

Lighting Subcommittee Meeting #3



CALIFORNIA

TECHNICAL FORUM

**TIM MELLOCH
AYAD AL-SHAikh
JANUARY 2018**

Agenda

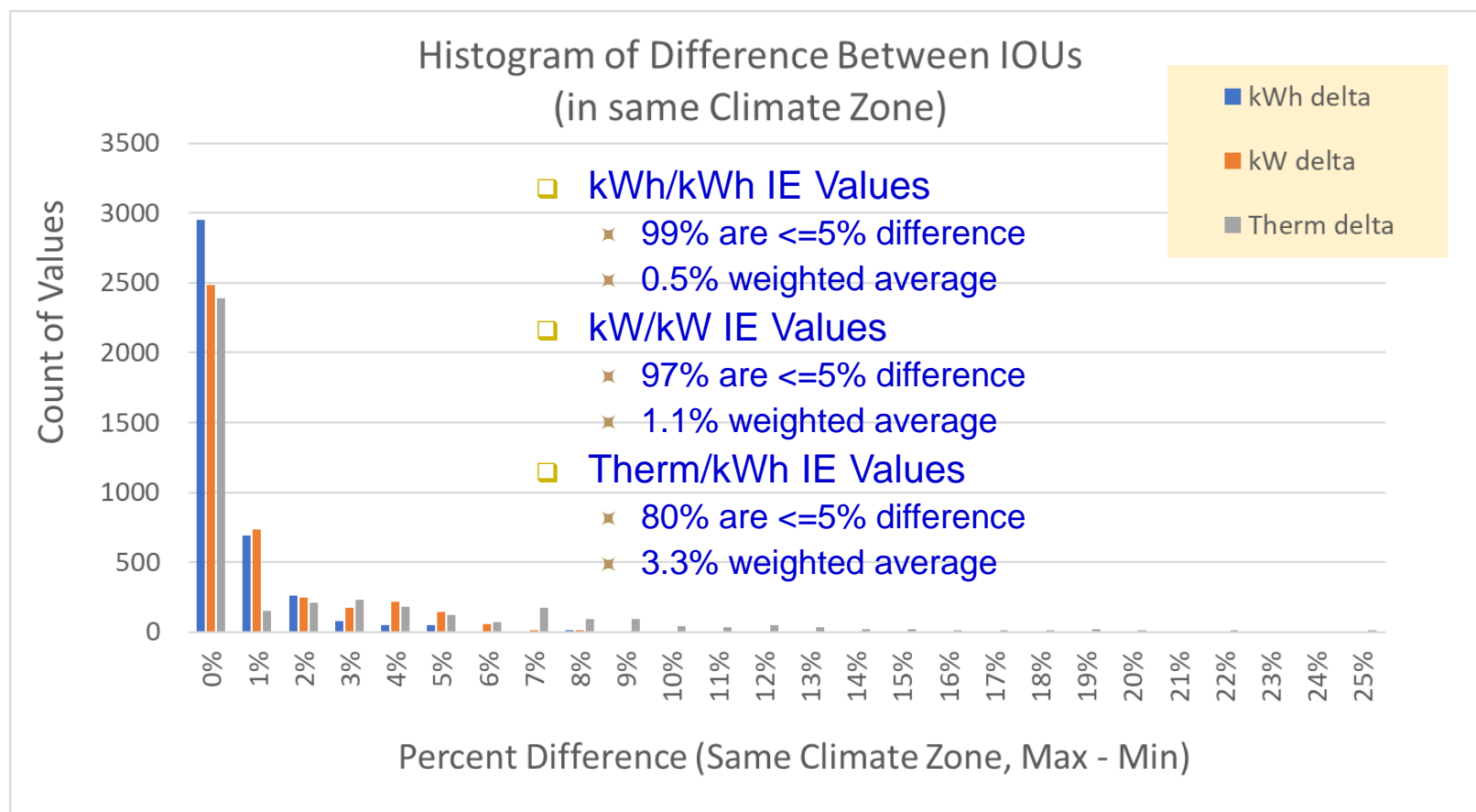
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- Input / Agreement to move forward with removing PA from Climate Zone interactive effects
 - Currently, we do not have all of the files to move forward
 - I can explain the methodology if we agree to this in concept
- Status and Questions from 2017
 - 9 completed Measures
 - Planned for Cal TF Affirmation in first meeting of 2018
- Planning for 2018
 - Question: In what order should we complete the remaining measures?

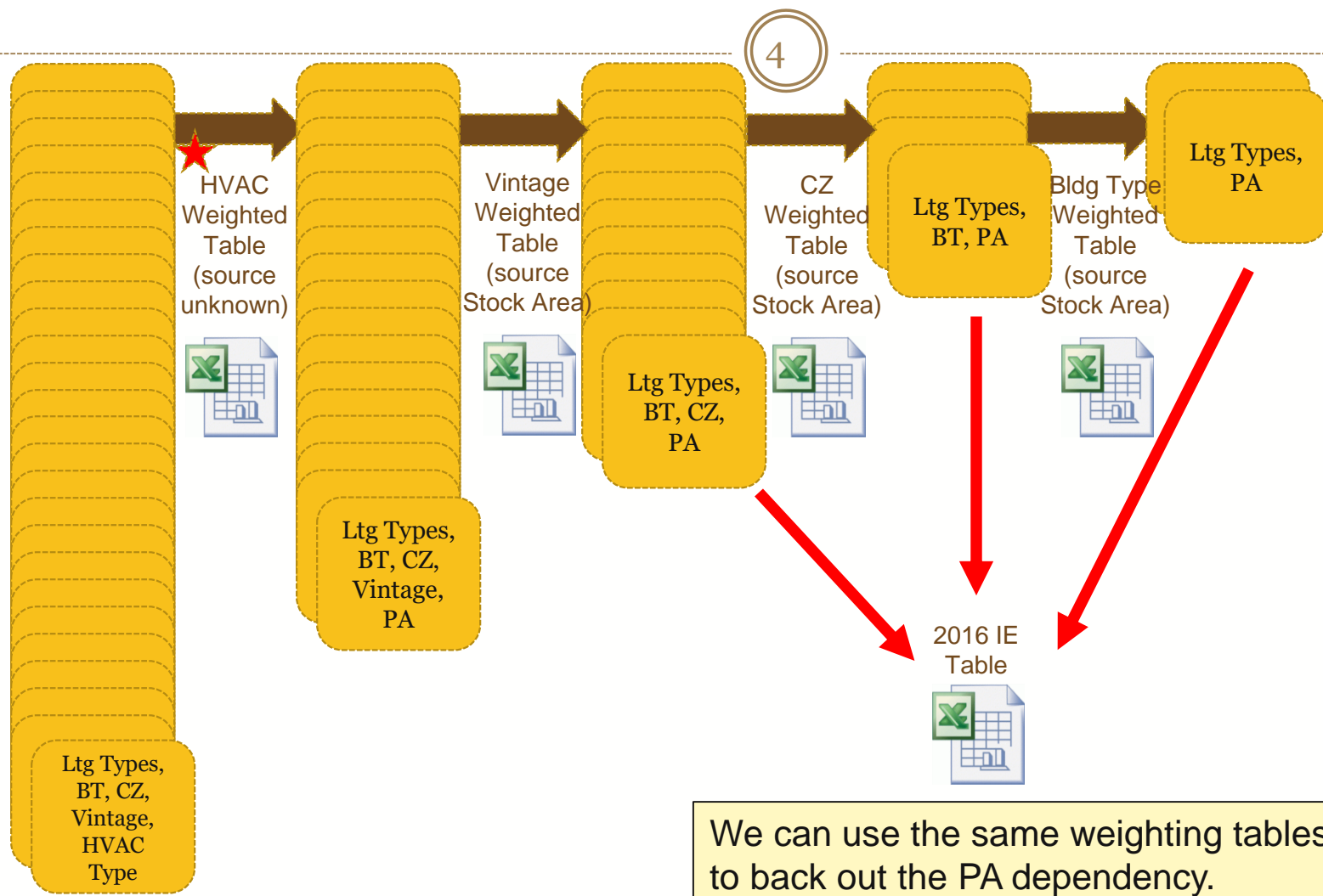
Can we consolidate CZ across IOUs

3

- 4,598 overlapping CZs between IOUs (removed IOU weighted averages)
- Consider Max – Min difference (most conservative)

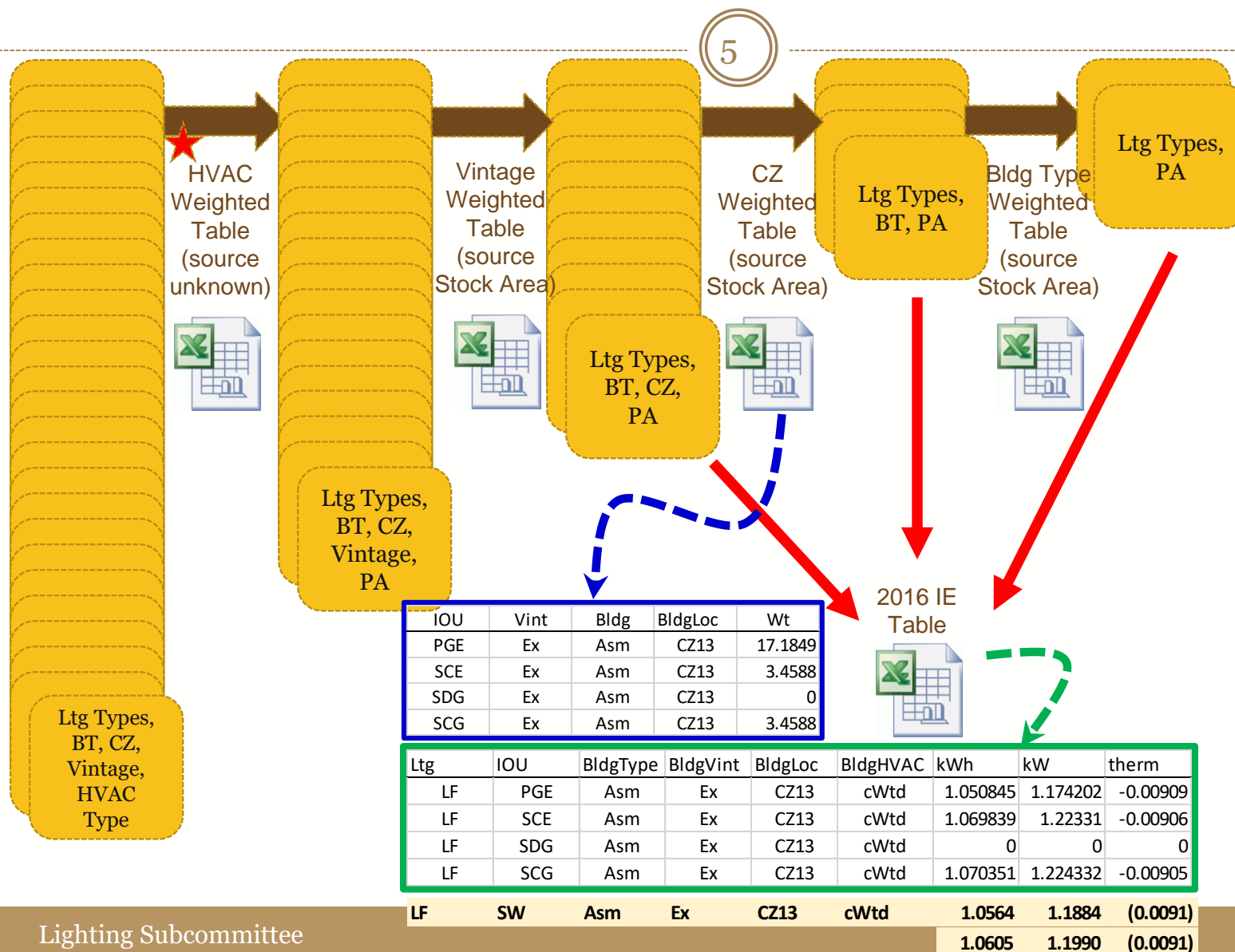


Interactive Effects



★ Distinction by PA starts here

Interactive Effects

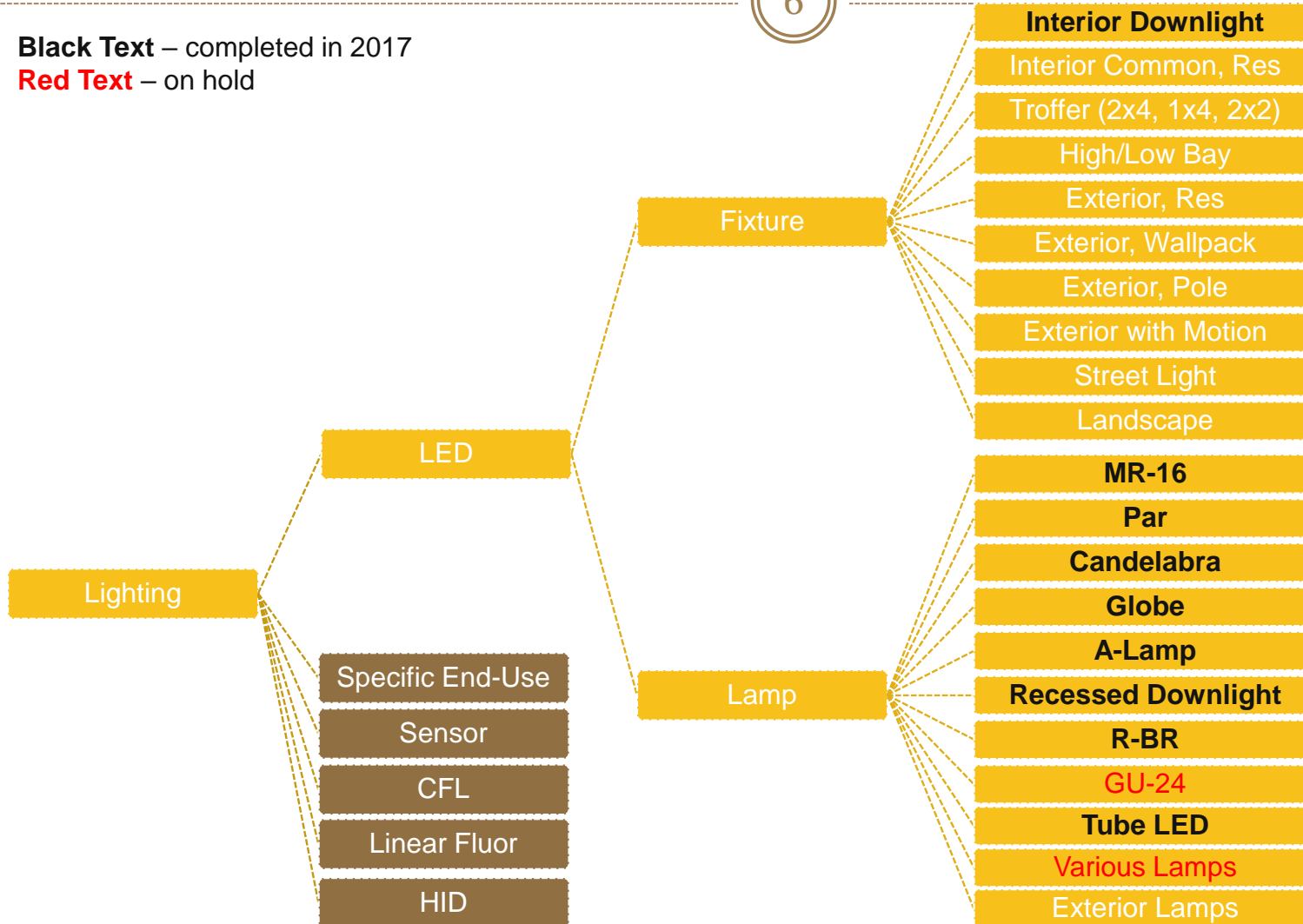


Lighting Measure Tree

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Black Text – completed in 2017

Red Text – on hold



Measure Consensus

4.16 LED Recess Downlight Fixture

7

- Offering

- ❑ 20 Lighting Bins: <7W, 7W – 24W, ≥25W
- ❑ Building Types: 24 NonRes / 4 Res (**Note: Not OTR**)
- ❑ Vintage: Ex, New
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall



- Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*
- ❑ Did not include 2 commercial EUL's as listed in the SDG&E WP
- ❑ Used base case and measure case cost data from PG&E WP which was based on webscraping. SDG&E used RS Means for base case cost and cited the Ex Ante database for measure cost.
- ❑ Used the WRR from the PG&E WP since it represented a more current approved value (2.42 vs. 2.96 in SDG&E WP).

- Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

- Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.26 LED MR-16 Lamp



8

- Offering

- ❑ 8 Lighting Bins: <6W, 6W – 11W, ≥12W
- ❑ Building Types: 25 NonRes / 4 Res (**Note: Not OTR , Gst/not GsR**)
- ❑ Vintage: Ex (**Note: Not New**)
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

- Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*

- Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

- Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.27 LED PAR Lamp

9



● Offering

- ❑ 4 Lamp Types: PAR16, 20, 30, 38
- ❑ Multiple Lighting Bins:
 - ✦ PAR16 (<6, 6, ≥7W), PAR 20 (≤11W), PAR30 (<10, 10-19, ≥20W), PAR38 (<12, 12-26, ≥27W)
- ❑ Building Types: 25 NonRes / 4 Res (**Note: Not OTR**)
- ❑ Vintage: Ex (**Note: Not New**)
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

● Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*
- ❑ Included incremental items added by SCE in their “short form” WP, specifically dwelling areas & common areas were added for the MF dwelling area and residential mobile home- double wide (including operating hours of 541hrs/yr for dwelling areas and 6,142 hrs/yr for common areas).

● Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

● Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.28 LED Candelabra Lamp

10

- Offering

- ❑ 3 Lighting Bins: <3W MF, <3W, 3W – ≤5W
- ❑ Building Types: 25 NonRes / 4 Res (**Note: Not OTR, Gst/not GsR**)
- ❑ Vintage: Ex (**Note: Not New**)
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

- Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*

- Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

- Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.29 LED Globe Lamp

11

- Offering

- ❑ 3 Lighting Bins: <3W MF, <3W, 3W – ≤5W
- ❑ Building Types: 25 NonRes / 4 Res (**Note: Not OTR, Gst/not GsR**)
- ❑ Vintage: Ex (**Note: Not New**)
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

- Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*

- Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

- Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.30 LED A Lamp



- Offering

- 4 Lumen Equivalents: 40W, 60W, 75W, 100W
- 3-4 Lumen Bins Each:
 - ✱ 40W-(68,80,90,100 LPW), 60W-(80,90,100,110 LPW), 75W-(90,100,110,120 LPW), 100W-(90,100,110 LPW),
- Building Types: 25 NonRes / 4 Res (**Note: Not OTR, Gst/not GsR**)
- Vintage: Ex (**Note: Not New**)
- Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- Residential Area: Dwelling/Common
- Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

- Stage 1 Issues

- **Climate Zone specific claims to match across the state**
- Included incremental items added by SCE in their “short form” WP, specifically dwelling & common areas were added for the MFm and DMO (including operating hours of 541 hrs/yr for dwelling areas and 6,142 hrs/yr for common areas).
- SDG&E “short form” added LED reflector lamps (BR/R). This lamp type is addressed in measure 4.32.
- SDG&E “short form” included a long list of requirements but it was not clear if they are incremental to the lead WP or just explicitly broken out here (e.g. PF, CRI, standby power, etc).
- SDG&E utilized their own measure cost data from contracted manufacturer/distributor. Currently, the consolidated measure reflects the webscraping methodology costs from the PG&E WP.

- Measure Extension

- Added measure for POUs (electric measure)
- Added residential areas beyond SCE

- Stage 2 Issues

- *Calculation: Review hours of use, interactive effects*
- *Cost: Review variation due to Climate Zone*
- **Cost: Should cost breakouts be used (by Com/Res, by Delivery Type (downstream, upstream, midstream, DI))**
 - ✱ **Should there be a statewide team to develop**
 - ✱ **But number of data points would be a bigger issue**
- *Baseline: Existing conditions opportunity*
- *Permutation collapse*

Measure Consensus

4.31 LED Recessed Downlight Kit

13

- Offering

- ❑ 3 Lighting Bins: <10W, 10W – 12W, 13-25W
- ❑ Building Types: 25 NonRes / 4 Res (**Note: Not OTR**)
- ❑ Vintage: Ex (**Note: Not New**)
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall



- Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*
- ❑ PG&E had three measure offerings, while SCE had one measure offering which overlapped with the most conservative of the PG&E measure offerings.
- ❑ Base, measure and labor costs used in the two WPs vary significantly. The consolidated measure currently includes the PG&E values but the data needs to be reviewed to determine which WP includes better cost data/represents the better methodology.

- Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

- Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.32 LED R/BR Lamp

- Offering

- ❑ 3 Lighting Bins: <11W, 11W – 13W, 14-22W
- ❑ Building Types: 25 NonRes / 4 Res (**Note: Not OTR, Gst/not GsR**)
- ❑ Vintage: Ex (**Note: Not New**)
- ❑ Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- ❑ Residential Area: Dwelling/Common
- ❑ Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

- Stage 1 Issues

- ❑ *Climate Zone specific claims to match across the state*
- ❑ Included incremental items added by SCE in their “short form” WP, specifically dwelling areas & common areas were added for the MFm and DMO building types (including operating hours of 541 hrs/yr for dwelling areas and 6,142 hrs/yr for common areas).

- Measure Extension

- ❑ Added measure for POUs (electric measure)
- ❑ Added residential areas beyond SCE

- Stage 2 Issues

- ❑ *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- ❑ *Cost: Review variation due to Climate Zone*
- ❑ *Baseline: Existing conditions opportunity*
- ❑ *Permutation collapse*

Measure Consensus

4.36 LED T8 Replacement Lamp

15

- Offering

- 1 Lighting Bin: weighted average of 25, 28, 30, and 32W
- Building Types: 25 NonRes / 4 Res (**Note: Not OTR, Gst/not GsR**)
- Vintage: Ex (**Note: Not New**)
- Climate Zone: CZ01 – CZ16 (**Note: Not IOU**)
- Residential Area: Dwelling/Common
- Delivery: PreRebDown, PreRebUp, NonUpStrm, DirInstall

- Stage 1 Issues

- *Climate Zone specific claims to match across the state*
- In SDG&E's "short form" WP, they removed the requirement for pre- and post-inspections included in the SCE WP because their 3rd party contractor performs energy efficiency audits prior to all installations.
- Currently, the consolidated measure still includes the SCE specified requirements for pre- and post-inspections.

- Measure Extension

- Added measure for POUs (electric measure)
- Added residential areas beyond SCE

- Stage 2 Issues

- *Calculation: Review wattage reduction ratio (WRR), hours of use, interactive effects*
- *Cost: Review variation due to Climate Zone*
- *Baseline: Existing conditions opportunity*
- *Permutation collapse*

2017-18 Lighting Measures

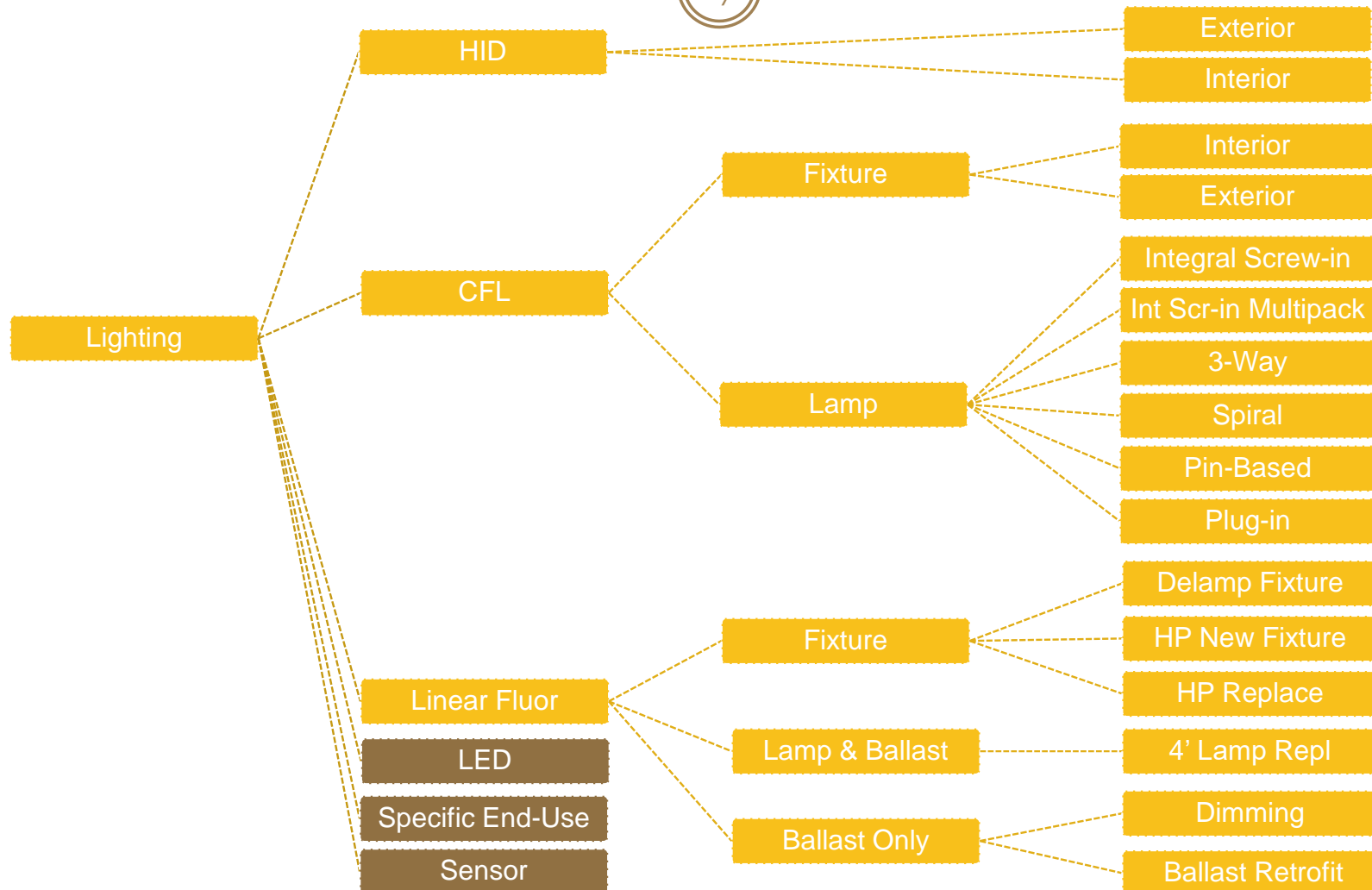
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No.	Description	Energy (kWh/yr)	% of Total
4.01	CFL, Interior Fixture	1,639,129	0.3%
4.02	CFL, Exterior Fixture	2,472,772	0.4%
4.03	CFL, BiLevel Fixture	15,128	0.0%
4.04	CFL, Integral/Screw-in	164,363,359	26.7%
4.05	CFL, Integral/Screw-in, Multiple	12,639,624	2.1%
4.06	CFL, 3-Way	14,063,950	2.3%
4.07	CFL, Spiral	82,874	0.0%
4.08	CFL, Pin-Based		
4.09	CFL, Plug-In	3,806	0.0%
★ 4.10	LF, 4' Replace Lamp	11,245,144	1.8%
4.11	LF, Dimming Ballast		
4.12	LF, Ballast Retrofit		
4.13	LF, Replacement Fixture	23,561,653	3.8%
4.14	LF, HP Fixture	7,312,149	1.2%
4.15	LF, Delamping Fixture		
★ 4.16	LED, Interior Downlight	9,762,830	1.6%
4.17	LED, Exterior Wallpack	4,612,086	0.7%
4.18	LED, High/Low Bay	23,523,635	3.8%
4.19	LED, Troffer (2x4, 1x4, 2x2)	46,380,364	7.5%
4.20	LED, Street Light	16,266,823	2.6%
4.21	LED, Interior Common, Res	2,506,851	0.4%
4.22	LED, Landscape	270,207	0.0%
4.23	LED, Exterior with Motion	3,422,230	0.6%
4.24	LED, Exterior, Res	1,687,353	0.3%
4.25	LED, Exterior, Pole		
★ 4.26	LED, MR-16	3,639,850	0.6%

No.	Description	Energy (kWh/yr)	% of Total
★ 4.27	LED, PAR20, 30, 38,	77,757,805	12.6%
★ 4.28	LED, Candelabra	4,150,347	0.7%
★ 4.29	LED, Globe	236,283	0.0%
★ 4.30	LED, A-Lamp	112,402,706	18.2%
★ 4.31	LED, Recessed Downlight	13,090,543	2.1%
★ 4.32	LED, R-BR	40,386,227	6.6%
★ 4.33	LED, GU-24		
4.34	LED, Various Lamps		
4.35	LED, Exterior Lamps	1,194,663	0.2%
★ 4.36	LED, Tube LED	423,546	0.1%
4.37	HID, Interior Fixture	22,981	0.0%
4.38	HID, Exterior Fixture	20,173	0.0%
4.39	HID, Interior Lamp		
4.40	Sensor, Residential Occ	57,408	0.0%
4.41	Sensor, Wall or Ceiling Occ	889,086	0.1%
4.42	Sensor, Integrated Fixture	154,002	0.0%
4.43	Sensor, Photocell		
4.44	Open Sign	130,576	0.0%
4.45	Menu Board		
4.46	Channel Letter Sign		
4.47	Refrig, Case Door	12,515,846	2.0%
4.48	Refrig, Walk-in	15,982	0.0%
4.49	Refrig, Reach-in	2,732,405	0.4%
4.50	Cold Cathode		
4.51	LED, Pool		
4.52	CFL, Ceiling Fan		
4.53	LED, Sports or Athletic Fields	398,406	0.1%

Lighting Measure Tree

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Lighting Measure Tree

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