California Technical Forum (Cal TF)
Technical Forum (TF) Meeting #16
January 28th, 2016
Pacific Energy Center
San Francisco, CA

I. Participants

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

Tom Eckhart, TF Members
Ed Reynoso, TF Members
Pierre Landry, TF Members
Mary Matteson Bryan, TF Members
Spencer Lipp, TF Members
Alina Zohrabian, TF Members
John Proctor, TF Members
Gary Fernstrom, TF Members
Mike Casey, TF Members
George Beeler, TF Members
Armen Saiyan, TF Members
Ryan Hoest, TF Members
Grant Brohard, TF Members
Martin Vu, TF Members
Steven Long, TF Members
Owen Howlett, TF Members
David Springer, TF Members
Mark Modera, TF Members
Brian Warren, TF Members
Bing Tso, TF Members
Ahmad Ganji, TF Members
Bryan Warren, TF Members

Michael Klopfer, CalPLUG, Presenter
Stephen Putnam, Grundfos, Presenter
Jessica Morrison, Grundfos, Presenter
Larry Brackney, National Renewable Energy Laboratory, Presenter

David Gamson, Office of CPUC Commissioner Carla Peterman

Katie Wu, CPUC Energy Division
Oriana Tiell, Pacific Gas & Electric, PG&E
Chan Paek, Southern California Gas, SCG
Christine Hanhart, UCONS
Pete Ford, San Diego Gas & Electric, SDG&E
M M Valmiki, AESC
Bernard Emby, TrickleStar
Jon Lanning, TrickleStar
Thad Carlson, TrickleStar
Mark Hardwick, TrickleStar
Scott Wilson, Bits, Ltd.
Eric Kramer, Bits, Ltd.
Kurt Markshausen, Bits, Ltd.
Domenico Gelonese, Embertec
Damien Broadbent, Embertec
Rod Williams, Embertec
Kelly Knutsen, 38 North Solutions
Bob Rispoli, Advanced Energy Products
Tianzhen Hong, Lawrence Berkeley National Laboratory

On the Phone
Bruce Harley, TF Member
Sherry Hu, TF Member
Larry Kotewa, TF Member
Andy Brooks, TF Member
Christopher Rogers, TF Member
Jon McHugh, TF Member

Jeff Hirsch, JJ Hirsch & Associates
Andrew Parker, National Renewable Energy Laboratory
Kevin Madison, JJ Hirsch & Associates
Pete Jacobs, CPUC Consultant
Steve Kromer
Amir Roth, Department of Energy
Dale Drury, Grundfos
Janice Martinez, SDG&E
Mike Myser, Energy Platforms
Joe Prijyanonda, Applied Energy Group
David Shallenberger, Synergy Companies
Sam Dent, VEIC
Jordana Camarata, First Fuel
Roger Baker, ComEd

Mohit Singh-Chhabra, Northwest RTF
Ben Lipscomb

II. Key Decisions and Action Items

Advance Power Strips

- ACT: APS team to present standard error in the mean for both samples in February.
- ACT: Longer field monitoring needed to support updates to persistence estimate.
- ACT: APS team to present side-by-side comparison of key parameters for two possible options (one estimate vs. two).

Efficient Pumps

- ACT: **Abstract approved for full workpaper development.** Workpaper to incorporate the following suggestions:
    - Workpaper to consider full system impacts.
    - Consider possible variations in gas savings across different pumps uses.
    - Workpaper to remain manufacturer neutral, but development team to present range of savings, costs, and other key parameters across different manufacturer pumps.
    - Workpaper to assume like-for-like replacements.
    - Development team to present two TRC calculations: One based on best available data from other jurisdictions and one that incorporates California-specific restrictions and DEER values.

Technical Position Paper #4 – Best Available Data

- ACT: Cal TF staff to produce the necessary checklists and other tools to make TPP 3 usable for all workpapers.

Technical Position Paper #3 – EnergyPlus vs. DOE2.2

- ACT: EnergyPlus to be default modeling engine for the Electronic TRM as proposed in Technical Position Paper 2.

III. Advanced Power Strips

Annette Beitel—We will not be asking the group to render a final decision on this matter, since we have received so much new information in the last few days. For now we will just be asking for your input on how to incorporate the new data into the workpaper we already approved last year. We will be asking for final decisions on those items during the February meeting.

Martin Vu, RMS Energy Consulting; Michael Klopfer, CalPLUG—

PowerPoint Presentation

Martin Vu—So, to begin with, how would the group like us to deal with the savings estimates?

Jon McHugh—One of the issues I've heard about with home AV control equipment is that it may create some issues for people that use their TVs to stream music. Do either of the products have way of preventing unintended shut offs in those cases?

M M Valmiki—Both models have a music mode, which lasts for eight hours and should address that scenario.

Oriana Tiell—The qualitative survey didn't reveal any significant issues with that capability.

Jon McHugh—Were any outliers excluded based on usage changes?

M M Valmiki—No sites were excluded based on usage. The only exclusions were for data quality issues.

Steven Long—Was there any analysis done to account for test periods that included holidays?

M M Valmiki—We were unable to control for that.

John Proctor—It looks to me like we have two significantly different products. You'd be creating significant cost effectiveness risk if you were to use a single variable for both. If the one that saves less gets installed more, the cost effectiveness and the general accuracy of the program estimate is going to go sideways very quickly.

Spencer Lipp—I agree with John that it looks like you have two different products with different savings. However, what we really need to be looking at is the coefficient of variation. I think that would tell us if there is any significant overlap in the savings from the two products. It seems like you have enough data from Phase Two to do those calculations.

M M Valmiki—The 90% confidence intervals are included in the ET report.

Armen Saiyan—On first glance, I too agree with John about the need for two separate savings estimates. What is your most educated guess about the reason behind the savings discrepancies?

Martin Vu—The differences in savings may be related to the specific timing allowed by each product before shut off. A shorter, more aggressive time clock may reap more savings, but it may also lead to reduced user satisfaction and possibly affect persistence.

Mark Modera—Moving forward, I think it would be much better for you to present the standard error in the mean. That's a much more helpful statistic for our current purposes.

- ACT: APS team to present standard error in the mean for both samples in February.

Owen Howlett—The slides on persistence show that more than half of rip-outs happened within the first month. That tells me that you need to monitor the devices in the field for longer time periods to get an accurate read on persistence.

Annette Beitel—That top-heavy rip-out rate is actually consistent with the Australian study, which found that the vast majority of device unplugging occurred within the first three months. However, the current six week monitoring period does fall short of that.

Steven Long—And it also seems like the monitoring periods are different.

Annette Beitel—I'm hearing that the TF does not think we have enough data to update persistence.

- ACT: Longer field monitoring needed to support updates to persistence estimate.

Owen Howlett—It seems like the CalPLUG SVS methodology would overestimate savings. Do you have any estimates about how much that overestimation is?

Michael Klopfer—Yes, we are aware that there is some amount of that, but the magnitude depends a lot on the field trial designs—for instance, if the alert is an LED light or a bell.

M M Valmiki—In the trial, both products use a flashing LED light.

Mike Casey—Not to further complicate the matter, but if we do approve two different estimates, one for each of the products, what happens when we have to add the third or fourth manufacturer?

Annette Beitel—That gets to one of the key asks that we will have to answer in February: How to update the product eligibility requirements in the existing workpaper.

John Proctor—The savings table on slide 18 seems to indicate that the SVS methodology does not over-predict.

Armen Saiyan—It's too bad the IR study was not completed.

Pierre Landry—Is there any follow-up being done in the Australia sample?

Domenico Gelonese—No, that study has been completed.

Pierre Landry—The qualitative behavioral survey left me wanting for more analysis of what was actually happening in the test sites. For instance, what happened in the cases were there was an undesired shut-off but the equipment wasn't turned back on.

Grant Brohard—It would be really helpful if you could present us in February with cover slides that show us what the different estimate options (one versus two) are, so we know what the choices we're making will actually look like in practice.

- ACT: APS team to present side-by-side comparison of key parameters for two possible options (one estimate vs. two).

IV. Efficient Pumps

Stephen Putnam and Jessica Morrison, Grundfos—

PowerPoint Presentation

Mark Modera—When you're analyzing the system for your optimization, do you look at the thermal implications?

Stephen Putnam—Our analysis looks at the system flange to flange, which would include the pipes between the two pumps.

Jessica Morrison—We are looking at developing gas savings estimates, but the measure as proposed right now only counts electric savings.

David Springer—My guess is that those would depend really heavily on the pump uses.

Jessica Morrison—The market segmentation estimates ("dumb" vs. efficient pumps) are based off of our own sales data. Grundfos sells both products.

John Proctor—So, if both products are available, why aren't the efficient pumps installed more?

Jessica Morrison—It is a question of contractor awareness, which is exactly what the midstream program would address.

Spencer Lipp—Sounds like you're not including installation costs to the contractor. Is there any additional installation costs for the measure case?

Stephen Putnam—There is virtually no difference between installing the base and measure cases, so no need to factor in labor costs.

Mike Casey—Does the EPRI study differentiate the size of pumps?

Stephen Putnam—I believe EPRI tested a set of pumps that ranged between 8 and 15 horsepower.

Mike Casey—To what do you attribute the high savings in your test site?

Stephen Putnam—The replaced pump was clearly severely oversized, which is what happens after decades of repeated incremental over-sizing, replacement after replacement. This would be immediately corrected with the self-sizing technology.

Dough Mahone—How much of the efficiency in the measure case is directly related to the actual pump?

Stephen Putnam—The vast majority of savings come from the controlling logic. As was correctly pointed out earlier, incremental improvements in hydraulic efficiency have been diminishing significantly for several years now.

Gary Fernstrom—The question we don't currently have the answer to is what the size of the California market is.

Stephen Putnam—We knew this question was going to come up and are actually in the process of answering it. We will have more details when we come back with a full workpaper.

Annette Beitel—So, does the group support moving forward with full workpaper development for this measure, as long as the team considers the system impacts, the application use types and savings variations across the different applications, ensures the measure is manufacturer neutral, and gets a better handle on the size of the California market?

Martin Vu—I see you used the .95 NTG from other jurisdictions. If there is no related NTG in DEER, the default number is currently .6.

John Proctor—That is a ridiculously low number.

Annette Beitel—I'd remind the group that one of the Technical Forum's goals is to decide on the most technically rigorous estimates. This is likely to mean not using DEER values when we can't find a reasonable, data-based explanation for them.

Steven Long—It would also be helpful to see the range of possible values across manufacturers for other parameters like costs.

Doug Mahone—Given that most of the savings come from the controlling algorithm, we are also going to need more details on the variability of savings across manufacturers.

Stephen Putnam—Howard, do you have any insights on what that variability is in the existing Vermont program?

From the phone—I'm not a technical expert, so I'm really not the best person to ask about this type of detail. However, I do know that the variability in savings

across manufacturers is small enough to keep our regulators comfortable with using a single estimate.

Steven Long—The problem with using ranges is that Energy Division direction then mandates that we use the lowest value in any given range.

Annette Beitel—I think that is a perfect example of where we need to follow actual Commission policy. Commission language is very clear in that ex ante estimates should be neither too optimistic nor too conservative, they must be as unbiased in any direction as possible.

Steven Long—Currently you can use the median value in a range only as long as there is sales data to create a sales-weighted average.

Bryan Warren—I think you're going to have a very difficult time justifying the oversize claim in a deemed workpaper.

Armen Saiyan—Yes, you're going to have to assume like-for-like replacements.

Alina Zohrabian—I'd suggest that you run two sets of TRC calculations: One according to the extensive research from other states and one that takes into account the constraints dictated in California.

Annette Beitel—Does the group approve the measure for full workpaper development with all of the already listed comments as well as the ones just added?

Group—Yes, no opposition.

- ACT: Abstract approved for full workpaper development. Workpaper to incorporate the following suggestions:
    - Workpaper to consider full system impacts.
    - Consider possible variations in gas savings across different pumps uses.
    - Workpaper to remain manufacturer neutral, but development team to present range of savings, costs, and other key parameters across different manufacturer pumps.
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V. Technical Position Paper #4 – Best Available Data

Tim Melloch, Cal TF Staff—

PowerPoint Presentation

Doug Mahone—I think a key aspect here is the "available" part of "best available data."

Pierre Landry—Personally I think that the key concept for success here is "collaborative." We really won't be able to draw fine lines for every case. Sometimes the available data could be one really good expert. However, these decisions need to be made as part of a collective process that leads to balanced decisions.

Tom Eckhart—As an outsider looking in, I'm somewhat confused. Doesn't California already have guidelines written down that we can use?

Annette Beitel—No really; at least not in a consolidated, comprehensive, and easily available fashion.

Bing Tso—I'm wondering if we necessarily must start from scratch. Aren't there already collaborative processes elsewhere that we can borrow from?

Tim Melloch—I think this is what these recommendations represent, best practices around developing TRMs based on best available data. The next step is to get agreement that all parties will adhere to this process and requirements.

Steven Long—I think the paper needs to be formalized somewhat more, possibly by the creation of a checklist and other tools.

- ACT: Cal TF staff to produce the necessary checklists and other tools to make TPP 3 usable for all workpapers.

VI. CPUC Ex Ante Technical Consultant Feedback on Cal TF-Reviewed Measures

Annette Beitel—Jeff Hirsh is here to continue the presentation he was unable to get through at our meeting in December. Unfortunately he is only on the phone, despite our requests that he return in person. Given the short time we have for this agenda item, I'm going to ask the group to hold your questions to ensure that we can get through all of the material. However, I will note that silence should not

be taken as agreement with or support for any of the positions that will be presented.

Jeff Hirsch, CPUC Ex Ante Technical Consultant—

PowerPoint Presentation

Chan Paek—Jeff, what to you see as the difference between standard practice and free ridership and which should be applied where?

Jeff Hirsh—For standard practice baseline, it is what is already happening today; then you layer the proposed free ridership estimates on as part of the program logic. Some of the pathways in the standard practice program assumption ended up with net savings and others with gross savings. The proposal was to use the default DEER NTG, which we think is too low.

Annette Beitel—Thank you for the presentation Jeff. There still seems to be some lack of clarity or consensus on several key issues, one of those the question of the interaction between ISP and NTG. We will follow up on those off line, and possibly ask you to return to discuss the ISP/NTG issue in person at the February meeting.

We will also be having a closed-door session for only TF members that morning so we can self-evaluate and decide on the necessary process improvements stemming from the Clothes Washer Recycling workpaper.

VII. Technical Position Paper #3 – EnergyPlus vs. DOE2.2

Larry Brackney, LBNL—

PowerPoint Presentation

Armen Saiyan—The crowd-sourcing idea is great, but what about quality control?

Larry Brackney—Great question. We do differentiate between “crowd sourced” measures and what has been peer-reviewed and formally approved.

Armen Saiyan—Does the Building Components Library accurately describe those measures?

Annette Beitel—No. This is something that the Open Studio team is currently working on.

Larry Brackney—Yes, right now most of the nomenclature is built around the individual authors' search needs.

Steven Long—Can you do automated QA/QC?

Larry Brackney—Certainly. We have scripts that we use to run and double quality check new measures.

Alina Zohrabian—Is there active user protection?

Larry Brackney—Absolutely. There is the ability to have groups in which only the moderator can make final changes.

Bing Tso—How can we translate our current modeling assumptions to the new engine?

Larry Brackney—There was actually a measure written in Canada to take eQuest INPs and input it into EnergyPlus. That being said, DOE2.2 and EnergyPlus do not deal with HVAC in the same way, so there will not be a one-to-one comparison. However, the measure does input all of the geometry and other data inputs.

Annette Beitel—This tool can clearly streamline the types of code and other yearly updates that currently take up thousand of engineering hours in California.

Doug Mahone—Even if we're successful in translating from one engine to another, you're going to have new savings estimates for most programs in the state. That is definitely a process issue that we're going to have to think through.

Larry Brackney—That is a very important point. My suggestion is that we take the first step of getting the DEER building prototypes and input them into the EnergyPlus model so we can start getting an idea of what magnitiudes and types of discrepancies we're dealing with.

Annette Beitel—So, does the group support the recommendation that EnergyPlus be used as the default modeling engine for measures going into the eTRM? Of course, while recognizing that other tools may be more adequate for specific uses.

Group—Approval, no abstentions.

Armen Saiyan—That being said, we need to be cognizant that there is going to be a bunch of work involved in implementing this translation.

Spencer Lipp—I think it would be very interesting to get a similar pitch from the developers of DOE2.2 to come in and give us the analogous analysis.

VIII. Closing

Gary Fernstrom—I just want to say that we have all been working really hard reviewing workpapers and it is very frustrating to have such negative dispositions be the result.

Annette Beitel—Yes, I understand that it must be frustrating. Cal TF staff has been analyzing all of the current dispositions to try and figure out were the biggest misunderstanding have been. We do not think that the majority of the comments we have received from the EAR Technical Consultants involve technical faults in our analysis. The majority of the feedback seems to be about different choices of data. In fact, we think the logical flaw in the Clothes Washer recycling workpaper has been the only indisputable mistake so far. We will be sharing this analysis with the group in February.

David Gamson—I am very happy to have had the opportunity to come here on behalf of Commissioner Peterman. Our office really appreciates the hard work all of you have put into this process. We look forward to seeing your final recommendations in regards to the ex ante process.