nation. For each MF complex, the portfolio manager can generate two values:
1. Energy Usage Intensity (EUI) score, where a lower value is more favorable,
2. Energy Star Score (i.e., 1-100 points rating), where higher the value is more favorable.

ii. The above information will be made available during a 12-month period.

b. Treatment-B: On-site Marketing, Competition and Rewards

i. Treatment-B consisted of on-site marketing support and tenant engagement through signage, door hangers and etc., for 12 months. The pilot will utilize apartment association and property owners/managers, common areas to engage individual renters using tactics such as homeowner association meetings, common area signage, and door-hangers to communicate and rally for complex-wide engagement and support.

ii. This Pilot will engage competitive behavior at three levels by utilizing the information generated by the MF Energy Star Portfolio Manager Software (i.e., MF ES Score & Energy Usage Intensity):

1. MF complex-wide self-competition (i.e., % of reduction from all dwellings and common areas meters combined). For example, month to month self-measurement compared to same month the prior year.

2. MF complex to MF complex competition (i.e., Apartment Complex-A competes with Apartment Complex-B in the same city or in different cities). The participating MF complex can select an avatar for their complex and compete against another MF complex that has another avatar. For example, the “Ring of Fire” MF complex will compete against “Batman” MF complex within the same city or in a different city.

3. The participating MF complexes can be grouped to facilitate city-to-city competition. For example, the participating MF complexes in the city of Fontana can compete against participating MF complexes in the city of Rosemead. A natural partition for this city-to-city competition is along the city-oriented water districts.

iii. Rewards

1. For MF complex self-competition and/or interim result competition: The rewards are small and low cost items that are relevant to the pilot and available to all tenants. The pilot can recognize the interim MF complex winners on a quarterly basis to generate excitement and engagement.

2. For MF complex-to-complex competition: The reward can be more substantive such as an energy efficient washer and dryer for the common area laundry room with proper signage to explain the reasons for the reward to the apartment dwellers (i.e., winning the energy savings competition).

3. It is also possible to aggregate MF complexes at a city level to facilitate a city-to-city competition. The reward for city-to-city competition could be recognition and publicity for the winning MF complex.

Pilot Program and Behavior Theory:

This pilot will use a multi-pronged behavior strategy to engage residential customers in MF complexes to decrease energy usage by utilizing the following:

- **Feedback and Benchmarking** – A Comparative Usage Report will be generated using MF Energy Star Portfolio Manager Software for property owners/managers.

- **Goal Setting** – 10-10-10+ is a goal setting pilot program. We are asking the participating MF complexes to reduce electricity and gas usage by 10% each. For water, the pilot program is expecting the participating MF complexes to meet the California water conservation challenge of reducing usage by 25%. While a 10% behavior-only reduction (i.e., without plug load appliance upgrades) in electricity usage may be difficult to achieve, but a 10%+ reduction in water usage may be easily achievable[13].

- **Competition** – the participating MF complex will compete in multiple levels. Using signage, door hangers and other feedback tools, this pilot will update the displayed information regularly for all treatment MF complexes to engage property owners and tenants in the competition.

[13] EPA (http://www.epa.gov/WaterSense/pubs/indoor.html) suggest 20-30 potential savings in water conservation. Mitchell and Chesnutt (2013) show water savings in their experimental study which vary 5.5% to 8.4%.

- **Rewards** as a tool – Different levels of rewards will be made available for the different levels of MF complex competition.

- **Commitment & Goal Setting** – seeking 10% electricity and gas, and 10%+ water usage reduction from baseline at the time of participation.

- **Follow-through** – the pilot will be asking the apartment renters and property owners/managers to exhibit behavior changes to support 10% reduction within a 12-month period.

Rather than quoting all of the above as pilot program behavior theory, the primary 10-10-10+ intervention strategy is condensed to (1) Feedback & Benchmarking and (2) Competition. Other interventions such as rewards, goal setting and commitment are used as "tools" to facilitate the primary intervention strategies.

Additional Theoretical Background

Energy efficiency has been considered to be a promising approach to reducing energy demand and thus decreasing greenhouse gas emissions; and in this context, electricity, gas, and water consumption. Recent increases in non-monetary interventions using behavioral economics and psychology have led consumers to conserve energy. In a variety of areas, many behavioral concepts have been implemented to "nudge" consumers toward behavioral change to increase health, wealth, and other benefits. There are some studies that have reviewed/tested concepts or designs similar to what is being proposed by SCE in this study, but in different settings. Additionally, few of these studies are larger than SCE's proposed pilot design. These studies indicate that there are increased opportunities to implement various behavioral concepts within different settings to better identify what drives consumers' energy use behavior and investigate how this behavior can be further influenced. CPUC D. 12-11-015, makes provisions for the utilities to go beyond the described minimum level and definition for energy efficiency behavioral programs.

Studies have shown that customers are more likely to make permanent changes in their energy behaviors if the new behaviors are easy and convenient to perform, skills and resources are available, peer pressure and social norm dictates the change, and when commitments are made to change in public settings (Costanza et al., 1986; Stern, 1992; McMakin et al., 2002). More specifically, as indicated by McMakin et al. (2002) and other recent studies, people are more likely to adopt energy-efficiency behaviors under the following conditions:

- People view energy efficiency in terms of benefits to themselves (especially in terms of increased thermal comfort and health) rather than curtailment (Becker et al., 1981; Samuelson & Biek, 1991).

- When energy use and savings are made visible, this provides goals and motives where they did not previously exist (Kempton et al., 1992; Harding and Hsiaw, 2012). In addition, competitive incentives have been shown to be effective in inducing more effort. In a dynamic competitive setting where information on the performance of the competing agents is available, the state of competition may

have an impact on performance (Apesteguia and Palacios-Huerta, 2010; Bracha and Fershtman, 2012)

- Information or feedback is particularly effective when it is salient, vivid, and in a personalized format (Tversky and Kahneman, 1981; Costanza et al., 1986; Stern and Aronson, 1984; Stern 1992; Chetty et al., 2007; Finkelstein, 2009).

- Another often used behavioral tool/concept is social pressure and norms. In a study by Mani et al. (2013), homeowners were encouraged to conserve electricity through social feedback on how much electricity they used relative to the average person. When the comparison was between the homeowner and all the other people in the country, virtually no savings resulted; people behaved the same. However, when the comparison was between homeowner and other people in their neighborhood, people were more motivated to conserve energy. This indicates that social comparison group matters and people are more likely to identify with close others (i.e., others in their neighborhood) than random other people (i.e., people in their country). . According to Pentland (2014), identification with a group of people (i.e., "in-group") increases both trust between group members and the amount of social pressure that the group can exert. Thus, in the Mani et al. (2013) experiment, behavior change was most effective when it took advantage of the strength of the surrounding social ties.

Considering the findings from the literature, the pilot design is intended to utilize social ties by emphasizing competition among the multi-family apartment complexes, creating a 10-10-10+ goal and commitment structure. Few, if any, studies have explored competition among multi-family apartments. For a complete reference of bibliographical references, please refer to **Attachment A-6**.

Pilot Program Experimental Design & Implementation

This pilot program is designed at the apartment complex level in order to take advantage of the MF Energy Star Portfolio Manager's capabilities (i.e., aggregating tenants and common meters to establish an energy/resource usage output for the entire MF complex). To operationalize a Randomized Control Trial (RCT) using Randomized Encouragement Design (RED), a qualified MF complex population must be established.

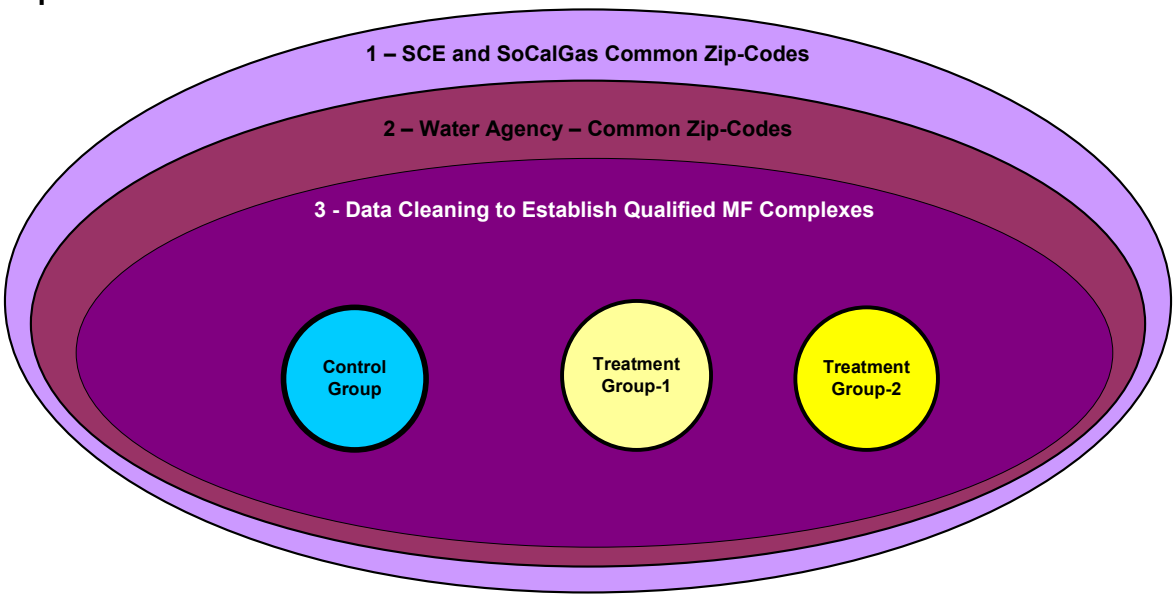
Establishing this population is a significant challenge since utility databases do not easily link tenant units to apartment complexes. There may also be a many-to-many (i.e., many tenants vs. many common area meters) relationship, making it impossible to use the existing utility databases to perform sampling design. Establishing a population is further complicated by the desire to engage a minimum number of water utilities to simplify the pilot program logistics – water districts must be aligned with electric and gas utilities. SCE and SoCal Gas have currently engaged several water districts in the Inland Empire to explore the possibility of working together to explore the feasibility of this endeavor. However, it is possible that there is no way to align all three utilities for this MF population. In light of this possibility, this pilot program may need to accept MF complexes with only two resources (i.e., a MF complex with SCE and a selected water partner only). We will not know the size and scope of this alignment issue until the MF data cleaning process is underway.

The qualified MF complex population must meet the following qualifications:

1) Must be 20 apartment units or larger,
2) Must be able to support a minimum of two resources (i.e., gas/water, electricity/water, or electricity/gas)

The pilot program will use the approach outlined below to generate the qualified MF complex population.

Illustration-A: Data Cleaning Approach to Establish a Qualified MF Complex Population



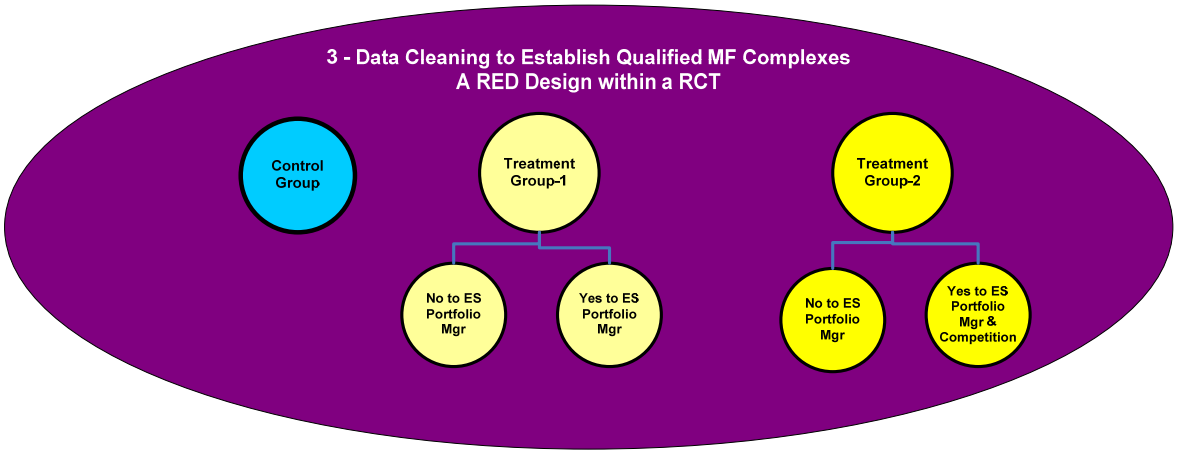
- Step-1: Establish shared territory at the zip code level for SCE and SoCal Gas
  - Run an account analysis at both SCE and SoCal Gas to establish the coverage for the common zip codes.
  - Select a focus list of zip codes with adjacent cities for the pilot program. This action will serve the following: (1) ease climate zone differentiation, (2) facilitate a community environment, and (3) simplify implementation logistics.

- Step-2: Get prospective water agency zip-codes
  - Contact the prospective water districts and map them onto the shared SCE and SoCal Gas zip-codes described in Step-1.

- Step-3: Data cleaning to establish qualified population
  - Obtain preliminary water and gas billing data from partners,
  - Use a tri-angulation approach for data cleaning to match zip codes and accounts to qualified MF complexes. The pilot will use the following tactics:
    - Use GIS mapping and data analytics to align MF complex addresses using electric, gas and water billing records,
    - Use available web information and county tax assessor database to verify address and size of each MF complex,
    - Use site visits as necessary to establish basic MF complex information (e.g., location, size, etc.).

- The final list of pilot qualified MF complexes will have a clearly identified street address, list the number of apartments within the complex, the number of bedrooms in each apartment unit, the estimated size of common area, and well-defined common area meter functions (see **Attachment A-4** for an example of a blueprint for each MF complex).
- The pilot program will establish an initial qualified MF population of 1,100 MF complexes in order to have sufficient power to detect the goal of 10% savings (see **Attachment A-3** for power analysis).
- The pilot program team understands the importance of documentation for the data cleaning phase so this information can be used to support other scaled ES portfolio manager and benchmarking implementation later. As such, careful documentation of all actions related to data cleaning will be recorded.

Illustration-B: A RED Design within a RCT



- Step-4: Randomized sampling design to establish "treatment" and "control" groups.
  - The pilot program will establish 2 different treatment groups and 2 different treatment options (please refer to Illustration-B above).
    - The randomly selected Treatment Group-1 will receive Treatment-A only.
    - The randomly selected Treatment Group-2 will receive Treatment-A and Treatment-B at the same time (please refer to Table-1C below).
  - The pilot team will schedule a pre-meeting to review stratification strategy before the sampling assignment. The pre-meeting will also include an updated power analysis using the MF load profiles. Until the appropriate MF load profile is available, the pilot team has developed a proxy power analysis (please refer to Appendix-A5 for details).
  - This sampling design will need Energy Division's approval and verification.

Table-1C: Types of Treatment & Treatment Groups

	Treatment-A: Invitation to Benchmarking	**Treatment-B:** On-site Marketing Support, Competition & Reward/s
Targets	**Property Owners/Managers**	**Property Owners/Managers & Tenants**
Control Group	**---**	**---**
Treatment Group-1	**Comparative Usage Report**	**---**
Treatment Group-2	**Comparative Usage Report, plus**	**On-Site Marketing Support, Competition & Reward**

Note – Treatment Group-2 will receive Treatment-A and Treatment-B at the same time.

- Step-5: Pilot pre-implementation activities
  - Execute proper agreements with water agencies and SoCal Gas to obtain monthly billing data to support the pilot,
  - Complete the ES portfolio manager logistical shakedown to support electricity, gas and water data and data aggregation needs,
  - Design and develop a comparative report with benchmarking information,
  - Design and develop competition signage, door hangers, and other relevant marketing material,
  - Design and develop interim and final reward options for the competition.

- Step-6: Implementation – frequency of comparative report with benchmarking information from ES Portfolio Manager (please refer to Illustration-C below)
  - The pilot program will offer benchmarking reporting at a regular frequency (i.e., Quarterly with 2 extra email follow-up) to engage MF property owners.
  - The ES Score and Energy Usage Intensity value will serve as the content for MF comparative energy usage report delivered on a quarterly basis to the property owners. The actual frequency of this report will become clear once the pilot implementation team completes the ES Portfolio Manager logistical shakedown process in 2015 (please refer to Mock Report in **Attachment-5**)

Illustration-C: MF Comparative Report Mailing Cadence

MF Comparative Report	Mailings	@ Quarterly frequency to property owners
	Mailing-1	Month-1
	Mailing-2	Month-4
	Mailing-3	Month-7
	Mailing-4	Month-10

Note: Plus two email follow-ups scheduled between the above 4 quarterly mails.

- Step-6: Implementation – frequency of competition and reward for MF complexes (please refer to Illustration-D and Illustration-E below)

- The competition and reward will build upon information provided in the Comparative Usage Report using resources from the ES Portfolio Manager.
  - Self-competition – trending of ES Score and Energy Usage Intensity value over time for a single MF complex.
  - MF complex-to-complex competition – trending the above for two MF complexes as comparison.
  - MF complex city-to-city competition - By grouping the pre-selected MF complexes together, trending average/mean ES Score and Energy Usage Intensity value.
  - The frequency of on-site marketing support and tenant engagement with competition is subject to change after ES portfolio management logistic shakedown.

Illustration-D: MF Competitive Report & Competition & Reward

Time	Mailings To Property Owners @ quarterly frequency	On-site Marketing Support & Tenant Engagement with Competition	Reward/s
Month-1	Mailing-1	On-site Signage Treatment-1	#1 - Announce reward options
Month-2, 3	N/A	N/A	N/A
Month-4	Mailing-2	On-site Signage Treatment-2	#2 - Announce interim winner/s & provide reward/s
Month-5, 6	N/A	N/A	N/A
Month-7	Mailing-3	On-site Signage Treatment-3	#3 - Announce interim winner/s & provide reward/s
Month-8,9	N/A	N/A	N/A
Month-10	Mailing-4	On-site Signage Treatment-4	#4 - Announce interim winner/s & provide reward/s
Month-11, 12	N/A	N/A	N/A
Month-12			#5 - Announce final winner/s & provide reward/s

Illustration-E: MF Multi-Level Competition

MF Complex Self-Competition	MF Complex-to-Complex Competition	MF Complex City-to-City Competition
Trending of ES Score and Energy Usage Intensity value over time	Trending of ES Scores and Energy Usage Intensity values for two MF Complexes over time	Trending of average/mean ES Scores and Energy Usage Intensity values for logical groupings of MF complexes over time

- Step-7: Ongoing maintenance
  - This pilot's ongoing maintenance treatment is the Comparative Report using benchmarking data from the MF Portfolio Manager.
  - This will require the pilot team to extend the Comparative Report with Benchmarking information beyond the pilot duration.

- Step-8: Conduct a rapid feedback analysis and ex-post evaluation
  - There will be a program funded EM&V study activity to support this pilot.
  - The content of this EM&V study will be reviewed and approved by Energy Division, CPUC.
  - Anticipated schedule for this activity is in 2017.

- Step-9: Optional – Persistence Study
  - It may be desirable to monitor post-pilot behavior once all treatments are completed. This may be of interest from a behavior persistence and maintenance perspective. Post-intervention monitoring will allow us to examine the long-term durability and persistence of behavior change elicited by an intervention. The design of the pilot allows The Utilities to study the long-term persistence and durability of the energy reducing treatment.

Pilot Design and Study Limitations

This pilot design has several limitations:

1. Behavioral theories are sensitive to the design. In order to avoid confounding all the intervention outcomes, each behavior concept needs to be carefully defined. Otherwise SCE may not be able to identify which intervention motivated the behavior change. For example, pilot concepts that will be used as "tools" to execute the pilot need to be clearly identified and distinguished from each other.

2. The ideal design for this pilot program is to have 2 (MF Energy Star Portfolio Manager vs. no MF Energy Star Portfolio Manager) x 2 (competition vs. no competition) RCT design in order to have greater confidence in results. However, due to the high cost of implementation – financial, structural, and time – the pilot design has slightly been simplified into a simple one-way design, something that could impact a more complete interpretation of the results. However, this study is the first major attempt in testing competition using a RCT design, so even with its limitations, the implications are still important.

3. Depending on the number of each type of MF recruited (low income, affordable, results may not be generalizable across all MF complexes (e.g., if the majority of participating complexes are low income or affordable, we cannot claim that energy savings apply to market-rate complexes as well).

4. Studies suggest that as the group's size increases, it is more likely to observe people within the group to exhibit moral hazard[14] behavior such as not providing sufficient effort, lower incentive and cheating.

5. The pilot program team recognizes that a 10% reduction in energy usage for electricity and gas may be quite ambitious considering the tenants do not own the residence and do not have much of an incentive to invest heavily in energy efficient products. As pilot program designers, we are aware of this risk in achieving such a lofty goal, especially in electricity consumption.

6. Implementing a RCT (RED) design for future programs may not be realistic due to barriers such as complexity and financial considerations. However, the current pilot could be used to develop a workpaper serving as the basis for future energy savings claims.

7. Self-selection bias may be present due to the use of RED. That is, the sample of apartment complexes may be biased because of potential characteristics that caused them to self-select into groups (i.e., there may be individual differences between complexes who decided to participate vs. complexes who decided not to participate). This is relevant to the common areas.

8. The selection of possible sample size is based on a power analysis that only includes electricity consumption information. Due to the complex nature of doing so, we do not aggregate the electricity, gas, and water information for this analysis.

a) Pilot Program Energy and Demand Objectives

This pilot is seeking to claim energy savings on an ex-post basis.

b) Program Non-Energy Objectives:

The non-energy objective is to test the following:

(1) A program model to engage MF complex and community, for all income level populations.

(2) A program model to engage a multi-level participation:

   a. MF self-competition
   b. Apartment-to-apartment competition
   c. City-to-city competition

(3) To embrace Energy Star Portfolio Manager's capabilities to facilitate competition and results tracking.

[14] In some situations, members of the certain group form goals and objectives. The success of the objective often depends on individual contributions by group members to the collective cause. However, it is possible that members of the group have incentive to benefit from the effort contributed by the other members while contributing insufficiently individually. So we use the term moral hazard in teams to designate free riding within the community or group (Anesi, 2009)

For other non-energy metrics, please refer to **Attachment A-1**.

c) Cost Effectiveness/Market Need:

CPUC Decision 12-11-015, encouraged "the utilities to work with OPower, EHC, and other interested parties to initiate a process for expanding the definition of behavioral programs as well as initiating additional program activities in this cycle. Nothing prohibits the utilities from going beyond this minimum level and definition. If there is consensus on additional types of activities in the behavioral area that would be beneficial, the utilities may initiate them as soon as possible utilizing the program and administrative flexibility they have already been granted and/or they may seek specific authority from the Commission, if necessary.

The cost effectiveness analysis for this pilot can be constructed as "pilot costs" versus "pilot benefits". Methodologies to test the cost-effectiveness of the project may include the following:

Pilot costs may include:

- Pilot administration cost
- Pilot implementation cost
- Pilot marketing cost
- Pilot early M&V evaluation cost

Pilot benefits may include:

- Energy and water related benefits
  - Electricity: Avoided kW and kWh
  - Gas: Therms
  - Water

- Other benefits that can be tangibly quantified from participant feedback surveys.

- Other non-energy benefits may include items such as avoided greenhouse gas or CO2 emissions. We will be using the inherent capabilities built-in MF Energy Star Portfolio Manager to estimate these values.

The 10-10-10+ pilot presents an innovative MF pilot program implementation to institute the latest behavioral program concepts. This is also an innovative use of Energy Star Portfolio Manager Software and Benchmarking.

d) Measure Savings/ Work Papers:

As discussed earlier, The Utilities and Energy Division should discuss the next step for this pilot once the results of the ex-post evaluation can be available. The Utilities and Energy Division will need to initiate a discussion to assess if an ongoing RCT design is feasible for energy savings reporting. To avoid possible withholding services to this customer segment (i.e., withholding services to control group participants), a workpaper approach may be needed.

- **Program Implementation Details**

  - **Timelines:**

Table-3: Pilot Program Milestones

	Timeline	
	Milestones	**Dates**
1	Complete advice letter filing & gain ED's approval	May 2015
2	Identify & sign-up10-10-10+ gas & water partner/s	July 2015
3	Data cleaning, establish qualified MF complex population & sampling design parameters (i.e., MF complex blue-prints)	June to November 2015
4	Data testing and implementation with MF ES Portfolio Manager • Conduct logistic shake-down of 1 MF complex, • Conduct a logistic shake-down with 2-3 MF complexes with multiple resources, • Establish mock-design for the MF comparative energy usage report	June to November 2015
5	ED Check-In: Post-data cleaning and pre-sampling design check-in meeting with ED	December 2015
6	ED Check-In: 10-10-10+ Population, Sampling Design Check-in & Approval	January 2016
7	Complete & sign-off: • Design of Energy Usage Report, • Competition signage treatments & • Interim & final rewards	January 2016
8	Implement 10-10-10+ with Treatment-A for treatment group-1 and treatment group-2, as scheduled.	March 2016 to June 2017
9	Implement 10-10-10+ Treatment-B for treatment-group-2, as scheduled.	March 2016 to June 2017
10	Announce competition/reward winners as scheduled	March 2016 to June 2017
11	Pilot monitoring & feedback	Q4/2016
12	Complete M&V Assessment	Q4/2017

  - **Geographic Scope:**

This pilot program will be limited to the Inland Empire Cities, in service territory common to SCE, SoCal Gas and water agencies.

  - **Program Administration**

This pilot program will be administered by SCE/So Cal Gas. SoCal Gas and selected water agencies may engage and participate. The Utilities may engage additional sub-contractors to perform the following tasks:

1. Data cleaning to establish a qualified MF complex population,

2. Program recruiting and marketing,
3. All treatment signature and communication material and displays,
4. Support of Energy Star Portfolio Manager data implementation and ongoing results reporting,

- **Program Eligibility Requirements:**
  i. Customers:

  The eligible MF complexes for this pilot must meet the above described RCT sampling design and other pilot qualification requirements.

  ii. Contractors/Participants:

  No installation of hardware is required; therefore this pilot will not engage any program contractors.

  SCE, SoCal Gas and water agencies will be participants.

- **Program Partners:**
  i. Manufacturer/Retailer/Distributor partners:

  Not Applicable

  ii. Other key program partners:

  Not Applicable

- **Measures and Incentive Levels:**

  - The “rewards” are in the form of logo items and/or MF complex operational items such as energy efficiency washers and dryers.

- **Additional Services:**

  N/A

- **Program Pilot Specific Marketing and Outreach:**

  Refer to Section 9 above, “Pilot Program Description, Objectives and Theory”.

- **Pilot Program Specific Training:**

  The pilot program will provide training to The Utilities and water agency’s call center representatives to handle potential customer inquiries.

- **Pilot Program Software and/or Additional Tools:**

  i. List all eligible software or similar tools required for pilot program participation:

MF Energy Star Portfolio Manager Software will be used as a part of this pilot implementation. The Utilities is familiar with the DOE Energy Star Portfolio Manager Software. During 2010-2012, The Utilities recruited over 50,000 non-residential customers into its benchmarking program using this software. In 2014, a multi-family component of this software was made available by the U.S. Department of Energy.

Portfolio Manager is an online, interactive energy management tool that allows the program administrator to measure and track MF building's energy and water consumption, identify investment priorities, and verify improvements over time. The MF participants can use the Portfolio Manager to track weather-normalized energy usage intensity (EUI), energy costs, greenhouse gas emissions and water consumptions, against a portfolio of liked-MF buildings in the nation. In addition, a comparative Energy Star Score (i.e., 1-100 points rating) is also available.

For the purpose of the 10-10-10+ pilot, rather than grouping MF complexes for single property owners/managers together, The Utilities is proposing to use the Portfolio Manager capability to support competition at various levels as described above. This is an innovative use of this capability and may very well be the first in the country to deploy a pilot with such a design to support behavioral change.

ii. Indicate if pre and/or post implementation audits will be required for the pilot program:

Pre-implementation audit required: ___ Yes ☑ No
Post-implementation audit required: ___ Yes ☑ No

iii. As applicable, indicate levels at which such audits shall be rebated or funded, and to whom such rebates/funding will be provided (i.e. to customer or contractor):

- **Pilot Program Quality Assurance Provisions:**

The program quality assurance and quality control steps are not yet determined. This will be a part of the ongoing implementation logistics, especially from the perspective of data integrity. The Utilities acknowledges this requirement in our detailed program implementation process also.

- **Pilot program Delivery Method and Measure Installation/Marketing or Training:**

i. Upstream Incentive Delivery Channel

Not Applicable

ii. Midstream Incentive Delivery Channel

Not Applicable

iii. Downstream Incentive Delivery Channel

Refer to Section 9 above, “Pilot Program Description, Objectives and Theory,” regarding intrinsic motivations to increase participation in this pilot.

iv. Marketing Education & Outreach (ME&O)

Not Applicable

v. Worker Education & Training (WE&T)

Not Applicable

- **Pilot Program Process Flow Chart:**

Pilot Program Process Diagram

This pilot program process is complex, prior to the implementation activities identified below; this pilot proposal must obtain regulatory approval from CPUC using an Advice Letter process.

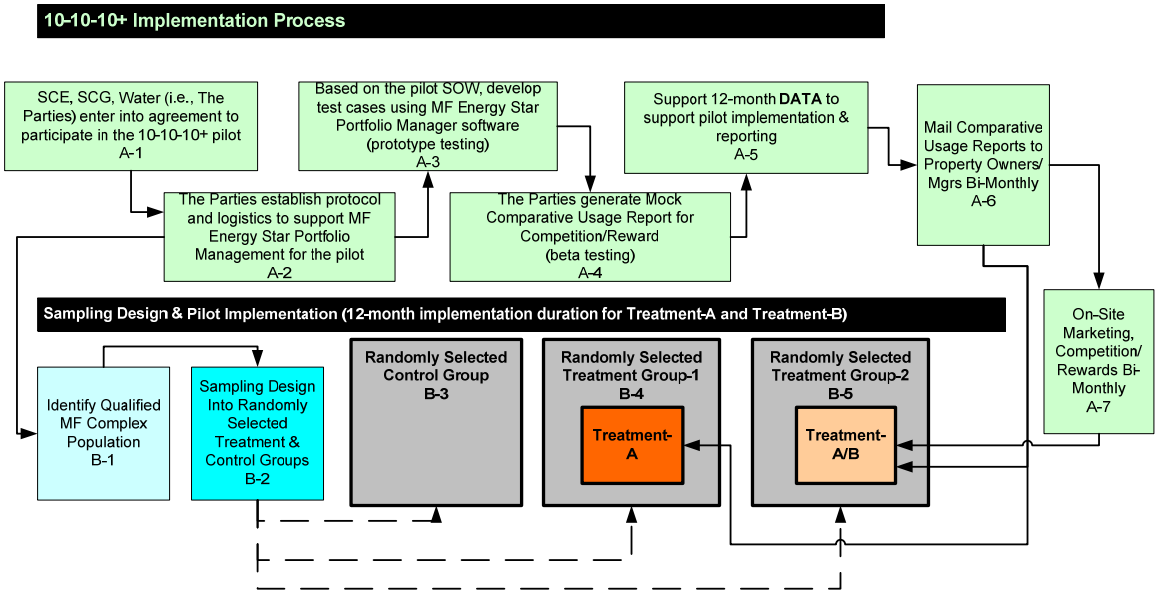
Once this Advice Letter is approved, the 10-10-10+ pilot has three major implementation processes (see process diagram below)

A. Process steps to streamline data needs from The Utilities and water agency to support quarter comparative energy report implementation, using data from MF Portfolio Manager.
B. Process steps for a RCT sampling design to support one control and two treatment groups.
C. Implementation of Treatment-A for a minimum of 12-month duration.
D. Implementation of Treatment-B for a minimum of 12-month duration.

In parallel to the above outlined process, the M&E team would need to support the following:

1) Participate in the pilot development to make sure data would be available to support evaluation.
2) Conduct an early M&V ex-post evaluation, to the extent possible to assess energy savings, verification and validation.

Process Diagram: 10-10-10+ High Level Process



Detailed Pilot process steps:

- Comparative Usage Report: The pilot program team must engage the existing Benchmarking Program team to implement a comparative energy report using MF Portfolio Manager, as benchmarking service.
    - Finalize the 10-10-10+ partnership between The Utilities and water agency,
    - Develop mock comparative energy usage report,
    - Enroll several MF complexes to perform logistic shake-down for comparative energy report,
    - Enroll several MF complexes to perform logistic shake-down for competition and reward.

- RCT Sampling Design and RED Pilot Implementation
    - As indicated above, the first challenge of this pilot program is to establish a pool of qualified MF complex population.
    - The next step is to perform random assignment of “treatment” versus “control” groups.
    - As indicated above, the pilot program will have one-control and two-treatment groups.

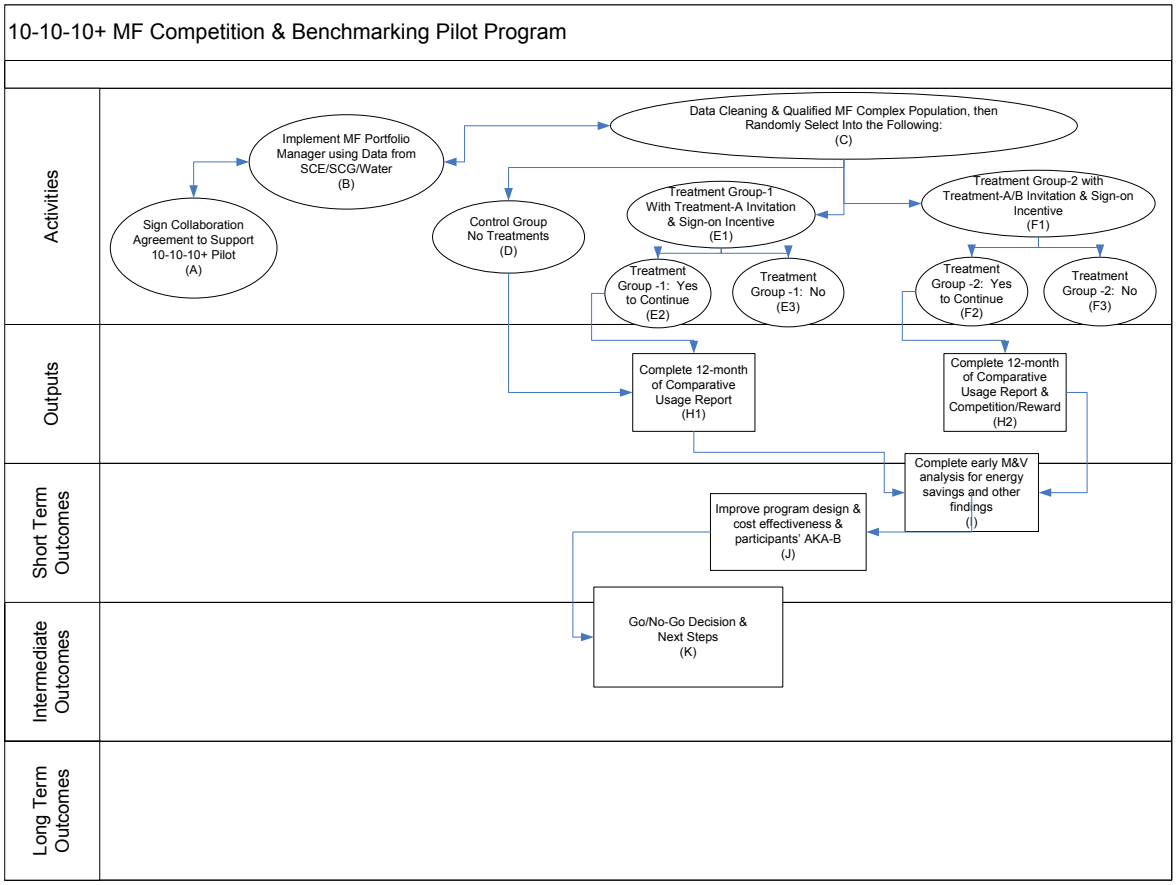
- Mail the Comparative Usage Report quarterly to property owners/managers for Treatment-group-1.
- Mail the Comparative Usage Report quarterly to property owners/managers for treatment-group-1, plus on-site market signage, door hangers, competition and reward to engage tenants.

- **Cross-cutting Sub-program and Non-IOU Partner Coordination:**

  This pilot will need to coordinate with the SCE Benchmarking Program.
  This pilot will require coordination among SCE, SoCal Gas and water agencies.

- **Logic Model for 10-10-10+ MF Competition and Benchmarking Pilot**

Logic Model for 10-10-10+ Pilot



Pilot Program M&E & Monitoring Plan

In parallel to the above outlined process, the M&E team would need to support the following:

1) Participate in the pilot development and RCT sampling design to make sure data would be available to support evaluation.

2) Support early M&E and rapid feedback evaluation so the pilot program can get feedback from participants.

a. Participant feedback from property owners and tenants.
b. Interview of implementer/s to get feedback.
c. Review MF Portfolio Manager data integration and management process to improve 10-10-10+ comparative energy usage report production,

3) Conduct an early M&V ex-post evaluation, to the extent possible to assess energy savings, verification and validation.
    a. Using either monthly billing or AMI data, as necessary.

4) Go beyond early M&V to establish pilot impact, conduct a usage analysis to gather energy and resource insights for property owners/managers and tenants' usage behavior.

This will be a program funded M&E study task. The Utilities M&E team will be working with Energy Division to seek approval for this study plan and study tasks.

- **Additional Pilot Program Information:**

a) Advancing Strategic Plan Goals and Objectives:

Yes. This pilot will test additional behavior elements and to support MF complexes reaching market rate, moderate-income and lower-income tenant population. This comprehensive IDSM design is more likely to help the MF complexes achieving significant energy and resource usage reductions.

b) Pilots:

To meet the requirements of 09-09-047, please also refer to **Attachment-A2** for pilot/pilot specific information.

c) Knowledge Transfer:

During the pilot period, The Utilities program team will report pilot progress at the monthly program Check-In meeting with ED staff. Once the pilot program implementation has been completed, The Utilities M&E team will initiate the early M&V study to verify results and effects. The Utilities M&E team will file an ED approved M&E plan prior to initiating the study. After completing this early M&V evaluation study, The Utilities will engage the other IOUs and ED staff to conduct a debriefing session.

- **Market Transformation Information:**

a) A summary of the market transformation objectives of the program:

Not Applicable

b) A description of the market, including identification of the relevant market actors and the relationships among them:

Not Applicable

c) A market characterization and assessment of the relationships/dynamics among market actors, including identification of the key barriers and opportunities to advance demand side management technologies and strategies:

Not Applicable

d) A description of the proposed intervention(s) and its/their intended results, and specify which barriers the intervention is intended to address:

Refer to Section 9 above, "Pilot Program Description, Objectives and Theory"

e) A coherent program, or "market," logic model that ensures a solid causal relationship between the proposed intervention(s) and its/their intended results[15]:

Refer to Section 10 above

f) Appropriate evaluation plans and corresponding Market Transformation indicators and Program Performance Metrics based on the program logic model:

Not Applicable

- **Additional information as required by Commission decision or ruling or as needed:**

  This pilot will support the pending decision by the CPUC on the expansion of qualifying behavior programs as part of Phase III of R. 13-11-005, EE Rolling Portfolios OIR proceeding and prior Commission direction in Decision 12-11-015, and 12-08-044 ESA decision to support program integration.

[15] If this logic model is the same as that requested in #10. (O), only provide once. As needed, provide a more detailed logic model emphasizing the market transformation elements of the program and/or how such elements integrate with resource acquisition elements.

ATTACHMENT A-1

10-10-10+ Multi-family Behavioral Pilot Program

Program Non-Energy Objectives

ATTACHMENT A-1: Program Non-Energy Objectives

For New or Substantially changed programs and sub-programs, provide the following information for Program Non-Energy Objectives and follow the format used for the previous cycle Program Performance Metrics found in Resolution E-4385:

i. List the primary SMART[16] non-energy objectives of the program:
ii. For each SMART objective, identify the quantitative targets, direction or percent of change that you hope to achieve during the program cycle[17]:
iii. For each proposed SMART objective, describe any relevant baseline data on current market conditions that you have assembled or plan to assemble and the sources:
iv. Quantitative program targets (PPMs):

The following pilot performance metrics should be considered for the early M&V study: (not exhaustive, subject to change during pilot implementation)

1. Number of apartments in the pilot,
2. Number of dwelling units in the pilot,
3. Number of common area meters for each apartment and for the pilot program,
4. Number of 1 bedroom versus 2 bedroom versus 2+ bedroom units available per apartment for the entire pilot
5. Number of square footage for each apartment and the pilot,
6. Number of swimming pool, spa, and other plug load appliances for the apartment and for the pilot,
7. For electricity, gas and water:
    a. Number of individual meters,
    b. Number of common area meters,
    c. Number of master meters.

The following program outputs should be tracked on a quarterly basis:

1. Energy Score and Energy Usage Intensity (at average or mean)
    a. For the individual MF complex,
    b. For MF complex against MF complex,
    c. MF complexes grouped by city-1 against MF complexes grouped by city-2
    d. MF complexes for the entire pilot program

2. Number of tons of greenhouse gas or CO2 avoided.
3. Other relevant metrics provided as standard metric by MF ES Portfolio Manager.

---

[16] A SMART objective is one that is **S**pecific (i.e. quantitative and quantifiable generally, in terms of the results to be achieved**), M**easurable, **A**mbitious, **R**ealistic, and **T**ime-bound. For example, for a vender training component of an innovative commercial program, two SMART mid-term objectives and one long-term objective might be:

a) During the period 2013-2014, the number of HVAC installers in The Utilities service territory who are able to perform quality installations of energy efficient packaged air conditioners will increase by 20%.
b) During the period 2013-2014, the number of installations of energy efficient packaged air conditions in The Utilities service territory that are considered quality installations will increase by 25%.
c) By 2020, installations of energy efficient packaged air conditions in The Utilities service territory that are considered quality installations will increase by 75%.

[17] Please also add any new program objectives and quantitative targets for statewide programs to the portfolio PPM/MTI reporting template.

ATTACHMENT A-2

10-10-10+ Multi-family Behavioral Pilot Program

Pilot Project Criteria D. 09-09-047

Attachment A-2: Pilot Project Criteria D.09-09-047

In accordance to Decision 09-09-047 (page 48), any program pilots must provide the following information:

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 10-10-10+ pilot is design to leverage MF portfolio manager's capabilities to create a comparative usage report to engage property owners/managers and tenants to reduce electricity, gas and water usage with competition and reward. The competition can be implemented at multiple levels: (1) self-competition, (2) MF complex-to-MF complex competition, (3) MF complexes grouped into city-1 against MF complexes grouped into city-2. This pilot will be implemented with a RCT and RED.

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

   Please refer to the pilot program description.

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

   Please refer to the pilot program description.

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

   This is a new and innovative program design for the following reasons:
   - Combine electricity, gas and water in one single program,
   - Innovative use of MF Portfolio Manager to deliver a comparative energy report,
   - Use the MF portfolio manager data to set-up competition for MF complexes at multiple levels, as indicated above.
   - This pilot supports the California's call for residence to reduce water usage by 25%.

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

   The 10-10-10+ pilot is complex. We are proposing to complete a RCT sampling design and perform pilot logistic shake-down in 2015. In 2016, we are proposing to implement planning pilot program Treatment-A and Treatment-B. We expect this pilot will be fully implemented to complete a12-month treatment duration for both treatments in 2017.

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

   Please refer to attachment A-1.

7. Program performance metrics;

   Please refer to attachment A-1.

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

   We are planning to claim energy savings for this MF behavior pilot on an ex-post basis. As a part of this early M&V analysis, we will also report on cost effectiveness of this pilot as well as recommended next steps.

   We understand that ED may wish to independently verify the random sample design. The pilot program and M&E team will work closely with ED to conduct this verification.

   We also understand this pilot will provide valuable insights for ES portfolio manager implementation for other program administrators. As a result, this pilot will pay special attention for documentation for data cleaning and data aggregation efforts.

9. A proposed EM&V plan; and

   Please refer to the M&E portion of the pilot program description.

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.

    The results of this pilot implementation and study results will be posted on ED's basecamp, public website and CALMAC website. In addition, The Utilities pilot program team will conduct pilot results debriefings to share results and lessons learned for all IOUs, ED/Consultants and others upon request.

ATTACHMENT A-3

10-10-10+ Multi-family Behavioral Pilot Program

Preliminary Power Analysis by Dr. Piotr Urbanski of SCE

ATTACHMENT A-3: Preliminary Power Analysis by Dr. Piotr Urbanski of SCE

- **Introduction**

This analysis is organized into two sections. The first section explains of the sample size calculations, and the second section is my recommendations on the minimum sample size necessary based on the 10-10-10+ experimental design and the sample size calculations. All calculations are done using the Minimum Detectable Effect (MDE) methodology and data are pulled from SCE sources and studies publicly available on CALMAC.org where noted.

- **Sample Size Analysis**

a. Background

To begin, I make some assumptions about what I will use as parameters for the power analysis given prior research on similar though not exactly the same behavior programs (e.g. Opower) and the study design. The 10-10-10+ program utilizes a Randomized Encouragement Design (RED) with three groups—one control, and two different treatments. In a RED field experiment, treatment is encouraged with some incentive, but participants can "opt-out" by not complying with the treatment. This introduces some complications into analysis of the results but also complicates a priori estimation of the sample size requirement.

After the experiment is completed, accounting for non-compliance can be done using the Local Average Treatment Effect (LATE) / Intent To Treat (ITT) approaches. However, neither these approaches nor traditional power analysis do not allow us to calculate a priori what our sample size should be. The Minimum Detectable Effect (MDE) approach described by Bloom (1995) does and is recommended by the Department of Energy for use with randomized encouragement designs.[18] Sample sizes are calculated by rearranging the MDE equation. The next section explains this in more detail. This approach compared to other types of power analyses allows for incorporating the compliance/noncompliance rates in a RED type of field experiment.

a. What We Know

To compute the sample size using MDE for this study design we will need to know seven parameters: (1) the alpha, α, level we would like; (2) the power, *k*, (or 1 – beta)[19]; (3) the

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[18] See Bloom (1995) "Minimum detectable effects: A simple way to report the statistical power of experimental designs" for the original paper on the topic. See also the 2010 "U.S. Department of Energy Smart Grid Investment Grant – Technical Advisory Group Guidance Document #7" and for a clear explanations of equations see Duflo, Glennerster, and Kremer (2007) "Using Randomization in Development Economics Research: A Toolkit."

[19] The **alpha** and **beta** can be thought of as the acceptable probability we are willing to accept Type I and Type II error. Type I error is a situation where we reject the null hypothesis when in fact it is true. For example, an airport screener does not know if a passenger is dangerous or not. If the screener arrests an innocent person, the screener has committed Type I error (commonly called a "false positive"). Type II error is a situation where we fail to reject the null hypothesis when in fact it is false. Continuing with the airport screener example, if the screener allows a dangerous person through, the screener has committed Type II error. The **power** of a statistical test is 1 – beta, which is the probability that we correctly reject the null hypothesis

proportion of participants receiving treatment, P; (4) the expected share of participants who may select themselves into the treatment from the control group, s; (5) the expected share of participants that will comply with the treatment, c; (6) the effect size we expect to see (or to put another way, how sensitive we would like the study design to be to the magnitude of the treatment effect); and (7) the variance, σ^2, of the variable of interest (kWh).

The first three are set by the study designer. The fourth and fifth are difficult to know ahead of time, therefore, I will calculate a range of sample sizes given a range of compliance. The sixth parameter will come from a few sample populations similar to what the program will examine. These will be discussed in a later section of the power analysis.

b. Minimum Detectable Effect Equation and Sample Size

The Minimum Detectable Effect size is the smallest detectable effect between two group means in an experimental design given the seven parameters above (swapping sample size for effect size in the previous section). Unlike other power calculation methods, the MDE calculated is in the same units as the outcome variable as opposed to standard deviations. I calculate an example later before estimating the sample size requirements.

MDE is a versatile method for estimating effect sizes. And when solved for N by rearranging the equation, allows for calculating the required sample size for an experimental design such as the Randomized Encouragement Design of 10-10-10+.

Here, I will describe the Minimum Detectable Effect size equation and its components, then solve for the sample size equation and calculate a range of sample sizes based on compliance rates in RED. The equation has seven parameters mentioned above in four components:

$$\boldsymbol{MDE = \left(t_{(1-k)} + t_{\alpha}\right)\sqrt{\frac{1}{P(1-P)}}\sqrt{\frac{\sigma^2}{N}}\frac{1}{c-s}}$$

$\left(\boldsymbol{t_{(1-k)} + t_{\alpha}}\right)$ **=** Represents the sum of the t-statistics for the power (*k)* and alpha (α) levels selected by the analyst.

$\sqrt{\frac{1}{P(1-P)}}$ **=** This term controls for the proportion of participants (P) receiving the treatment. This term is optimized when there is an equal allocation—when P equals 0.50.

$\sqrt{\frac{\sigma^2}{N}}$ **=** Represents the ratio of variance to sample size.

$\frac{1}{c-s}$ **=** This term accounts for the share of compliance by participants assigned to the treatment and control groups respectively.

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when it is false. This is the case where the airport screener correctly identifies a dangerous person. So power can be considered the probability that we correctly identify something we are trying to identify (finding the "signal" in the "noise"). The goal is for our research and statistical calculation results to match reality as accurately as possible given limitations of our study, such as budget.

When the MDE equation is rearranged and solved for N, we are able to calculate the sample size requirement. I changed MDE to E in the equation to reflect it is no longer the minimum detectable effect size, but some effect size we set instead.

$$N = \frac{\left(t_{(1-k)} + t_{\alpha}\right)^2 \sigma^2}{P(1-P)(c-s)^2(E)^2}$$

For **alpha**, the study designer has chosen an alpha level of 0.10. This means the study designer is accepting a 10% probability of rejecting the real outcome when in fact we shouldn't be (see footnote 2).

For **power** (this is kappa, *k*, in the MDE equation), the study designer has chosen a power level of 0.90. This has two interpretations as power is based on the beta level (1 – beta). First, the value of 0.90 corresponds to a beta of 0.10, meaning the study designer is accepting a 10% probability of failing to reject the real outcome when in fact we should be rejecting it. Second, the value of 0.90 can also be interpreted in terms of power of a statistical test. This means the study designer is hoping to correctly reject an outcome when it should be in fact rejected (see footnote 2).

For the **effect size** (E) and **variance** (σ^2), we will need to make some additional assumptions. The study design is shooting for an ambitious effect of 10% reduction in water, gas, and electric usage. To calculate the effect size I will begin with the assumption we will indeed get 10% reduction in electric usage and go from there.

I next calculate the effect size parameter from our expected treatment effect of the study designs goal of 10% as well as a lower bound of 1% given prior research on the Opower behavior program.[20]

I use two sources of data as a proxy for what the load profiles of MF complexes may look like. First, I use the publicly available SCE 2014 residential static load profiles to proxy for unit load within complexes. Second, I use internal SCE 2014 smart meter data for Hotels (SIC code XXXX) as a proxy for common areas.

From the residential load profiles, I calculated a monthly usage average of 558.23 kWh with a monthly average standard deviation of 118.49 kWh.[21] A ten percent reduction equals 503.407 kWh or a difference of 55.823 kWh. A one percent reduction (at the lowest treatment effect seen in Opower type behavioral studies) equates to 552.648 kWh or a reduction of 5.582 kWh.

From the hotel load profiles, I calculated a monthly usage average of 849.88 kWh with a monthly average standard deviation of 109.41 kWh. A ten percent reduction equals 764.89 kWh or a difference of 84.98 kWh.

The study designer has chosen three equivalently proportioned groups (two treatment and one control). This means that **the proportion of participants receiving treatment** (P) is $0.\overline{66}$. This means 66% or 2/3rds of participants are receiving the treatment. This parameter is optimized when it equals 0.50. Increasing it to 2/3rds has a marginal effect

[20] SCE's Home Energy Report Program Savings Assessment: Ex-Post Evaluation Results, Program Year 2013

[21] https://www.sce.com/wps/portal/home/regulatory/load-profiles/2014 static load profiles/

on increasing the sample size requirement to account for an unequal distribution of treatment and control. However, the change on sample size is very marginal until P approaches the extremes of 0 and 1.

Lastly, because this is a Randomized Encouragement Design, we must account for the fact that some participants will not comply with the treatment. This is represented in the equation as the **share of treated participants complying with treatment**, c. The alternative is also accounted for—those participants that were chosen into the control group but self-select themselves into participating in the program. This is represented as the **share of control participants participating with the treatment**, s. The study designers seem to believe this share will be very low and I agree. I set this parameter as zero. Increasing it has a marginal effect on the sample size requirement until it gets fairly large (much larger than we should observe in reality).

c. Results

Figure 1: Sample Size by c from Residential Load Profile when Power = 0.80, Alpha = 0.10, P = 0.66, σ^2 = 118.49, E = 55.82, and s = 0

c	N
0.05	72646.11
0.10	18161.53
0.15	8071.79
0.20	4540.38
0.25	2905.844
0.30	2017.947
0.35	1482.574
0.40	1135.095
0.45	896.8655
0.50	726.4611
0.55	600.3811
0.60	504.4869
0.65	429.8586
0.70	370.6434
0.75	322.8716
0.80	283.7739
0.85	251.3706
0.90	224.2164
0.95	201.2358
1.00	181.6153

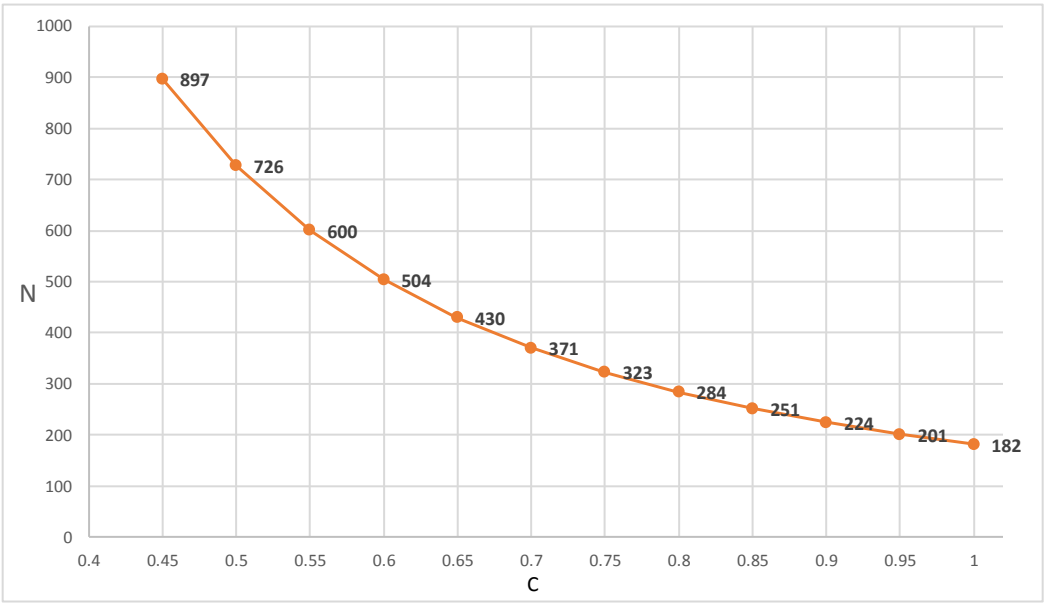


Figure 1 shows the a table of calculated sample sizes given a range of values of c from 0.05 to 1—representing 5% treated comply with treatment to 100% compliance. The study designer can choose the estimated compliance rate here in column c and translate this to a given sample size when power = 0.8, alpha 0.10. Increasing power leads to a larger sample size while decreasing alpha does the same. Increasing proportion of treated away from the optimum 50/50, increases sample size. Increasing variance increases sample size, and decreasing the desired detectable effect increases sample size.

Figure 2: Sample Size by c from Hotel Load Profile when Power = 0.80, Alpha = 0.10, P = 0.66, σ^2 = 109.41, E = 84.98, and s = 0

c	N
0.05	25940.89
0.10	6485.223
0.15	2882.321
0.20	1621.31
0.25	1037.636
0.30	720.5803
0.35	529.406
0.40	405.3264
0.45	320.2579
0.50	259.4089
0.55	214.3875
0.60	180.1451
0.65	153.4964
0.70	132.3515
0.75	115.2929
0.80	101.3316
0.85	89.76087
0.90	80.06448
0.95	71.85843
1.00	64.85223

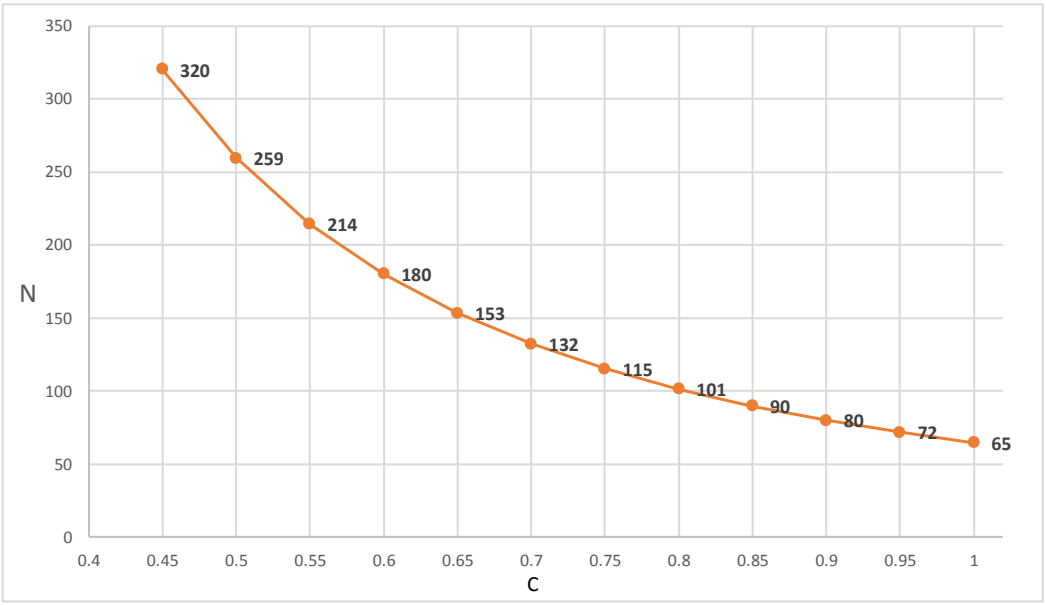


Figure 2 shows the same calculations as above but for Hotel load. Because the load is more concentrated around the mean (smaller variance, more “peaky”), the Hotel load is not as conservative as the residential load. There is a lot more homogeneity in usage with Hotels. The study designer should use Residential load as it will give a more conservative estimate of the sample size required.

Figure 3: Minimum Detectable Effects in kWh by c from Residential Load Profile when Power = 0.80, Alpha = 0.10, P = 0.66, σ^2 = 118.49, N = 750, and s = 0

c	MDE	%
0.05	541.3003	96.97%
0.10	270.6501	48.48%
0.15	180.4334	32.32%
0.20	135.3251	24.24%
0.25	108.2601	19.39%
0.30	90.21671	16.16%
0.35	77.32861	13.85%
0.40	67.66253	12.12%
0.45	60.14447	10.77%
0.50	54.13003	9.70%
0.55	49.20911	8.82%
0.60	45.10835	8.08%
0.65	41.63848	7.46%
0.70	38.6643	6.93%
0.75	36.08668	6.46%
0.80	33.83127	6.06%
0.85	31.84119	5.70%
0.90	30.07224	5.39%
0.95	28.48949	5.10%
1.00	27.06501	4.85%

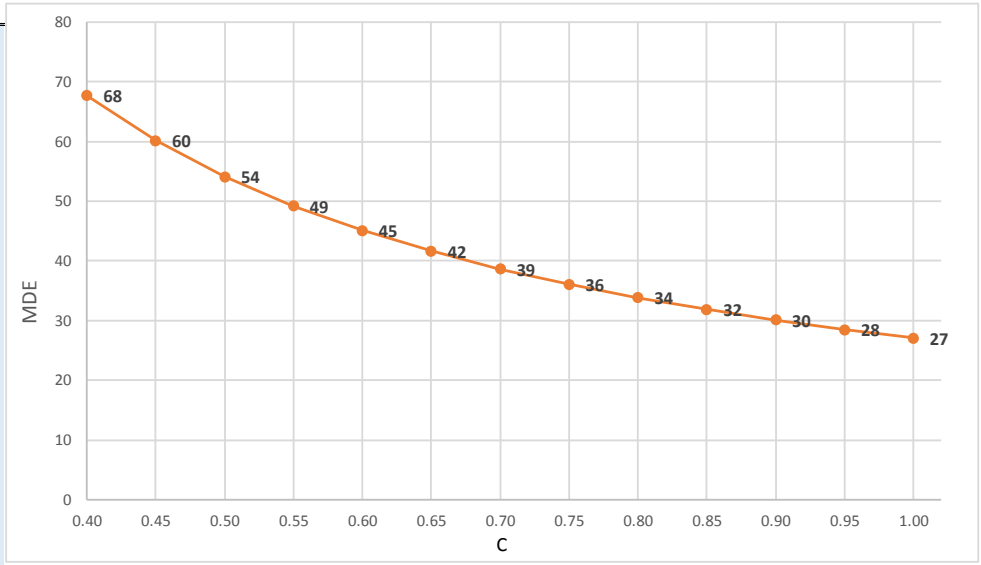
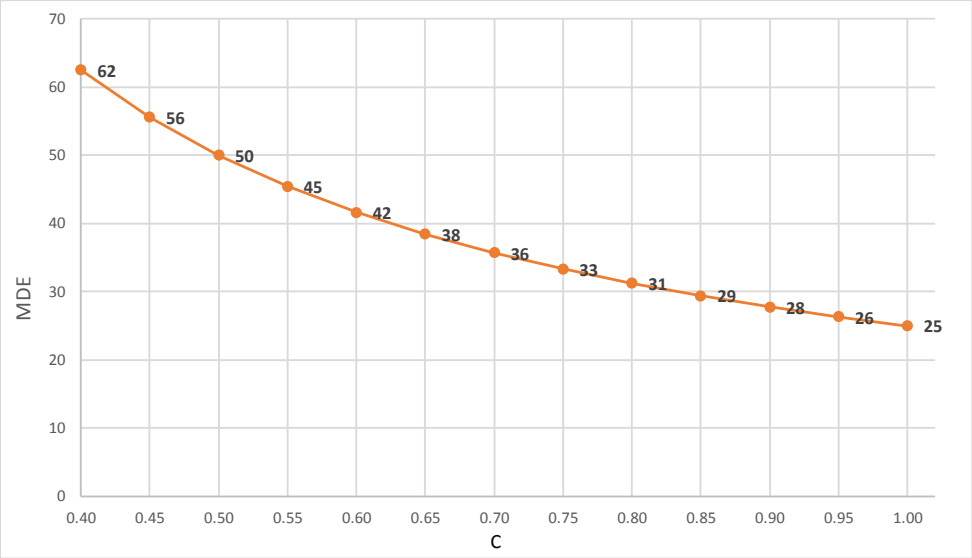


Figure 3 shows that with a sample size of 750, the smallest detectable effect possible is 4.85% with full compliance. In order to reduce this down to 1.5% such as Opower, a sample of 7500 is necessary.

Figure 4: Minimum Detectable Effects in kWh by c from Hotel Load Profile when Power = 0.80, Alpha = 0.10, P = 0.66, σ^2 = 109.41, N = 750, and s = 0

c	MDE	%
0.05	499.8303	58.81%
0.10	249.9151	29.41%
0.15	166.6101	19.60%
0.20	124.9576	14.70%
0.25	99.96605	11.76%
0.30	83.30504	9.80%
0.35	71.40432	8.40%
0.40	62.47878	7.35%
0.45	55.5367	6.53%
0.50	49.98303	5.88%
0.55	45.43911	5.35%
0.60	41.65252	4.90%
0.65	38.44848	4.52%
0.70	35.70216	4.20%
0.75	33.32202	3.92%
0.80	31.23939	3.68%
0.85	29.40178	3.46%
0.90	27.76835	3.27%
0.95	26.30686	3.10%
1.00	24.99151	2.94%



As before, the variance of the Hotel Load profiles is a lot tighter around the mean. This makes detecting an effect easier. Therefore, with a sample of 750 complexes, the smallest detectable effect is 2.94%.

Recommendations for the Pilot Design Team & Energy Division

The study designers should use the load profile and sample size calculations for hotel instead of single family residential to support initial data cleaning efforts. The hotel load profile is more consistent with the aggregated load profile from MF complexes. SCE agrees to update the pilot program's power analysis once we have developed more robust MF load profile at the end of the data cleaning activities. SCE supports the agreed-to check-in meetings (1) at the end of data cleaning to review sampling strategy, and (2) after RCT sampling is completed so it can be verified.

Although the above analysis is using an expected delta change of 10% savings, but this is an aspirational goal for both electricity and gas usage. We do anticipate a much large effect size for water but this effect cannot totally attributed to this pilot due to the statewide water emergency. For electricity, based on MF portfolio manager implementation from Washington DC and elsewhere, we are hearing an initial reduction of 5-7% without competition/reward. For Washington DC where MF portfolio manager implementation is mandatory, they have noticed that this effect lasts for about 2 years then tapered off. (Source: April 2015 ACEEE Market Transformation Conference, Mr. Marshall Duer-Balkind of DC Energy Administration). For the purpose of this pilot, the pilot team should consider an effect size of 5% (half of the original) for electricity and gas to ensure detectable effects. This reduction in effect size will increase the sample size requirement to approximately 1100. This is a good compromise between hotel vs residential load differences, differences in potential compliance rates, as well as the other parameters.

Recommended inputs for the Power Analysis Model:

- Effect Size = reduce by 50% from its initial setting,
- Population size = 1100,
- % of compliance = 85%
- Alpha = 0.10
- Power = 0.80
- % of sample for treatment = 66%

With the above inputs plus minor rounding after sample size calculations, I recommend the following for the pilot program team:

(1) Prepare qualified MF complex population to 1,100,
(2) Randomly select 360 MF complexes to support Control, Treatment-Group-1 and Treatment-Group-2 each.

Attachments:

1) Model with Residential Load Profile:

Minimum Detectable Effect @ 85.xlsx

2) Model with Hotel Load Profile:

Minimum Detectable Effect - Hotels @ 85.xl

ATTACHMENT A-4

10-10-10+ Multi-family Behavioral Pilot Program

Example of MF Complex Blueprint for Data Cleaning

ATTACHMENT A-4: Example of MF Complex Blueprint for Data Cleaning

Apartment Complex Blue Print						
Apartment Complex-1						
Apartment Unit	Bedroom	Electric Acct #	Gas Acct #	Water Acct #	Address	Zip Code
Unit-1						
Unit-2						
Unit-3						
Unit-4						
Unit-5						
Unit-6						
Unit-7						
Unit-8						
Unit-9						
Unit-11						
Unit-12						
Unit-13						
Unit-14						
Unit-15						
Unit-16						
Unit-17						
Unit-18						
Unit-19						
Unit-20						
Unit-21						
Unit-22						
Unit-23						
Unit-24						
Unit-25						
Common Area-1						
Common Area-2						
Common Area-3						
Master Meter - Water						
Swimming Pool						
Spa						
Laundry room						
Square footage						
Vintage by Year						
Etc.						

ATTACHMENT A-5

10-10-10+ Multi-family Behavioral Pilot Program

Illustrative Comparative Usage Report

ATTACHMENT A-5: Illustrative Comparative Usage Report

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

MF Comparative Report
Account number: XXX

Date YYY

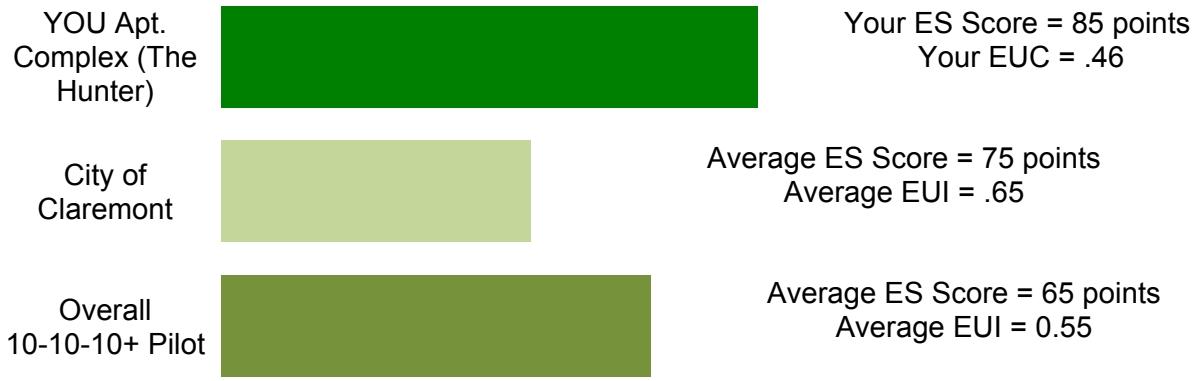
Dear ZZZ Property Owner:

We are pleased to update you with personalized report and help you to save electricity, gas and water.

The purpose of this report is to:

- Provide you information about your MF complex's ES Score and Energy Usage Intensity (EUI) data
- Help you track your apartment complexes energy conservation progresses

Energy Star Score *– Multi Family Complex
From April 30 – March 30



* (A short ONE sentence about ES portfolio and EUI– how it is scored, meaning)

ES Competition between your MF Complex (The Hunter) against your neighbor MF Complex (Fuzzy-Wozzy) from the month of XYZ, 2016

Fuzzy Wozzy = **65 points**

The Hunter = **75 points**
"Looking Good"

(It's possible also provide the historical graph of the competition – showing logos on the side, this could give the sense of the trend over time)

ES Competition between Claremont vs. Upland

ES Score = **75 points**
"Awesome"

ES Score = 65 points

1. Tips to increase the Energy Savings:

1. **(Provide short list of Tips – too many is confusing)**
2.
3.

If you need further information about energy savings tips, please visit www.sce.com/tips

2. Currently, we have following rebate programs: (highlight few effective ones)

1. **$50 for old refrigerators by September 15, 2016**
2. **…**
3. **…**

If you want to know more about our energy efficiency and rebate programs, please visit www.sce.com/rebates

Attachment A-6

10-10-10+ Multi-family Behavioral Pilot Program

Bibliography for Behavior Program Theory

ATTACHMENT A-6: Bibliography for Behavior Program Theory

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ATTACHMENT A-7

10-10-10+ Multi-family Behavioral Pilot Program

PIP Revision Comparison Table

ATTACHMENT A-7: PIP Changes Comparison Table

PIP Revision Comparison Table			
ED Contact(s)	**Prior Page No.**	**Current Page No.**	**Revised Information**
P. Franzese, T. Francisco, and D. Buch			
	No page number	Attachment A - pp. 1-3. Table 1A: Projected Pilot Program Budget, by Calendar Year	Previous budget $725,000 for 2015 only. Current budget is $1.5M for 2015 and 2016.
	No page number	Attachment A - pp. 3-4.	Specific information added to provide detail regarding 2015 and 2016 budget activities.
	No page no. Attachment A - Table 1B	Attachment A -P. 4. Table 1-B.	Previously Electric, Gas, and Water savings marked as N/A. Now marked TBD.
	N/A	Attachment A - P. 4	Statement added referencing D. 09-09-047 Pilot Requirements in Attachment A2 and Non-energy Objectives in Attachment A1.
	No page number. Pilot Program Description	Attachment A - pp. 5-7 Pilot Program Description	Modified to incorporate a Randomized Controlled Trial (RCT) and Randomized Encouragement Design (RED)
	N/A	Attachment A - pp. 7-8 Pilot Program and Behavior Theory	Additional Theoretical Background section updated to reflect revised pilot structure.
	N/A	Attachment A - pp. 9-15 Pilot Program Experimental Design & Implementation.	Revised to reflect RCT approach.

PIP Revision Comparison Table			
ED Contact(s)	**Prior Page No.**	**Current Page No.**	**Revised Information**
	No page number; Program Non-Energy Objectives	Attachment A - P. 15 Pilot Program Energy and Demand Objectives	Added to show that SCE expects to claim energy savings.
	No page number; Measure Savings/Work Papers.	Attachment A - P. 17 - Measure Savings/Work Papers.	Incorporated to identify the potential need for workpaper development.
	No page number; Program Implementation Details, Table 3 - Pilot Program Milestones.	Attachment A - P. 17 Program Implementation Details, Table 3 - Pilot Program Milestones.	Updated to reflect the additional time used for ED engagement
	No page number; Pilot Program Specific Training	Attachment A - P. 19 Pilot Program Specific Training.	Additional language added to inform The Utilities' training of water agencies in addition to internal staff.
	No page number; Process Diagram: 10-10-10 Phase-1 Pilot Process Steps	Attachment A – P. 21 Process Diagram: 10-10-10+ High Level Process.	Amended to demonstrate revised design process and adds detailed pilot process steps.
	No page number; Logic Model for 10-10-10 MF Competition and Benchmarking Pilot	Attachment A - P. 22 Logic Model for 10-10-10 MF Competition and Benchmarking Pilot.	Logic Model revised to reflect new pilot approach.
	No page number; Pilot Program M&E Plan	Attachment A - pp. 22-23 Pilot Program M&E and Monitoring Plan.	Revised to reflect RCT approach.
	No page number. Additional Pilot Program Information.	Attachment A - P. 23 Additional Pilot Program Information.	Additional language incorporated regarding behavior elements.
	No page number; Attachment A-1	No page number; Attachment A-1	Additional language provided to address the new RCT design and approach.

PIP Revision Comparison Table			
ED Contact(s)	**Prior Page No.**	**Current Page No.**	**Revised Information**
	Program Non-Energy Objectives	Program Non-Energy Objectives	
	No page number; Attachment A-2 Pilot Project Criteria D.09-09-047	No page number; Attachment A-2 Pilot Project Criteria D.09-09-047	Revised to demonstrate the 10-10-10+ approach.
	No page number; Attachment A-3 Bibliography for Behavior Program Theory	No page number; Attachment A-3 Preliminary Power Analysis by Dr. Piotr Urbanski of SCE	Bibliography moved to Attachment A-6. Power Analysis added as Attachment A-3.
	N/A	No page number; Attachment A-4 Example of MF Complex Blueprint for Data Cleaning	Additional attachment.
	N/A	No page number; Attachment A-5 Illustrative Comparative Usage Report	Additional attachment.
	No page number; Attachment A-3 Bibliography for Behavior Program Theory	No page number; Attachment A-6 Bibliography for Behavior Program Theory	Previously Attachment A-3. Attachment updated to reflect additional sources.