Subcommittee Meeting #2
Appliance/Plug Load

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Objective

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

Meeting #1

- Discussed following measures
  - Smart Power Strips (Tier 1 and Tier 2)
  - Retail Products Platform
  - PC Power Management
  - ENERGY STAR Refrigerators
  - Appliance Recycling

Meeting #1 follow-up items

- RPP
  - Do further research on multi-state aspects of program
  - Look at potential evaluation impacts if RPP is split into measures
- PC Power Management
  - Review evaluations, other research to inform position regarding annual savings degradation factor
- Smart Power Strips
  - Review CalPlug specifications and test approach
- ENERGY STAR Refrigerators
  - Come to resolution regarding “DEER Adjustment Factor”

Meeting #2

- Agenda
  - Continue discussion on RPP
  - Review Additional Measures
    - ENERGY STAR Clothes Washers
    - ENERGY STAR Clothes Dryers
    - ENERGY STAR Dishwashers
    - Vending Machine and Beverage Case Control
  - Follow-up discussion topics
    - PC Energy Management
    - Smart Power Strips
    - ENERGY STAR Refrigerators

Cross-Cutting Issue
Retail Products Platform (RPP)

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- Background:
  - PG&E and SMUD are currently offering RPP.
  - Operates as a “Market Transformation” program, not a “Resource Acquisition” program
  - 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
  - Additional Measures to be added for 2017.
    - Refrigerators
    - Clothes Washers
  - Proposed Measures for 2018
    - Dehumidifiers
  - General principle is to add two measures annually

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)

7.04 – Energy Star Clothes Dryers

- Workpaper Differences (Standalone vs. RPP)
  - Savings methods aligned between workpapers
    - Rely on DOE methods
    - RPP savings corrected in compliance revision to incorporate final moisture content per DOE test procedure, plus use interactive heat gain guidance from Staff
  - Minor difference in permutation quantity
    - Standalone Dryer template has single value for all dryers
    - RPP has 13 permutations
    - It appears that the RPP dryer is more developed in this regard
  - Minor differences for costs
    - Tier 1 Incremental Cost
      - $49.50 for standalone Dryer measure
      - $84 for Dryer in RPP
  - Different NTG
    - 0.55 for ENERGY STAR dryer - standalone
    - 0.70 for ES Emerging Technology Award dryer – standalone
    - 0.20 for dryers under RPP (per Staff Disposition)

7.04 – Energy Star Clothes Dryers

- Recommendation – Where workpapers differ,
  - Adopt RPP Dryer Measure calculations
  - Adopt RPP Dryer Measure costs
  - Adopt Standalone Dryer NTG ratios for non-RPP delivery mechanisms
    - RPP NTG trajectory is likely outside scope of this subcommittee

7.12 – Energy Star Dishwasher

- No current Work Paper for this measure
  - Measure is in DEER
    - Negative kWh savings
    - Mixed kW reductions
    - PositiveTherm savings
    - Unclear what methodology/source was used to achieve these values
  - Measure is in POU TRM
    - ENERGY STAR qualified dishwashers
      - 37 kWh/yr (electric water heater)
      - 16 kWh/yr, 0.93 therm/yr (gas water heater)

7.12 – Energy Star Dishwasher

- DOE Dishwasher Standard assumes electric water heating
  - Nearly half of energy usage in test method is for water heating
  - Most efficiency gains above code arise from reducing hot water use
    - Reduce sump volume in dish machine tub
    - Improve water filtration within dishwasher
    - Optimize spray arm and nozzle configuration
    - Incorporate heater into base of tub
  - Generally these will increase the amount of energy used by the machine itself
  - Other actions could reduce machine use
    - Increase insulation of machine to retain more heat
    - Use Permanent Magnet Motor for impeller drive
    - Improved and more sophisticated controls

7.12 – Energy Star Dishwasher

- ENERGY STAR calculator assumes reduction in machine energy use
  - 0.42 kWh/cycle versus 0.45 kWh/cycle for DOE compliant
- ENERGY STAR qualified list 80 standard-size models with positive machine energy savings
  - 43 models meet ENERGY STAR Most Efficient criteria
- ENERGY STAR Most Efficient list contains 53 models
  - 10 models have negative machine savings
  - 37 models that do not meet Most Efficient criteria show positive machine savings

- Proposal
  - Migrate from DEER to eTRM
  - Parse out machine savings from total savings
  - Consider working with CEE to establish a Tier 2 standard

7.18 – Vending Machine Controller

- Add-on control for vending machines and beverage coolers
- Uses occupancy sensor technology to shut off lighting and reduce compressor operation
  - Variant uses “sales-based intelligence” to control cooling system operation
- Current work paper uses 4 hours/day for hours-of-use reduction (per DEER 2004-05)
  - Corresponds to 16.67% reduction in energy use
  - Most other TRMs around the country use 46% reduction, which is largely based on one vendor’s claims
  - Wisconsin Focus on Energy cites three studies in support of the 46% value
    - Texas A&M campus study
    - Michigan Energy Office (case study 05-0042)
    - E-Source review (document ER-00-12)
  - Has any valid metering study been done in California to update the DEER value?

7.18 – Vending Machine Controller

- POU TRM relies on same data as other states' TRMs to arrive at much larger savings versus Work Paper
- Massachusetts TRM notes that measure is not eligible for installation on ENERGY STAR qualified vending machines, as they already have control capability built-in

Proposal:

- Approve current workpaper for migration to eTRM
- Conduct research to update hours-of-use reduction

Next Call and Next Steps

- Follow up on issues from today's call
- Attempt to attain consensus on outstanding measures

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

- SDGE 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%

Appendix: Support Data

- Standard-size Dishwasher Consumption

Level	Energy Use (kWh/yr)	Water Use (gal/cyc)	Standby Power (W)	Per Cycle Energy Use Component		
				Total (kWh/cyc)	Water Heating (kWh/cyc)	Machine + Drying (kWh/cyc)
Baseline	307	5.00	0.0	1.43	0.82	0.61
1	295	4.25	0.5	1.35	0.70	0.65
2	280	3.50	0.5	1.28	0.58	0.70
3	234	3.10	0.5	1.07	0.51	0.56
4	180	2.22	0.5	0.82	0.37	0.45
TSD inputs						
Cycles per Year		215				
Standby Hours		8,551	hr/yr			
Csp(water)		0.0024	kWh/gal-F			
T(rise)		70	F			
Eff(water heater,elec)		102%	issue with TSD assumption			

Recreated from Table 7.2.3 of TSD