

Technical Reference Manual Meeting Notes

December 19, 2013

Golden Rule Building LL35, 10:00am – 12:00pm

Meeting Objectives: Discuss summary of changes from old to new specs, rationale/logic for changes in peak coincidence factors and operating hours, measure design (grouping of different technologies, required inputs from customers/contractors), and the development a residential LED measure.

Attendees

In person: Jessica Burdette (COMM), Joe Plummer (COMM), Mary Sue Lobenstein (COMM), Adam Zoet (COMM), Tanuj Gulati (Energy Insight), Chad Trebilcock (MP), Will Nissen (Fresh Energy), Tim Gallagher (MP), Mark Garofano (COMM), Richard Szydlowski (CEE), Jeff Haase (GRE), Dean Laube (Franklin Energy Services)

Remote: Phil Dunlay (Xcel), Bruce Boerner (Xcel), Joe Steffel (Buffalo Public Utilities), Kim Lillyblad (MMPA), Kurt Hauser (MRES), John O'Neil (SMMPA), Bryce Dvorak (Michaels Energy), Jason Grenier (OTP)

Presenter: Joe Plummer (COMM)

Agenda

10:00 Introductions

10:10 New Residential LED Measure

10:45 Lighting Measure Design

11:00 C/I Lighting Assumption Changes

11:30 Other Issues

11:45 Wrap-up/Next Steps

Joe P: Other issues people want discussed during the meeting?

- John O'Neil: Lighting questions emailed to group in the morning
- LED Drivers
- Quality of LED Drivers
 - Joe Steffel: For LEDs, watts as an accurate measure of energy questionable and whether should pay attention to drivers behind watts in fixtures? Range of drivers has increased significantly over time to increase the lumen output; question regarding the efficiency of this.

Residential LEDs – See PowerPoint

- Joe P: Aim is to create a general solution with flexible implementation options; TRM is a general solution/statewide resource that needs to work for everyone

- Joe P: How are your lighting programs designed?
 - Chad Trebilcock, MP: Offer incentive with direct installs. Direct installs through audit programs. Offered through new construction (energy star fixtures and lighting). Do a little bit of both for rebates (paper coupon used in stores can be barrier – instant rebate better). Work with many different department stores (Menards, Home Depot, e.g.).
 - Joe P: What info is collected through WECC?
 - CT: Breaking it down by type of bulb; they are rebating LEDs currently through pilot program.

 - Bruce Boerner, Xcel: Has LEDs in upstream rebate program and include some in home performance program and other programs.
 - Joe P: Does upstream model track wattage and model type?
 - Xcel: Yes.
 - Joe P: How is the baseline determined in WECC?
 - BB: Use DOE table that they agreed to use a year and a half ago. Deemed wattage based on input wattage, adjusted for LED higher efficiency. Table for their deemed savings on wattage, WECC is using this table.

 - Jeff Haase, GRE: Coops similar to what the other utilities have described. Retail promotional efforts (instant rebate approach). Working with Walmart, Target on CFL program and LED holiday light promotions through co-ops. They put it out to coops through recruitment; not all participate - they employ direct rebates and coupons for smaller hardware stores in areas without larger Walmart and Target stores. Want to

eliminate paper as much as possible. Looking at LED program in 2014 and working with manufactures to get involved.

- MMPA: Have rebate for CFL bulbs. LED pricing caps. Customer buys bulb ahead of time and submits rebate request. They have struggled to partner with retailers because stores are not in every town. They go with a rebate after purchase method.
- Joe P: Seems to be a general trend toward using instant rebates but paper rebates still used in smaller towns. This is something we'll look at in the designs.

Residential LEDs, Measure Design Considerations Continued – See PowerPoint

- Efficient wattage could be deemed based on recent sales data (figure out what an average bulb equals).
- There are tradeoffs with every measurement approach:
 - Accuracy vs admin ease, savings vs admin ease, and participation vs accuracy.

Residential LEDs, Algorithms – See PowerPoint

- Joe P: We would like to gather feedback and determine what should be deemed vs collected
 - Is baseline wattage something that should be deemed or collected by utility?
 - It depends.
 - Jeff Haase: Given residential LED price point – shouldn't use wattage equivalent for baseline; collecting this info. Don't know the wattage of what the bulbs are replacing – but think that going to capture appropriate baseline in general.
 - Mark G: Think that it would be deemed.
 - Joe P: Should this be based on equipment lumen range or historical average?
 - If based on lumen then customer should be rebated accordingly
 - Joe P: Overwhelming preference is for a deemed wattage it appears.
 - One person on the call said that they get info for the bulbs sold.
 - Joe P: For WECC wattage, sounds like tracking wattage based on sales.
 - For Munis: they have table of equivalents to figure things out; have people fill things out on forms for the rebates.
 - Joe P: Nationally, big push to look at lumens rather than wattage and this is something that we're looking at closely
 - Rich S, CEE: a baseline assumption of incandescent may not be appropriate for LEDs since purchasers of LEDs are early adopters of technology and may be replacing CFLs

- Tim G, MP: on the other hand, some people have tried CFLs, didn't like them and gone back to incandescents, and are waiting to replace them with LEDs.
 - Joe P: Should annual operating hours be deemed?
 - Could have them check off the type of room where they are installed to calculate usage if didn't choose a deemed calculation.
 - Jeff Haase: Xcel still use different hours of operation for bulbs?
 - Xcel: Correct.
 - Jeff H: With residential LEDs, might be first time that people have bought a 10\$ bulb and hours might be skewed to higher number of operation than CFLs (are they being put into lights that are left on a lot longer).
 - Franklin Energy: We haven't done this type of set up so far (have used 800-900 hour range).
 - Joe P: Incremental cost –thinks that this will have to be deemed (baseline is a hypothetical bulb installed in the absence of a rebate – so not realistic to collect incremental cost from customer.)
 - Joe P: Product lifetime – deemed
 - Participant: Overall quality of the LED driver affects this; should look at whether this is as of a concern now compared to previous years.
 - Participant: With baseline – people leading the charge are already more efficient, makes things tricky and something to consider.

Residential LEDs, Examples provided by Franklin Energy Services (FES) – See PowerPoint

- Numbers are from Michigan Deemed Database
- Joe P: If were to make a measure that covers the four types of bulbs that are listed (LED-A-Line Lamps, LED Globe Lamps, LED Flood, and LED Downlights), does that cover everything? is there anything else that should look at?
 - Participant: Need outdoor option for flood lights?

Lighting Measure Design

- Joe P: Received comments from Xcel about grouping different techs with different costs and assumptions. Thinking was to group by existing fixture type and so that user of TRM could start with bulb going to replace and see replace options; also wanted to limit # of options per measure. Any concerns or suggestions?

- Xcel: We try to group things by tech type and cost, which gets into lifetime too. Would not know what an ideal group looks like; once measure finished, it quickly becomes out of date.
- Joe P: Other thoughts on how measures are grouped?
 - Question: If lifetime is based on 10 years, but if lamps aren't operated that much would you change the lifetime?
 - Joe P: Not as much good data on lifetime for LEDs, so used an engineering estimate based on rated lifetime in hours divided by average deemed hours across the space types in the TRM which gave us about 8 years for commercial.
 - Question: These measurements are flexible and will evolve/change in the future, correct?
 - Joe P: Yes, want to set up so that flexible since lighting changes a lot over time.

Lighting Revisions Methodology – See PowerPoint

- George Roemer, FES: Most of the data came from big IOUs in Illinois, but still feel that it is fairly representative for statewide Midwest TRM; could vary measurements for some areas of the state.
- Joe P: We're trying to use best available information; might not be totally representative of MN, but it's what is available. Thinking that some CARD studies could help get more accurate representation of savings in MN.
 - There is still flexibility for utilities to design their own TRMs – just need to justify them
 - Jeff Haase: if talking about CFs, talking about systems or about MISO coincidence.
 - Joe P: Talking about utility systems.

Lighting Hours and Peak Coincidence Factors (CFs) Tables – See PowerPoint

- Kurt Hauser, MRES: More recent estimates aren't necessarily better. Old study that MR used is much better than the values that are on the tables (e.g. with grocery stores, don't know how they got that low because they leave lights on; college numbers seem off; high schools and elementary school numbers are flipped.
- Tanuj G: Grocery stores leave lighting on during night for stocking
- George R: We looked at many different TRM values to come up with these numbers
- KH: Many of the TRM studies go back to the same source of data.
- George R: Most of these are based on IL. Thinks it's right that most of these values go back to an original couple of studies; the options were to go with just one study or go with multiple sources and average by building type; we chose to go with one
- Joe P: Put this issue in "parking lot" for wrap-up.

Lighting Lifetime and Incremental Cost – See PowerPoint

- For 2012 – used more data intense approach, requiring collection of product lifetime in hours

- For 2014 – went with deemed lifetime with a couple of exceptions.

Lighting Lifetime Table - See PowerPoint

- Joe P: Have carried T 12's into 2014, albeit with reduced lifetimes accounting for average remaining life of T12 magnetic ballasts in the field (from a TX study). Xcel has dropped T12s.
- Phil D, Xcel: We don't T12s in our tables, but will look at them on a custom basis and derate the baseline to a T8 equivalency
- Joe P: George, how are these values looked at across the country?
 - George R, Franklin: Various weighting measures for these lifetime calculations. Most have used T 12 as baseline and then gone to T 8
- Rich S, CEE: Florescent lighting technology is constantly moving and lifetimes are changing pretty dramatically; some fluorescents have lifetimes close to LED lifetimes and in some cases even longer
- Kurt H, MRES: Still see a lot of opportunity out there; some people haven't moved to T 8 yet; many stores still carry older T 12s. Did a survey of stores and found that T 8s are same price as T 12s; expects that this will change with stores carrying compliant lamps.
- Tim G, MP: We have seen that some customers with T 12s are waiting to jump to LEDs.
- Joe P: Should we look into adding the new EISA compliant T 12s?
 - Tim G: should watch and see what happens
 - Participant: A customized approach might be justified.
 - Rich S, CEE: we are not aware of EISA compliant T12s.
 - Kurt H, MRES: GE makes an EISA compliant T12.

Other Issues

- "Parking Lot" Issues
 - LED Traffic signals and energy star CFL fixtures and LED holiday lighting
 - Joe P can work with George offline and present something to the group
 - Joe P: LED Drivers and how they affect wattage of luminaire and quality of driver
 - Participant: Should look to see if the situation has changed (LEDs aren't failing; the drivers are failing; quality issues with driver); something that should look at going forward (e.g. where the bad drivers are being dumped). Regarding new fixtures and wattage, should look at whether have Energy Star or Design Lights certification and whether to incent them differently.
 - Tanuj G: Energy Star is based on efficiency wattages and not lumen outputs; might be good candidate for residential but not commercial for LEDs. DLC or DOE certifications are a better source.
 - Joe P: Would be good to include guidance in TRM for what user should look for
 - Participant: DLC and ENERGY STAR certifications are mutually exclusive; once a product becomes ES-certified it automatically drops off the DLC list.

- Joe P: What is good baseline assumption for LEDs? Might just pick something in the middle to cancel out competing effects (e.g. what type of bulb people are replacing varies). This is an issue that we will monitor going forward.
- Joe P: Regarding CFs, struggling on where to go on this. What we're seeing in the field isn't matching up with the TRM and this is something we should look at. We will dig deeper into the studies to see demand response assumptions in the measures.
 - George R: We can pass on study assumption and value comparisons to the group for review

Next Steps – See PowerPoint

- COMM to distribute lighting tables with latest info from Xcel for review (early January)
 - Incandescent wattages reduced
 - Xcel dropping T12 retrofits
 - TRM will continue T12 retrofits with reduced lifetimes
 - Insert in Appendix B of TRM (separate document)
- Joe P: thinking of holding next lighting meeting in February.