Subcommittee Meeting #1 Appliance/Plug Load

CALIFORNIA
TECHNICAL FORUM

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Objective

- Address existing Appliance/Plug Load measures that would migrate to the eTRM
  - Reconcile differences between IOU workpapers
  - Understand issues with DEER values
  - Align IOU and POU methodologies/values
  - Look for opportunities to consolidate/simplify measures where appropriate.

Subcommittee Timeline

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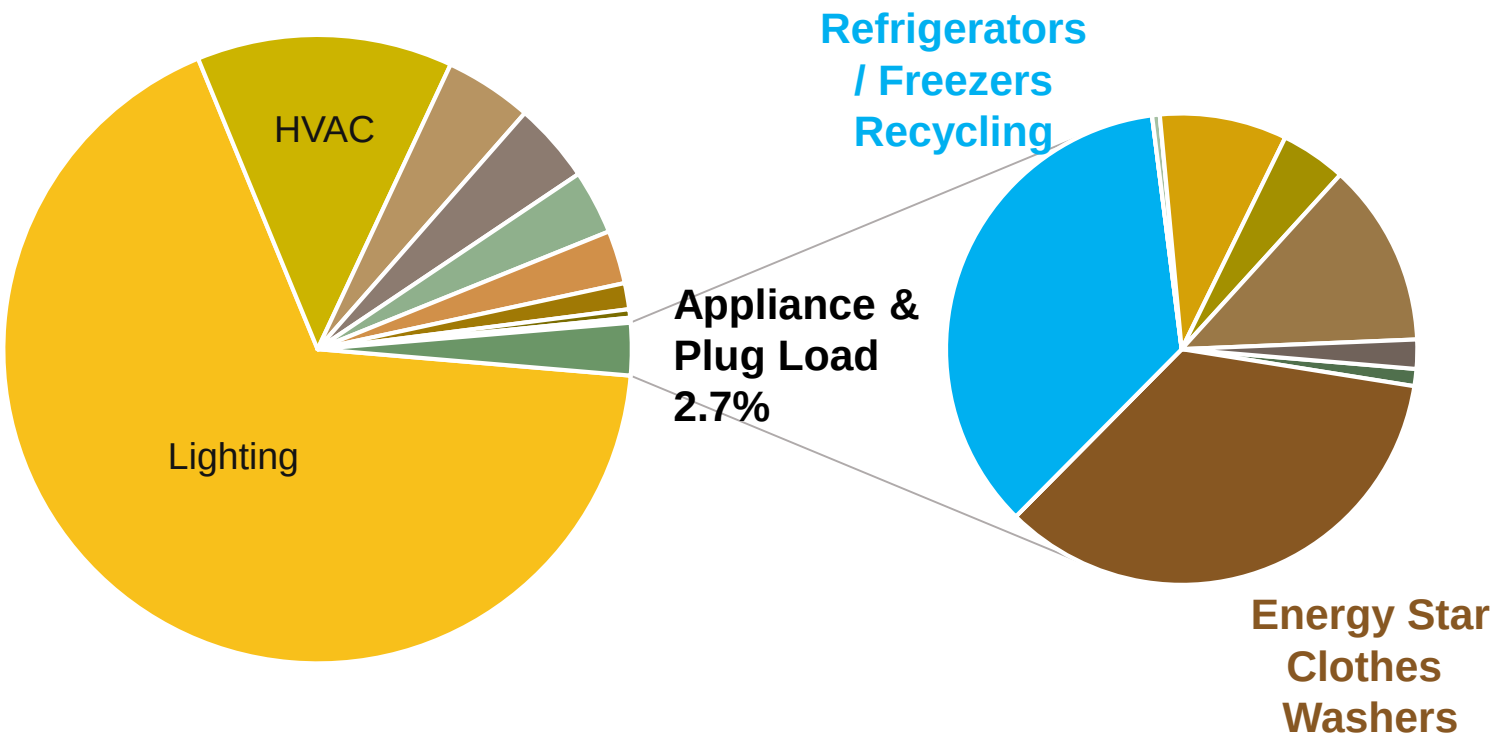
	29-May	5-Jun	12-Jun	19-Jun	26-Jun	3-Jul	10-Jul	17-Jul	24-Jul	31-Jul	7-Aug	14-Aug	21-Aug	28-Aug	4-Sep	11-Sep	18-Sep	25-Sep	2-Oct	9-Oct	16-Oct	23-Oct	30-Oct	6-Nov	13-Nov	20-Nov	27-Nov	4-Dec	11-Dec	18-Dec	25-Dec	1-Jan	8-Jan	15-Jan	22-Jan	2017	2018
Cal TF Meeting				6/22					7/27									9/28				10/26			11/15-16				12/14						1/25		
Governance Committee																																			1		
Commercial Refrigeration																		1				2													tbd	20	0
Food Service																		1				2													tbd	15	0
Agriculture / Pumps											T0 TC											1			2										tbd	5	1
Lighting																	T0	TC							1				2						tbd	11	42
HVAC																									1				2						tbd	2	50
Water Heating														T0 TC											1										2	22	0
Appliance or Plug Load														T0 TC											1				2						tbd	10	12
Building Envelope																																				0	4
Pools																						1													2	1	5
Process																																				0	7
Miscellaneous																						1			2										tbd	2	4
Low Income Measures																																					

Appliance / Plug Load Savings

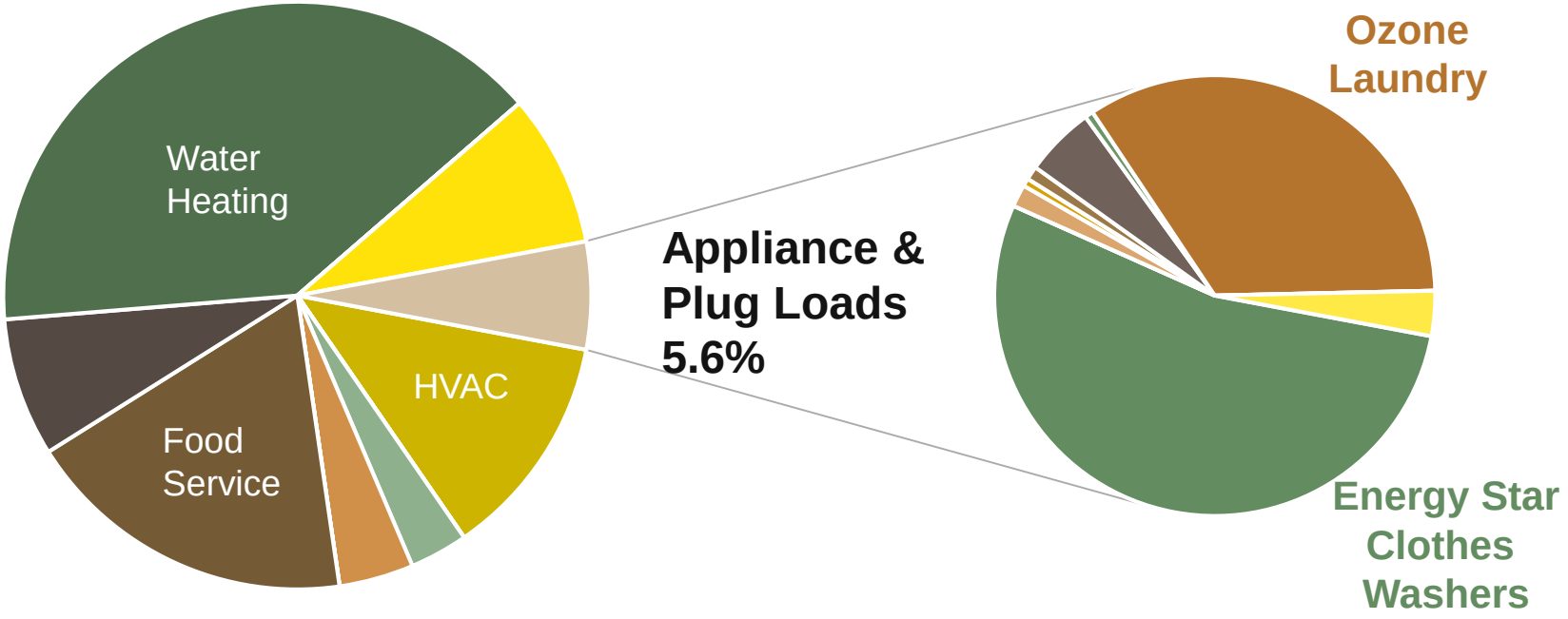
2016 CA Deemed Electric Savings (Total = 912 GWh/yr)



* Data Source: 2016 CA IOU claims data.

Appliance / Plug Load Savings

2016 CA Deemed Gas Savings
(Total = 12 MMTh/yr – without penalty)



(Lighting Penalty Removed)

(Refrigerator-Freezer / Power Strip Penalty Removed)

* Data Source: 2016 CA IOU claims data.

Appliance and Plug Load

- Nine 2017 measures, plus three 2018 measures
- For this week
  - Smart Power Strips
  - Tier 2 Advanced Power Strips
  - Power Management Software for Networked Computers
  - ENERGY STAR Refrigerator / Smart-Connected Refrigerators
  - Refrigerator and Freezer Recycling
  - ENERGY STAR Clothes Washer
  - Retail Products Platform
- For future discussion
  - ENERGY STAR Clothes Dryer
  - Ozone Laundry Non-residential
  - Residential ENERGY STAR Dishwasher
  - Vending and Beverage Merchandise Controller

7.16/7.17 – Power Strips

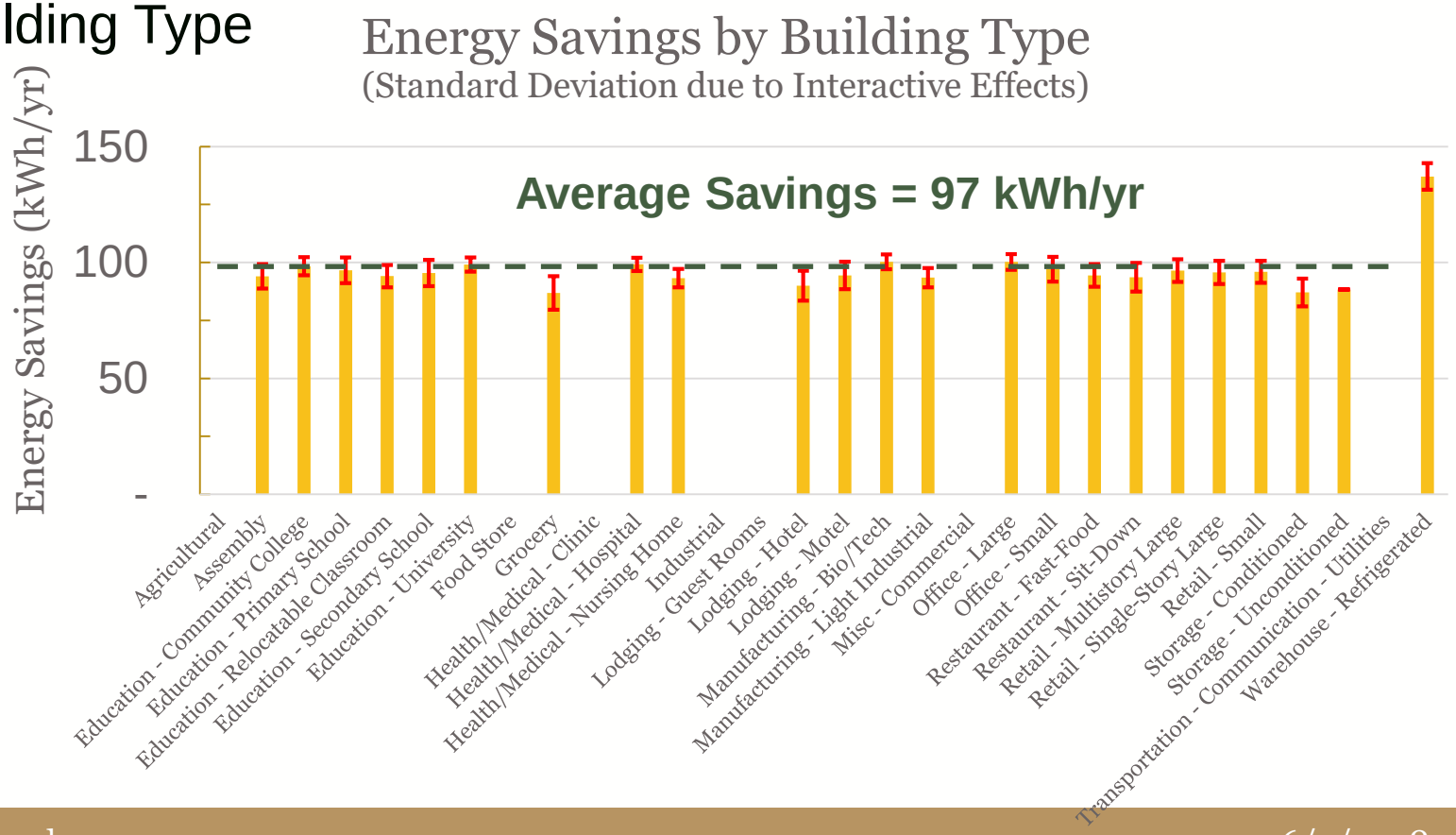
- Smart Power Strips vs. Tier 2 Advanced
  - Differentiation based on features
    - “Tier 1” typically master-slave control (M/S)
    - Tier 2 uses IR and/or OS control, with or without M/S
    - Future iterations to include Wi-Fi connectivity/controllability, geo-fencing, etc.
  - Proposal: Consolidate into single Measure with savings permutations based on features
    - Would depend on savings modeling approach (Cal-Plug vs pre/post vs other).

7.16/7.17 – Power Strips

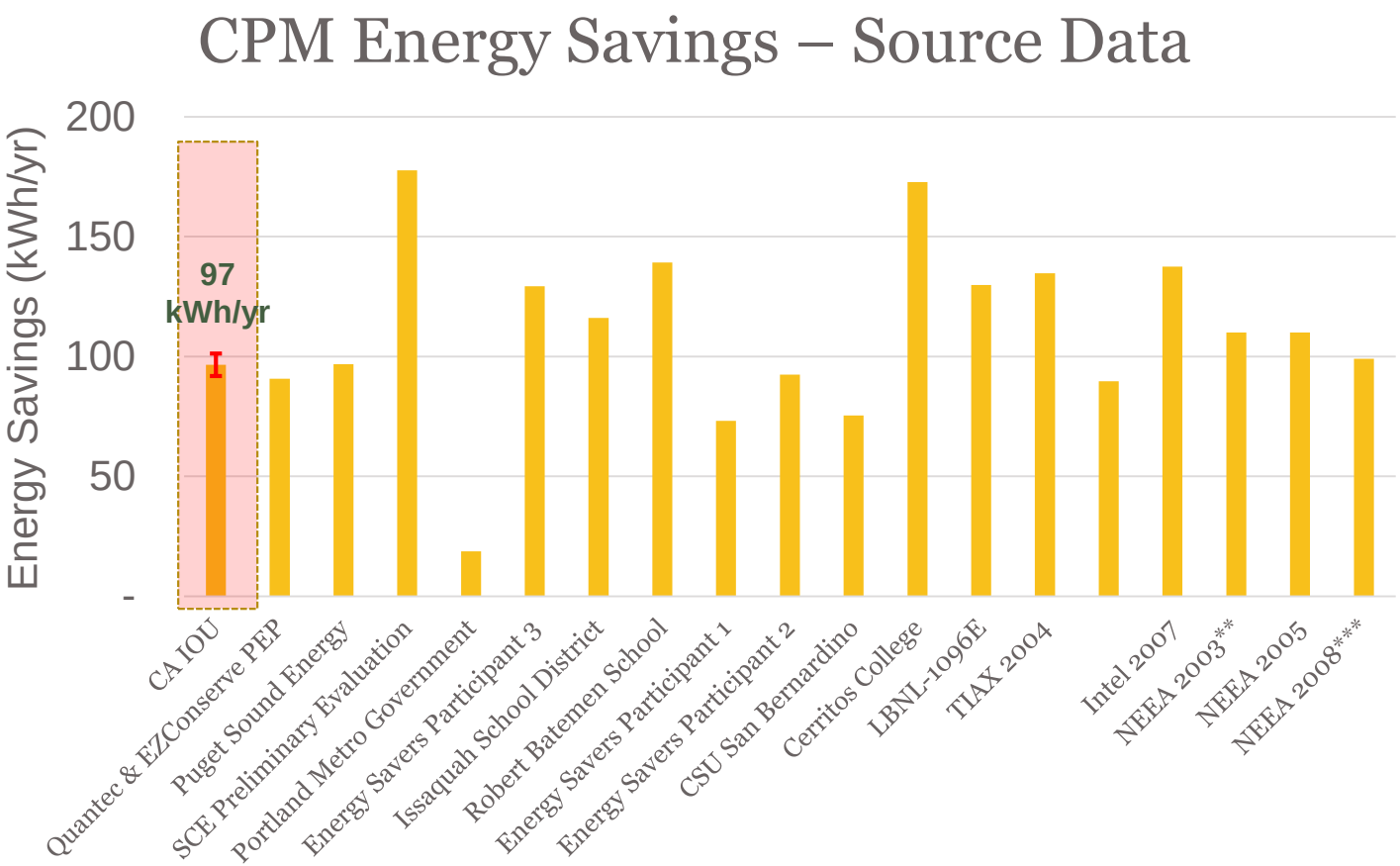
- Questions to Ponder
  - Do Tier 1 strips have to go through field trials like Tier 2 strips do?
  - How about new communicating Tier 2 APS devices?
    - Was the thought to integrate that measure into the workpaper, which has different product features and capabilities including meeting AB 793 requirements which the predecessor Tier 1 or Tier 2 APS devices are not required to adhere to AB 793 requirements?
  - Will the workpaper be updated to consider CalPlug's Qualified Products List (QPL) or CalPlug's 4-Phase Roadmap which includes lab and field testing before qualifying in utility rebate programs?
    - Assuming the 4-Phase Roadmap field trial approach is still the preferred method to prove savings, can manufacturers prove their savings in other jurisdictions and bring those savings to California for consideration?
    - If the 4-phase Roadmap field trial approach to prove up savings goes away, how does the current CalPlug QPL bench testing satisfy the rigor that was required in the past to substantiate energy savings claims?

7.15 – PC Management Software

- Examine parameters that effect savings:
  - Climate Zone / Interactive Effects (vary by CZ and PA)
  - Building Type

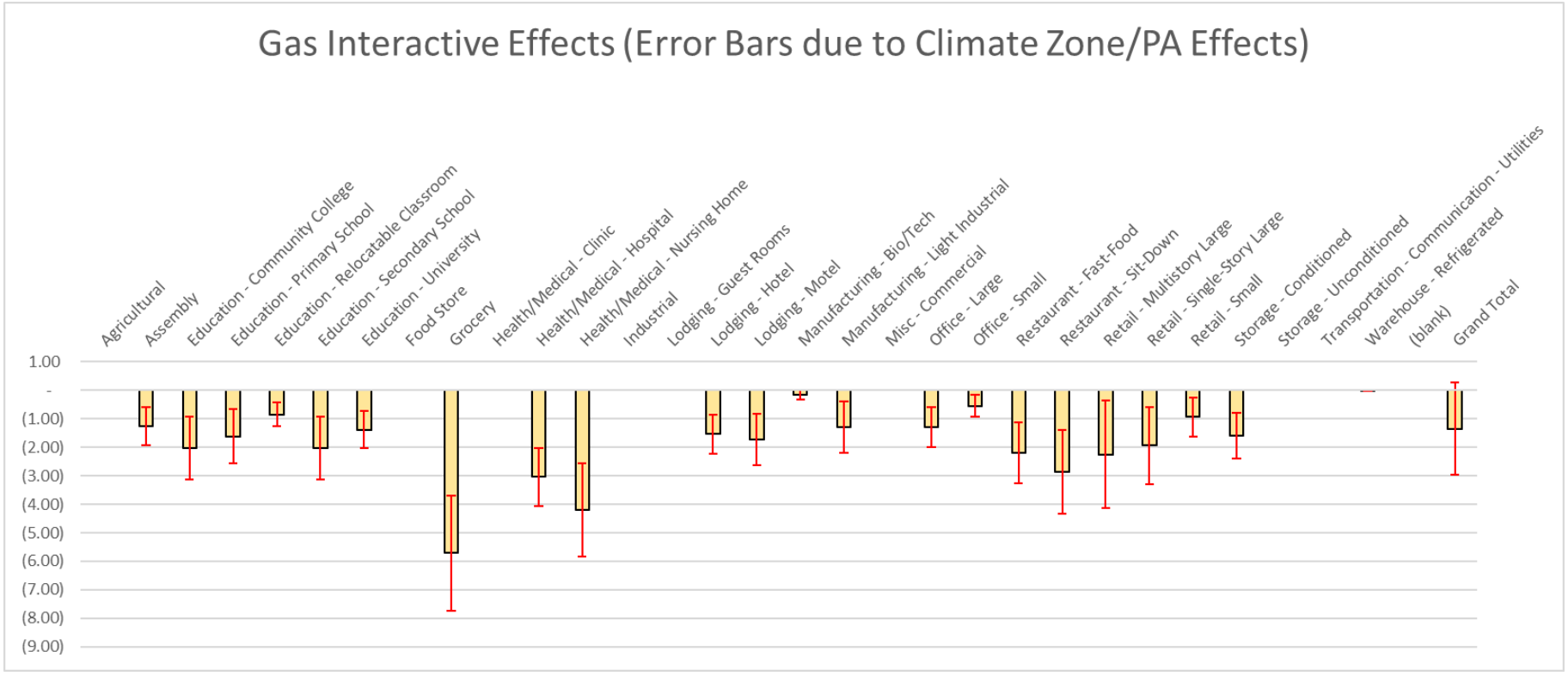


Measure Specific Issue
7.15 – PC Management Software



Gas – Interactive Effects

- 2010 Disposition requested interactive effects
  - Is the average value appropriate? -1.35 th (+/- 1.62 th)
  - Weighted average (based on 2016 claims): -1.69 th (+/- 0.91 th)



7.15 – PC Management Software

- Includes an annual reduction factor in savings.

These monitoring studies took place between 2000-06, and were installed primarily on desktop computers with Cathode Ray Tube (CRT) monitors. While the duty cycle data from these studies is likely to be still valid, there have been notable changes in monitor and desktop energy use since 2006. These changes have been primarily driven by the transition from CRT to LCD monitors and improvements in LCD monitor efficiency. Desktop computers have seen significant improvements in Sleep Mode Power, but have had limited gains in Active Mode energy use. Assuming an even stock turnover cycle, the average age of the installed desktop and monitor base is two years, or half of the EUL. This suggests that in the currently installed base, the average computer and desktop were purchased in 2014.

To account for these improvements from 2006 to 2014, we estimated a 5% annual reduction in savings, which corresponds to a 40% decrease in energy savings over the 2006-2014 period. This 5% figure is derived from average On Mode Power values taken from Energy Star Monitor lists during the 2006-2010 period.

- How is this 5% reduction accommodated? (annual update?)

7.01 / 7.02 - Energy Star Refrigerator

- DEER Basis Factor
  - What is it? Why does it exist?
    - Review of 11 TRMs from other states, none provide such an adjustment
      - Maine TRM applies 98.8% factor for in situ adjustment
      - New York derates saving by 20% IF old refrigerator is not recycled
  - Contributing factor to cost-effectiveness issue
- Tiered efficiency
  - ENERGY STAR
  - CEE Tier 2
  - ENERGY STAR Most Efficient
- Measure Cost
  - What is best approach? Hedonic cost model?

7.01 / 7.02 - Energy Star Refrigerator

- Refrigerator Efficiency Levels – Nationally Recognized Tiers
  - ENERGY STAR
    - Certified: ≥ 10% more efficient than Federal Standard
    - Most Efficient: ≥ 15% more efficient than Federal Standard
  - CEE
    - Tier 1: ≥ 10% more efficient than Federal Standard
    - Tier 2: ≥ 15% more efficient than Federal Standard
    - Tier 3: ≥ 20% more efficient than Federal Standard
  - Top 10
    - Qualified = one of ten most efficient models identified by TopTenUSA
    - Used by several programs in Northeast

Cross-Cutting Issue
"Connected" Measures

- Background:
  - Measures linked to AB793 / DR capabilities.
  - Savings for "connected" Measures matches the savings for standard Measures.
  - Additional savings are expected, but not yet claimed.
  - 2017/18 Measure: Refrigerators
  - 2018 Measure: Power Strips
  - Future Measures: Clothes Washers, Plugs, Home Bundle, Smart Hub, In-Home Display
- Question(s)
  - Should these "Smart/Connected" devices use deemed values or AMI data to document savings?
  - Should these become separate Measures or a new Offering within an existing Measure?

7.03 – Refrigerator/Freezer Recycling

- Offered by certain POUs, not sure about IOUs
- Savings methodology
  - From DEER
  - Simulation modeling?
  - Climate Zone specific
- Measure cost

7.05 – Energy Star Clothes Washers

- Workpaper Differences
  - MF-CA and Non-Res wash cycles/yr
    - MF-CA = 1,095 per 2015 Technical Support Document (TSD)
    - Non-Res = 1,497 per 2015 TSD
    - PG&E WP uses these values
    - SCE WP based on prior TSD
  - Differing Electric Savings between IOU
    - Appears to be due to Dryer and Water Heating share differences
      - Efficient washer wrings out more moisture from clothes, reducing dryer requirements
      - PG&E has largest overall percent of electric dryers

7.05 – Energy Star Clothes Washers

- RASS Summary by IOU

		Gas WH	Electric WH
PG&E	Gas Dryer	40%	0%
SCE		72%	0%
SDG&E		66%	1%
SCG		78%	0%
PG&E	Electric Dryer	58%	2%
SCE		21%	7%
SDG&E		31%	1%
SCG		21%	1%

Source: Clothes Washers Calculations_R6.xls (PG&E)

Cross-Cutting Issue
Retail Products Platform (RPP)

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- Background:
  - RPP is Midstream Program
  - In CA, PG&E and SMUD are currently offering RPP
  - Products and tiers decided by national task force (with 10 utility sponsors, and growing to 13-15 in 2018)
  - Is a “Market Transformation” program, but operating in a “Resource Acquisition” framework
  - Net-to-Gross – follows a Bass Diffusion Model
  - Cost – re-calculated annually using hedonic price modeling from a web-harvesting tool that runs periodically throughout the year.
  - Savings – methodology matches the methodologies used for a “Resource Acquisition” program.

Cross-Cutting Issue
Retail Products Platform (RPP)

- Background (*continued*):
  - Includes:
    - Freezers
    - Electric Clothes Dryers
    - Gas Clothes Dryers
    - Room Air Cleaners
    - Soundbars
    - Room Air Conditioners
    - Refrigerators
    - Clothes Washers
  - Additional Measures expected to be added in 2018.
    - Dehumidifiers and UHD-TVs
- Question(s):
  - Should RPP Measures be grouped together?

    OR
  - Should RPP Measures simply be another market delivery channel (like Direct Install)?

Next Call and Next Steps

- Follow up on issues from today's call
- Address other measures not discussed today
  - Dishwashers
  - Clothes Dryers
  - Other

Appendix: Support Data

- Refrigerator TRM Review

State	Uses DOE Test Method	Applies Adjustment to Unit Savings	Comment
Connecticut	Yes	No	
Hawaii	Yes	No	
Maine	Yes	Yes	98.8% factor based on in situ metering versus DOE calculation study
Massachusetts	Yes	No	
Minnesota	Yes	No	
New York	Yes	Yes	If old refrigerator not recycled, applies 80% "Market Effects" factor to savings
Pennsylvania	Yes	No	
Rhode Island	Yes	No	
Texas	Yes	No	
Vermont	Yes	No	
Illinois	Yes	No	

Appendix: Support Data

- PG&E RASS Data – Clothes Dryer

DHW Fuel	NO DRYER	NATURAL GAS DRYER	ELECTRIC DRYER	BOTTLED GAS DRYER	NO RESPONSE	NOT APPLICABLE	Total
Natural Gas	471	1,787	2,572	3*	10*	499	5,342
	8.80%	33.50%	48.10%	0.1%*	0.2%*	9.30%	100%
Electric	15*	10	73			38	136
	11.0%*	7.4%*	53.70%			27.90%	100%
Propane	4*	2*	7*	5*		9*	27
	14.8%*	7.4%*	25.9%*	18.5%*		33.3%*	100%
Solar		1*	1*				2
		50.0%*	50.0%*				100%
Other						2*	2
						100.0%*	100%
Total	490	1,800	2,653	8	10	548	5,509
	8.90%	32.70%	48.20%	0.10%	0.20%	9.90%	100%

Appendix: Support Data

- SCE RASS Data – Clothes Dryer

DHW Fuel	NO DRYER	NATURAL GAS DRYER	ELECTRIC DRYER	BOTTLED GAS DRYER	NO RESPONSE	NOT APPLICABLE	Total
Natural Gas	790	5,443	1,615	17*	21*	1,031	8,917
	8.90%	61.00%	18.10%	0.2%*	0.2%*	11.60%	100%
Electric	94	32	497	11*	11*	317	962
	9.80%	3.30%	51.70%	1.1%*	1.1%*	33.00%	100%
Propane	62	5*	138	179		48	432
	14.40%	1.2%*	31.90%	41.40%		11.10%	100%
Solar						1*	1
						100.0%*	100%
Other	1*		1*			6*	8
	12.5%*		12.5%*			75.0%*	100%
Total	947	5,480	2,251	207	32	1,403	10,320
	9.20%	53.10%	21.80%	2.00%	0.30%	13.60%	100%

Appendix: Support Data

- SCG RASS Data – Clothes Dryer

DHW Fuel	NO DRYER	NATURAL GAS DRYER	ELECTRIC DRYER	BOTTLED GAS DRYER	NO RESPONSE	NOT APPLICABLE	Total
Natural Gas	861	6,181	1,648	10*	22*	1,025	9,747
	8.80%	63.40%	16.90%	0.1%*	0.2%*	10.50%	100%
Electric	17*	33	58			38	146
	11.6%*	22.60%	39.70%			26.00%	100%
Propane		4*	2*			4*	10
		40.0%*	20.0%*			40.0%*	100%
Solar						1*	1
						100.0%*	100%
Other		1*	1*			5*	7
		14.3%*	14.3%*			71.4%*	100%
Total	878	6,219	1,709	10	22	1,073	9,911
	8.90%	62.70%	17.20%	0.10%	0.20%	10.80%	100%

Appendix: Support Data

- SDG&E RASS Data – Clothes Dryer

DHW Fuel	NO DRYER	NATURAL GAS DRYER	ELECTRIC DRYER	BOTTLED GAS DRYER	NO RESPONSE	NOT APPLICABLE	Total
Natural Gas	71,366	426,196	200,691	118*	474*	110,385	809,230
	8.80%	52.70%	24.80%	0.0%*	0.1%*	13.60%	100%
Electric	442*	5,877	9,126			7,203*	22,648
	2.0%*	25.9%*	40.30%			31.8%*	100%
Propane			120*	108*		355*	583
			20.6%*	18.5%*		60.9%*	100%
Solar							
Other		108*					108
		100.0%*					100%
Total	71,808	432,181	209,937	226	474	117,942	832,568
	8.60%	51.90%	25.20%	0.00%	0.10%	14.20%	100%