

Lighting Subcommittee Meeting #6



CALIFORNIA

TECHNICAL FORUM

**TIM MELLOCH
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APRIL 2018**

Agenda

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- Discuss Final Items to Harmonize Four Lighting Measures Consolidated in Q1 2018:
 - 4.19 LED Troffers
 - 4.22 LED Landscape
 - 4.48 LED Refrig Walk-in
 - 4.51 LED Pool and Spa Lighting
- Revisit Lighting Measure List for Additional Viable Measures to Consolidate into eTRM in 2018
- Discuss Opportunities for Addressing Interactive Effects for Statewide Measures:
 - Current Approach, Intermediate Approach, Proposed Approach
- High Level Discussion of Future Topics:
 - Future Lighting Program Opportunities
 - Cost Methodologies and Update Process
 - Improving Hours of Operation Data

Measure Consensus

4.19 LED, Troffer (2x4, 1x4, 2x2)

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- Offering (WPs Reviewed: PGECOLTG179-R5, SCE17LG118-R0)
 - ❑ Replacement of linear fluorescent fixtures with LED Ambient Commercial Fixtures & Integrated Retrofit Kits (LED panel fixtures)
 - ❑ Cost, wattage and savings are all in units of kilolumen
 - ❑ Building Types: 24 NonRes (Not: OTR) / 1 Res (MFm-Common Area) (Not: MFm)
 - ❑ Measure Application Type: ROBNC (replace-on-burnout / new construction)
 - ❑ Vintage: Ex, New
 - ❑ Climate Zone: CZ01 – CZ16
 - ❑ Residential Area: Common (Not: In-Dwelling)
 - ❑ Delivery: PreRebDown, ~~PreRebUp~~, NonUpStrm, DirInstall
- Stage 1 Issues
 - ❑ *Document source of Base and Measure Case kilolumen/Watt (will work with Energy Solutions)*
 - ❑ *Climate Zone specific claims to match across the state*
 - ❑ Included incremental items added by SCE in their “short form” WP, specifically adding common areas for the Multifamily (MFm) Building Type (and additional calc. template)
 - ✦ What NTG should apply (Residential or Commercial)
 - ❑ Using PG&E / SCE cost approach since PG&E has the lead workpaper – from distributor catalogs and web-scraping
 - ✦ SDG&E (short form) is using READi cost IDs, but cost fairly close

Measure Consensus

4.22 LED Landscape Lighting Fixtures

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- Offering (WPs Reviewed: SCE17LG105R0, SDGE1057R1)
 - The replacement of a low voltage JC bi-pin lamp halogen landscape lighting fixtures typically ranging from 10-75 watts with LED landscape lighting fixtures in commercial and residential sectors
 - Six measure offerings (3 measure wattage ranges, Commercial & Residential applic's)
 - ✦ ≤5W, >5W to ≤15W, >15W to ≤30W
 - Building Types: 24 NonRes / 4 Res (Note: Not OTR , Gst/not GsR, ~~add CNC-Clinics~~)
 - Measure Application Type: **ROBNC** (~~replace-on-burnout~~ / new construction)
 - Vintage: Ex, **New**
 - Climate Zone: CZ01 – CZ16
 - Residential Area: Dwelling only
 - Delivery: PreRebDown, NonUpStrm, PreRebUp
- Stage 1 Issues
 - **How does recent (March 1, 2018) Outdoor Lighting Disposition affect the viability of this measure?**
 - Check WRR used in WPs against recent dispositions – using 4.24 WRR
 - **Hours of Operation and CDF come from a different source:**
 - ✦ **2015_Lighting_Retrofit_Guidance_memo_FINAL.docx,**
 - ✦ **DEER2015-2016_CFLighting_UncertainMeasureUpdateDescription_2015-05-19.pdf**
 - ✦ **The Res outdoor general hours were changed from 1,249 to 935, per the 2016 CFL Lighting document.**
 - ✦ **CDF over-ridden for Res and Non-Res to be zero to make demand savings zero.**

Measure Consensus

4.48 LED in Walk-in Coolers & Freezers

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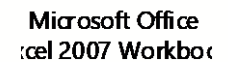
- Offering (WPs Reviewed: PGE3PLTG171R2)
 - Replacing fluorescent and incand lighting systems in refrigerated areas of a grocery store with LED luminaires
 - *Ten iterations of the measure to account for the range of existing lighting technologies and the impact of case temperature (i.e. cooler/freezer) on refrigeration system efficiency*
 - ✦ 32W to 24W, 60W to 38W, 75W to 38W, 100W to 38W, 220W to 80W
 - ✦ *Each wattage analyzed separately for cooler or freezer savings to account for refrigeration system efficiency*
 - Building Types: Grocery (only)
 - ✦ *May also be applicable in small business, hospitality, and hospital sectors*
 - Measure Application Type: ROB (replace-on-burnout) / NR (normal replacement)
 - Vintage: Ex (Note: Not New)
 - Climate Zone: CZ01 – CZ16
 - Delivery: PreRebDown
- Stage 1 Issues
 - Measure didn't report savings in 2017 Q1-Q3. Confirmed to be moving forward.
 - *Text methodology for indirect savings does not match Ex Ante values in Rev.2.*
 - ✦ *The Rev.1 workshop described savings linked to the refrigeration efficiencies that are documented in DOE2.2 (grocery prototype model).*
 - ✦ *The Rev.2 savings are calculated in the more traditional manner of using the interactive effects table. Because gas savings are included in this table, it seems unlikely that interactive effects are specific to walk-in coolers.*
 - ✦ *Rev.1 methodology seems more correct.*
 - EUL ID is correct, but confirm approach:
 - ✦ 50,000 hrs/yr @ 4,710 hrs/uyr (Grocery) = 10.6 yrs
 - ✦ EUL ID has 16 yrs
 - ✦ Measure should claim the lessor of these values
 - *Change NormUnit from Each to Fixture*
 - ✦ *Workpaper use "luminaires"*

Measure Consensus

4.51 LED Pool & Spa Lighting

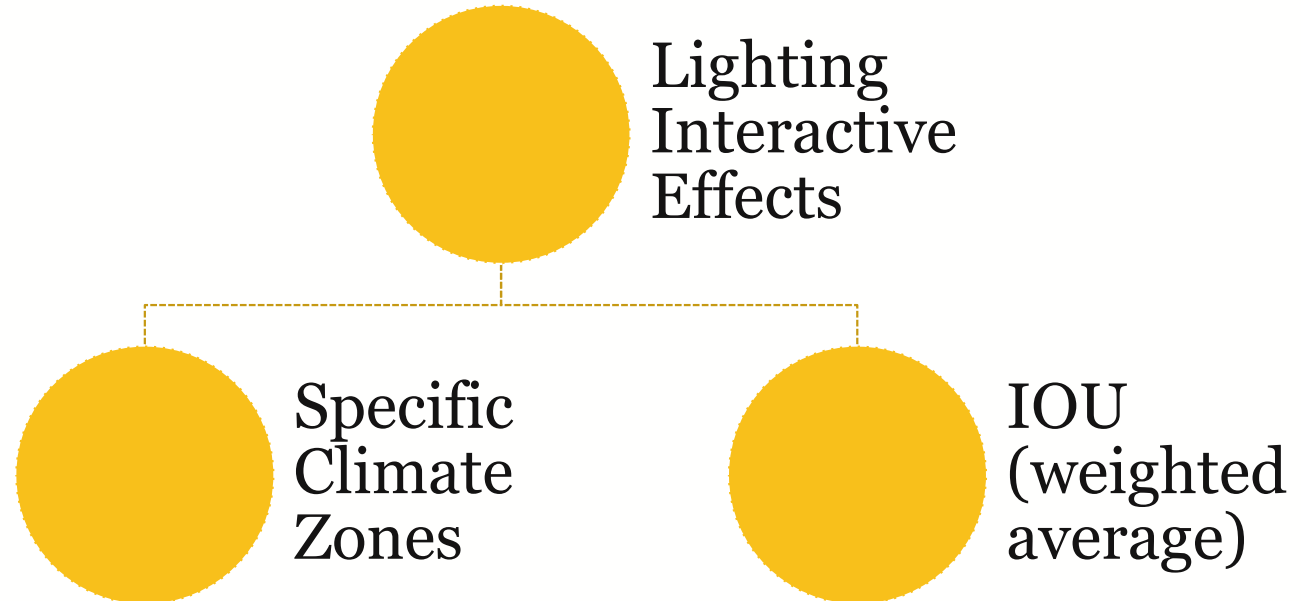
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- Offering (WPs Reviewed: SCE17LG071R0, SDGE0028R1)
 - Replacement of incandescent pool lamps or luminaires with LED pool lighting in commercial and residential swimming pools and spas
 - 32 measure offerings (4 wattages, 4 scenarios, lamps and luminaires)
 - Base case and measure wattages are the same for both lamps and luminaires
 - Building Types: Hotel / Motel and 3 Residential (SFm, MFm-Common, DMO-Common)
 - Measure Application Type: ROBNC (replace-on-burnout / new construction), ER (Early Retirement)
 - Vintage: Ex
 - Climate Zone: CZ01 – CZ16
 - Delivery: PreRebDown, DirInstall
- Stage 1 Issues
 - Do recent lighting dispositions have any impact on the future of this measure?
 - Confirm that Dusk-to-Dawn hours of operation should be 4,380 hrs/yr (versus 4,100 hrs/yr)
 - Confirm that two schedules Dusk-to-Dawn and Dusk-to-Close (1,460 hrs/yr) are applicable
 - Using 1st and 2nd Baseline values as the same for ER permutations.
 - Confirm that Spa Offerings should not exist for non-Res (Hotel / Motels)
 - Confirm that ROBNC should be used for fixtures; ROB should be used for lamps.
 - ✦ Is this a general rule that can be applied for lighting measures?



Lighting – Location Value Change Summary

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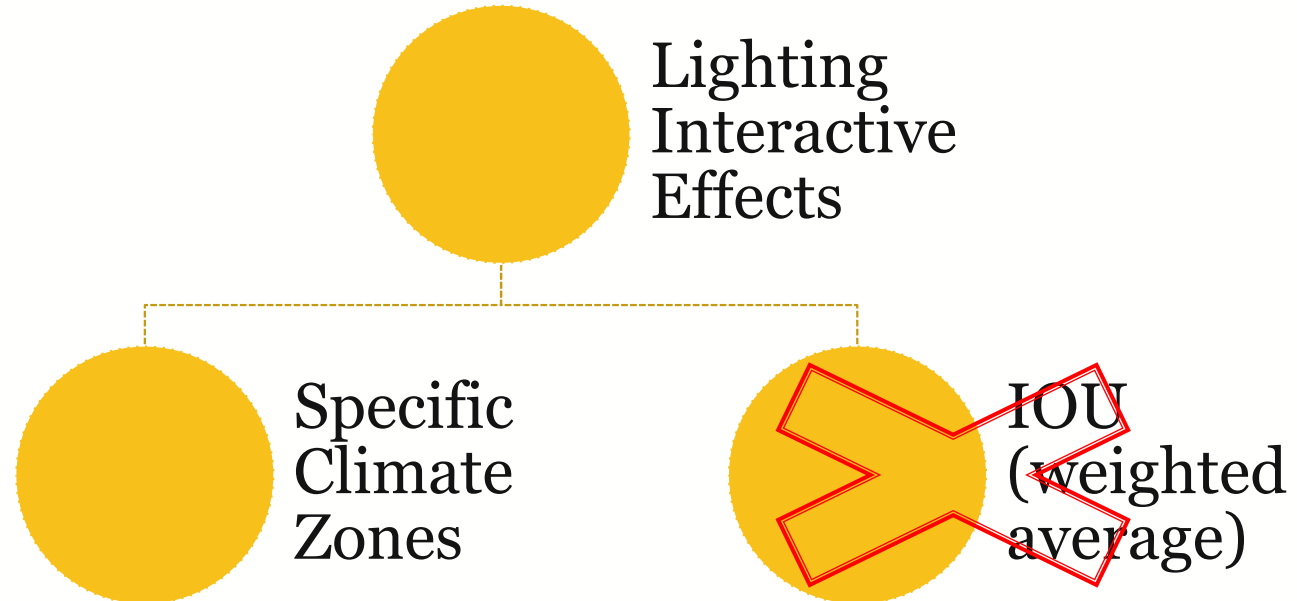
Impact of Specific CZ vs IOU (on Lighting)

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- PG&E change in savings (examples):
 - ❑ 4.26, LED MR-16 (-1% kWh, -1% kW, +3% therms)
 - ❑ 4.30, LED A-Lamp (+1% kWh, +1% kW, +6% therms)
 - ❑ 4.31, LED Recessed Downlight Retrofit Kit (+2% kWh, +1% kW, +8% therms)
- Suspected to effects some other programs for SCE and SDG&E
- Conclusion
 - ❑ Minimal change due to using “CZxx” rather than “IOU”

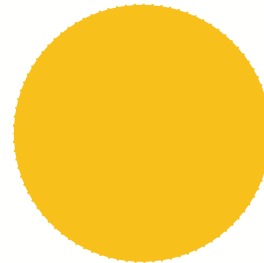
Lighting – Location Value Change Summary

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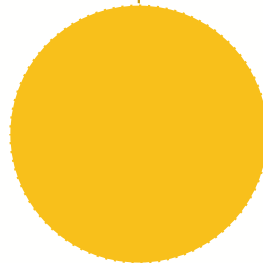


Lighting – Location Value Change Summary

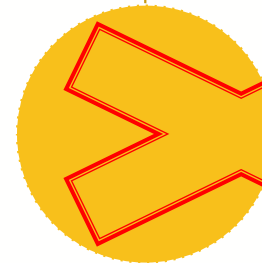
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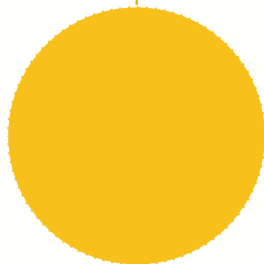
Lighting
Interactive
Effects



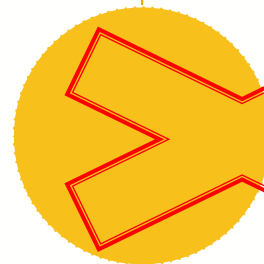
Specific
Climate
Zones



IOU
(weighted
average)



16 Climate
Zone Values



PA-Specific
Climate
Zone Values

Impact of Removing PA Effects from CZ (on Lighting)

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- Approach to follow...
- Effect
 - PG&E and SCE – much less than 1% shift
 - SDG&E – less than 1%
 - ✦ 4.32, LED R-BR (-0.5% kW, 0% kWh, -0.1% therms)

Approach

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- Goal: Keep it simple
- Looked at Stock SqFt weighting data (from 2014)

Climate Zone	PGE	SCE	SCG	SDG	Action	Recommendation
CZ01	23.5138					
CZ02	152.9304					
CZ03	837.3043					
CZ04	366.6724					
CZ05	55.388	8.0326	8.0326			
CZ06		584.3908	659.2546	18.2303		
CZ07				409.5341		
CZ08		839.0039	989.3702	16.8964		
CZ09		387.6003	965.5512			
CZ10		485.3834	485.3834	134.6185		
CZ11	120.4384					
CZ12	467.2743					
CZ13	310.4741	60.6275	60.6275			
CZ14		80.4411	80.4411	2.7436		
CZ15		92.1954	92.1954	1.1765		
CZ16	16.3118	44.9486	44.9486			

Approach

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- Goal: Keep it simple
- Looked at Stock SqFt weighting data (from 2014)

Climate Zone	PGE	SCE	SCG	SDG	Action	Recommendation
CZ01	23.5138				Only one PA	PG&E
CZ02	152.9304				Only one PA	PG&E
CZ03	837.3043				Only one PA	PG&E
CZ04	366.6724				Only one PA	PG&E
CZ05	55.388	8.0326	8.0326			
CZ06		584.3908	659.2546	18.2303		
CZ07				409.5341	Only one PA	SDG&E
CZ08		839.0039	989.3702	16.8964		
CZ09		387.6003	965.5512			
CZ10		485.3834	485.3834	134.6185		
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Approach

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CZ05	55.388	8.0326	8.0326		One IOU is much larger	PG&E
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CZ07				409.5341	Only one PA	SDG&E
CZ08		839.0039	989.3702	16.8964		
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CZ13	310.4741	60.6275	60.6275		One IOU is much larger	PG&E
CZ14		80.4411	80.4411	2.7436	One IOU is much larger	SCE
CZ15		92.1954	92.1954	1.1765	One IOU is much larger	SCE
CZ16	16.3118	44.9486	44.9486		One IOU is much larger	SCE

Approach

16

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- Looked at Stock SqFt weighting data (from 2014)

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CZ02	152.9304				Only one PA	PG&E
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CZ04	366.6724				Only one PA	PG&E
CZ05	55.388	8.0326	8.0326		One IOU is much larger	PG&E
CZ06		584.3908	659.2546	18.2303	SCG missing values	SCE
CZ07				409.5341	Only one PA	SDG&E
CZ08		839.0039	989.3702	16.8964	SCG missing values	SCE
CZ09		387.6003	965.5512		SCG missing values	SCE
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CZ15		92.1954	92.1954	1.1765	One IOU is much larger	SCE
CZ16	16.3118	44.9486	44.9486		One IOU is much larger	SCE

Impact of Removing PA Effects from CZ (on Lighting)

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- Approach
 - Choose single IOU value to represent the area (no calculation)
 - Note that typically the values match
- Effect
 - PG&E and SCE – much less than 1% shift
 - SDG&E – less than 1%
 - ✦ 4.32, LED R-BR (-0.5% kW, 0% kWh, -0.1% therms)

Future Lighting Subcommittee Work

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- High Level Discussion of Future Topics:
 - Future Lighting Program Opportunities:
 - ✦ Can Existing Baseline Resurrect Any Measures
 - ✦ Underserved Markets
 - ✦ Specialty Lamps
 - ✦ High Quality Lamps
 - ✦ Controls
 - Cost Methodologies and Update Process
 - Improving Hours of Operation Data