California Technical Forum (Cal TF)
Technical Forum (TF) Teleconference Meeting
Follow-up on LED Panels Abstract
Tuesday, October 28th, 2014
3 pm – 4 pm PDT

I. Participants

TF Members:
Sherry Hu
Ron Ishii
Srinivas Katapamula
Larry Kotewa
Steven Long
Mary Matteson Bryan
Jon McHugh
David Pruitt
George Roemer
David Springer
Martin Vu
Armen Saiyan

Non-Members:
Jenny Roecks, Cal TF Staff
Alina Zohrabian, PG&E
Greg Barker, Energy Solutions
Yun Han, SCE

II. Key Decisions

LED Recessed or Surface Panels Abstract

Decision: TF approves abstract for workpaper development by PG&E contingent on the following:

1. Revisit the assumption for maintained lumens, comparing maintained lumens over the 12 year expected life of the LED luminaire. LED lumen depreciation would be calculated over the life of the LED luminaire, and fluorescent depreciation would be calculated over the life the fluorescent lamp, accounting for at least one replacement of lamps over the fluorescent luminaire life. Resource suggestions include the LED lighting facts website, and a lighting calculator to which Mary Matteson Bryan can direct the workpaper developer. Mary can be contacted directly for assistance with these resources.
2. Consider modifying program restrictions to ensure the appropriate use of depreciation factors and CRI.

III. Discussion on Proposed Baseline for LED Panels Abstract

Greg Barker—

PowerPoint Presentation

Discussion during presentation:

Jon McHugh—My recollection is the cut sheets usually have the Coefficient of Utilization (CU), or it is easily calculated from the Illuminating Engineering Society (IES) file.

Greg Barker—We use the CU as basis of comparison. Modeling the fixture using lighting simulation software would be a big hurdle for a customer in an application.

Jon McHugh—For the first line in the table (availability for baseline products), you are developing deemed defaults for generic types. You are not expecting the customer/applicant to actually dig up the CU or other metrics, are you?

Greg Barker—No, we are not expecting the customer to do that. The issue relates to the availability of LED products. LED fixtures come in such a range of outputs, it is not clear how you would actually choose a baseline fluorescent fixture that would match the full range of LEDs. The fundamental metric we are targeting is the quantity of light input, such as fixture efficacy. By contrast, the CU targets the light on a horizontal plane. The LEDs available that we're interested in creating an incentive for vary across ranges. We prefer to have an adjustable range, with some sort of baseline that can be adjusted to the actual light output of the products being purchased.

Steven Long—Is an adjustable baseline difficult for implementation?

Greg Barker—We outlined an adjustable baseline in the Excel spreadsheet that was distributed with the meeting materials. We welcome suggestions or other input.

Jon McHugh—I looked up a cutsheet online and was able to find the CU listed. I am not attached to this methodology. If the DesignLights Consortium (DLC) gives this information, it makes it simpler and is close to the concept of CU but not exactly. Are you proposing that incentivized products be on the DLC list?

Greg Barker—This is PG&E's approach for these products. My understanding is that their desire is to not be their own independent fixture review organization.

Alina Zohrabian—This is true. For deemed applications, we try to use the DLC or ENERGY STAR lists. We are not doing any fixture reviews.

Greg Barker—There are just so many fixtures (hundreds).

Jon McHugh—Does ENERGY STAR provide listings?

Greg Barker—It's mostly an integral lamp list.

Alina Zohrabian—It has some residential fixtures, not as much commercial.

Mary Matteson Bryan—There is no overlap between the DLC and ENERGY STAR lists in this product category. Only the DLC lists commercial fixtures.

Greg Barker—Since this is a nonresidential program, we are only looking at DLC.

Jon McHugh—Did you calculate a luminaire efficiency?

Greg Barker—Yes, on the next slide. The actual luminaire IES file was not provided. By looking at similar fixtures, we determined the luminaire efficiency.

Jon McHugh—Is the task lighting allowance included in the CASE study?

Greg Barker—The CASE study excluded task lighting in the base model but included task lighting in the task ambient model.

Jon McHugh—Thank you.

Excel Spreadsheet: Baseline Calculation

Jon McHugh—For an apples to apples comparison, you need to use maintained lumens. Do you actually use a 70% depreciation factor for LEDs? It is probably around 90% depreciation for fluorescents, which is a pretty significant difference.

Greg Barker—Initial light loss factors considered in the CASE report were almost 10%. One of the limitations is what is presented on the DLC list.

Jon McHugh—How many hours do you assume per year?

Greg Barker—It depends on the market segment. For offices it's more like 2,800 – 3,800 hours. There isn't a good number to use necessarily given what is provided by the DLC. We would like input on how to regress information on rated lifetime.

Mary Matteson Bryan—I know a source that provides lumen maintenance at a particular number of hours. Go to the LED Lighting Facts website. You won't get to 70% depreciation until well after the lifetime has expired. You should use the measure life.

Steven Long—Which measure life? DEER is substantially less than 50,000 hours.

Greg Barker—Should we use DEER measure life or claim something more?

Steven Long—Do you have data to substantiate something longer? We would need recent data.

Jon McHugh—What does DEER use?

Steven Long—I believe 20,000 hours for a lamp, and for a luminaire it's capped at 12 years.

Jon McHugh—It should be somewhere around 40,000 hours.

Alina Zohrabian—I believe the DEER analysis used by DEER for the code baseline also used initial lumens.

Martin Vu—I think you're right.

Greg Barker—DEER had standardized to assume every ballast was Normal ballast factor 0.85 – 0.95. We chose to use a real example consistent with code.

Jon McHugh—As long as you are using comparable lumen efficacy, the ballast factor doesn't really matter. You're trying to match efficacy and expectations for maintained luminaire efficacy. Is there a need for training so that people do not apply LEDs using the full 70% depreciation? What is common practice for LED application? Mary, do you know?

Mary Matteson Bryan—People I've worked with do not make that mistake – whether that is true in general contractor world, I don't know.

Greg Barker—The price point of LEDs prevents people from putting them in without too much consideration for their use. Manufacturer representatives trusted to doing lighting layouts are a good backstop against that.

Jon McHugh—Is there something in the program model such as an education component to prevent this?

Greg Barker—That is a good idea, the only place I can think to introduce that into the stream of delivery for this rebate is the catalog.

Jon McHugh—Mary, what does Lighting Facts do exactly?

Mary Matteson Bryan—The manufacturer can list at a particular point in time what the depreciation is. DLC just says the fixture meets some minimum threshold. This is an interesting question in terms of program design.

Jenny Roecks—So does the TF approve this abstract for workpaper development, considering an alternate depreciation factor and possible modifications to program restrictions as appropriate? Is another recommendation to look for more recent data on lamp life?

Mary Matteson Bryan—The recommendation is to revisit the maintained lumens and make sure we're doing that correctly for fluorescent and LEDS. Sources include the LED Lighting Facts website and a lighting calculator I can refer you to.

Steven Long—My comment on alternate data on lamp life was just to see if anybody knew of any other data. We may need to use DEER.

Mary Matteson Bryan—Do we have other data? A life of 12 years is reasonable instead of trying to find other data that supports a different life.

Steven Long—In the abstract there were two savings approaches, and one was a modeling approach. The other was to revise the Title 24 baseline. Is your proposed approach to revise the Title 24 baseline?

Greg Barker—The modeling approach was not pursued in detail. This would have required a lot of time.

Steven Long—So the proposal is to go with the updated Title 24 approach?

Greg Barker—Yes.

Jenny Roecks—Does the TF approve the abstract methodology presented by Greg, contingent on revisiting the maintained lumens and considerations to modify program restrictions as appropriate?

Group—Yes.

Additional Comments from Jon McHugh: There are a number of program considerations in regards to CRI, dimmability. There is the issue that lumen depreciation is greater for LEDs than fluorescent. Accounting for LED LD70 rated life in the calculation of incentives is one approach. Another approach is to integrate these incentives with marketing of incentives for high end trim control. The SCE CASE study estimated $0.08/SF for the cost of adjusting the lights. A value that the designers on the ASHRAE 90.1 lighting subcommittee thought was in the right ballpark.

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