California Technical Forum (Cal TF)
Technical Forum (TF) Meeting #21
June 30th, 2016
San Francisco

I. Participants

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

Bryan Warren, TF Member
Lawrence Kotewa, TF Member
Alina Zohrabian, TF Member
Mary Matteson Bryan, TF Member
Doug Mahone, TF Member
Spencer Lipp, TF Member
Ron Ishii, TF Member
Ryan Hoest, TF Member
Mark Modera, TF Member
Tom Eckhart, TF Member
Steven Long, TF Member
Martin Vu, TF Member
Pierre Landry, TF Member
Ed Reynoso, TF Member

Paula Gruendling, CPUC Staff

Travis Richards, RMS Energy Consulting, Presenter

On the Phone
Grant Brohard, TF Member
Christopher Rogers, TF Member
Dave Pruitt, TF Member
Mike Casey, TF Member

James Benya, Benya Burnett Consultancy
Wade Smith, Air Movement and Control Association (AMCA)
Geoff Sheard, AMCA
Joe Prijyanonda, Applied Analytics

II. Key Decisions and Action Items

LED Billboard Abstract

- ACT: Follow up with Edison custom project records regarding hours of operations for billboards that are metered separately.
- ACT: Define measure by fixture and wattage, not by use case (poster and bulletin boards).
    - Include both lamp and fixture replacement options and allow customer to make optimal choice.
- ACT: Ensure full consideration is give to Titles 20 and 24 and Federal codes.
- ACT: This should be treated as a “Repair Indefinitely” (or “Repair Eligible”) measure.
    - In absence of program, metal halide bulbs would be replaced by other metal halide bulbs from O&M contractor warehouse.
- ACT: Adjust measure and base case costs as follows:
    - Base case cost should be the lamp cost, not the fixture cost.
    - Cost calculations should also consider avoided operations and maintenance resulting from increased LED lives.
- ACT: Early Replacement is the most likely application type. Consider how to make this showing.
- ACT: Provide more complete logic and explanation for how program will trigger changes in behavior:
    - Use of LEDs instead of metal halides.
    - Replacement of all luminaires at once instead of individual ones as they burn out.
- ACT: Calculate simple customer payback period for base and measure cases.

Update on Interior Garage Luminaire Workpaper

- ACT: Remove luminary replacement option.
- ACT: Limit measure to two retrofit permutations: 10% of space as day lit and 90% as interior.
    - Use custom projects and other small sample survey data, as available, to support assumption that there is no need for further indoor use case permutations.

Update on PSMS Workpaper

- ACT: Support use of Emerging Technology parameters:

    - How many QSync products have been sold in California?
- ACT: Perform bin analysis to asses savings differences across climate zones.
    - If variance is less than 10%, limit to a single measure that combines temperature and measure mix.
- ACT: Fully describe rationale for creating an ROB measure with an IMC of zero.
- ACT: Explain plan for justifying an Early Retirement application type:
    - Prove customer would not make change absent program.
    - Leverage simple survey with energy efficiency and survey experience.
    - Discuss survey instrument and contractor with CPUC Staff before launching survey.
- ACT: Estimate savings using comparison point of lab and field tests.

Appliance Recycling Analysis for POUs

- ACT: Cal TF staff to manage short-term subcommittee to finalize recommendations on ARP for POUs.

VFD Measure Proposal

- ACT: Measure not approved for workpaper development.

III. LED Billboard Abstract

Martin Vu and Travis Richards, RMS Energy Consulting—

PowerPoint Presentation

Mark Modera—Have you done acceptance testing to make sure the end user will be satisfied with the product?

Martin Vu—This measure came out of the custom program, so we know that customers are interested in the technology.

Alina Zohrabian—Is this going to be a replace on burnout or early retirement measure?

Martin Vu—We are currently preparing it as a replace on burnout measure, but we think the reality is that it is an early retirement opportunity. Replacing these

lamps most likely involves touching wires and therefore triggering code, which makes it harder for the customers to pursue in absence of the incentive.

Tom Eckhart—What is your assumption for the burn out rate?

Martin Vu—I believe metal halide bulbs are rated for 20,000 hours.

Steven Long—Are there any other use cases for these lamps?

Doug Mahone—So, wouldn't it make sense to make this measure for outdoor advertising and then just calculate the savings based on the wattage of the fixture being replace?

Martin Vu—That would present an issue given the wide range of incremental costs for the various use cases.

Tom Eckhart—I certainly understand the use of sensors for these billboards, but I have seen many of these billboards that are lit during the day.

Travis Richards—I think there are definitely some billboards that are lit during the daytime. However, given that there is also some variability in the nighttime hours, we are making the conservative assumption that limits use to nighttime.

Tom Eckhart—I understand you're being conservative, but there may be demand savings here that you are not capturing by sticking with the conservative nighttime-only assumption.

Martin Vu—Furthermore, absent empirical data to support a demand claim, we cannot claim operation during the daytime.

Doug Mahone—I think there is an industry practice question here. Do people that put in halide lamps five years ago really want to come back and replace them, or do they behave like the street lighting market?

Martin Vu—I think the primary concern here is product visibility, not efficiency, which means they will go with the cheapest, most easily available technology.

Mary Matteson Bryan—I think your base cost calculation is wrong. It should include the cost of the fixture.

Travis Richards—Are you saying this because the retrofit would include a ballast bypass?

Spencer Lipp—So, if I'm in the billboard business and I'm going out to change one of these lamps, you better believe I'm changing all of them while I'm up there.

Ed Reynoso—And the cost of bucket truck to change the halides every five years because maintenance becomes less frequent.

Spencer Lipp—Exactly.

Pierre Landry—Only replacing one bulb would also affect the color rendering on the entire billboard.

Annette Beitel—So it seems like the group consensus is that this is clearly an early replacement measure.

Group—Agreement.

Martin Vu—So, that gives us clarity on measure application type. In terms of number of measures, is the group direction to lump both uses together?

Annette Beitel—No. I believe Doug's suggestion was to differentiate but not by use type, by bulb wattage.

Doug Mahone—Yes, separate by wattage.

Martin Vu and Steven Long—There is a timing concern here, and traditionally it is very difficult to get an ER application accepted.

Annette Beitel—While that may be true, we recently received some encouraging guidance from the ex ante team about exactly they are looking for to support ER applications. They wish to see survey data, collected by a reputable survey firm with energy efficiency experience, that shows that the customer absolutely would not have pursued the retrofit absent the utility incentive.

Alina Zohrabian—Traditionally the preponderance of evidence standards have been very location-specific. So, unless they switch their delivery channel to direct install, they won't be able to get the information that is currently required.

Annette Beitel—One possibility for implementing the survey they are requesting is by contacting the customer after they have applied for the rebate but before

they receive the equipment. That way we can be assured that they will participate in the survey without biasing their survey responses or program participation.

Steven Long—One good thing about this case is that there is a limited number of participants in this market, so it would be feasible to gather some data on ISP. However, we do have some ER conversations with the EAR team that have been outstanding for years.

Paula Gruendling—Well, those outstanding conversations are still unsettled because the survey instrument was not agreed tupon beforehand. I've spoken with the team, and, yes, settling the firm and instrument is hard. However, I think we can crack the nut on this one. If so, maybe that can even help us resolve those other outstanding discussions.

Mark Modera—Has anyone done the calculation for a customer's payback period for this measure? That would tell us a lot about what the customer is likely to do in the absence of the incentive.

For that analysis, the labor for the ballast bypass measure should not be a wash when compared to the simple bulb replacement base case.

Ed Reynoso—I was just on the phone with a former contact of mine who works in this type of industry. He told me that billboard owners usually enter into O&M contracts that replace only the bulbs when necessary.

Doug Mahone—I think this particular case has such a limited set of actors, this issue can be settled with a fairly inexpensive standard practice survey of the three or so major players.

Paula Gruendling—I find it interesting that you're developing a measure with a very limited understanding of what the industry currently does.

Pierre Landry—I think we know some of what the industry does, but it would make sense to find out more.

Alina Zohrabian—You may want to double check that Title 20 doesn't limit the meatal halide in the outdoor use.

Doug Mahone—If what Ed was saying about individual lamps being replaced is true, then that takes us back to the concept of Repair Indefinitely. These are systems that are being maintained at the minimum efficiency endlessly.

Paula Gruendling—So you are saying that the Repair Indefinitely treatment would be for the whole fixture?

Doug Mahone—Exactly.

Mary Matteson Bryan—But the current measure is only for lamp replacement. A full fixture replacement is the more robust solution. However, since the savings are the same, only the costs and timeline vary, the measure should make all offerings available and allow the customer to make their choices.

Pierre Landry—I think we have to go with what Paula was saying. We need to understand more about the industry, what they are currently doing, and what they would be willing to change.

Mark Modera—Can you meet the code requirements with anything but LEDs?

Travis Richards—You cannot. However, code is only triggered if a permit is pulled.

Spencer Lipp—There is also a B Path that doesn't push to LEDs.

- ACT: Follow up with Edison custom project records regarding hours of operations for billboards that are metered separately.
- ACT: Define measure by fixture and wattage, not by use case (poster and bulletin boards).
    - Include both lamp and fixture replacement options and allow customer to make optimal choice.
- ACT: Ensure full consideration is give to Titles 20 and 24 and Federal codes.
- ACT: This should be treated as a "Repair Indefinitely" (or "Repair Eligible") measure.
    - In absence of program, metal halide bulbs would be replaced by other metal halide bulbs from O&M contractor warehouse.
- ACT: Adjust measure and base case costs as follows:
    - Base case cost should be the lamp cost, not the fixture cost.
    - Cost calculations should also consider avoided operations and maintenance resulting from increased LED lives.
- ACT: Early Replacement is the most likely application type. Consider how to make this showing.
- ACT: Provide more complete logic and explanation for how program will trigger changes in behavior:
    - Use of LEDs instead of metal halides.

- Replacement of all luminaires at once instead of individual ones as they burn out.
- ACT: Calculate simple customer payback period for base and measure cases.

IV. Update on Interior Garage Luminaire Workpaper

Tim Melloch, Cal TF Staff; Martin Vu, RMS Energy Consulting; Jim Benya, Benya Burnett Consultancy—

PowerPoint Presentation

Steven Long—So, in light of their recommendation to use the .7 NTG for this measure, should that also be the value used for the billboard measure?

Martin Vu—I believe so, but we can certainly double check when we talk with them about this measure.

Tim Melloch—To the extent that you have and will continue to find more HIDs and metal halide use cases, that would show that this is an even more conservative savings estimate.

Paula Gruendling—I would also recommend that you address not just the data you are providing, but also the rationale behind why that data was requested. That would strengthen your argument.

Alejandra Mejia—To be clear, this is not a counter proposal to a recommendation from the EAR team. What Martin is presenting are his findings in response to the EAR team's request for data on the likelihood of having a third, high use interior use case.

Steven Long—Is it the lighting levels in the tube or the luminance level in the space?

Jim Benya—My survey found reduced luminance by about 20%.

Steven Long—Our work with LED tubes saw that luminance was either maintained or improved.

Jim Benya—That's a really good point. A troffer lamp tends to actually improve the luminance, but the garage fixtures have a different effect.

Spencer Lipp—So, are you really proposing 4 measures. Can't we just use a weighted average and have a single measure?

Doug Mahone—I think these uses are too site specific to have a single measure.

Annette—So, what I am hearing from the group is that the premium, non-cost effective full retrofit measure should be removed *and* that there is not enough "premium" indoor use case to justify a third, non-day lit measure.

Group—Agreement.

- ACT: Remove luminary replacement option.
- ACT: Limit measure to two retrofit permutations: 10% of space as day lit and 90% as interior.
    - Use custom projects and other small sample survey data, as available, to support assumption that there is no need for further indoor use case permutations.

V. Update on PSMS Workpaper

M. M. Valnicki, AESC—

PowerPoint Presentation

Mark Modera—What the chart on slide four shows is that the technology *could* deliver savings. However, it doesn't prove that the savings in the field weren't caused by the decreased airflow. What you need to ensure is that power doesn't increase.

Geoff Sheard—There is a complementary CFM per watt chart that shows that more airflow could create more savings, but that the savings are not contingent on CFM.

Mark Modera—I understand. You have essentially shown that the flow test in the field must have been incorrect, and therefore that the power measurements in the field must be the correct basis for the savings estimates.

Geoff Sheard—Exactly.

Mark Modera—Just to be clear, was the power kept constant across all fans?

Geof Sheard—The power supply was kept constant, but the QM fan drew considerably less watts at all points.

Wade Smith—In fact, the fact that the QM fan drew less power while consistently delivering more flow shows that the current savings estimate is fairly conservative.

Steven Long—What is the measure application type?

M. M. Valnicki—I think we'd like to do early retirement for direct install and early retirement/replace on burnout for downstream.

Steven Long—The methodology for this workpaper should stand alone regardless of what other workpapers use. That way if the other workpaper retires, this one will still be based on sound methodology.

Steven Long—Do you know what time of year these measures were taken? I'm wondering if there might have been some seasonal effects captured.

M. M. Valnicki—September through some of November. Roughly a shoulder season.

Mark Modera—My final recommendation for the savings calculation is to base it on the field comparison units as measured in the lab, with the air flow curves, and CFM/watt.

- ACT: Support use of Emerging Technology parameters:
    - How many QSync products have been sold in California?
- ACT: Perform bin analysis to asses savings differences across climate zones.
    - If variance is less than 10%, limit to a single measure that combines temperature and measure mix.
- ACT: Fully describe rationale for creating an ROB measure with an IMC of zero.
- ACT: Explain plan for justifying an Early Retirement application type:
    - Prove customer would not make change absent program.
    - Leverage simple survey with energy efficiency and survey experience.
    - Discuss survey instrument and contractor with CPUC Staff before launching survey.
- ACT: Estimate savings using comparison point of lab and field tests.

VI. Appliance Recycling Analysis for POUs

Alejandra Mejia, Cal TF Staff—

Subcommittee Summary and Preliminary Comparison

- ACT: Cal TF staff to manage short-term subcommittee to finalize recommendations on ARP for POUs.

VII. VFD Measure Proposal

Martin Vu, RMS Energy Consulting—

PowerPoint Presentation

Spencer Lipp—This target market is so hard to serve. Even marketing to them is a huge challenge.

Doug Mahone—Wouldn't you need some kind of assurance that the measure equipment is actually serving a variable load?

Mary Matteson Bryan—Implementation wise, does simply creating a deemed measure really guarantee that the small customers will even access it?

Martin Vu—The Edison program staff are hoping it will.

Steven Long—Would there be third parties interested in taking up the deemed measure and selling it?

Spencer Lipp—It's hard because implementers have no real skin in the game. You still need to provide the same assurances for significantly reduced savings. The customer will need the same support but for much smaller savings.

Doug Mahone—Will anyone even go out and market this?

Pierre Landry—Furthermore, there seems to be really wide variation in savings across the use cases. Any average would have significant error margins. It would be basically meaningless.

Steven Long—We could be very conservative.

Pierre Landry—Which would make it even less likely that implementers will provide the necessary technical assistance to the customers.

Mary Matteson Bryan—I don't think this helps the industry.

Annette Beitel—So, it seems like the group is not comfortable with a deemed measure that would cover all the use cases that Edison is interested in.

Group—Agreement.

- ACT: Measure not approved for workpaper development.

VIII. Closing