



**California Technical Forum (Cal TF)
Technical Forum (TF) Meeting #11
June 25th, 2015
Pacific Energy Center
San Francisco**

I. Participants

Annette Beitel, Cal TF Facilitator
Jenny Roecks, Cal TF Staff
Alejandra Mejia, Cal TF Staff

Doug Mahone, TF Member
Pierre Landry, TF Member
Tom Eckhart, TF Member
Grant Brohard, New TF Member
Ahmed Ganji, TF Member
Gary Fernstrom, New TF Member
Sherry Hu, TF Member
George Hernandez, TF Member
Armen Saiyan, TF Member
George Beeler, New TF Member
Mike Casey, New TF Member
Mark Modera, New TF Member
Ron Ishii, TF Member
Ryan Hoest, New TF Member
Owen Howlett, New TF Member
Steven Long, TF Member
Martin Vu, TF Member
Bryan Warren, TF Member
Andy Brooks, TF Member
Jesse Martinez, New TF Member
Ed Reynoso, New TF Member

Andrea Salazar, EMI Consulting, Presenter
Juliana Colwell, Southern California Gas (SCG), Presenter
Greg Sullivan, UCONS, Presenter
Andres Fergadiotti, Southern California Edison (SCE)
Thad Carlson, TrickleStar
Dominico Gelonese, Embertec
David Shallenberger, Synergy Companies



Chris Li, Pacific Gas & Electric (PG&E)
Jia Hunag, PG&E

On the Phone

Bing Tso, TF Member
Bruce Harley, TF Member
Christopher Rogers, TF Member
David Springer, TF Member
Larry Kotewa, TF Member
George Roemer, TF Member

Kevin Messner, AHAM
Val Valmiki, AESC
Mike Mysser, Energy Platforms
Pete Ford, Southern California Gas (SDG&E)
Kathy Yi, Idaho Power

II. Key Decisions and Action Items

Subcommittee Update

- ACT: Individual TF members to reach out to Jenny Roecks if interested in reviewing measures for LEDs, Commercial Air Conditioning, Whole House Fans, and/or VFDs for Pumps and Fans.

Residential Advanced Power Strips Workpaper

- **Workpaper approved for one year**
 - Workpaper to acknowledge that existing power management software affects savings; that the “low water line” from the existing field trial data reflects this reality; and that additional data collection will help continue to calibrate that number.
 - Martin Vu to continue working with the various parties to build greater consensus around a tighter definition of the technology that may eventually reduce the need to lab and field test different products.
- ACT: Cal TF staff to ensure existing procedures are in place to amend workpaper in subcommittee in accordance with recommendations from the full TF.



EUL Analysis for Residential Tier 2 Power Strips Memo to CPUC Staff

- **Approval of 5 year EUL for Residential Tier 2 APS.**
- HVAC Res QI
- ACT: Subcommittee to review:
 - Accuracy of DOE-2.2 modeling of equipment deficiency degradation in later phase, and reasonableness of over sizing assumptions
 - Saturation of variable capacity equipment in the residential market
 - Impact of continuous fan cycling
- ACT: SCE to investigate the penetration of variable capacity equipment in the replacement market.
- **Measure approved to proceed to workpaper development**

Mini Split Research Plan Proposal

- ACT: UCONS to consider using fan transfer to enhance distribution.
- ACT: Study to consider temporarily sealing the existing ducts.
- ACT: Study to consider the possibility of thermo siphoning loops.
- ACT: Survey to clearly question occupants about system performance during both test periods.
- ACT: Workpaper to use similar system for baseline.
- ACT: Study to ensure existing equipment *and* insulation is precisely characterized.

Laminar Flow Restrictor Abstract

- ACT: ACT: Workpaper to consider whether reduced flow leads to reduced energy usage, or whether people just use faucets longer, to compensate for reduced flow.
- ACT: **Measure approved for workpaper development**
 - Don't factor in line losses
 - Use an RUL of 10 minus the age of the equipment being removed—subject to checking with the water district.
 - Seek additional studies on whether reduced flow leads to expected energy savings and does not trigger compensating behavior (using faucet longer).



Retail Plug Load Portfolio Workpaper

- ACT: Cal TF to make decision on NTG approach for RPP workpaper on issues that were raised in July meeting.

III. Subcommittee Update

Jenny Roecks, Cal TF Staff—

POU TRM Review and DEER Documentation Subcommittee Summary

Jenny Roecks—The POU TRM review will be discussing LEDs next week, so please let me know if you would like to participate in that meeting. Commercial Air Conditioning, Whole House Fans, and VFDs for Pumps and Fans are also coming up soon. Please reach out to me if you are interested in those measures as well.

- ACT: Individual TF members to reach out to Jenny Roecks if interested in reviewing measures for LEDs, Commercial Air Conditioning, Whole House Fans, and/or VFDs for Pumps and Fans.

IV. Tier 2 Advanced Power Strips

Martin Vu, RMS Consulting—

PowerPoint Presentation

Gary Fernstrom—That use rate speaks poorly for user productivity.

Group—Yes. Most of the time the computers are waiting for the users.

Ron Ishii—What is the criteria for defining “idle”?

Martin Vu—I believe the power strip measured inactivity. The laboratory trials had predetermined inactivity times, but the field trial periods depended solely on the various users.

Bruce Harley—Was inactivity time measured only after the screen saver went on? It occurs to me that would over estimate the active time.



Val Valmiki—It is an estimate that depends on various measured parameters of the software use.

Dominico Gelonese—The strip monitors power fluctuation, mouse, and keyboard activity. After a few minutes of inactivity, a screen pops up warning of upcoming low power mode, and the inactive period starts if the user does not elect to continue on high power mode.

Jessica Coldwell—Does this also work with wireless equipment?

Dominico Gelonese—Yes because we actually measure software activity, not the hardware.

George Hernandez—What happens if there is a power outage?

Dominico Gelonese—The strip resets itself.

George Hernandez—What does it do for users who need to install update patches overnight?

Dominico Gelonese—We are developing a user interface that will allow for that functionality.

Sherry Hu—How does the strip deal with the various power management defaults on the plugged in equipment?

Dominico Gelonese—The trial assumed there were a variety of pre-existing power management defaults, and the sample was big enough to normalize the savings estimates.

Steven Long—It seems like your current data is the best we will know for now, absent a new, larger study.

Pierre Landry—For the program you might not want to verify default settings for every customer. But for larger sites, you may be able to remotely ask what the default power management setting are, and assume that all users at that site use the same settings.

Dominico Gelonese—We attempted to do that at several of our trials, including SDSU. We found that reality as measured by the strip was very different than what we were originally told.



Gary Fernstrom—Does the baseline usage really vary enough to make a savings difference? The question is if the refined precision in baseline assumptions is worth the resources we would need to invest in gathering even more data.

Steven Long—Wouldn't the baseline in the existing workpaper on network software be the upper limit for this? I realize it is a fairly old estimate.

Martin Vu—Does the groups feel that the estimate in the existing workpaper is a better estimate than using real field data?

Owen Howlett—How large were the field trails?

Martin Vu—Sample sizes were between 50 and 100 at just a few sites. Definitely one of the recommendations that would go along workpaper approval would be to continue with ongoing data collection.

Pierre Landry—If the technology has the monitoring capability, wouldn't that be your ex post data?

Owen Howlett—Then you would be relying on the implementer to collect your ex post data.

Pierre Landry—Which would necessitate some parallel monitoring by the evaluator.

Martin Vu—So, are you proposing taking the existing ex ante estimates for now, and then "truing up" with the ongoing monitoring data?

Pierre Landry—Yes.

Steven Long—I am concerned that the estimates may be optimistic for large corporate settings that already have strong power management software. However, they may actually be conservative for small commercial settings. What do we think will be the larger market for the technology?

Pierre Landry—Or we could just ask if the users have existing power management.

Dominico Gelonese—Our experience with SDSU was that their answers to that question were about 65% off.



Annette Beitel—So Dominico, are you suggesting that we use the savings from the computer lab setting as a default?

Dominico Gelonese—Yes, since that seems to be the least savings deployment scenario. And then we monitor to calibrate.

Pierre Landry—Any idea how long the field trials will take?

Thad Carlson—We are still waiting to hear from CalPlug on the field trial timing. We do have an Advanced Power Strip field trial underway in Minneapolis; however, we are not aware of an industry definition for Tier 2 Commercial Power Strips.

Owen Howlett—Isn't there a way to broaden the definition to eliminate the requirement for field tests? I imagine that would make it easier to innovate.

Dominico Gelonese—Australia tried that approach, and the drastically lower savings that materialized from lower quality products basically killed the market.

Bruce Harley—I agree with John Proctor's comment that this particular measure really depends on the technical specs. I don't think we're at a point to be able to broaden the definition without risking the savings.

Annette Beitel—To summarize the group's recommendations:

- Workpaper to acknowledge that existing power management software affects savings and that additional data collection is needed to continue to calibrate that number.
- Martin Vu to continue working with the various parties to build greater consensus around a tighter definition of the technology that may eventually reduce the need to lab and field test different products.

With all of those contingencies, does the group wish to grant interim approval to the Commercial Tier 2 Power Strips measure?

Group—Yes.

- **Workpaper approved for one year**

Armen Saiyan—Procedurally, what would it look like to amend the workpaper after the field data comes back?



- ACT: Cal TF staff to ensure existing procedures are in place to amend workpaper in subcommittee in accordance with recommendations from the full TF.

George Hernandez—The issue with the product definition is actually an ongoing issue with utilities around the country. I think we could really add some value to the field if we continue to work on this question.

Annette Beitel, Cal TF Facilitator—

EUL Analysis for Residential Tier 2 Power Strips Memo to CPUC Staff

Tom Eckhart—Did your research give you any insight as to why the measure lives are so low?

Gary Fernstrom—My speculation is that correct installation has a huge effect on the product removal rates.

Steven Long—Isn't this going to be a direct install measure?

Annette Beitel—The Australia program also relied on direct install, and products were still removed at the 33% rate.

So, the joint recommendation from Martin and Cal TF staff is to re-approve the residential measure with an EUL adjusted to 5 years by the 33% product removal rate. Does the TF approve the 5 year EUL, and the methodology that was used to make this adjustment?

Group—Yes.

Approval of 5 year EUL for Residential Tier 2 APS.

V. Residential Quality Installation Abstract, continued.

Jenny Roecks—The following presentation reflects the recommendations of the Cal TF HVAC Res QI subcommittee. Andres is seeking approval of the proposed calculation input parameters to move forward with workpaper development.

Andres Fergadiotti, SCE—

PowerPoint Presentation



Gary Fernstrom—What value did you use for static hit?

Andres Fergadiotti—There is a slide later in the deck that will cover that question, but we will be using a lower static hit value.

Doug Mahone—So, did the program get people up to code or was realization pitiful?

Andres Fergadiotti—The program did bring people up to code, but the savings claimed in the workpaper were not fully realized.

Andrea Salazar—So the small realization rates were only in regards to improved efficiency from quality installation.

Airflow Performance

Jenny Roecks—The subcommittee is actually recommending the nuanced .57 rather than the .58 we discussed last time.

Grant Brohard—Isn't using WO 32 for the base case and program data for the measure case cherry picking data?

Jenny Roecks—The subcommittee is attempting to use best available data for all parameters. We are using the WO 32 estimates when there is no other available information, but we are using the more accurate program data whenever we can, since program data has a significantly larger sample size.

However, since we already discussed these parameters, we can circle back to this question once we get through the parameters we didn't already discuss.

Duct Leakage

Gary Fernstrom—What about the down flow cases where the unit is located in the crawl space?

Andress Fergadiotti—Unfortunately we are limited to modeling in the attic by the DOE-2.2 building prototypes.

Gary Fernstrom—I would ask if modeling just in the attic makes much difference.



Mark Modera—I've done this a thousand times. The difference is not non-significant, particularly for cooling.

I also don't particularly agree with the 75%-25% split, but all of these are on the subcommittee's list of items to return to as time permits. There are bigger issues that we needed to focus our initial efforts on.

Andres Fergadiotti—We acknowledge that there are deficiencies in this and other parameters, but we are limited by the DEER mandates.

Jenny Roecks—Gary, I will make sure to capture your comments in our subcommittee documentation and hopefully we can address them in a later phase of the project.

Equipment Sizing

Steven Long—So WO 32 really didn't address equipment sizing?

Andres Fergadiotti—WO 32 compared the load estimate to the installed capacity and found that 10% of the participants were still oversized.

Steven Long—So why wasn't that used as part of the measure case here?

Annette Beitel—I think what Steven is asking is if we have evidence that the program will reliably minimize over sizing?

Andres Fergadiotti—The real issue is the delta between the two Manual Js.

Steven Long—So, if it is the delta, does it matter what percentages you use in the modeling?

Doug Mahone—I know that this is all just to generate an input parameter to run an energy model, but I understand that a lot of modern equipment is not as sensitive to over sizing. My question is if the energy model will adequately generate the energy penalty.

Mark Modera—My opinion is that the modeling approach to efficiency degradation needs to be looked at more closely.

Jenny Roecks—We can add this issue to the list of items to be looked at in future phases. In the meantime, is the group comfortable with the proposed approach for now?



Mark Modera—Another key question is the penetration of variable capacity equipment in the replacement market.

Annette Beitel—Is it possible to collect this information via implementation?

Mark Modera—It would be really great to know those values.

Pierre Landry—These seem like very important questions that need to be scoped into next year's EM&V plan. In the meantime we need to use best available information.

Jenny Roecks—These are all items we can ask Andres to note as questions for further exploration in the workpaper. The eventual workpaper will only be seeking interim approval, so the subcommittee can flesh out those outstanding questions in the year following that.

- ACT: Subcommittee to review (at future date when subcommittee reconvenes, along with other HVAC issues that the subcommittee identified):
 - Accuracy of DOE-2.2 modeling of equipment deficiency degradation in later phase, and reasonableness of over sizing assumptions
 - Saturation of variable capacity equipment in the residential market
 - Impact of continuous fan cycling
- ACT: SCE to investigate the penetration of variable capacity equipment in the replacement market.

Is the group comfortable with moving forward with these assumptions in the meantime?

Group—Yes.

Airflow Capacity

Doug Mahone—Does this parameter vary by climate zone?

Andres Fergadiotti—We are assuming that it doesn't vary.

Modeling Simplifications



Mark Modera—I believe your baseline for cooling and heating degree days may generate some discussion. You are doing something new here and people will ask questions.

Ahmed Ganji—you can do a sensitivity analysis. That can help assure that your assumptions are more accurate.

Doug Mahone—How will you be breaking down the results from your groupings?

Andres Fergadiotti—The approach would be to generate a single value per grouping of climate zones, so seven deemed values.

Ron Ishii—I'm concerned about the ranges in the averages you're presenting.

Andres Fergadiotti—That was something I did have in mind when selecting the groupings, but there is a trade off between complexity and improved accuracy.

Ahmed Ganji—A sensitivity analysis on the simplification would be very informative.

Annette Beitel—So is the group comfortable with Andres moving forward with the simplified EUCA approach, given that that has already been subject to a parametric sensitivity analysis?

Group—Yes.

- **Measure approved to proceed to workshop development**

VI. UCONS, Mini Split Research Plan Proposal

Tom Eckhart and Greg Sullivan, UCONS—

George Hernandez—Why is the existing equipment staying inside the home?

Tom Eckhart—The old equipment is staying installed to help make the measure cost effective, but should not be used at all. That is what we are testing for.

Mark Modera—How well are you characterizing the existing system? Are you going under the doublewide trailers to make sure everything is connected and sealed?

Tom Eckhart—Yes we are.



Doug Mahone—Is there a chance that the reduced air distribution will affect comfort?

Greg Sullivan—Yes, and we will be metering and surveying for that.

Andy Brooks—Will the measure equipment be sized to cool the entire home?

Greg Sullivan—No, they will be sized for the space we are targeting.

Owen Howlett—Will you consider using fan transfer to enhance distribution?

- ACT: UCONS to consider using fan transfer to enhance distribution.

Greg Sullivan—I think that's a great idea.

Mark Modera—Are you considering temporarily sealing the ducts for some of the study period?

Group—That's a great idea.

- ACT: Study to consider temporarily sealing the existing ducts.

Mark Modera—I would warn you to look out for thermo siphoning loops if you have a temperature differential.

- ACT: Study to consider the possibility of thermo siphoning loops.

Greg Sullivan—Does the group have any other suggestions for the study?

Steven Long—I think your survey needs to clearly ask about operation in both periods. You should also ask if the occupants increased their fan usage.

- ACT: Survey to clearly question occupants about system performance during both test periods.

Sherry Hu—Why aren't you using the already approved PG&E workpaper?

Greg Sullivan—Because this is a different measure, not for the entire home.

Sherry Hu—You also need to be using similar system for the baseline. This is guidance we have recently received from ED.



- ACT: Workpaper to use similar system for baseline.

George Hernandez—One thing that would be interesting to see is if differences in results can be linked to differences in manufacturers, insulations, etc.

- ACT: Study to ensure existing equipment *and* insulation is precisely characterized.

VII. Laminar Flow Restrictor Abstract

Jesse Martinez and Juliana Coldwell, SCG—

PowerPoint Presentation

Mark Modera—Is there a chance that reducing the flow just makes people throttle the flow even more?

Juliana Coldwell—In health care settings there is no option to throttle more; health regulations demand on or off faucets.

Ron Ishii—What about the flow time?

Jesse Martinez—You'll see in the following slides that we do account for that and are being hyper-conservative.

Steven Long—Do the health care regulations apply to all different sinks in non-hospital facilities, like clinics?

Jesse Martinez—No. We will probably end up having to segregate the estimates and requirements by use type.

Doug Mahone—Why do we need an extra widget if maintenance can also go in and adjust the flow manually?

Juliana Coldwell—Because maintenance could just be called back the next day to adjust the flow back. This is why the measure is tamper proof.

Jesse Martinez—And it will also be coupled with direct install education for maintenance staff.

Ron Ishii—Are there any concerns for facilities that have co-generators?



Jesse Martinez—We can't use deemed measure for co-generators.

Grant Brohard—How do we know you're not just displacing the water district's program?

Juliana Coldwell—We are actually working with the water district to improve their program from just rebates to direct install.

Armen Saiyan—Do you know what the distribution of your flow rate assumption is?

Juliana Coldwell—The actual workpaper will break the estimates down into the various use cases, so we won't be using the average.

Steven Long—Why are you claiming this measure as REA, not ROB?

Jesse Martinez—Because we're not actually replacing anything.

Steven Long—So the base case is no restrictions at all, Ok.

George Hernandez—Are mineral deposits going to affect your EUL?

Jesse Martinez—That may be a risk in some use cases, so we might have to have some evidence of in line filters to prevent that.

Armen Saiyan—Do you happen to know why the water district uses such a low EUL?

Jesse Martinez—I think it is because their program is down stream prescriptive, and so it may take in service rates into account.

Pierre Landry—Can the water district help pay for the measure?

Jesse Martinez—That is a possibility.

Bruce Harley—If the TRC is so close to 1, why are there so many assumptions that are so conservative?

Jesse Martinez—Based on our experience with the custom projects, we know that savings do vary depending on specific end uses, so we wanted to take a conservative approach.



Doug Mahone—Since you're doing direct install, you may be able to actually limit your measures to the highest use sinks. That may help your TRC.

Mark Modera—Is there field data that shows reduced water usage from the custom application of this measure?

Jesse Martinez—We are using data from our custom program, but it's hard to isolate the effect in meter data.

- ACT: Workpaper to consider whether reduced flow leads to reduced energy usage, or whether people just use faucets longer, to compensate for reduced flow.
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Juliana Coldwell—So, does the group have any recommendations about our line loss assumptions?

Group—There is no need to consider line losses.

Annette Beitel—Does anybody in the room know of any resources to validate the abstract's usage time assumptions?

Grant Brohard—I would think that operating rooms are a tiny fraction of your target market.

Steven Long—Will the Title 20 regulations coming into effect affect your chosengpm?

Group—It seems like a base case of 2.5 gpm is more appropriate.

Andy Brooks—I actually think that the real gpm is closer to 3.

Jesse Martinez—Lastly, the EUL and including the water savings in the TRC. What does the group think?

Group—It seems reasonable to calculate the water reduction calculations, since it seems to be significant.

- ACT: **Measure approved for workpaper development**
 - Don't factor in line losses
 - Use an RUL of 10 minus the age of the equipment being removed—subject to checking with the water district.



- Seek additional studies on whether reduced flow leads to expected energy savings and does not trigger compensating behavior (using faucet longer).

VIII. Retail Plug Load Portfolio Workpaper

Brian Smith, PG&E; Rick Ridge, Ridge & Associates—

Power Point Presentation

Pierre Landry—Why is ADE not a straight line?

Rick Ridge—Because we expect that absent the program, market forces, technological improvements, price decreases, and other forces will still have some effect on adoption.

Mike Casey—What are the gross savings based on?

Rick Ridge—Gross savings are based on participating deemed EUS values.

Todd Malinik—The promotions during the trial were also very short-lived, so they had limited long term effects.

Doug Mahone—So, you are showing us what the NTG will look like in three year intervals, but will be using the ten year estimate in the E3 calculator.

Pierre Landry—Seems like the Dean Hyndman approach to forecasting.

Rick Ridge—Yes. The problem is calibrating between the expectations from the first evaluations and really calculating the actual market transformation.

Annette Beitel—So, does the group agree the results from the ET study should not be used in the calculation of the workpaper NTG?

Armen Saiyan—How far off was your projection for the first year from what you saw in the pilot?

Rick Ridge—The pilot was only a small piece of the full program logic, so it really doesn't apply.

Pierre Landry—So why did you bother doing it?



Rick Ridge—Because we learned a whole lot of other lessons about the program design. And we calculated the PLI NTG to demonstrate some level of separation between control and treatment in the short term.

Steven Long—Is your model detailed enough that you could actually run it with the limited trial scope? That would give you a one-to-one comparison or at least a useful tracking tool.

Pierre Landry—Seems like it would still be in the right direction.

Annette Beitel—What does the group think about using the short-term NTG to calculate the short-term TRC in the meantime?

Doug Mahone—I think the whole energy efficiency endeavor in California has become way too short sighted.

Pierre Landry and Gary Fernstrom—In strong support. It is a very over-due approach.

Armen Saiyan—Why not use the incremental estimates while being very clear that the program has long-term goals? That seems more straightforward.

Annette Beitel—Exactly. The using a shorter-term NTG ratio seems clearer and more intellectually honest. By using a shorter-term NTG ratio, it will be clear that program will have low TRC for the first several years, but the hope and expectation based on 10-year modeling is that program will be cost-effective over the 10-year period.

Steven Long—I would tend to agree with Armen and think that we need to update a shorter-term NTG estimate with an annual number.

Jesse Martinez—In the short-term, year-to-year, the program will be fighting for implementation resources, and low TRCs early in the program cycle will undoubtedly affect various parties' perception of the program.

Martin Vu—Similar to the Tier 2 APS, it seems like collecting implementation data is necessary. I would suggest we adopt an ex ante NTG estimate and then calibrate retrospectively on an annual basis based on field data is collected.

Annette Beitel—Given the complicated nature of this issue, and the fact that the group has not come to a consensus decision, I'm going to ask the RPP team to come back for a short wrap up discussion during our July meeting.



- ACT: Cal TF to make decision on NTG issues that were raised for RPP workpaper in July meeting.

IX. Closing