



**California Technical Forum (Cal TF)
Technical Forum (TF) Meeting #20
May 26th, 2016
Pacific Energy Center
San Francisco, California**

I. Participants

Annette Beitel, Cal TF Facilitator
Alejandra Mejia, Cal TF Staff
Tim Melloch, Cal TF Staff

Ed Reynoso, TF Member
Tom Eckhart, TF Member
John Proctor, TF Member
Pierre Landry, TF Member
Armen Saiyan, TF Member
Mary Matteson Bryan, TF Member
Alina Zohrabian, TF Member
Gary Fernstrom, TF Member
Spencer Lipp, TF Member
George Beeler, TF Member
Ryan Hoest, TF Member
Andy Brooks, TF Member
Christopher Rogers, TF Member
Bing Tso, TF Member
Steven Long, TF Member
Martin Vu, TF Member
Mark Modera, TF Member
John McHugh, TF Member
David Springer, TF Member

M M Valnicki, Presenter, AESC

Katie Wu, California Public Utilities Commission (CPUC)
Mike Myser, Enery Platforms
Pete Ford, San Diego Gas & Electric (SDG&E)
Paul Pruschicki, SDG&E

On the Phone

Bryan Warren, TF Member



Larry Kotewa, TF Member
Mike Casey, TF Member

Philip Hasley, Hasley Consulting
Travis Richards, RMS Energy Consulting
Roger Baker, ComEd
David Alexander, Pacific Gas & Electric (PG&E)
Joe Priyjanonda, Applied Analytics Group
Gay Powel, PG&E
Fred Coito, Itron
Linda Wan, PG&E

II. Key Decisions and Action Items

Interior LED Parking Garage Luminaires

- ACT: Consider including multifamily parking in the target sectors.
- ACT: Use Energy Solutions metered data to determine hours of operation.
- ACT: Customer-facing values should use the more common per fixture savings metric.
- ACT: Establish product specifications and use those to maximize calculated savings while still meeting health and safety requirements.
 - See if Energy Solutions metered data can be used for this.
- ACT: Attempt to develop workpaper to cover both ER and ROB applications.
 - Use HID and no controls for base case for ER applications.
 - Ensure clear guidance is received at abstract review stage on viability of the ER application type.
- ACT: Consider including new luminaires.
- ACT: For enclosed garages, use hours of operation as determined by January 21st, 2015 CPUC Staff memo to PG&E.
 - That EUL should be calculated with 8760 hours of use.
- ACT: Make sure EUL for un-enclosed spaces reflect hour of operation being used.
 - Does EUL change do to the 1/3 low power use? Illuminating society may have data on this.
- ACT: Request information from BOMA regarding percentage of California garages that have day lighting.

Permanent Magnet Synchronous Fan Motor Assemblies

- ACT: Consider possible rebound effect on compressor use.



- Measure or model power draw at compressor. Strong preference for empirical measurement, even if very small sample (n=2).
 - Possibility to use Edison or Davis lab.
 - Consider leveraging on Oak Ridge study or other early installations, or working with AMCA.
- ACT: Factor in improved power factor.
 - Gary Fernstrom to provide methodology.
- ACT: Consider why other utilities currently break out low and mid temperature supermarket fridge products and using that approach.
 - Even if weighted blending approach is used, need to be clear about weights being used and data to support them.
- ACT: Consider limit of DI delivery on large chain supermarkets.
- ACT: Ensure various blending of values (mid/low temp and climate zones) does not push error past 10%.
- ACT: This should be an ER measure. How can that be shown?
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Measure Consolidation Update

- Cal TF staff to incorporate TF edits into measure consolidation checklist.

III. Opening

Annette Beitel, Cal TF Facilitator—

Run Through of Agenda

Questions on working Next Steps Memo

Steven Long—Has the EAR team committed to reviewing all workpapers, or just selected ones?

Annette Beitel—Yes. CPUC Staff has committed to reviewing all of the workpapers that come through the Cal TF process. We are very appreciative of that commitment, since at this time it will be additional work for their team.

Pierre Landry—For a long time we have discussed the importance of having CPUC personnel with decision-making authority attend these meetings in person. Seeing the dynamics in the room—the discussions, the murmuring, head nods—will be really valuable to them.



Annette Beitel—Yes, but we need to be mindful that changes will be incremental. CPUC Staff will be here in the room during your discussions about the complete workpapers. I am confident that they will be more and more interested in participating actively as time goes on.

Pete Ford—Informal progress is very good, but I don't think Staff will be fully confident until there is more formal regulatory support for their participation.

Annette Beitel—Thanks for bringing this up. It is an important question and we are certainly discussing the available options.

Jon McHugh—Maybe our role shouldn't be developing workpapers, but a higher-level prioritization function. CPUC Staff and their consultants can then develop and defend their numbers.

Annette Beitel—We have asked them to do that for the DEER measures, which already are their numbers, and we've had difficulty getting them to do that.

David Springer—So, did I hear you say that there will be no EAR team involvement in the measures that go into the eTRM?

Annette Beitel—Not at all. This section of the memo was just focused on improving the current process for workpaper review. The third section lays out next steps for eTRM implementation. CPUC Staff review will be an essential step there as well.

IV. Interior LED Parking Garage Luminaires

Martin Vu, RMS Energy Consulting—

PowerPoint Presentation

Steven Long—Did you consider including multifamily as one of the target sectors?

Phillip Hasley—We haven't at this point, but the opportunity certainly exists.

Gary Fernstrom—Well, wouldn't multifamily parking garages already be on commercial rates?

Steven Long—I would still double check that the data includes multifamily, since those buildings don't usually go through utility custom projects.



John McHugh—I worked on the Title 24 rulemaking for this, and I’m not convinced the simulations are defensible compared to metered data. I believe Energy Solutions has more robust data to fine-tune your baseline assumptions.

Alina Zohrabian—I believe Energy Division would accept a per kilolumen approach, but I have heard that the metric is confusing for customers. It would be preferable for the customer-facing catalog parameters to use per fixture metrics.

Ed Reynoso—Are you including a luminaire solution?

Martin Vu—That is considered to be the “best in class” solution, but we constructed this measure to target the middle of the road option that is most likely to be demanded by customers.

Pierre Landry—In terms of metering, why do we care about what is “appropriate” versus what is commonly used?

Martin Vu—Because we may get guidance directing us to be more aspirational in our saving calculations.

Pierre Landry—But the question here is about determining the currently correct savings estimate not the savings estimate that would result if people behaved appropriately.

Jon McHugh—I think part of the answer to your question is that there is actually very little human interaction for this use. There are really no dimmers involved here. The hi/lo use is really dependent on the product specifications.

Annette Beitel—It seems like Jon’s recommendation is to not go by common dimming practices, but to instead specify requirements for manufacturers that maximize savings while staying code compliant.

Jon McHugh—These are fairly new codes. Do you really expect that savings will truly be from a code baseline?

John Proctor—I agree with Jon. This is clearly an Early Retirement opportunity.

Spencer Lipp—Absent program intervention, customers will only replace individual lamps as they burn out. The true retrofit proposed in this measure will only happen under program influence.



Pete Ford—Doesn't the Work Order 29 impact evaluation show that the majority of lighting retrofits are indeed Early Retirement?

Ed Reynoso—We have seen some customers start using the plug and play replacements, because they like how it improves the visibility of their security cameras, but they take care not to trigger code and therefore avoid putting in the controls. That may be one way to show that this measure is Early Retirement.

Alina Zohrabian—In terms of hours of operation, we have a January 2015 memo from CPUC Staff that directs us to use a specific building type for building garages. I believe that building type uses 8760 hours of operation.

Bing Tso—How confident are you that the costs you're citing will stay relevant?

Martin Vu—Yes, LED prices are changing rapidly, so we'll probably have to collect data during implementation to update the measure in a year.

Steven Long—The interaction of the measure life and high/low output came up during our LED tube discussions. You may want to be aware of that.

Grant Brohard—Do we have any idea about the distribution of daylighted and not-daylighted parking garages?

Steven Long—Isn't there a code requirement for how enclosed the garage is?

Gary Fernstrom—It depends on when the buildings were built.

Grant Brohard—You may want to see if BOMA has an answer on this.

Group—**Approve measure to move on to full workpaper development.**

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- ACT: Request information from BOMA regarding percentage of California garages that have day lighting.

V. LED 4-Pin Lamps

Alina Zohrabian, PG&E—

PowerPoint Presentation

John Proctor—So, please remind me, the rational behind the current REA guidance is that the equipment the new lamp is attached to will only last about one third of the time the lamp will live?

Alina Zohrabian—Essentially.

Steven Long—Aren't the retrofit cans around the same price point?

Alina Zohrabian—Maybe so for residential, but not for commercial uses.

David Alexander—The commercial products we are targeting with this measure involve a lot of specialized labor to install and so are significantly more expensive.

Jon McHugh—Does the GSA study involve a higher fixture efficiency?

Alina Zohrabian—Unfortunately not that I could tell.

Gary Fernstrom—The reason for that is that the new lamps have significantly higher lamp efficiency, and the fixture efficiency depends on the orientation of the lamp.



Steven Long—We’ve gotten a lot more data on medium-term lamp efficacy as part of our tubes research. You should make sure to incorporate whatever comes out of that final disposition.

Alina Zohrabian—One big difference between tubes and this application is that it seems like only a few manufacturers, all very reputable ones, will be producing this 4-pin lamp. Therefore we wouldn’t expect to have the concerns about “third tier manufacturers.”

David Alexander—To help safeguard against the performance concern, we’re actually working to include ballast compatibility as part of the DLC spec.

Gary Fernstrom—I find the current RUL limitations for REA very problematic.

Spencer Lipp and Mary Matteson Bryan—It makes very little sense to assume that cost-conscious commercial customers would simply throw out functioning lamps because they have to replace a ballast.

Armen Saiyan—It goes back to the ability to replace a single component over a whole system.

Jon McHugh—Have you considered limiting your program design to harder to replace uses?

David Alexander—That’s a hard question to answer. I’m not sure that there are very many uses that are all that easy to replace, specially since a lot of our target market are those higher architectural uses, and enforcing the type of exclusions you mention could be really expensive.

Jon McHugh—What about the idea of reusing the trim?

David Alexander—You can’t reuse the trims for retrofits.

Pete Ford—One possible back up plan is to include the cost of the ballast so that equipment is not limiting the EUL of the lamp.

VI. Permanent Magnet Synchronous Fan Motor Assemblies

M M Valnicki, AESC—

PowerPoint Presentation



Jon McHugh—Does the new motor provide the same airflow rate?

M M Valnicki—The speed is supposed to be the same, but the fan air rate does seem to decrease by 7%

Jon McHugh and Mark Modera—That would sacrifice your savings.

Gary Fernstrom—We should really ask if the compressor's power draw changed.

M M Valnicki—The ET study didn't measure that.

Mark Modera—But you should measure the power consumption of the compressor, because it will have to work harder in light of the decreased airflow.

Jon McHugh—What about power factor?

M M Valnicki—These actually have an improved power factor. It's not addressed in this presentation, but that is one of the benefits.

Spencer Lipp—The PG&E portfolio breaks out low and medium temperature fridges. You should consider why they do that.

Mark Modera—Since you're switching out the entire unit, you may be getting some efficiency from using a different fan blade.

Pete Ford—The pictures on slide 3 do show a different blade design.

Mark Modera—You still have to investigate the effects on the compressor side, but the different blade design may ensure some of the measured savings.

Gary Fernstrom—I'm less concerned with Early Retirement on this, as much as I'm unsure this technology is any better than the alternative. I think we have to normalize for the effect on the compressor.

Steven Long—So, how are you currently calculating the system efficiency if you didn't measure the compressor power draw?

M M Valnicki—It's a calculated value.

Spencer Lipp—Is there a concern about trying to do a direct install for large chain stores? Since DI is usually limited to smaller stores, should we consider a different delivery channel for the larger supermarkets?



Armen Saiyan—I'm concerned about error stacking between blending the different temperature cases and the climate zones. You should ensure that the final error bound is still within 10%.

Christopher Rogers—Baseline matters here, because there has been a lot of change in this market in the last 5 years.

Spencer Lipp—ECMs have been a measure in the portfolios for a while now. Program data may help you refine your estimate for ECM and shaded pole distribution.

Linda Wan—Isn't there a Title 20 requirement for smaller motors?

Gary Fernstrom—I'm not aware of any appliance standards, but there are refrigeration requirements for buildings in Title 24.

- ACT: Consider possible rebound effect on compressor use.
 - Measure or model power draw at compressor. Strong preference for empirical measurement, even if very small sample ($n=2$).
 - Possibility to use Edison or Davis lab.
 - Consider leveraging on Oak Ridge study or other early installations, or working with AMCA.
- ACT: Factor in improved power factor.
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VII. Approach to Determining Correct Number of Measures for eTRM

Tim Melloch, Cal TF Staff—

PowerPoint Presentation and Memo



Alina Zohrabian—I think it's important to understand your definition of a measure. Would different wattages of A lamps be considered one or several measures?

Annette Beitel—That would be one measure.

Bing Tso—Do you have any idea of the key reasons behind the different numbers of measures?

Annette Beitel—One big reason are the much stronger cost effectiveness mandates for individual measures in the Midwest.

Spencer Lipp—Is this at all related to the question of measure permutations?

Annette Beitel—Not really. That is a related but separate question.

Pete Ford—So what exactly is being proposed, defining a measure by the calculation methodology?

Annette Beitel—In general that would be the preferred approach. That way we could leverage drop down tables as much as possible.

Spencer Lipp—Along with that, we need to consider uncertainties as we go through the process of consolidating measure permutations as well.

Alina Zohrabian—Currently, interactive effects and coincident demand factors vary across utilities even within the same climate zone. That's a big reason why we don't benefit from statewide consolidation today. Consolidating those different values would be really helpful.

VIII. Measure Consolidation Update

Tim Melloch, Cal TF Staff—

Updated Checklist and Measure Comparison Documents

Steven Long—For Step 1, I would also ask if there are any planned updates.

Spencer Lipp—You would also want to flag any imminent sunsets, say within six months.

Steven Long—We may also need a few crosscutting subcommittees to address overarching issues.



Steven Long—I would emphasize the importance of delivery method and sub measures.

Armen Saiyan—I don't think those differences should be consolidation deal breakers.

Pete Ford—But you will definitely have to be aware of the implications associated with delivery type.

Steven Long—One option on timing is to coordinate the consolidation process with the yearly workpaper updates. The one challenge with doing that is that the different organizations have competing priorities that don't always match up.

Annette Beitel—Another option is to keep the usual workpaper updating to a minimal so we can focus our resources on the consolidation work.

Steven Long—That, in turn would reduce the amount of resources necessary for future updates. However, I would still expect that some measures wouldn't be good candidates for statewide programs.

Katie Wu—What are some of the reasons that those measures wouldn't work statewide?

Steven Long—A lot of them are more along the lines of reporting questions, which we can address. But the differences in building stocks and other structural specifications, like the desire for heat pumps, can affect what measures are viable in different regions.

Tim Melloch—There is an important difference between offering statewide programs and having statewide measures available in a single TRM.

Spencer Lipp—For instance, TVA covers 9 states. All measures in that TRM are available to be offered across the entire TVA territory. They don't have to be offered by all utilities, but if they are, then they have standard values available in the TRM.

Bing Tso—The Pacific Northwest is also an example of the variability California is concerned about. The RTF has managed to create a single set of measures that cover the entire state. There are some measures, like particular agricultural products, with very limited reach. But the region has realized those measures, though small savers, are important for a particular segment. Maybe we spend



fewer resources on them, but we do address them in a way that they can be offered by any Northwest utility that chooses to.

Tim Melloch—This would shift the genesis of measures from individual program managers to a statewide TRM-creation group around which more consistent program could be designed.

Steven Long—In that case, there are cost questions that will need to be answered. For instance, what happens in the case that a utility wants to add on to a measure initially created by another entity.

Pierre Landry—We may need two “Step 10”s, a draft and a final version.

Steven Long—Sometimes I’ve found that even when the approach is the same, the final numbers differ. It may be helpful to have some test results so we can see how the differences translate into savings and costs, etc.

Martin Vu—How do you address different delivery channels for one measure?

Tim Melloch—You would use drop down tables to capture the savings from each possible delivery channel.

Steven Long—There are crosscutting issues, like we just saw with LEDs, so you will have to be thoughtful about sequencing and batching.

Martin Vu—We also need to be mindful of the timing with other things that are going on, such as DEER updates, new codes, and the requisite workpaper updates.

Katie Wu—That is certainly a question we all need to be very mindful of sooner rather than later.

Pierre Landry—The draft tools and getting us started will be very helpful. I would encourage us to get started and avoid over engineering the implementation plan. “Not letting the perfect be the enemy of the good” applies to the process as well as the final values.

- ACT: Cal TF staff to incorporate TF edits into measure consolidation checklist.