California Technical Forum (Cal TF)
Technical Forum (TF) Teleconference Meeting
Follow-up on June and July in-person Meetings
Thursday, August 14th, 2014
10 am – 12 pm PST

I. Participants

TF Members:
Larry Kotewa
David Pruitt
Yeshpal Gupta
Martin Vu
Doug Mahone
Armen Saiyan
Pierre Landry
Bryan Warren
Bing Tso
Srinivas Katapamula
Tom Eckhart
John Proctor
Scott Fable
Christopher Rogers
Jon McHugh
Ahmed Ganji
Sherry Hu
Steven Long
George Hernandez

Non-Members:
Annette Beitel, Cal TF Staff
Jenny Roecks, Cal TF Staff
Grant Brohard, PG&E
Alina Zohrabian, PG&E
Alex Alzugaray, Energy Solutions
Steve Galanter, SCE
Alfredo Gutierrez, SCE
Yun Han, SCE
Miriam Fischlein, SCE
Larry Tabizon, SCE
Chan Paek, SCG

Dario Moreno, SCE

II. June Open Items: Unapproved Workpaper Abstracts

Set Top Boxes

- Decisions:
  - ACT: SCE will explore options for data logging to establish Set Top Box (STB) duty cycle and develop a data logging proposal for the TF to review. Alfredo Gutierrez will be point of contact between Cal TF and SCE and will apprise Cal TF staff of the timing of this effort. Options for data logging include:
    - Possibly incorporating logging into current Research Into Action research plan
    - Collaborating with SDG&E to incorporate STB logging into the ET study taking place in Sept/Oct for Advanced Power Strips (follow up with Martin Vu)
  - ACT: SCE will consult with Pierre Landry on establishing a sufficient logging sample size that will lead to a statistically significant analysis that minimizes variation.
  - ACT: Alfredo Gutierrez will expand abstract content based on additional information obtained from:
    - NYSERDA study
    - Input from William Paddock, industry expert referred by Brandon Tinianov in June
  - ACT: Alfredo Gutierrez to present results of additional research and plan for data logging to Cal TF at later time this year to be determined with Cal TF Staff.

Advanced Power Strips

- Decisions:
  - ACT: Martin Vu will look at existing studies (CalPlug, Australian study) and determine how values were derived, whether there was variability in the study results, and what caused the variability.
  - ACT: Martin Vu will use the information obtained from looking at existing studies to propose an ET study design for the fall for the TF to review prior to study implementation.
  - ACT: Jenny Roecks (Cal TF Staff) will coordinate with Martin Vu on the timing of presenting the proposal to the TF either via conference call or in-person meeting as appropriate.

LED Menu Boards

- Decisions:
  - ACT: Jon McHugh will send Energy Solutions study to Yun Han at SCE.

- ACT: SCE will develop an interim workpaper based on existing studies and will collect additional data through implementation to supplement field research that will be done in June 2015. SCE will present the interim workpaper to the TF in the fall along with a proposed data collection plan during implementation.
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LED Recessed or Surface Mounted Panels

- Decisions:
  - ACT: Jon McHugh will contact Jim Benya (CEC) about data for typical room cavity ratios for different space types and provide information to Alina Zohrabian and PG&E and Alex Alzugaray at Energy Solutions.
  - ACT: Jenny Roecks will schedule a follow-up call to discuss data with interested TF members, including Alex Alzugaray, Alina Zohrabian, Jon McHugh, and Mary Matteson Bryan; other TF members and interested individuals will be invited.

July Open Item: Subcommittee formation for capturing EE savings through code compliance

- **Decision:**
  - Subcommittee to be formed.
  - ACT: Cal TF staff to solicit subcommittee interest and potential leader interest via email.
  - ACT: TF members to respond to subcommittee email if interested within 5 days.

Additional Subcommittees: Res HVAC Quality Installation and Nonresidential Variable Refrigerant Flow

- **Decision:**
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III. June Open Items: Unapproved Workpaper Abstracts

Set Top Boxes

Larry Tabizon—Research plan data will show how many people upgraded, what they started with, what they upgraded to.

Miriam Fischlein—The project is ongoing. We are conducting interviews with participants in both treatment and control groups. This will give insights into real savings and the STB upgrade rate. We know we have about 9% lift over the control group, people who choose to change out the set-top box.

This is like early EM&V. We are testing whether the pilot approach makes any sense. Interest is actually quite substantial.

Jenny Roecks—Alfredo and Steven, how will the results of this research plan inform WP?

Alfredo Gutierrez—From this pilot, hoping to understand market so that we can establish baseline (what is existing). Also, the study will identify the number of boxes currently in homes.

Pierre Landry—My biggest concern is logging of energy savings estimates. Miriam, it sounds like you can't even match data to customers. SCE gave Direct TV information; but they are not able to give customer information to SCE. SCE gave zip codes that were 100% populated by SCE customers. Miriam Fischlein: Savings are based on specs for boxes, not logging. We assume hours of operation to be 24 hours. We have a question in the survey about whether the box is ever switched off.

Amad Ganji—Do you have any measurements from boxes? Actual power draw is likely to be less than the nominal value.

Alfredo Gutierrez—We used ENERGY STAR power draw data.

Steven Long—Operating Hours will be uncertain.

Alfredo Gutierrez—We are okay on demand. Operating hours and the number of hours in each mode is an open issue. We're looking at NYSERDA data – different hours in each power model.

John Proctor—We want really good data on hours in each mode. If you have a good study, you need to include it in the workpaper.

Miriam Fischlein—Direct TV does not collect hours in each mode. The study is collecting hours of operation in each model.

Pierre Landry—There was a suggestion from the last meeting to talk to somebody in the business, has that been done?

Alfredo Gutierrez—We reached out to William Paddock, the contact was provided by Brandon Tinianov. We are supposed to touch base with him early next week.

Bing Tso—What is the shelf life of the study? It must be pretty dynamic given all the media out there.

John Proctor—I agree with Pierre, we need to get some empirical data.

Alfredo Gutierrez—I'll talk to Miriam offline about logging with the current study. We would like to use ENERGY STAR power consumption values but will see if we can do logging on site.

Miriam Fischlein—Research into Action got cell phones and names.

John Proctor—Have Research into Action log energy use.

Jon McHugh—My understanding is that the study is supposed to be about human factors and actual behavors. Can we have a nested sample with pre and post measurements of STBs?

Steven Long—Can we combine logging of set top boxes with the monitoring of advanced power strips that Martin talked about in June?

Martin Vu—If there is a need to collect additional information on set top boxes we can look into that and are open to it. The ET study will be looking at multifamily apartment complexes.

Larry Tabizon—Yes, add that to the scope.

Pierre Landry—25 houses is not a lot of variation. If those 25 give wildy varying estimates, then a sample size of 25 is not enough. You will have to look at the data and see.

Doug Mahone—A broader issue for this type of a measure that will likely see for other measures is that you end up settling on a point estimate that represents a wide range of savings for which a distribution curve may be more useful to see the range in estimates and shape of the curve.

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Advanced Power Strips

Martin Vu—Before we start collecting more information from the residential sector and subsequent surveying because of the persistence issue, what do we need to collect to establish a reasonable

baseline? John Proctor had mentioned there is lots of data out there, is that enough and can we move forward with certain assumptions? The general consensus was, yes. The key aspects of the baseline are behavior, customer acceptance, and persistence. What should be estimated abased on what we have now? What should be collected? I did an assessment of the LBNL study, and they used an open wireless sensor. LBNL did two studies in Oakland, one in Boston. There is really good information from there. Is this possible approach for here? The technology itself has logging capabilities. What needs to be collected? Given ET is collecting 50 data set points. The first concern is, is info from one zip code representative enough? There is a fairly finite area where they are trying to collect information. The contractor is identifying 25 customers in that zip code. We are leaning towards direct install. The sample is representative of the most impactful climate zone (climate zone 7). We are targeting the most populated areas rather than outskirts.

Steven Long—Is the sample representative of the typical median income or skewed on socio economic scale?

Doug Mahone—The fundamental problem is we have no reason one way or another to think about whether location or demographics would have any impact on usage. This is an exploratory study rather than a definitive study. We don't know how much variability we have in use of these?

Martin Vu—Eight studies prior to CalPlug had captured customer acceptance, plugged-in components, time of use, and run time. CalPlug came up with what variables that impact energy savings. ET wants to understand what the variability is. Studies are there that capture variability.

Doug Mahone—Was there substantial variability found? Were they able to correlate to demographics or socioeconomic status?

Martin Vu—I will look at the equations used in the studies. Another issue is sun-setting; the technology evolves so quickly, it may be out-of-date by the time the workpaper is approved.

John Proctor—The calculations were the same. What we are looking for is the raw data. What they gave is point estimate. What is the deviation from mean? How big was the sample? How variable?

Annette Beitel—What caused the variability in the studies, Martin?

Martin Vu—Variability comes from game systems – this is the main variable but not the only variable.

Pierre Landry—What factors are critical to estimating the energy use that is monitored and controlled by power strip? What matters is what is plugged in, not zip code or socioeconomic status. You are on the right track to survey the targeted populations instead of the whole service territory. We don't want to see data. We want to see analysis of data. What is the distribution of usage and what are the types of equipment plugged in.

Jon McHugh—There is an overlap between STBs and advanced power strips. A divergent estimate of savings could be due to the age of the products that are plugged in. A fairly significant demographic

impact is expected. What about age and income? Ideally, there is some distribution in the sample to account for this.

Martin Vu—ET is collecting age, the number of people in the household, and whether they are renters or owners.

Doug Mahone—This information might help you target a program. You may not be able to target a program to teenagers. So, you may need to consider savings based on entire demographics (average savings).

Doug Mahone—Look at the range of variability, and the parameters that explain the variability which can be used to design a program.

Martin Vu—I'll investigate if studies include distribution of usage: sleep, off, and on, and what was plugged in. I'll look at the CalPlug and Australian studies, the calculations, and if they can be supported by the study. We also need to understand whether the area is a senior citizen group. We need to get a sample that is stratified.

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LED Menu Boards

Yun Han—The pilot is a midstream trial starting in September of this year and finishing next June. For the pilot, we will be collecting operating hours, square footage, and sign wattage. This will help us determine savings per square foot.

Yeshpal Gupta—What will the baseline technology be. T-12 is not considered a baseline with the code.

Yun Han—If the technology is covered by code, we will use a T-8 with an electronic ballast. If it's not covered by code, we will use a T-12 as baseline.

Jenny Roecks—Yun, since the pilot won't be finished until June, are you interested in creating an interim workpaper with existing workpaper?

Yun Han—We would like an interim workpaper since the study won't be done until June. We're having trouble getting interim data for the larger food retailers.

Annette Beitel—Could you collect data during the course of implementation? You could collect some data, create an interim workpaper, and then collect more data later on.

Yun Han—If we collected data through larger food chains like Jack-in-the-Box and McDonalds, it would not be applicable to mom and pop shops.

Pierre Landry—It's better to use data from chain stores for chain stores. You would need a separate estimate for mom and pop shops as there is probably more variability with mom and pop shops.

Dario Moreno—Implementation of the pilot will be starting in Oct/Nov. We are looking to do about 130 individual stores. That is a number that we feel is enough from engineering to create workpaper. If we see we are not getting much uptake in the project, we will make decisions to pull back. We will not be collecting data on brightness.

Jon McHugh—Energy Solutions is looking at Title 20 Code Change proposals on signs. They may have requests on what you could collect, and have data that would be useful for you.
Bing Tso—Is there an established set of factors to understand which interactive factor most appropriate?

Jon McHugh—Would use DEER lighting interactive effects. We don't want to do custom interactive effect here. Too much effort.

Martin Vu—Stick to DEER interactive effects, they don't come with custom interactive effects.

Bing Tso—It would be good to state what the interactive effects are from DEER.

Yun Han—Interactive effects are included in the abstract documentation.

- Decisions:
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LED Surface Mounted or Recessed Panels

Jenny Roecks—The main outstanding issue for this workpaper is the baseline. Two methods were proposed for establishing the baseline, both based on replace-on-burnout scenarios that meet Title 24

requirements. Jon McHugh proposed another method that he shared via email with PG&E and Energy Solutions, and Alex at Energy Solutions has some thoughts to share on the proposed methodology. Jon, could you please share with the greater group what your recommendations were to Energy Solutions?

Jon McHugh—My recommendations were to look at a calculation process that looks at total lumens for a task. The test method for LED luminaires is based on the actual light output of a luminaire, versus the light output optical efficiency, and coefficient of utilization. You look at the geometry of the space and compare the LED to what you are replacing. The code baseline for a warehouse/factory is a pulse-start metal halide, and for offices it's third generation T-8s. You compare delta of the power of the two sources.

Alex Alzugaray—The challenge with the methodology is sorting out equivalent lumens associated with the lamps and fixture efficiencies and coming up with actual values for the given variables that were highlighted. Given broad nature of LED technologies, it's a challenge to come up with some reasonable broad assumptions.

Jon McHugh—Warehouses and offices are not using same geometry for lighting. You need to look at luminaire type. I assume you are not proposing LED luminaire to be applied everywhere. They are designed for particular applications.

Alex Alzugaray—Is there a list of typical room cavity ratios for different space types?

Jon McHugh—Jim Benya at the CEC has a spreadsheet.

Annette Beitel—Is the logical next step for Jon to obtain that list from Jim at the CEC?

Jon McHugh—Yes, I think so.

Jenny Roecks—We should follow up on this issue on another call after more data is gathered on the variables in Jon McHugh's proposed methodology. Mary Matteson Bryan was unable to make today's call but had some comments as well and would likely be interested in participating in another call. Another issue raised with this abstract was whether to consider early retirement as an option in addition to replace on burnout. Is that something the group would still like to consider? In this case, a preponderance of evidence would need to be supplied in order to justify the baseline for early retirement.

Martin Vu—The Energy Division would expect photos of the existing equipment like in custom projects.

Jenny Roecks—For prescriptive programs, no precedent has been set for early retirement as to what constitutes sufficient evidence. Perhaps that is something that can be discussed in a follow-up call on the baseline methodology.

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