

Pool Measures Subcommittee Mtg #4



CALIFORNIA

TECHNICAL FORUM

**ROGER BAKER
AYAD AL-SHAikh
JUNE 2018**

Meeting Objectives

2

- Review previously identified measures
- Identify additions/deletions to pool measures list
- Review work paper differences

Blue text = First time that item is mentioned
Italics text = Item that has not been completed

Measures Under Consideration

3

- 9.03 DC Circulation Pool Pump
 - 9.04 Residential VSD Spa and Wading Pool Pump
 - 9.05 Residential VSD Swimming Pool Pump
 - 9.06 Commercial VSD Pool Pump
 - 9.09 Commercial Pool and Spa Heater
- Plus
- Finish up 9.01 (Commercial Pool Cover) from last year

Blue text = First time that item is mentioned
Italics text = Item that has not been completed

9.03 DC Circulation Pool Pump

4

- 100 watt DC circulation pump piped in parallel with existing fixed-speed pool pump
- Existing work paper for commercial applications
 - Subcommittee determined this measure, as designed, cannot satisfy code
 - ✦ Minimum pool circulation during operating hours requires larger pump than 100 watt
 - ✦ Opportune time for low flow (after hours) lacks sun for solar panel use
 - Alternatives to this work paper
 - ✦ Residential single family only
 - ✦ Commercial, with larger DC motor
 - May be cost-prohibitive
 - Savings reduced to (mostly) avoided inverter losses

Measure Consolidation Opportunity

5

- Measures 9.04, 9.05 and 9.06 are (or should be) similar in approach and methodology
- Is there an opportunity to merge these
 - Use offerings from SCE work paper for 9.05
 - ✦ Already incorporates wading pools and spas
 - Hotel/Motel pool pumps would also be additional offerings/permutations

9.04 Residential VSD Pump – Spas and Wading Pools

6

- Merged into 9.05
 - Based on 2017 SCE work paper

9.05 VSD Pool and Spa Pump

7

- Replace existing pump with variable speed pump
 - Single-family and Multi-family
 - Savings for CZ15 differs from rest of state
 - ✦ Affects single-family contractor-installed pool pump offerings
 - ✦ Savings for Offering A and Offering C (2nd baseline) fixed by EAR disposition for non-CZ15
 - Uses 18,000 gallon pool capacity
 - Offering B uses 20,341 gallon capacity
 - Calculated savings for non-CZ15 do not match disposition value
 - Disposition value is hard-coded into work paper spreadsheet
 - Most offerings use 365 days/yr, Offering B uses 365.25 day/yr
 - SCE is updating the Residential Pool Pump work paper
 - Will incorporate updates as part of Stage 2 work when available

9.05 VSD Pool and Spa Pump

8

- Consolidated measure with Commercial (Htl/Mtl)
 - Calculation methodology currently differs between Res and Com
 - ✦ Residential savings based on pool size, energy factor, turnover rate
 - ✦ Hotel/Motel savings based on metered data

9.05 VSD Pool and Spa Pump

9

- Cost Data alignment
 - Multi-family costs include permit cost (\$220)
 - ✦ Cost is same for base and measure case
 - ✦ Cost element cancels out when calculating IMC
 - ✦ Permit costs generally not included in other measures
 - ✦ No permit cost identified in Commercial Pool Pump work paper
 - Recommend excluding permit cost

9.05 Residential VSD Pool Pump

10

- Six offerings covered in 2017 SCE work paper
 - Residential Single Family
 - ✦ A – Commissioned VSD pump replacing 2-speed pump
 - ✦ B – VSD replacing 2-speed pump (downstream)
 - ✦ C – Commissioned VSD pump replacing single-speed pump
 - Residential Multi-Family
 - ✦ D – Commissioned VSD pool pump replacing single-speed pump
 - ✦ F – Commissioned VSD spa pump replacing single-speed pump
 - ✦ G – Commissioned VSD wading pool pump replacing single-speed pump
- Additional offering for Hotel/Motel (from 9.06 work paper)
 - Pool Pump only
- Commissioned offerings for contractor-driven market
- Others designed for downstream
- Measure also in POU TRM (Single-family only)
 - Largely based on older (2012) work papers

9.05 VSD Pool and Spa Pump

11

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	ER ROBNC	ROB RobNc	ER RobNc	No Value	No Value
BldgType	SFm MfM Htl Mtl Dmo	Res	SFm Any	SFm MFm	No Value
BldgVintage	Any	Any	Any	Ex	No Value
BldgLoc	CZ15 Any	Any	CZ06 CZ08 CZ09 CZ10 CZ13 CZ14 CZ15 CZ16 Any	Any	No Value
NormUnit	Each	Each	Each	Each	No Value
EULID	OUTD-POOLPUMP	OutD-PoolPump	OutD-PoolPump	OutD-PoolPump	No Value
RULID	OUTD-POOLPUMP	(blank)	OutD-PoolPump	No value	No Value
NTGR	RES-DEFAULT>2 RES-DEFAULT-HTR-DI	Res-Default>2	Res-Default>2 Res-Default-HTR-di	No Value	No Value
DeliveryType	DirInstall PreRebDown	DirInstall PreRebDown PreRebUp	DirInstall PreRebDown	No Value	No Value
GSIA	Def-GSIA	Def-GSIA	Def-GSIA	No Value	No Value
Electric Load Shape	<i>(use Existing)</i>	PGE:RES:DEER:RefgFrzr_HighEff	SCE:Residential:Residential Pool Pumps	SDGE:19-RES-AllResidential-POOL_PMP SDGE:13-MFM-ResidentialMulti-family-POOL_PMP	No Value
Gas Load Shape	ANNUAL	Annual	Annual	Annual	No Value
Sector	RES	Res	Res	No Value	No Value
PA/POU					
BldgHVAC	ANY	cUnc	Any	Any	No Value
HOU					
IE Factor					
Use Category	Recreate	Recreate	Recreate	Recreate	No Value
TechType	PoolPump	PoolPump	PoolPump	PoolPump	No Value
Cost Adjustment Type	NONE	None	None	None	No Value

9.06 Commercial VSD Pool Pump

12

- Merged into 9.05

9.09 – Commercial Pool and Spa Heater

13

- Gas-fired heater with minimum efficiency = 84%
 - Not applicable to electric or solar heaters
- Base case is 82% efficient heater (Federal standard)
- Applicable to all heated pools in commercial facilities
 - Includes multi-family pools
 - Includes community pools as part of homeowners association
- Uses DOE Energy Smart Pools calculator to determine energy savings
- Should this measure be limited to condensing heaters only?

9.09 – Commercial Pool and Spa Heater

14

- ESPECI software no longer supported
 - Other software available?
- Savings for work paper based on average efficiency of units in CEC database (84% or higher)
- Stage 2 work can look at new calculation tool
 - This would allow separation of condensing from non-condensing heaters
- Explore qualification process for units not validated under DOE requirement

9.09 – Commercial Pool and Spa Heater

15

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	ROB	ROB	No Value	No Value	ROB
BldgType	Any, Com, MFm	Any	No Value	No Value	Any,Com
BldgVintage	Ex, Any	Ex	No Value	No Value	Any,Ex
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16	No Value	No Value	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16,CZ08
NormUnit	Cap-kBTUh	Cap-kBTUh	No Value	No Value	Cap-kBTUh
EULID	WtrHt-GPoolHtr	WtrHt-GPoolHtr	No Value	No Value	WtrHt-GPoolHtr
RULID	WtrHt-GPoolHtr	(blank)	No Value	No Value	0
NTGR	Com-Default>2yrs	Com-Default>2yrs	No Value	No Value	Com-Default>2yrs,Res-Default>2
DeliveryType	PreRebDown	PreRebDown	No Value	No Value	PreRebDown
GSIA	Def-GSIA	No Value	No Value	No Value	Def-GSIA

9.08 – Robotic Pool Cleaners

16

- Measure was raised during last meeting
- One work paper (SDG&E, 2014)
 - Does any utility have more recent work paper?
- Should this be deferred to Stage 2?

Next Steps

17

- Presenting measures at CalTF June 28
 - Outline issues identified by subcommittee
 - ✦ DC pool pump – learnings and potential revision in Stage 2
 - ✦ Variable Speed Pool Pumps – consolidation and update
 - ✦ Pool Heater – discuss Stage 2 issues
 - ✦ Pool Covers – update
 - ✦ Robotic Pool Cleaner – update as part of Stage 2
 - ✦ Larger Pool Pumps – research measure development
 - Seek affirmation from membership

Questions?

18

Appendices

19

Measures Under Consideration

20

No.	Measure Names	Plan	PG&E	SCE	SDG&E	SCG	Other	POU
9.01	Commercial Pool Cover	2017						
9.02	LED Pool and Spa Lighting	2018						
9.03	DC Circulation Pool Pump	2018						
9.04	Residential Variable Speed Spa and Wading Po	2018						
9.05	Residential Variable Speed Swimming Pool Pu	2018						
9.06	Commercial Variable Speed Pool Pump Replac	N/A						
9.07	Variable Speed Pool Motors	N/A						
9.08	Robotic Pool Cleaners for Residential Pools	N/A						
9.09	Commercial Pool and Spa Heater	2018						
9.10	SF Pool Heater	N/A						
9.11	SF Spa Heater	N/A						

9.05 Residential Pool Pump

- 2017 Claims Data
 - PG&E, SDG&E and SCE have claims for this measure

Ref No	Name	Implementation Party	Sum of TotalFirstYearG rosskW	Sum of TotalFirstYearG rosskWh	Sum of TotalFirstYearG rossTherm	Sum of TotalGrossMea sureCost	Sum of NumUnits
9.05	Residential Variable Speed Swimming Pool Pump	PGE	821.20	5,783,043	-	\$ 2,094,504	4947
9.05	Residential Variable Speed Swimming Pool Pump	SCE	2,235.67	8,738,435	-	\$ 2,434,707	6558
9.05	Residential Variable Speed Swimming Pool Pump	SDGE	931.37	2,903,960	-	\$ 549,231	1738

9.06 Commercial Pool Pump

22

- 2017 Claims Data
 - Only SCE has claims for this measure

Ref No	Name	Impleme ntationP A	Sum of TotalFirstYearG rosskW	Sum of TotalFirstYearG rosskWh	Sum of TotalFirstYearG rossTherm	Sum of TotalGrossMea sureCost	Sum of NumUnits
9.06	Commercial Variable Speed Pool Pump Replacing Pump, <3HP	SCE	2.72	32,285	-	\$ 7,785	4

9.09 Commercial Pool and Spa Heater

23

- 2017 Claims Data
 - PG&E and SCG have claims for this measure

Ref No	Name	Impleme ntationP A	Sum of TotalFirstYearG rosskW	Sum of TotalFirstYearG rosskWh	Sum of TotalFirstYearG rossTherm	Sum of TotalGrossMea sureCost	Sum of NumUnits
9.09	Commercial Pool and Spa Heater	PGE	-	-	12,839	\$ 11,821	5766.48
9.09	Commercial Pool and Spa Heater	SCG	-	-	94,217	\$ 93,591	45684.94

9.01 – Commercial Pool Covers

24

- This measure was started in 2017
- At October CalTF, certain stage 1 open issues were unresolved:
 - ❑ Savings methodology
 - ❑ GSIA treatment (for ROB)
 - ❑ Cost components

9.01 Pool Cover GSIA

25

WORKPAPER DISPOSITION FOR COMMERCIAL POOL COVERS

California Public Utilities Commission, Energy Division

March 1, 2013

To address possible regressive baselines

Based on Google Earth imagery – mainly PG&E sites

Pools with savings claims that did NOT already had pool covers

- PG&E – GSIA = 0.28 (28%)
- SDG&E and SCG – GSIA = 0.38 (38%)
 - ✦ Increased value by 0.10 (10%) due to an increase in R value used to 2.0 (from 0.5 for PG&E)
 - ✦ Is there a better way to make this adjustment
- SCG notes that GSIA is 'N/A' in their workpaper

9.01 Pool Cover GSIA

26

□ Issues with GSIA – Consensus?

- The GSIA addresses possible regressive baselines due to a degraded (or new) cover already installed.
- Could the degraded cover have been a cheaper vinyl bubble cover past its useful life? Is this likely?
- Can this lower value (lower than default GRRs) be removed if the WP requires that the pool cover measure applies only to pools with either:
 1. No Cover
 2. Cover degraded, not in use (for how long?), and not planned for replacement

Initial Recommendation - First eTRM iteration to exclude pools with any cover in use and note GSIA as 'N/A'.

9.01 Pool Cover Costs

27

Full and Incremental Measure Costs (FMC and IMC)

Typically Exclude Labor

Costs Components are Material and Reel

Larger Pools Require Automated Power Reels

Issues

- Pools with Degraded Covers do not usually require new reels
- Pools with No Covers will usually require new reels
- IMC applies to NC and ROB used by SCG in WP
- Some basic pool cover required for true NC or NEW installations (T24)
- For commercial, is the market standard now insulated foam floating covers?

WP Costs

- PG&E: FMC = \$2.60 / sf, Large Pool Covers; FMC = \$1.95 / sf, Small Pool Covers (incl. reel)
- SDG&E: FMC = \$1.68 / sf Small / \$2.28 / sf Large Pool Covers (includes reel)
- SCG: \$1.05 / sf vinyl; \$2.24 / sf insulated foam; IMC= \$1.19/sf. (Includes reel ???)

**Initial Recommendation – Develop costs with and without reels based on latest vendor information
– some additional research needed**

9.01 Pool Cover Savings

28

Insights on Savings Approach (RESPEC, SCG Approach, Other?)

Measure Type REA, ROB and NC require full EUL (RUL is N/A)
Only one (1st) period for savings

Inputs and Savings Ranges

- PG&E: R=0.5, Wind 10% or 1%, Shading 23% or 5%
 - ✦ Older DOE RESPEC! Model, **only SF and Sacramento weather inputs**
 - ✦ AVG Saved: 3.82, 4.17 or 4.52 therms/sf/yr saved
- SDG&E: R = 2.0, Wind = 1/5/15; Shad = 0%/5%, Pool Temp = 80F, 58 hrs/wk (high activity), closed Dec 15 - Jan 15
 - ✦ AVG saved: 2.44 to 5.06 therms/sf/yr outdoor; 2.70 therms/sf/yr indoor
 - ✦ Older DOE RESPEC! Model, **only SF, LA and Sacramento weather inputs**
- SCG Inputs: **R =0.5**, R total = 2.0, baseline = vinyl cover **R=0.1**, 0-40% wind factor, 0 -30% solar shading
 - ✦ Custom excel model with hard coded savings values, **16 weather stations input**, complex description in WP
 - ✦ AVG Saved – Outdoor: 0.44 to 1.46 therms/sf/yr for **CZ 1 - 16** (across 4 building types)
 - ✦ Indoor Pools: (0.03) to 0.12 therms/sf/yr for CZ 1 - 16