

Water Heating Subcommittee Measure Consolidation



CALIFORNIA

TECHNICAL FORUM

**AL LUTZ
AYAD AL-SHAikh
OCTOBER 5, 2017**

Subcommittee Timeline

	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 / TPP																																						
Commercial Refrigeration																																				tbd	20	0
Food Service																																				tbd	15	0
Agriculture / Pumps																																				tbd	5	1
Lighting																																				tbd	11	42
HVAC																																				tbd	2	50
Water Heating																																				2	22	0
Appliance or Plug Load																																				tbd	10	12
Building Envelope																																					0	4
Pools																																				2	1	5
Process																																					0	7
Miscellaneous																																				tbd	2	4
Low Income Measures																																						

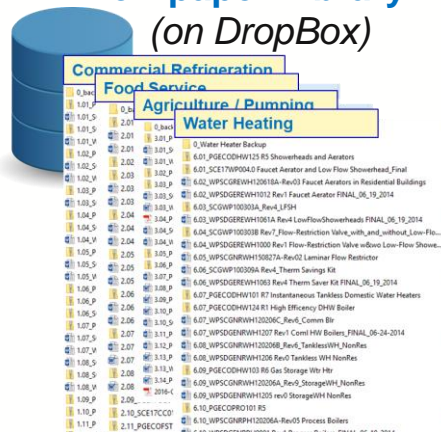
Green numbers = Number of Measures; Blue numbers: 1=First Review / 2 = Affirmation.

Subcommittee Process

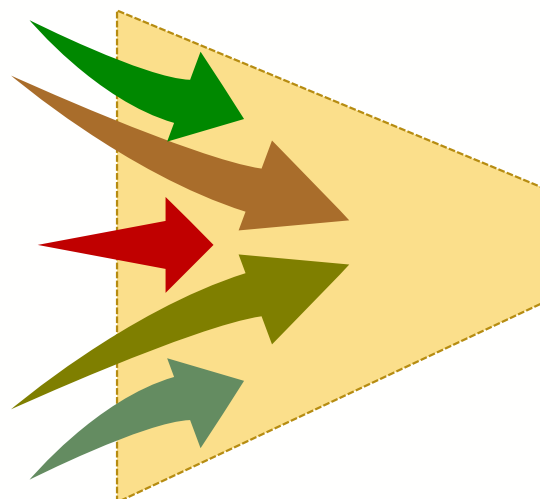
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1. Workpaper Library

(on DropBox)



Subcommittee Process



Consolidated Text Files



Consolidated Data Files



2. EE Stats: 2016 Portfolio Savings

- PA, Program
- End-Use, Sub-End-Use
- Climate Zone, Zip Code

3. CEDARS: 2016 Deemed Savings

- Workpaper
- Offering



4. Ex Ante Measure Tables:

- Impact -> Permutations
- Measure
- Implementation
- Measure Cost

5. New Data



Cal TF Members
IOU Representatives
CPUC Representatives
POU Representatives
Industry Experts

Goals – Water Heating

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- Final Goals

- eTRM measures – Consolidated Text and Data files
 - Data Specification Sheets

- Goals for Today

- Brief overview of consolidated text files – progress and expected updates
- Describe the Offerings and Overlap
- Suggest Separation and Consolidation
- Additions or Deletions of Measure (or move to 2018/2019)
 - ✦ Process Boilers (Custom treatment)?
 - ✦ HW Thermostatic Valves, Tank Insulation – Small measures?
 - ✦ Other measures that need to be included – Commercial Aerators and Showerheads (SCG in progress). Timeclock Pump Control?
- Agree on Measure Structure
- Not Included Today
 - ✦ Cost Effectiveness changes (TRC) – CET tool vs. E3 calculator
 - ✦ Quantification of savings changes
 - ✦ Costs

Subcommittee Materials – Process

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- Category Summary File
 - Measure Review
 - Cross-Cutting Issues
 - Measure-Specific Issues
- Category Savings Perspective
- Subcommittee Team List
- Listing / Library of Workpapers

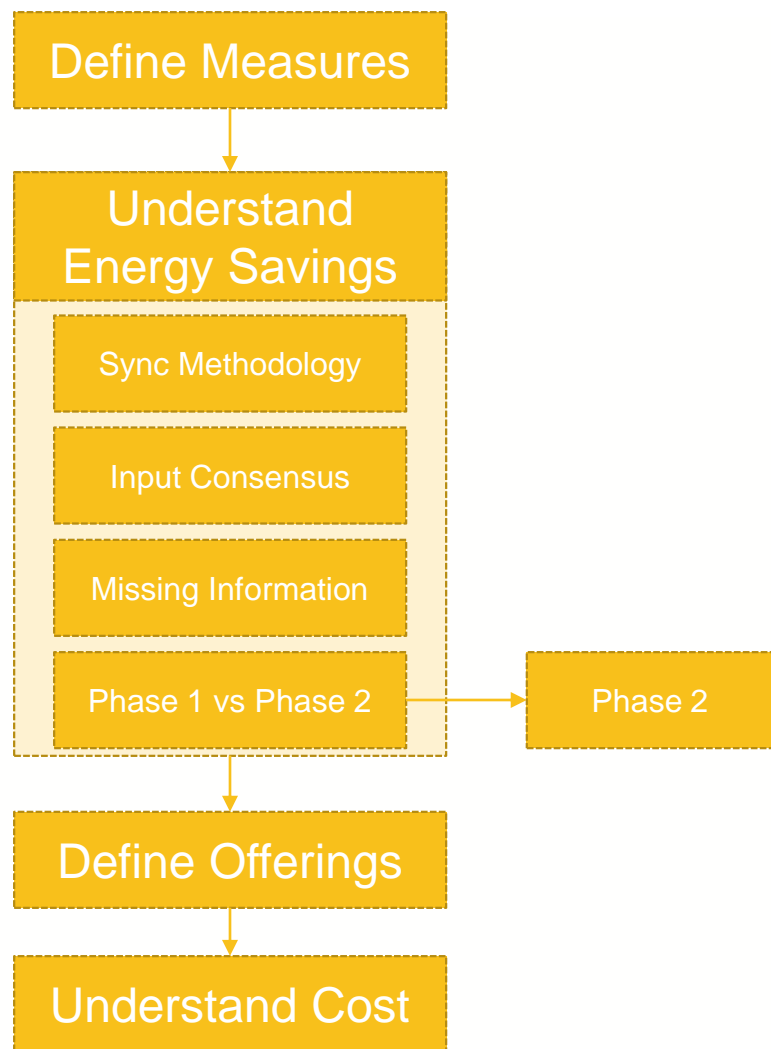
SubCommittee Members

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Water Heating Consolidation Overview

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- Workpaper Descriptions / Savings
 - ❑ Modeled in DEERs – some custom
- Defining Measures
 - ❑ Flow Changes
 - ❑ Boiler / Heater Efficiencies
 - ❑ Controls
 - ❑ Insulation
- Input consensus needed
 - ❑ Permutation / Implementation fields
 - ❑ Offerings
 - ❑ Cost
- Missing information:
 - ❑ Building vintage savings permutations – any?
 - ❑ DEER inputs
 - ❑ DR for Electric Water Heaters – (Grid enabled?)
 - ❑ Gas/electric fuel switching? 3 prong test and all GHG impacts (leaks, fuel mix, etc.)
 - ❑ Other?
- Phase 2
 - ❑ TBD

Define SWH / DHW Measures

Original Measure List

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No.		Measure Names	Plan	PG&E	SCE	SDG&E	SCG	POU
6.01	Flow	Faucet Aerator and Low Flow Showerhead	2017					
6.02		Faucet Aerators for Bathroom/Kitchen Sinks in Residential Buildings	2017					
6.03		Low-Flow Showerheads	2017					
6.04		Temp-Initiated Shower Flow Restr. Valve w&w/o LF Showerhead	2018					
6.05		Laminar Flow Restrictor	2017					
6.06		Therm Savings Kit	2018					
6.07	Water Heaters	Boiler, Commercial	2017					
6.08		Tankless, Commercial	2017					
6.09		Storage Water Heater, Commercial	2017					
6.10		Boiler, Process	2017					
6.11		Direct Contact Water Heater, Process	2017					
6.12		Boiler, Multi-Family	2017					
6.13		Central Storage Water Heater, MF	2017					
6.14		Storage Water Heater, Residential	2017					
6.15		Tankless, Residential	2017					
6.16		Heat Pump Water Heater	2017					
6.17	Controls	Commercial Boiler Water Heating Control System	2018					
6.18		Demand Control for Centralized Water Heater Recirculation Pump	2017					
6.19		Multifamily DHW RCx, Training, and Boiler Reset Controller	2017					
6.20	Insul.	MF Central Recirc System Pipewrap	2018					
6.21		Hot Water Line Insulation Electric/Gas	2017					
6.22		Tank Insulation	n/a					
6.23	New	Faucet Aerators for Bathroom/Kitchen Sinks, Commercial	n/a					
6.24		Low-Flow Showerheads, Commercial	n/a					
6.25		Recirculation Pump Time Clocks	2017					

 Lead Workpaper
 Supporting Workpaper

SHW / DHW Measures

Representative Measure Savings Claims

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No.	Name	Sum of NumUnits	Energy (kWh/yr)	Demand (kW)	Energy (therms/yr)
6.01	Faucet Aerator and Low Flow Showerhead	18,822	42,306	4.25	18,852
6.02	Faucet Aerators for Bathroom/Kitchen Sinks in Residential Buildings	232,384	30	0.00	397,107
6.03	Low-Flow Showerheads	83,141	0	0.00	493,980
6.04	Temp-Initiated Shower Flow Restr. Valve w&w/o LF Showerhead	8,637	0	0.00	13,461
6.06	Therm Savings Kit	139,674	0	0.00	971,101
6.07	Boiler, Commercial	394,267	33,809	0.94	717,657
6.08	Tankless, Commercial	32,928	(16,629)	0.03	135,539
6.09	Storage Water Heater, Commercial	205,301	0	0.00	324,740
6.10	Boiler, Process	419,761	0	0.00	484,035
6.12	Boiler, Multi-Family	18,395	0	0.00	28,089
6.13	Central Storage Water Heater, MF	5,798	0	0.00	6,389
6.14	Storage Water Heater, Residential	14,980	18,354	1.79	305,457
6.15	Tankless, Residential	109,485	38,451	12.51	449,694
6.16	Heat Pump Water Heater	506	842,354	181.61	0
6.18	Demand Control for Centralized Water Heater Recirculation Pump	16,089	440,908	48.97	349,389
6.21	Hot Water Line Insulation Electric/Gas	64,080	0	0.00	1,024,128
6.22	Tank Insulation	18,707	0	0.00	186,005
Grand Total		1,782,954	1,399,584	250.10	5,905,622

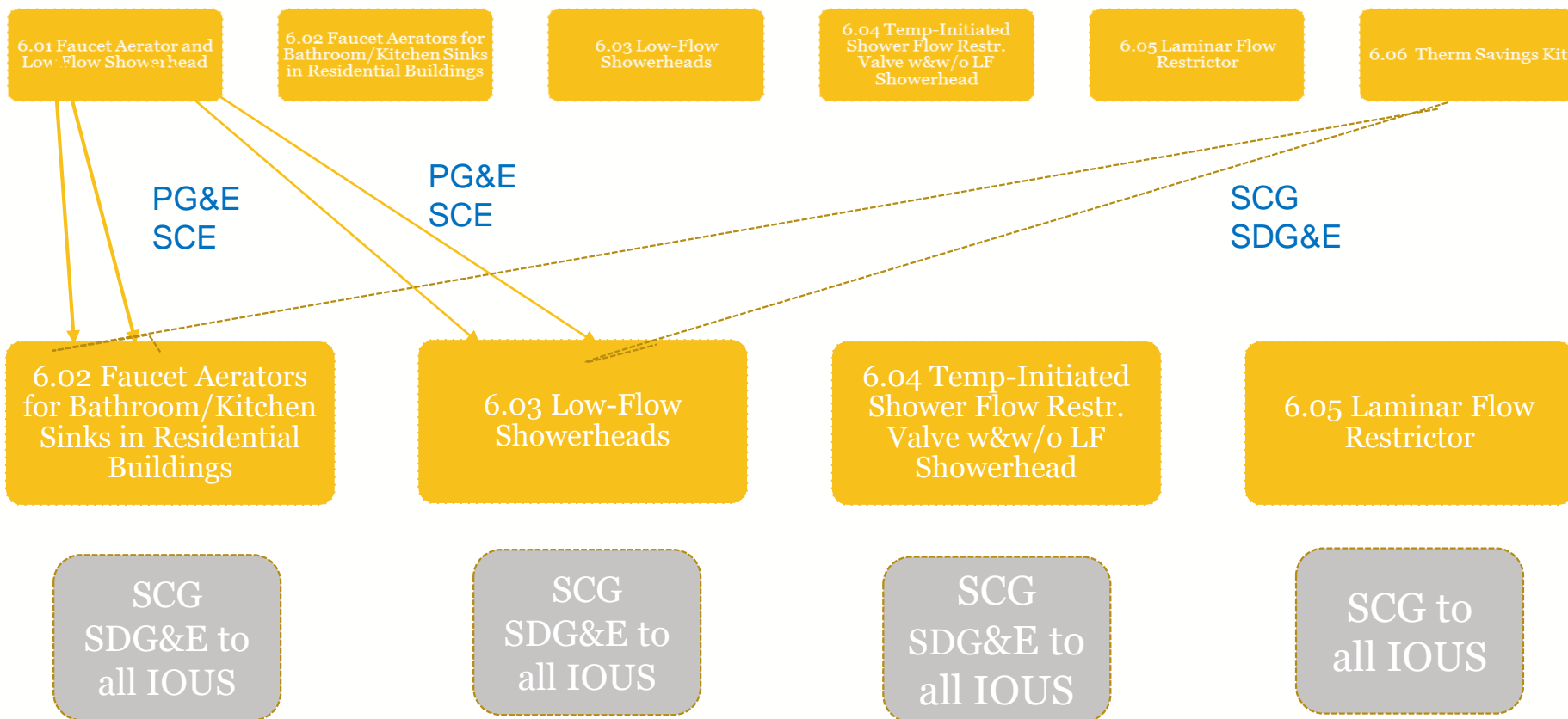
Representative as claims track to IOU WPs – not all proposed eTRM numbers included. May also have had zero claims in 2016.

6.01 thru 6.06 – Flow Restriction / Water Reduction Measures

- Offerings
 - All residential except 6.05 – laminar flow restrictors
 - Includes MF and sometimes DMo – double wide mobile home
 - Mix of Direct Install (DI) and Some Up and Downstream Rebate
- Ex Ante Measure Tables
 - Building Type
 - ✦ SFm, MFm, Dmo (6.05 – Hospital, Clinics, Nursing Home)
 - Building Vintage
 - ✦ Any
 - Building Location
 - ✦ Any (varies for some IOUs by climate zone)
 - Building HVAC
 - ✦ Any (or Res-weighted rWtd)

6.01 thru 6.06 – Flow Restriction Measure- Possible Consolidation

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Includes POUs!

6.01 thru 6.06 – Flow Restriction Measures

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- Resolving Issues

- ❑ Collapse to only Aerators and Showerheads? IOUs can offer combinations tracking back to eTRM values
 - ✦ Addresses problems with Baseline Type (ER/RET or ROB vs. REA for aerators)
- ❑ Allow multiple measure efficiencies – incl. all code compliant (current)??
- ❑ Any reason to separate MF?
- ❑ Include Climate Zone Variation (+/- 15% maximum)?
- ❑ Consensus on Delivery Type – changes GSIA and NTG values
- ❑ Addressing embodied energy in water – water reduction given for some measures
- ❑ Add Commercial measures for aerators and showerheads
 - ✦ Smaller Commercial can be hard to reach – big opportunity (lodging, rest., etc.)
 - ✦ Many building types / permutations – Separate eTRM measures??
- ❑ Keep Temp Initiated Thermostatic Valve in eTRM?

6.01 thru 6.06 – Flow Restriction / Water Reduction Measures

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- Other Measures

- Include 6.04 – Thermostatic Valves (only SCG and SDG&E currently)
 - ✦ Separate tub spout and shower diverter submeasures?

- Extensions of Existing Measures

- Extend 6.05 – Laminar Flow Restrictors - for all IOUs / POUs (currently only SCG)

6.07 thru 6.16 – Hot Water Heaters and Boilers

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- 6.07 Boiler, Commercial
- 6.08 Tankless, Commercial
- 6.09 Storage Water Heater, Commercial
- 6.10 Boiler, Process
- 6.11 Direct Contact Water Heater, Process
- 6.12 Boiler, Multi-Family
- 6.13 Central Storage Water Heater, MF
- 6.14 Storage Water Heater, Residential
- 6.15 Tankless, Residential
- 6.16 Heat Pump Water Heater

6.07 thru 6.16 – Hot Water Heaters and Boilers

- **Offerings**

- ❑ Majority are already grouped separately - Residential and Commercial
- ❑ Multifamily with Residential typically **(not always)** and sometimes DMO – double wide mobile home – SMO not used
- ❑ MultiFamily sometimes standalone
- ❑ Mix of Direct Install (DI) and Some Up and Downstream Rebate

- **Ex Ante Measure Tables**

- ❑ Building Type
 - ✦ SFm, MFm, DMO or Com
- ❑ Building Vintage
 - ✦ Ex or Any Building Location
 - ✦ Any for SCG (varies for other IOUs by climate zone)
- ❑ Building HVAC
 - ✦ Any [or Res-weighted (rWtd) or Com Weighted (cWtd)]

6.07 to 6.16 – Hot Water Heaters / Boilers

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HEATERS ONLY - Storage (6.09, 6.14)

- Storage Water Heaters – EI and Gas
 - ❑ 2 WPs for Residential (PG&E, SDG&E), 3 Workpapers (WPs) for Commercial (PG&E, SCG, SDG&E)
 - ❑ Commercial base and measure efficiencies based on small or large size
 - ❑ SHOULD ALIGN DEFINITIONS WITH FEDERAL AND CA TITLE 20 CODES ??? CEE STANDARDS APPLY? AFFECTS BASE EFFICIENCIES
 - ✦ SMALL STORAGE HEATER < 75 kbtuh OR < 12 kW EI. OR < 24 Amps HPWH
 - ✦ Note that Title 24 does not separate into residential and commercial
 - ❑ PG&E WP CONTAINS TANKLESS – SHOULD WE SEPARATE?

6.07 to 6.16 – Hot Water Heaters / Boilers

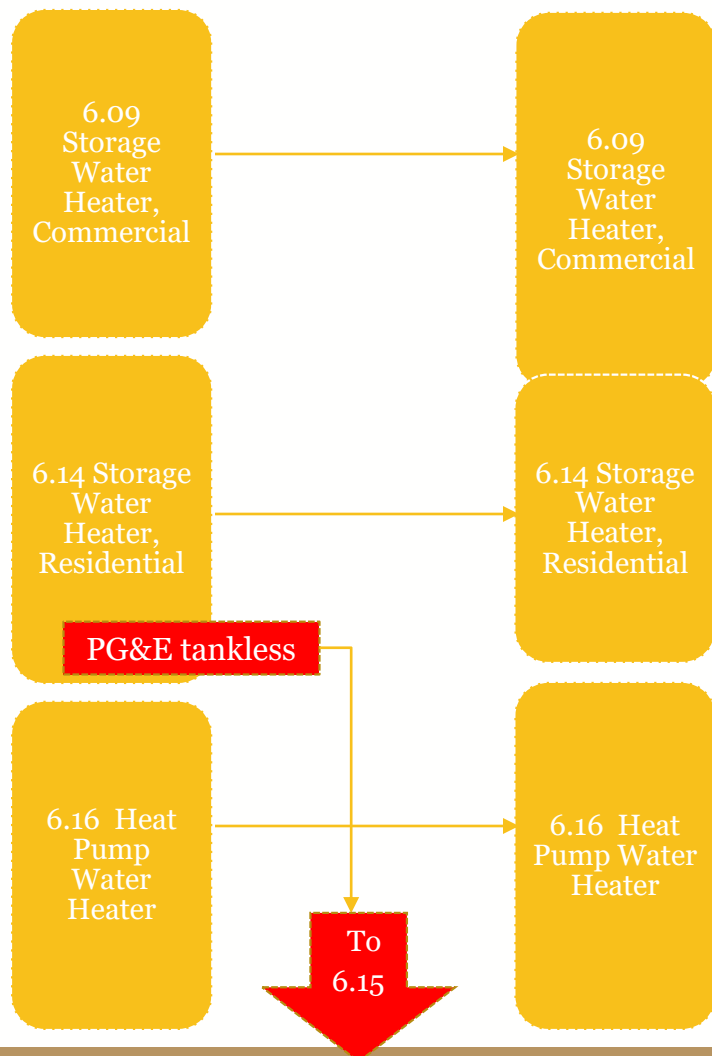
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HEATERS ONLY - Heat Pump Water Heater (6.16)

- Heat Pump Water Heater – Electric Only
 - ❑ 2 WPs for Residential (SCE, SDG&E), 1 Workpaper for Residential and Residential Sized units in commercial applications (PG&E)
 - ❑ Use market baseline (what is available in the CA market) or code?
 - ❑ Some ROB offerings – some NC also. Include NC for all ???
 - ❑ **SHOULD ALIGN DEFINITIONS WITH FEDERAL AND CA TITLE 20 CODES ????? AFFECTS BASE EFFICIENCIES?? CEE STANDARDS APPLY? Small HPWH < 24 Amps. No rating for large?**
 - ❑ **PG&E WP CONTAINS COMMERCIAL – SHOULD WE EXPAND FOR ALL? How do we deal with HOU / profile?**

6.09, 6.14, and 6.16 – Storage Hot Water Heaters

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PG&E No Small Size, One Large Tier
SCG/SDG&E – 1 Small, 2 Large Eff. Tiers

Consolidate on Tiers and Efficiencies, Expand to Electric (no TE standard for Large >12 kW)

PG&E Small Only, 3 gal size electric, and tankless
SDG&E – Small Only, 4 gal sizes electric 3 sizes gas

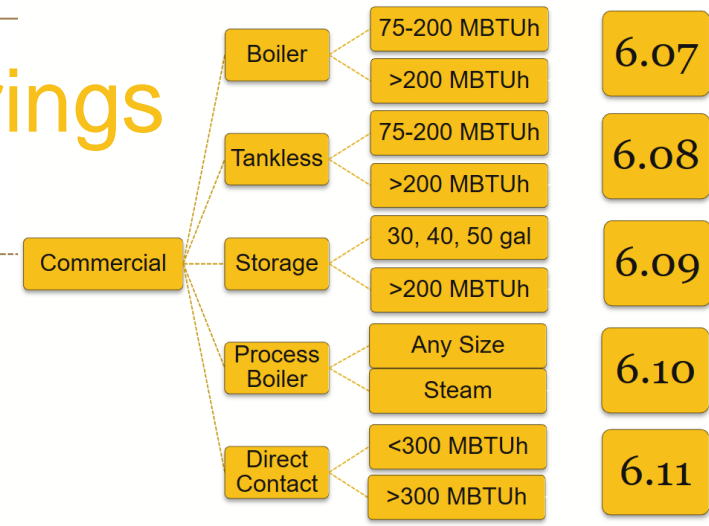
Move PG&E tankless to 6.15, Consolidate on Sizes and Efficiencies per CA T20, Include Electric

PG&E, SCE, SDG&E
40, 50, 60, 75, 75 + gal (varies)
Limited Com for PG&E

Consolidate on Tiers and Efficiencies, Include Com?, Expand to POUs

Commercial Hot Water Offerings

No.	PG&E	SCG	SDG&E	SCE	Commercial	Capacity	Efficiency
6.07	x				Comm Boiler	Small (>75MBTU/h)	>90% TE
6.07		x	x			Small/Med (<=200MBTU/h)	>=84% EF
6.07		x	x				>=90% EF
6.07		x	x			Large (>200MBTU/h)	>=84% TE
6.07		x	x				>=90% TE
6.07	x						>=85% TE
6.07	x						>=90% TE
6.08		x			Comm Tankless	Small/Med (<=200MBTU/h)	>=82% EF
6.08			x				>=80% EF
6.08		x	x				>=90% EF
6.08		x	x			Large (>200MBTU/h)	>=80% TE
6.08		x	x				>=90% TE
6.09		x			Comm Storage	Small, 30g (<=75MBTU/h)	>=70% EF
6.09		x				40 gal	>=67% EF
6.09		x				50 gal	>=67% EF
6.09			x			Small, 30g (<=75MBTU/h)	>=67% EF
6.09			x			40 gal	>=65% EF
6.09			x			50 gal	>=64% EF
6.09			x			60 gal	>=62% EF
6.09			x			75 gal	>=59% EF
6.09		x	x			Large (>75MBTU/h)	>=83% TE
6.09	x	x	x				>=90% TE
6.10	x	x	x		Process Boiler	(<20,000MBTU/h)	>=85% CE / >=83% TE
6.10		x	x			(<20,000MBTU/h)	>=90% CE / >=88% TE
6.10	x	x	x			Steam	>83% CE
6.11	x		x		Direct Contact	<300MBTU/h	>= 88% AFUE
6.11	x		x			>300MBTU/h	>=90% TE



- Com Boiler, Large Tier 1,
 - Min efficiency
- Tankless, Small Tier 1
 - Min efficiency
- Storage,
 - Small offerings (#, %EF)
 - Large Tier 1
- Process Boiler
 - Tier 2 Offering for HW
- Direct Contact
 - Tier 2 min efficiency
 - SCG offers through Proc Boiler

6.07 to 6.16 – Hot Water Heaters / Boilers

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HEATERS ONLY - Instantaneous (6.08, 6.15)

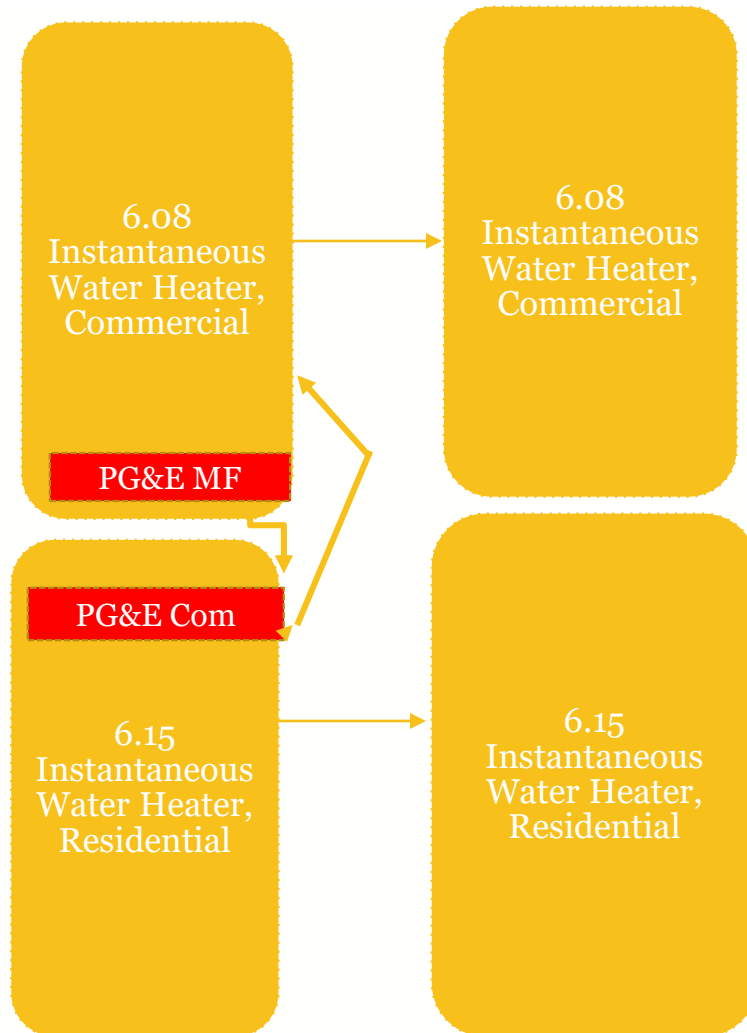
- Instantaneous Water Heaters (aka Tankless)

(Consolidate on Instantaneous - conform with codes)

- 2 WPs for Residential (PG&E/SCG), 3 WPs for Commercial (PG&E/SCG/SDG&E)
- Commercial base and measure efficiencies based on small or large size
- SHOULD ALIGN DEFINITIONS WITH FEDERAL AND CA TITLE 20 CODES ???? CEE STANDARDS APPLY? Changes in text – minor.
 - ✦ **SMALL INSTANTANEOUS < 210,000 Btu/hr in CA Title 20**
- PG&E WP CONTAINS Multi-Family – SHOULD WE SEPARATE ?????
- SCG HAS ADDITIONAL TIERS FOR MEASURE EFFICIENCIES – SHOULD WE INCLUDE ????????

6.08 and 6.15 – Instantaneous Heaters

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PG&E – MF incl., 2 large Tiers
SCG/SDG&E – 2 Small, 2 Large
Eff. Tiers – MF not included.
SDG&E – Com
SCG Com, Ind, Ag

*Consolidate on Tiers and Efficiencies per CA T20,
Expand to Electric ??? Move MF to 6.15 ? Include
Ind And Ag for all IOUs? Offer MF to SDG&E?*

PG&E - All Res and Comm
Small and Large, 1 Tier each
SCG – SF/MF - 2 Tiers Small, 1
Tier Large

*Move PG&E Com to 6.08, Consolidate on Sizes
and Efficiencies per CA T20, Include Electric ???*

6.07 to 6.16 – Hot Water Heaters / Boilers

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BOILERS ONLY – Commercial and MF (6.07, 6.12, 6.13)

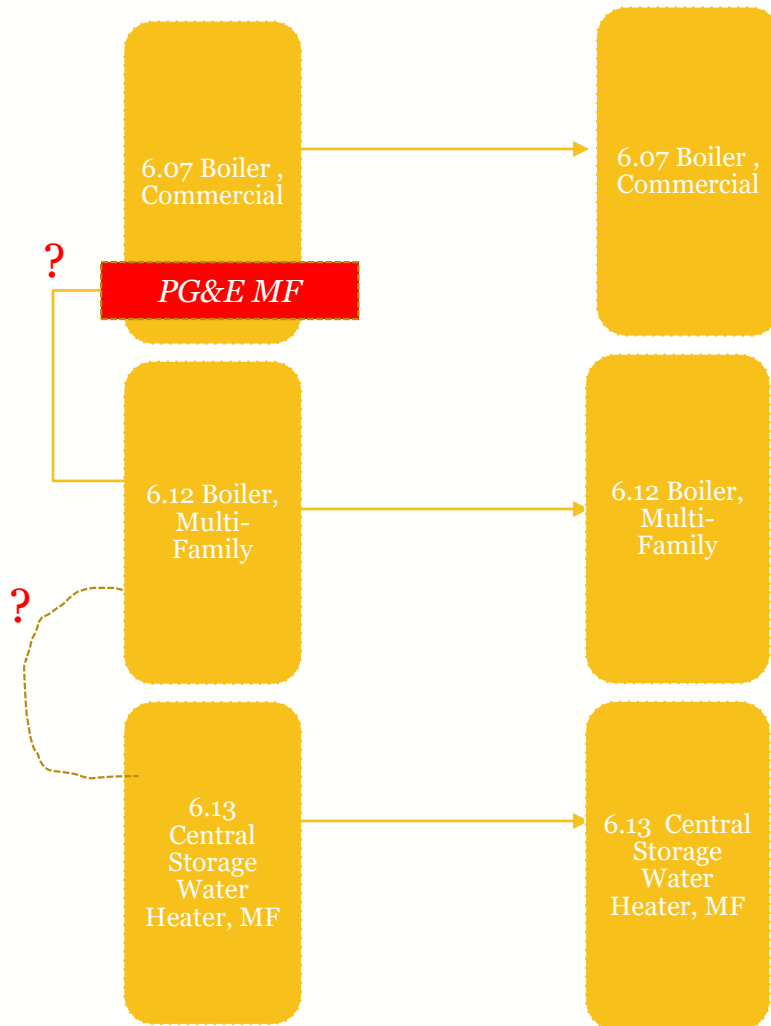
(Mostly – Contains Storage)

• Boilers

- ❑ 3 Workpapers (WPs) for Commercial (PG&E, SCG, SDG&E), 2 WPs for MF Boilers (PG&E, SCG), 2 WPs for MF Storage /Heaters (PG&E /SCG)
- ❑ Commercial base and measure efficiencies based on small or large size
- ❑ Overlap with Instantaneous (suggest do not collapse Boilers and Small Instantaneous).
- ❑ SHOULD ALIGN DEFINITIONS WITH FEDERAL AND CA TITLE 20 CODES
???? CEE STANDARDS APPLY?
 - ✦ **BOILERS ARE > 300 kbtuh and <1250 kbtuh AND >4 kbtuh / gal. storage**
- ❑ SDG&E MF seems to be not covered
- ❑ PG&E COMMERCIAL WP CONTAINS MF – SHOULD WE SEPARATE?
 - ✦ MF has different use profile than other commercial (but all types differ)

6.07, 6.12 and 6.13 – DHW Boilers

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PG&E – 1 Small Size, 2 Large Tiers
SCG/SDG&E – 2 Small, 2 Large Eff. Tiers
PG&E only offers MF
Different Methodology for PG&E MF

*Overlap with Instantaneous (6.08),
Consolidate on Tiers and Efficiencies, Expand
to POUs*

SCG – 2 Tiers Large - WP 310030A
Revoo (overlap with 6.07)

*Check Sizes and Efficiencies. Collapse with 6.07 ???
Overlap with Instantaneous (6.08).*

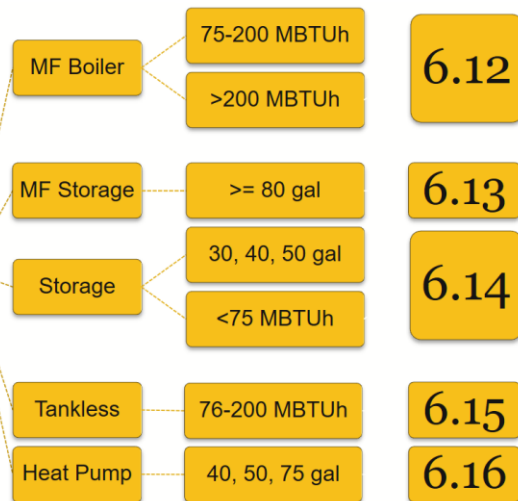
PG&E - 1 Tier LARGE
SCG – 2 Tiers Large

*Consolidate on Tiers and Efficiencies, Expand to other
IOUs / POUs, Collapse with 6.12 ????*

Residential Hot Water Offerings

	PG&E	SCG	SDG&E	SCE	Residential	Capacity	Efficiency
6.12	x				MF Boiler	Small (>75MBTU/h)	>=84% TE
6.12	x					Small (75-200MBTU/h)	>=90% TE
6.12		x				Large (>200MBTU/h)	>=84% TE
6.12	x	x					>=90% TE
6.13		x			MF Storage	>80 Gal (>75MBTU/h)	>=83% TE
6.13		x					>=90% TE
6.13	x						>=82% TE
(claim)			x		Res Storage	30 Gal	EF (0.65-0.69)
(claim)			x			40 Gal	EF (0.65-0.66)
(claim)			x			40 Gal	EF (0.67-0.69)
(claim)			x			40 Gal	EF (0.70+)
(claim)			x			50 Gal	EF (0.67-0.69)
(claim)			x			50 Gal	EF (0.70+)
(claim)		x				30, 40, 50 Gal	>=62% EF
(claim)		x				30, 40, 50 Gal	>=67% EF
6.14	x					Small (<75MBTU/h)	>=.67 EF
6.15	x				Res Tankless	Small (<200MBTU/h)	>=85% EF
6.15		x					>=90% EF
6.15		x				Small (76-200MBTU/h)	>=82% EF
6.15		x					>=92% EF
6.15	x						>=90% TE
6.15	x					Large (>200MBTU/h)	>=90% TE
6.16	x		x	x	Heat Pump	40 gal	EF=2.0
6.16	?		x			50 gal	EF=2.0
6.16	?		x			75 gal	EF=2.0

Residential



- MF separated out
 - PG&E: 11 yrs (Str WtrHtr)
 - SCG: 15 yr (WtrHt-Com)
- MF Storage
 - Min Efficiency
- Res Storage
 - Number of Offerings
- Res Tankless
 - Small, Tier 2 min efficiency
 - Confirm offering (yellow)

6.07 to 6.16 – Hot Water Heaters / Boilers

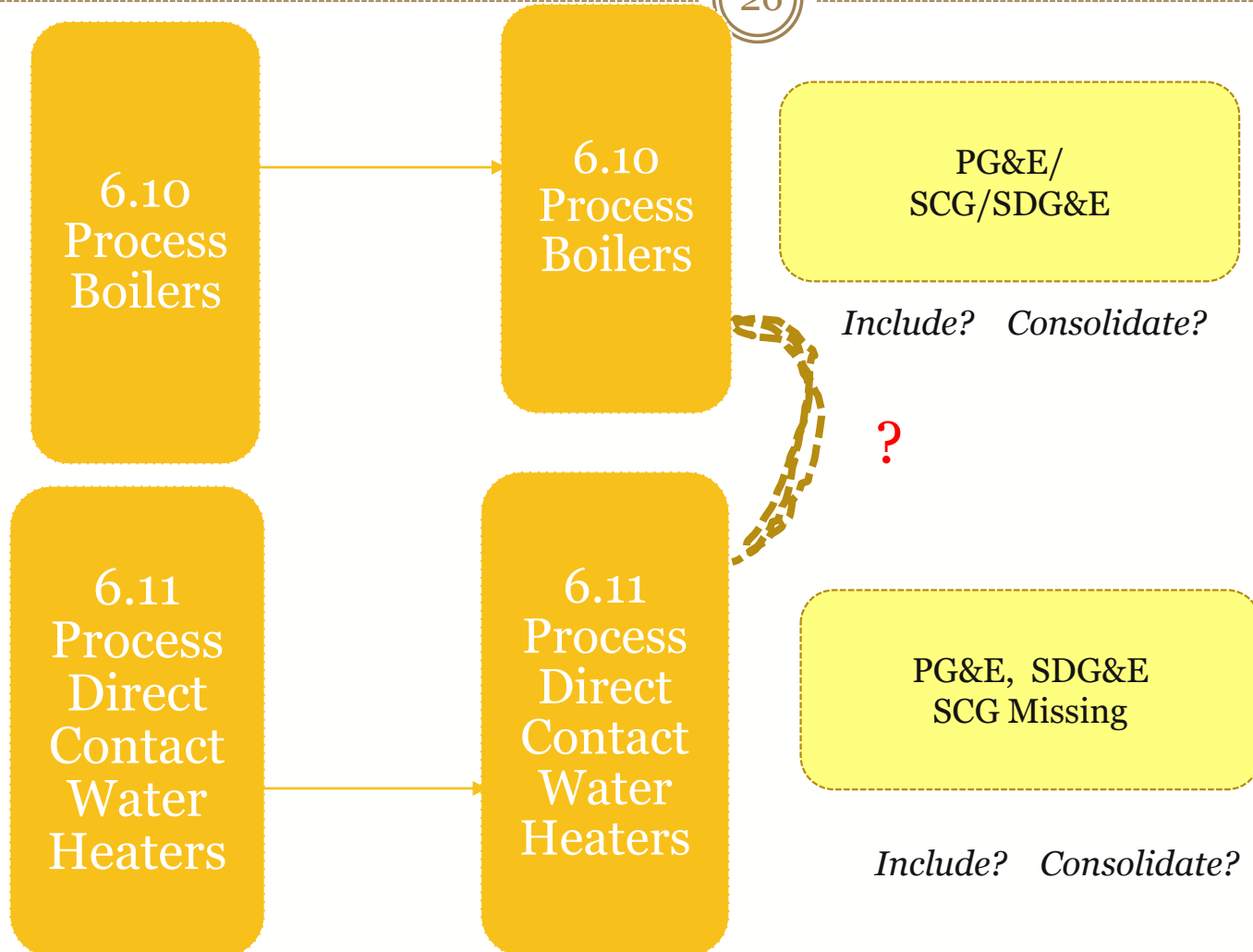
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PROCESS ONLY (6.10 and 6.11)

- ❑ 3 WPs for Process Boilers (PG&E, SCG, SDG&E), 2 WPs for Direct Contact Water Heaters (PG&E, SDG&E).
- ❑ SHOULD ALIGN DEFINITIONS WITH FEDERAL AND CA TITLE 20 CODES ???? DOES TITLE 20 APPLY TO PROCESS? CEE STANDARDS APPLY?
- ❑ BOTH MEASURES lots of usage variability – SHOULD WE INCLUDE IN DEEMED? OK if conservative (to capture market) ???
- ❑ Any way to included with instantaneous heaters and boilers (commercial, industrial and ag)?
- ❑ Are all installations really process? Offerings and workpaper open to lots of commercial building types.
 - ✦ Process / industrial has different use profile than other commercial (but all commercial types differ)

6.10 and 6.11 – Process Boilers and Heaters

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6.07 thru 6.16 – Hot Water Heaters and Boilers – ISSUES

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- Align with Federal and CA Title 20 standards terminology
 - **Instantaneous** vs. tankless
 - kbtuh or **Btu/hr** or kbtu/hr vs. **MBH** or other
 - **DHW**, SHW, other?
- Align with Small Size and Boiler, Storage Heater, Instantaneous Heater Definitions
- Separate categories for MF?
- Include air emission requirements (SCG does currently)? Merely state code compliance required? This can be a moving target requiring updating.
- Include CZ variation? Required in CPUC HW disposition (2013?)
- Other Categories – Tabletop? Grid-enabled?
- Keep process boiler/heaters in? Combine if possible?

6.07 thru 6.16 – Hot Water Heaters and Boilers – HARDER ISSUES !!

- Any way to include combination (space/water heating boilers? Enough of a market for deemed treatment?
 - ❑ Res NZE? CO2 HPWHs? GHGs
- Always use code baseline or DEER 2017 CLASS studies / market baselines (e.g., EF = 1 vs. EF = 2.0 for HPWHs)?
- Federal code changes requiring UEF for storage (and instantaneous?) water heaters. Long term effects? Short term calculator used by SCG.
 - ❑ Largest effects may be with ER and RET measures (conversion will be required).

6.17 thru 6.22 – Hot Water Controls, Insulation and Training



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- 6.17 Commercial Boiler Water Heating Control System
- 6.18 Demand Control for Centralized Water Heater Recirculation Pump
- 6.19 Multifamily DHW RCx, Training, and Boiler Reset Controller
- 6.20 MF Central Recirc System Pipewrap
- 6.21 Hot Water Line Insulation Electric/Gas
- 6.22 Tank Insulation

6.17 to 6.19 – Controls

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DHW Pump and Boiler Controls

- ❑ 6.17 – DHW Controls – 1 WP (PG&E)
 - ✦ MF and lodging
 - ✦ Temperature reset
 - ✦ IS PG&E still offering?
 - ✦ Possibly Remove from eTRM???
- ❑ 6.18 – Demand Control for Recirc. Pump – 4 WPs (PG&E, SCE, SCG, SDG&E)
 - ✦ Based on HW returning temperature and demand
 - ✦ MFm only
 - ✦ SCG DI only (others DI and PreRebDown)?
 - ✦ Interaction with 6.17 – would they ever both be offered???
 - ✦ Leave in eTRM – extend to lodging, hospitals, nursing homes, large offices, etc.
- ❑ 6.19 – MF Boiler Reset Controller (w/ RCx & Training) – 2 WPs (SCG lead, SDG&E)
 - ✦ Could interact with 6.18
 - ✦ SCG does not include RCx and Training components (Difficult to quantify savings)
 - ✦ Modify or remove?
 - ✦ Combine with 6.17?

6.17 to 6.19 – Controls

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DHW Pump and Boiler Controls

- 6.20 MF Central Recirc System Pipewrap – 1 WP (SDG&E)
 - ✦ MF only
 - ✦ SCG?
 - ✦ No Climate Zone Dependency (CZ)
 - ✦ Possibly Combine with 6.21
- 6.21 Hot Water Line Insulation Electric/Gas - 3 WPs (PG&E, SCG, SDG&E)
 - ✦ Climate Zone Dependency
 - ✦ Commercial Only
 - ✦ Modify WP approach – e.g., remove steam from SDG&E WP
 - ✦ Include MF Recirc Systems, Ag/Ind., SF & MF first 6 feet of Supply Lines ???
 - ✦ Verify Electric Savings – extend to SCE?
 - ✦ Set good baselines w/o many permutations.
 - ✦ SCG DI only (others DI and PreRebDown)?
 - ✦ Interaction with 6.18 – would they ever both be offered???
- 6.22 Tank Insulation – 2 WPs (PG&E, SCG, SDG&E)
 - ✦ Could interact with 6.18
 - ✦ SCG does not included RCx and Training components (Difficult to quantify savings)
 - ✦ Are most DHW tanks already insulated? Is this above code insulation?
 - ✦ OK for now? No combination?? Modify or remove?

6.17 thru 6.22 – Hot Water Controls, Insulation and Training

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6.17 Commercial
Boiler Water Heating
Control System

6.17 Commercial
Boiler Water Heating
Control System

? Any
claims?

6.18 Demand Control
for Centralized Water
Heater Recirculation
Pump

6.18 Demand Control
for Centralized Water
Heater Recirculation
Pump

6.19 Multifamily
DHW RCx, Training,
and Boiler Reset
Controller

6.19 Multifamily
DHW RCx, Training,
and Boiler Reset
Controller

? RCx Measure
Only? Any claims?

6.20 MF Central
Recirc System
Pipewrap

6.20 MF Central
Recirc System
Pipewrap

? No Claims?

6.21 Hot Water Line
Insulation
Electric/Gas

6.21 Hot Water Line
Insulation
Electric/Gas

6.22 Tank Insulation

6.22 Tank Insulation

? No conflict – PG&E
and SCG claims

6.01 thru 6.22 – Hot Water Measures

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- Remaining Issues – Cross Cutting
 - Be inclusive - include multiple offerings (efficiency tiers) and end use markets as possible to increase relevance and use, and capture opportunities
 - ✦ Expand Commercial to Agricultural and Industrial where relevant
 - ✦ Expand ROB measures to include NC where possible.
 - ✦ Consider RET / ER baseline types for several measures (Inst. htrs, damaged insulation, etc.) in light of AB 802
 - ✦ Explore alternate baselines (e.g., low efficiency instantaneous heaters vs. storage heaters only for instantaneous heaters)
 - Any preferred delivery method when not consistent across IOUs?
Expand to all?
 - Partial exclusion (or total) when buildings have functional solar water heaters?

6.01 thru 6.22 – Hot Water Measures

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Questions?

Next Steps?