

# HVAC - Residential HVAC System Measures

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**CALIFORNIA**  
TECHNICAL FORUM

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# HVAC Measure Breakdown

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- HVAC Measures (53 measures total)

- Commercial (29 measures total)

- Service / Quality Installation (6 measures)

- HVAC Units (12 measures)

- HVAC Controls (11 measures)

- Residential (24 measures total)

- Service (6 measures)

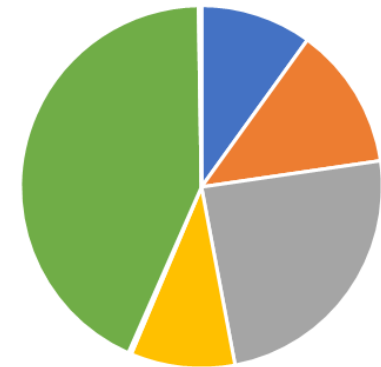
- HVAC Units (5 measures) – small savings

- HVAC Controls (5 measures) – large savings

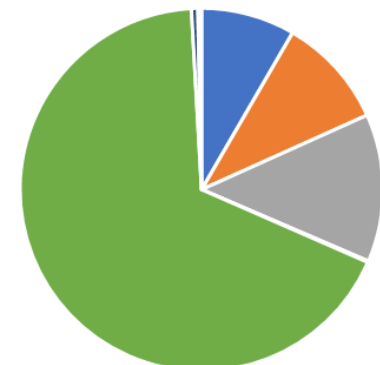
- Evaporative Units (4 measures) – small saving

- Gas Units (3 measures) – small savings

IOU Claims Data: 2018, Q1-Q3:  
Gross kWh

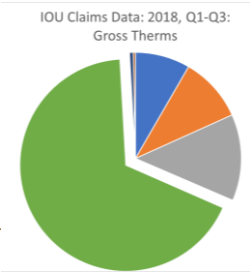
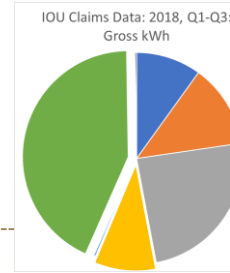


IOU Claims Data: 2018, Q1-Q3:  
Gross Therms



# Residential HVAC Measures

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Ref No	Description	2016			2017			2018 (Q1-Q3)		
		Number of Units	First Year Gross kWh	First Year Gross Therm	Number of Units	First Year Gross kWh	First Year Gross Therm	Number of Units	First Year Gross kWh	First Year Gross Therm
5.10a	Refrigerant Charge, Residential	74,591	7,674,601	(1,066)	36,635	2,451,593	(361)	16,959	671,757	(80)
5.10b	Condenser Coil Cleaning, Residential	25,003	293,835	(16)	24,798	178,457	211	34,790	256,309	(1)
5.10c	Evaporator Coil Cleaning, Residential	7,443	47,596	(1)						
5.10d	Air-flow Adjustment, Residential	22,803	281,798	(1,233)	4,818	379,746	(3,178)	2,587	191,779	(1,728)
5.10e	Duct Seal, Residential	26,538	4,549,294	312,136	225,697	12,132,847	354,286	103,040	554,162	45,383
5.10f	Blower Motor Retrofit	42,107	5,096,485	(65,948)	63,078	7,943,177	(55,843)	34,959	4,200,001	(44,687)
5.23	Evaporative Condenser, Residential	187	6,220	(14)						
5.34	Window Evaporative Cooler, Residential	1,129	405,450	(35,409)	1,058	407,712	(32,704)	391	157,867	(11,274)
5.35	Direct Evaporative Cooler, Residential	576	418,025	-						
5.36	Direct-Indirect Evaporative Cooler, Residential				854	632,929	-	371	-	-
5.11	Split System HVAC Quality Installation, Residential	2,585,468	780,468	8,149	905,152	123,889	4,482	88	6,008	222
5.27	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h	859	245,564	-	1,012	363,184	-	443	145,216	-
5.37	Energy Star Room Air Conditioners	111	4,398	-						
5.38	Portable Room Air Conditioner									
5.40	HVAC Equipment, Upstream, Residential	1,558	75,897	7,949	1,013	33,729	4,250	645	25,902	928
5.13	Fan Controller for Air Conditioner, Residential	85,870	7,256,469	-	100,309	10,577,760	-	65,709	6,597,362	-
5.17	Whole House Fan, Residential							1,110	424,983	(2,331)
5.29	Air Filter Replacement, Residential	5,571	50,663	-						
5.47	Smart Thermostat, Residential	13,244	-	11,046	61,276	3,972,639	486,911	105,935	20,114,851	1,325,012
5.55	Heat Pump Electric Resistance Heater Controls, Residential									
5.18	Furnace, Residential	94,074	-	63,606	15,313	-	31,266	3,080	-	6,305
5.20	Gravity Wall Furnace, Residential	55	-	284	55	-	272			
5.57	Intermittent Pilot Light, Residential									
5.08	Whole-house Upgrade							67	28,721	3,842
<b>Totals:</b>			<b>27,190,000</b>	<b>300,000</b>		<b>39,200,000</b>	<b>790,000</b>		<b>33,370,000</b>	<b>1,320,000</b>

# Residential HVAC Measures

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No	Description	Modeled	IOU Submittal	IOU Lead	Rigor	2018 (Q1-Q3)		
						Number of Units	First Year Gross kWh	First Year Gross Therm
5.23	Evaporative Condenser, Residential	Modified DEER	Aug	POU	Low			
5.34	Window Evaporative Cooler, Residential	DEER 2005	May	SCE	Low	391	157,867	(11,274)
5.35	Direct Evaporative Cooler, Residential	DEER 2005	May	SCE	Low			
5.36	Direct-Indirect Evaporative Cooler, Residential	DEER 2005	May	SCE	Low	371	-	-
5.11	Split System HVAC Quality Installation, Residential	eQUEST	May	0	Low	88	6,008	222
5.27	Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h	DEER 2005	Aug	POU	Low	443	145,216	-
5.37	Energy Star Room Air Conditioners	Energy Star	Dec	PG&E	Low			
5.38	Portable Room Air Conditioner	Excel	Aug	POU	Low			
5.40	HVAC Equipment, Upstream, Residential	DEER	May	SCE	Low	645	25,902	928
5.18	Furnace, Residential	Modified DEER	May	SCG	Low	3,080	-	6,305
5.20	Gravity Wall Furnace, Residential	eQUEST / scaled	Apr	SCG	Low			
5.57	Intermittent Pilot Light, Residential	Excel / ET Study	Apr	SCG	Low			



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**Planned to sunset.**

- Offering

- Implementation: NC and NR
- Norm Unit: Cap-ton

- Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
  - ✦ Modeled measures through MASControl/DOE2.2
- Consider how valuable it is to keep this measure in the eTRM

- Measure Extension

- No claims in 2017 or 2018

- Stage 2 Issues

- *Measure is based upon 2005 MASControl measure (D03-082 and D03-083) – potentially not available*
- *Ensure that cost methodology is consistent*
- *Evaporative effectiveness can vary significantly between products*
- *Locations should be restricted for this measure to ensure benefits*
- *Review EIR and capacity curves for base and measure case*
- *Update program requirements*

# Measure Consensus

## 5.23, Water Cooled AC and Residential AC with an Evaporative Condenser

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- Savings

- Residential

- ✦ Modeled measures – Through MASControl / DOE2.2
  - Tech ID: RE-HV-ResEvapAC-17p4S
  - Building Types: SFm, MFm, DMo

# Input Consensus

## 5.23 – Evaporative Condenser, Residential

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- Measure Permutations

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR, NC	No Value	ER,RobNc	No Value	No Value
BldgType	SFm, MFm, Dmo	No Value	No Value	No Value	No Value
BldgVintage	Ex	No Value	No Value	No Value	No Value
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05, CZ06,CZ07,CZ08,CZ09,CZ10, CZ11,CZ12,CZ13,CZ14,CZ15, CZ16	No Value	No Value	No Value	No Value
NormUnit	Cap-Tons	No Value	No Value	No Value	No Value
EUL ID	HVAC-evapAC	No Value	No Value	No Value	No Value
RUL ID	N/A	No Value	No Value	No Value	No Value
NTGR	NonRes-sAll-mHVAC-DX-up	No Value	NonRes-sAll-mHVAC-DX-up All-Default<=2yrs	No Value	No Value
DeliveryType	UpDeemed	No Value	PreRebUp	No Value	No Value
GSIA	Def-GSIA	No Value	Def-GSIA, Res-AC-SCE	No Value	No Value
Electric Load Shape	<i>(use existing)</i>	No Value	No Value	No Value	No Value
Gas Load Shape	Annual	No Value	No Value	No Value	No Value
Sector	Res	No Value	Com, Res	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	No Value	No Value	No Value	No Value
Use Category	HVAC	No Value	No Value	No Value	No Value
SubUseCategory	SpaceCool	No Value	No Value	No Value	No Value
TechGroup	dxAC equip	No Value	No Value	No Value	No Value
TechType	pkgSEER	No Value	No Value	No Value	No Value
Cost Adjustment Type	None	No Value	No Value	No Value	No Value
EnImpCalcType	Standard	No Value	No Value	No Value	No Value
MeasImpactType	Deem-DEER	No Value	No Value	No Value	No Value
MeasQualifierGroup	(blank)	No Value	No Value	No Value	No Value

# Measure Consensus

## 5.34 – Window Evaporative Coolers

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### ● Offering

- Implementation: AOE
- Climate Zones: 6, 8-10, 13-16 (originally SCE only) -> All CZs
  - ✦ Building Types: SFm, MFm, Dmo
- Norm Unit: Per installed evaporative cooler (Per Unit)

### ● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Measure expanded to other climate zones
- *Update EUL*

### ● Measure Extension

- 2017 savings shown; savings dropped in 2018
- Add POUs
- Add PG&E, SDG&E

### ● Stage 2 Issues

- *Confirm that baseline is correct / consistent with other measures*
- *Measure is based upon a 2005 MASControl measure (D03-405); potentially not available*
- *Ensure that cost methodology is consistent*
- *Update program requirements*
- *Update the Human Error Adjustment Factor; study required to support this factor.*

BldgType	kWh	kW	Therms
	SCE	SCE	SCE
DMo	16,116	50.08	(2,869)
MFm	997	0.75	(15)
SFm	265,218	428.96	(18,605)



# Measure Consensus

## 5.34, Window Evaporative Coolers

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- **Base Case**
  - Residential building with a code compliant (14 SEER) DX central AC
- **Measure Case**
  - One or more window evaporative coolers are added to the building. They do not replace the central AC.
  - During very high ambient temperatures and/or humidity and in the event that the evaporative cooler cannot satisfy the cooling setpoint in the space, the occupant is expected to disable the evaporative cooler and enable the DX central AC.
- **Savings**
  - A direct evaporative cooler (not window-mounted) measure is included in the DEER (D03-405)
  - Climate Zones: 6, 8-10, 13-16 (original)
    - ✦ Extended to additional climate zones
  - Calculation
    - ✦ Annual energy savings = DEER kWh savings \* ESAF \* HEAF
    - ✦ Demand reduction = DEER kW reduction \* PDAF \* HEAF
    - ✦ Annual therm savings = DEER therm savings \* ESAF \* HEAF
      - Where:
        - DEER savings are from the READi tool v.2.4.7, measure D03-405
        - ESAF is the Energy Savings Adjustment Factor
        - PDAF is the Peak Demand Adjustment Factor
        - HEAF is the Human Error Adjustment Factor

# Measure Consensus

## 5.34, Window Evaporative Coolers

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### ● Savings

- ✦ Annual energy savings = DEER kWh savings \* ESAF \* HEAF
- ✦ Demand reduction = DEER kW reduction \* PDAF \* HEAF
- ✦ Annual therm savings = DEER therm savings \* ESAF \* HEAF

#### ○ Where:

- DEER savings from READi tool v.2.4.7, D03-405
- ESAF is the Energy Savings Adjustment Factor
- PDAF is the Peak Demand Adjustment Factor
- HEAF is the Human Error Adjustment Factor, 75%

BldgL	Energy Savings Adjustment Factor (ESAF)	Peak Demand Adjustment Factor (PDAF)
CZ06	0.56081	0.33333
CZ08	0.31993	0.22222
CZ09	0.26299	0.00000
CZ10	0.47859	0.00000
CZ13	0.61629	0.00000
CZ14	0.86997	0.88889
CZ15	0.54673	0.11111
CZ16	0.95767	0.88889

- ✦ As there have been no studies performed to measure this particular factor, the HEAF will be arbitrarily set at 75% until a study yields a more conclusive value. This implies that up to 25% of the savings will be lost due to non-ideal operation of the evaporative cooler and DX system.
- ✦ **Question: Does the Human Error Adjustment Factor need to be updated?**

# Input Consensus

## 5.34 – Window Evaporative Coolers

- Measure Permutations

### Measure Data Field

Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	AOE	No Value	ER, REA	No Value	No Value
BldgType	DMo, MFm, SFm	No Value	DMo, MFm, SFm	No Value	No Value
BldgVintage	Ex	No Value	Any	No Value	No Value
BldgLoc	CZ01, CZ02, CZ03, CZ04, CZ05, CZ06, CZ07, CZ08, CZ09, CZ10, CZ11, CZ12, CZ13, CZ14, CZ15, CZ16	No Value	CZ06, CZ08, CZ09, CZ10, CZ13, CZ14, CZ15, CZ16	No Value	No Value
NormUnit	Each	No Value	Cap-Tons, Each	No Value	No Value
EUL ID	HV-Evap	No Value	HV-Evap	No Value	No Value
RUL ID	(house)	No Value	HV-Evap	No Value	No Value
NTGR	Res-Default>2	No Value	Res-Default>2	No Value	No Value
DeliveryType	DnDeemDI, DnDeemed	No Value	DirInstall, PreRebDown	No Value	No Value
GSIA	Def-GSIA	No Value	Def-GSIA	No Value	No Value
Electric Load Shape	(use existing)	No Value	SCE:RES:DEER:HVAC_Eff_AC	No Value	No Value
Gas Load Shape	Annual	No Value	Annual	No Value	No Value
Sector	Res	No Value	Res, Any	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	No Value	Any	No Value	No Value
Use Category	HVAC	No Value	HVAC	No Value	No Value
SubUseCategory	SpaceCool	No Value	SpaceCool	No Value	No Value
TechGroup	EvapCool_eq	No Value	EvapCool_eq	No Value	No Value
TechType	ResEvap	No Value	ResEvap	No Value	No Value
Cost Adjustment Type	None	No Value	HVAC50	No Value	No Value
EnImpCalcType	Standard	No Value	Standard	No Value	No Value
MeasImpactType	Deem-WP	No Value	Standard	No Value	No Value
MeasQualifierGroup	None	No Value	None	No Value	No Value



### ● Offering

- Implementation: AOE
- Bldg Type: PG&E (MFm); SDG&E (DMo) -> SFm, MFm, Dmo
- Climate Zones: PG&E (CZ11, 12, 13); SDG&E (CZ14) -> SFm, MFm, Dmo (all Climate Zones)
- Norm Unit: per Household

### ● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- AOE only offered; added equipment but not replacing existing AC
  - ✦ Consider if the factors are appropriate
- *Update EUL*

### ● Measure Extension

- No savings in 2017 or 2018.
- Add POUs
- Extend to all CZs

### ● Stage 2 Issues

- *Confirm that baseline is correct / consistent with other measures*
  - ✦ Ensure that cost methodology is consistent
  - ✦ Ensure that gas effects are handled consistently
  - ✦ Consider including the water savings (negative value)
- *Update program requirements*
- *Update methodology with addition supporting data (damper)*
- *Measure is based upon a 2005 MASControl measure (D03-405); potentially not available*

Climate Zone	Source IOU	Energy Savings Adjustment Factor (ESAF)	Peak Demand Adjustment Factor (PDAF)	Human Error Factor
CZ01	PGE	100%	11%	75%
CZ02	PGE	57%	44%	75%
CZ03	PGE	68%	33%	75%
CZ04	PGE	56%	33%	75%
CZ05	PGE	87%	56%	75%
CZ06	SCE	56%	33%	75%
CZ07	SDG	57%	22%	75%
CZ08	SCE	32%	22%	75%
CZ09	SCE	26%	0%	75%
CZ10	SCE	48%	0%	75%
CZ11	PGE	68%	78%	75%
CZ12	PGE	58%	33%	75%
CZ13	PGE	62%	0%	75%
CZ14	SCE	87%	89%	75%
CZ15	SCE	55%	11%	75%
CZ16	SCE	96%	89%	75%

# Measure Consensus

## 5.35, Direct Evaporative Coolers, Residential

- Savings

- ❑ ~~PG&E: ROB savings~~
- ❑ SCE: REA savings

*Annual energy savings* = *DEER kWh Savings* \* *ESAF* \* *HEAF*

*Demand reduction* = *DEER kW reduction* \* *PDAF* \* *HEAF*

where: DEER savings are from the READi tool v.2.4.7, measure D03-405  
ESAF is the Energy Savings Adjustment Factor  
PDAF is the Peak Demand Adjustment Factor  
HEAF is the Human Error Adjustment Factor, 75%

- ❑ With Dampers: 38 kWh/home is added
  - ✦ 2004-2005 incentive program direct evaporative cooler savings values

*(Original table – updated  
Shown on first page)*

IOU	CZ	ESAF	PDAF
PG&E	1	<del>100%</del>	<del>100%</del>
PG&E	2	<del>100%</del>	<del>100%</del>
PG&E	3	<del>100%</del>	<del>100%</del>
PG&E	4	<del>100%</del>	<del>100%</del>
PG&E	5	<del>100%</del>	<del>100%</del>
SCE	6	56%	33%
SCE	8	33%	33%
SCE	9	26%	0%
SCE	10	48%	0%
PG&E	11	<del>100%</del>	<del>100%</del>
PG&E	12	<del>100%</del>	<del>100%</del>
Both	13	65%	0%
SCE	14	88%	100%
SCE	15	57%	11%
Both	16	95%	89%

# Input Consensus

## 5.35 – Direct Evaporative Coolers, Residential

### • Measure Permutations

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	AOE	ROB	ER,REA,RobNc	No Value	No Value
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm,Asm,ECC,EPr,ESe,Hsp,HI,MLI,OfS,RFF,RSD,RTL,RtS,SCn	No Value	No Value
BldgVintage	Ex	Ex	Any	No Value	No Value
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16	CZ01,CZ02,CZ03,CZ04,CZ05,CZ11,CZ12,CZ13,CZ16	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16	No Value	No Value
NormUnit	Area-1kH	Household	Household, Cap-Tons	No Value	No Value
EUL ID	HV-Evap	HV-Evap	HV-Evap	No Value	No Value
RUL ID	(house)	(blank)	HV-Evap	No Value	No Value
NTGR	Res-Default>2	Res-Default>2	Com-Default>2yrs Res-Default>2	No Value	No Value
DeliveryType	DnDeemDI, DnDeemed	PreRebDown	DirInstall, PreRebDown	No Value	No Value
GSIA	Def-GSIA	Def-GSIA	Com-AC-SCE Def-GSIA Res-AC-SCE	No Value	No Value
Electric Load Shape	(use existing)	PGE:Residential:45 = Res. Dir. Assist. Evap. Cooler	SCE:RES:DEER:HVAC_Eff_AC SCE:NON_RES:DEER:HVAC_Split-Package_AC	No Value	No Value
Gas Load Shape	Annual	WinterOnly	Annual	No Value	No Value
Sector	Res	Res	Com Ag Ind Res	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rWtd	Any	No Value	No Value
Use Category	HVAC	HVAC	HVAC	No Value	No Value
SubUseCategory	SpaceCool	SpaceCool	SpaceCool	No Value	No Value
TechGroup	EvapCool_eq	EvapCool_eq	EvapCool_eq	No Value	No Value
TechType	ResEvap	ResEvap	spltSEER	No Value	No Value
Cost Adjustment Type	None	None	HVAC50	No Value	No Value
EnImpCalcType	Standard	(blank)	Standard	No Value	No Value
MeasImpactType	Deem-WP	DEER	Standard	No Value	No Value
MeasQualifierGroup	None	(blank)	None	No Value	No Value



### ● Offering

- Implementation: AOE
- Bldg Type / Climate Zones
  - ✘ PG&E (MFm / CZ 11, 12, 13); SDGE (DMo / CZ14) -> SFm, MFm, Dmo (all Climate Zones)
- Norm Unit – ~~PG&E (per Household)~~; SCE (per 1,000 sf)

### ● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Standardize Norm Unit for Residential
- *Update EUL*

### ● Measure Extension

- **2017 savings show; no savings for 2018**
- Add POU's
- Add to PG&E and SDG&E
- Climate Zone restriction due to savings / cost-effectiveness

BldgType	kWh SCE	kW SCE	Therms SCE
SFm	281,595	465.25	-

### ● Stage 2 Issues

- *Confirm that baseline is correct / consistent with other measures*
- ***Measure is based upon a 2005 MASControl measure (D03-407); potentially not available***
- *Ensure that cost methodology is consistent*

### • Savings

- ✦ Replace with direct-indirect or two-stage evaporative coolers in residential buildings
- ✦ An Advanced Evaporative Cooler Level 2 (AEC-2) must have
  - An indirect evaporative stage,
  - Rigid media direct stage,
  - Manufactured evaporative media with a rated saturation effectiveness of 0.95 or better (a natural fiber pad is not allowed – the rigid media is generally 8” or 12” thick),
  - A two speed fan,
  - A multi-position control switch that allows two fan speed operation and
  - Fan only operation and be equipped with water quality management system that provides positive removal of sump water on a regular interval (a bleed system is not allowed).
- ✦ DEER savings – D03-407
- ✦ PG&E – per Home; SCE – per 1000 sqft



# Input Consensus

## 5.36 – Direct-Indirect Evaporative Coolers, Residential

- Measure Permutations

Measure Permutations		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	AOE	ROB	ER,RobNc,REA	No Value	No Value
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm	No Value	No Value
BldgVintage	Ex	Ex	Ex	No Value	No Value
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06, CZ07,CZ08,CZ09,CZ10,CZ11,CZ12, CZ13,CZ14,CZ15,CZ16	CZ01,CZ02,CZ03,CZ04,CZ05,CZ1 1,CZ12,CZ13,CZ16	CZ06,CZ08,CZ09,CZ10,CZ13,CZ1 4,CZ15,CZ16	No Value	No Value
NormUnit	Area-1kH	Household	1,000 Square Feet	No Value	No Value
EUL ID	HV-Evap	HV-Evap	HV-Evap	No Value	No Value
RUL ID	(house)	(blank)	HV-Evap	No Value	No Value
NTGR	Res-Default>2	Res-Default>2	Res-Default>2	No Value	No Value
DeliveryType	DnDeemed	PreRebDown	PreRebDown	No Value	No Value
GSIA	Res-AC-SCE	No Value	Res-AC-SCE (blank)	No Value	No Value
Electric Load Shape	(use existing)	PGE:Residential:26 = Res. Central Air Conditioning	SCE:RES:DEER:Hvac_Eff_AC	No Value	No Value
Gas Load Shape	Annual	WinterOnly	Annual	No Value	No Value
Sector	Res	No Value	Com, Res	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rWtd	Any	No Value	No Value
Use Category	HVAC	HVAC	HVAC	No Value	No Value
SubUseCategory	SpaceCool	SpaceCool	SpaceCool	No Value	No Value
TechGroup	EvapCool_eq	EvapCool_eq	EvapCool_eq	No Value	No Value
TechType	ResEvap	ResEvap	ResEvap	No Value	No Value
Cost Adjustment Type	None	None	HVAC50	No Value	No Value
EnImpCalcType	Standard	(blank)	Standard	No Value	No Value
MeasImpactType	Deem-DEER	DEER	Standard	No Value	No Value
MeasQualifierGroup	None	(blank)	None	No Value	No Value

# Measure Consensus

## 5.11 – Quality Installation for Residential Split Systems and Package Systems



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**Planned to sunset.  
SDG&E reviewing.**

### • Offering

- Implementation: NR
- Bldg Types: SFm
- SCE: CZ06, 08-10, 13-16
  - Split and Package Systems, both A/C and HP
  - Quality Installations and Quality Installations with efficient systems
- SDG&E: CZ06-08, 10, 14-15
  - Split and Package Systems only
  - Quality Installations only
- Norm Unit: SCE (Area-ft<sup>2</sup>); SDG&E (Cap-Tons)

### • Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage* (developed with vintage prototypes)
- Plan to include both Quality Installations with High Efficiency systems. Note that High Efficiency systems are also offered through the Upstream Program. No further concerns related to double counting could be expressed
- Normalizing unit moved to Area-ft<sup>2</sup>

### • Measure Extension

- 2017 savings shows; 2018 savings <10,000 kWh
- Add POUs; Add PG&E, SDG&E
- Extend to all CZs*

### • Stage 2 Issues

- Add offerings of QI with Efficient Retrofit*
- Baseline of Upstream measures is inconsistent (compared to QI programs)*
- Update cost documentation*
- Support measure with additional data: Home Energy Use Survey (HEUS) was completed recently.*
- Include New Construction, currently through SCE
- Additional CZs might be created for PG&E and SDG&E*

BldgType	kWh SCE	kW SCE	Therms SCE
SFm	148,387	57.12	1,027

Black text = Current state of the consolidated measure  
Blue text = Changing and / or first time item is mentioned  
*Italics* text = Item that has not been completed

- **Systems**
  - Quality Installation + Efficiency Upgrade- Split Air Conditioner (*SCE only*)
    - ✦ SEER 14.0, 14.5, 15.0, 16.0, 18.0 Replacing SEER 13.0
  - Quality Installation + Efficiency Upgrade-Package Air Conditioner (*SCE only*)
    - ✦ SEER 14.5, 15.0 Replacing SEER 13.0
  - Quality Installation + Efficiency Upgrade-Split Heat Pump (*SCE only*)
    - ✦ SEER 14.0, 14.5, 15.0, 16.0 Replacing SEER 13.0
  - Quality Installation + Efficiency Upgrade-Package Heat Pump (*SCE only*)
    - ✦ SEER 14.5, 15.0, 16.0 Replacing SEER 13.0
  - Quality Installation Only-Packaged/Split Air Conditioner (*SDG&E and SCE*)
    - ✦ SEER 13.0, 14.0, 15.0, 16.0
  - Quality Installation Only -Packaged/Split Heat Pump (*SDG&E and SCE*)
    - ✦ SEER 13.0, 14.0, 15.0

# Input Consensus

## 5.11 – Quality Installation for Residential Split Systems and Package Systems



- Measure Permutations

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR	No Value	RobNc	No Value	ROB
BldgType	SFm	No Value	SFm	SFm	SFm
BldgVintage	Ex	No Value	Any	Ex	Any
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16	No Value	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16	CZ06,CZ07,CZ08,CZ10,CZ14,CZ15	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16
NormUnit	Area-ft2	No Value	Area-ft2	Cap-Tons	Area-ft2
EUL ID	HV-ResAC	No Value	HV-ResAC	HV-ResAC	HV-ResAC
RUL ID	N/A	No Value	HV-ResAC	No Value	No Value
NTGR	Res-Default>2	No Value	All-Default<=2yrs Res-Default>2	No Value	Res-Default>2
DeliveryType	DnDeemed	No Value	PreRebDown	No Value	PreRebDown
GSIA	Def-GSIA	No Value	Def-GSIA, Res-AC-SCE	No Value	Def-GSIA
Electric Load Shape	<i>(use existing)</i>	No Value	SCE:RES:DEER:HVAC_Eff_AC	SDGE:DEER:HVAC_Eff_AC	SCG:RES:DEER:Res:HVAC_Eff_AC
Gas Load Shape	Annual	No Value	Annual	WinterOnly	SummerOnly
Sector	Res	No Value	Res	No Value	Res
PA/POU	Any				
BldgHVAC	rWtd	No Value	Any	Any	Any
Use Category	HVAC	No Value	HVAC	HVAC	HVAC
SubUseCategory	SpaceCool	No Value	SpaceCool	SpaceCool	SpaceCool
TechGroup	HV_Tech	No Value	HV_Tech	dxAC_equip	dxAC_equip
TechType	pkgSEER	No Value	pkgSEER	spltEER	pkgSEER
Cost Adjustment Type	None	No Value	HVAC50	No value	No value
EnImpCalcType	Standard	No Value	Standard	Standard	Standard
MeasImpactType	Deem-WP	No Value	Standard	Deemed	Deemed
MeasQualifierGroup	None	No Value	None	None	None

# Measure Consensus

## 5.27 – High Efficiency PTAC and HP (<2 tons)



21

**Planned to sunset.  
SDG&E reviewing.**

- Offering

- Implementation; NR and NC
- Bldg Types:
  - ✦ Res: MFm and SFm (add DMO)
  - ✦ Com: Gst,Htl,MBT,MLI,Mtl,Nrs,OfL,OfS,RFF,RtS,WRf
- Norm Unit: Cap-Tons

- Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Change from NR only to NR and NC with different savings
- Agreed that the HVAC type breakdown is reasonable/accurate
- Energy savings: Recommend the weighted average approach

- Measure Extension

- Add POUs
- Add PG&E
- Add DMO

- Stage 2 Issues

- *Measure is based upon a 2005 MASControl measure (D03-084)*

	2016	2017	2018
	Sum of First	Sum of First	Sum of First
	Year Gross	Year Gross	Year Gross
PA <input type="checkbox"/>	kWh	kWh	kWh
SCE	194,390	332,020	145,216
SDGE	51,174	31,164	
	<b>245,564</b>	<b>363,184</b>	<b>145,216</b>

# Measure Consensus -

## 5.27 – High Efficiency PTAC and HP (<2 tons)

### ● Offering

#### □ Base = Code

- ✦ Package terminal air conditioning units (PTAC) or package terminal heat pumps (PTHP) that are through the wall, self-contained and less than or equal to 2 tons ( $\leq 24\text{kBtu/h}$ )

#### □ Measure = 20% Higher than Code

- ✦ Ductless mini-split A/C do not apply

Installation Type	Unit Capacity	T24 Minimum EER (AC)	T24 Minimum EER (HP)	Measure Minimum EER (AC)	Measure Minimum EER (HP)
ROB	$\leq 7,000$ Btu/hr	9.41	9.31	11.29	11.17
	$> 7,000$ and $\leq 15,000$ Btu/hr	8.56	8.46	10.27	10.15
	$>15,000$ Btu/hr	7.71	7.61	9.25	9.13
NEW	$\leq 7,000$ Btu/hr	11.9	11.9	14.28	14.28
	$> 7,000$ and $\leq 15,000$ Btu/hr	10.7	10.7	12.84	12.84
	$>15,000$ Btu/hr	9.5	9.5	11.4	11.4

### □ Building Types

- ✦ SDG&E – no residential

DEER Building Type used for Measure Savings	Work Paper Building Type
Lodging – Hotel	Agricultural
	Health/Medical - Nursing Home
	Health/Medical - Clinic
	Lodging - Hotel
	Lodging - Guest Rooms
	Manufacturing - Bio/Tech
	Manufacturing - Light Industrial
	Industrial
	Office - Large
	Office - Small
	Restaurant - Fast-Food
	Retail - Small
	Warehouse - Refrigerated
	Residential Multi-family (Dwelling)
Lodging - Motel	Lodging - Motel
	Residential Multi-family (Common)
	Residential Single Family

- ✦ Energy Savings – from DEER

- SCE: Savings for this work paper are based on **7-15 kBtuh capacity range**, since nearly all of the previous participation falls under this range (not weighted average)

Unit Capacity Ranges	% of Units Installed
PTAC/PTHP <7kBtuh	5%
PTAC/PTHP 7-15kBtuh	90%
PTAC/PTHP >15kBtuh	5%

# Input Consensus

## 5.27 – High Efficiency PTAC and HP (<2 tons)

### • Measure Permutations

Measure Data Field	Measure Value	Measure Data Field			
		PG&E	SCE	SDG&E	SCG
MeasureAppType	NR,NC	ROB	RobNc,REA	No Value	No Value
BldgType	MFm,Gst,Htl,MBT,MLI,Mtl,Nrs,OfL,OfS,RFF,RtS,WRf,SFm, DMO	Gst,Htl,MBT,MLI,Mtl,Nrs,OfL,OfS,RFF,RtS,WRf	MFm,Htl,MBT,MLI,Mtl,Nrs,OfL,OfS,RFF,RtS,WRf,SFm	DMo,SFm	No Value
BldgVintage	Ex,New	Ex	Any	Ex	No Value
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16	CZ01,CZ02,CZ03,CZ04,CZ05,CZ11,CZ12,CZ13,CZ16	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16	CZ06,CZ07,CZ08,CZ10,CZ14,CZ15	No Value
NormUnit	Cap-Tons	Cap-Tons	Cap-Tons	Each	No Value
EUL ID	HVAC-PTAC, HVAC-PTHP HV-ResAC, HV-ResHP	HVAC-PTAC HVAC-PTHP	HVAC-FlowCtrl-AirFiltCtrls HVAC-PTAC, HVAC-PTHP HV-ResAC, HV-ResHP	HV-RefChrg	No Value
RUL ID	n /a	(blank)	HVAC-FlowCtrl-AirFiltCtrls HVAC-PTAC, HVAC-PTHP HV-ResAC, HV-ResHP	No Value	No Value
NTGR	Com-Default>2yrs, Res-Default>2	Com-Default>2yrs	Com-Default>2yrs, Res-Default>2	No Value	No Value
DeliveryType	DnDeemed	PreRebDown	PreRebDown	No Value	No Value
GSIA	Def-GSIA	Def-GSIA	Def-GSIA	No Value	No Value
Electric Load Shape	(use Existing)	PGE:COMMERCIAL:3 = Commercial HVAC	SCE:RES:DEER:HVAC_Eff_HP SCE:NON_RES:DEER:HVAC_Split-Package_AC SCE:NON_RES:DEER:HVAC_Split-Package_HP SCE:RES:DEER:HVAC_Eff_AC	SDGE:res:DEER:HVAC_Eff_HP	No Value
Gas Load Shape	Annual	WinterOnly	Annual	(blank)	No Value
Sector	Ag, Com, Ind, Res	Com	Ag, Com, Ind, Res	No Value	No Value
PA/POU	Any				
BldgHVAC	cWtd,rWtd	cWtd	Any	Any	No Value
Use Category	HVAC	HVAC	HVAC	HVAC	No Value
SubUseCategory	SpaceCool, HeatCool	SpaceCool, HeatCool	VentAirDist SpaceCool, HeatCool	SpaceHeat	No Value
TechGroup	dxAC equip, dxHP equip	dxAC equip, dxHP equip	dxAC equip, dxHP equip	HV_Tech	No Value
TechType	pkgTerm	pkgTerm	pkgTerm	TStat	No Value
Cost Adjustment Type	None	None	HVAC50	No Value	No Value
EnImpCalcType	Standard	(blank)	Standard	Standard	No Value
MeasImpactType	Deem-WP	DEER	Standard	Deemed	No Value
MeasQualifierGroup	None	(blank)	None	None	No Value

# Measure Consensus

## 5.37 / 7.14a – Residential Room Air Conditioner

Low

24

- Offering
  - ❑ Two tiers available: ENERGY STAR and ENERGY STAR Most Efficient
  - ❑ One capacity (10,000 BTU offered) to address 10 variants in the Federal Code
- Stage 1 Issues
  - ❑ Added a delivery type to distinguish RPP (Midstream-RPP)
- Measure Extension
  - ❑ Added measure for POU's
  - ❑ RPP itself, as a delivery platform, can be adopted by POU irrespective of eTRM
- Stage 2 Issues
  - ❑ *Measure updates will occur annually for RPP; agile process needed to incorporate this in timely manner*
  - ❑ *Remove PA dependencies, which are due to interactive effects*

Affirmed with Appliance Measures; Submitted for CPUC approval in Dec 2018.



# Measure Consensus

## 5.38 – Portable Room Air Conditioner

25

**Planned to sunset.**

- Offering

- Implementation: NR, NC
- Bldg Type: Dmo, SFm
- Climate Zones: CZ06, 08-10, 13-16
- Norm Unit: per Cap-ton

- Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (Excel-based model)*
- *Additional Full Load Hours are required to expand to other CZs*

- Measure Extension

- No claims in 2017 or 2018
- Add POU's
- Add SDG&E, PG&E; *Extend to all CZs*

- Stage 2 Issues

- *Extend to additional climate zones.*
- *Demand savings can be improved*
- *Update cost data*





- Base Case

- 12,000 BTU/h room air conditioner (room AC) with an average EER of 11.0

- Measure Case

- 12,000 BTU/h portable room AC with an average EER of at least 11.9
- May include multi-cooling speeds, humidification control, automatic restart, and/or self-evaporating technology

- Savings

- Full Load Hours
  - ✦ 2006-2008 impact study report for room ACs was used to obtain typical room AC operating hours in climate zones 6, 8, 9, and 10
  - ✦ Remaining CZ's scaled based upon degree days
- Baseline EER: 11.7
- Measure EER: ~11.0 (from average of six typical models)

# Input Consensus

## 5.38 – Portable Room Air Conditioner

### • Measure Permutations

### Measure Data Field

Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR, NC	No Value	RobNc	No Value	No Value
BldgType	DMo,SFm	No Value	DMo,SFm	No Value	No Value
BldgVintage	Ex	No Value	Any	No Value	No Value
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06, CZ07,CZ08,CZ09,CZ10,CZ11,CZ12, CZ13,CZ14,CZ15,CZ16	No Value	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15, CZ16	No Value	No Value
NormUnit	Cap-Tons	No Value	Cap-Tons,Each	No Value	No Value
EUL ID	HV-RAC-ES	No Value	HV-RAC-ES	No Value	No Value
RUL ID	n/a	No Value	HV-RAC-ES	No Value	No Value
NTGR	Res-Default>2	No Value	Res-Default>2	No Value	No Value
DeliveryType	DnDeemed	No Value	PreRebDown	No Value	No Value
GSIA	Def-GSIA	No Value	No Value	No Value	No Value
Electric Load Shape	<i>(use existing)</i>	No Value	SCE:Misc._Commercial:New_AC-Ret	No Value	No Value
Gas Load Shape	Annual	No Value	Annual	No Value	No Value
Sector	Res	No Value	No Value	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	No Value	Any	No Value	No Value
Use Category	HVAC	No Value	HVAC	No Value	No Value
SubUseCategory	SpaceCool	No Value	SpaceCool	No Value	No Value
TechGroup	dxAC_equip	No Value	dxAC_equip	No Value	No Value
TechType	RoomAC	No Value	RoomAC	No Value	No Value
Cost Adjustment Type	None	No Value	HVAC50	No Value	No Value
EnImpCalcType	Standard	No Value	Standard	No Value	No Value
MeasImpactType	Deem-WP	No Value	Standard	No Value	No Value
MeasQualifierGroup	None	No Value	None	No Value	No Value

# Measure Consensus

## 5.40 – Upstream HVAC, Residential

Tier 2					
	Air Conditioners		Heat Pumps		Gas Furnaces
	Split System	Packaged	Split Air Source	Packaged	AFUE
Efficiency	17 SEER, 13 EER	15 SEER, 12 EER	17 SEER, 13 EER, 9 HSPF	15 SEER, 12 EER, 8 HSPF	96% AFUE gas and propane furnaces, gas and propane boilers, oil furnaces and hot water boilers

Tier 3					
	Air Conditioners		Heat Pumps		Gas Furnaces
	Split System	Packaged	Split Air Source	Packaged	AFUE
Efficiency	18 SEER, 13 EER	16 SEER, 12 EER	18 SEER, 13 EER, 9 HSPF	16 SEER, 12 EER, 9 HSPF	97% AFUE gas and propane furnaces, gas and propane boilers, oil furnaces and hot water boilers

- Offering

- Implementation: NR
- Norm Unit: Cap-Tons

- Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Consider separating from overlapping measures, any concerns
  - ✦ Gas Furnaces are part of 5.18

- Measure Extension

- Add POUs

- Stage 2 Issues

- *Can this measure be implemented cost-effectively*
- *Move to CZ values that are PA independent*
- *Update cost data for Evap AC*

	2016	2017	2018
	Sum of First Year Gross	Sum of First Year Gross	Sum of First Year Gross
PA ▾	kWh	kWh	kWh
PGE	75,897	33,729	25,902



# Input Consensus

## 5.40 – Upstream HVAC, Residential

### • Measure Permutations

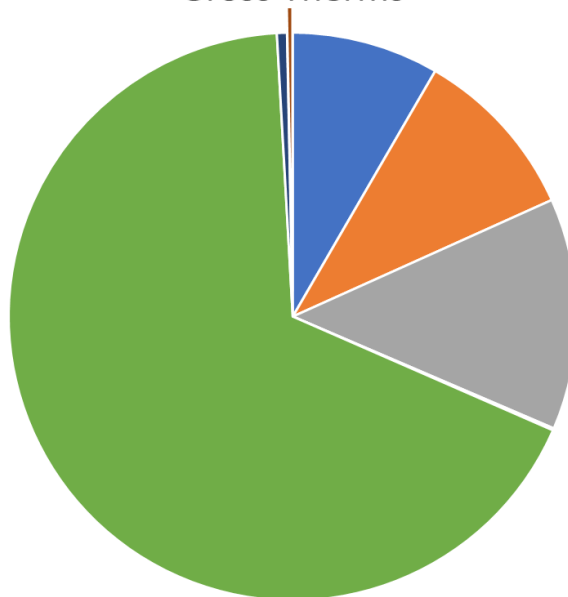
### Measure Data Field

Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR	ROB	ROB	No Value	No Value
BldgType	Res	Res	Res	No Value	No Value
BldgVintage	Ex	Ex	Ex	No Value	No Value
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06, CZ07,CZ08,CZ09,CZ10,CZ11,CZ12, CZ13,CZ14,CZ15,CZ16	IOU	IOU	No Value	No Value
NormUnit	Cap-Tons	Household	Cap-Tons, Household	No Value	No Value
EUL ID	HV-ResHP HV-ResAC HV-ResEvapAC	HV-ResHP HV-ResAC HV-EffFurn	HV-ResHP HV-ResAC HV-ResEvapAC HV-EffFurn	No Value	No Value
RUL ID	n/a	(blank)	No Value	No Value	No Value
NTGR	NonRes-sAll-mHVAC-DX-up	NonRes-sAll-mHVAC-DX-up	NonRes-sAll-mHVAC-DX-up	No Value	No Value
DeliveryType	UpDeemed	PreRebUp	PreRebUp	No Value	No Value
GSIA	Def-GSIA	Def-GSIA	Def-GSIA	No Value	No Value
Electric Load Shape	<i>(use Existing)</i>	PGE:Residential:23 = Res. Ele. & Ht. Pump Heating	DEER:HVAC_Split-Package_AC	No Value	No Value
Gas Load Shape	WinterOnly	WinterOnly	No Value	No Value	No Value
Sector	Res	Res	No Value	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rWtd	No Value	No Value	No Value
Use Category	HVAC	HVAC	HVAC	No Value	No Value
SubUseCategory	HeatCool SpaceCool	HeatCool SpaceCool SpaceHeat	HeatCool SpaceCool SpaceHeat	No Value	No Value
TechGroup	dxHP_equip dxAC_equip	dxHP_equip dxAC_equip SpaceHtg_eq	dxHP_equip dxAC_equip SpaceHtg_eq	No Value	No Value
TechType	SplitSEER	GasFurnace	GasFurnace, SplitSEER	No Value	No Value
Cost Adjustment Type	None	None	No Value	No Value	No Value
EnImpCalcType	(blank)	(blank)	No Value	No Value	No Value
MeasImpactType	Deem-DEER	DEER	No Value	No Value	No Value
MeasQualifierGroup	(blank)	(blank)	No Value	No Value	No Value

# Residential HVAC Measures

No	Description	Affirmation?	Short Status	2018 (Q1-Q3)		
				Num of Units	Gross kWh	Gross Therms
5.18	Furnace, Residential	Yes	Consolidated	3,080	-	6,305
5.20	Gravity Wall Furnace, Residential	Yes	Consolidated			
5.57	Intermittent Pilot Light, Residential	Yes	Consolidated			

IOU Claims Data: 2018, Q1-Q3:  
Gross Therms





- Offering

- ❑ Implementation: NR
- ❑ Tier 1: Res-GasFurnace-AFUE95 (removed additional 92%)
- ❑ Tier 2: Res-GasFurnace-AFUE97 (removed additional 96%)
- ❑ Furnace with variable speed motor (VFD or ECM), only CZ11, 12, 13
- ❑ Norm Unit: per Household

- Stage 1 Issues

- ❑ DEER 2020 updates: *Peak Period, Measure App Type, Delivery Type, Vintage (developed with vintage prototypes)*
- ❑ SCG uses additional tiers: Confirmed to keep the measure simple because of low update currently. Note that savings come from DEER, easy to include other offerings in the future
- ❑ PG&E offers variable speed fan addition: Offering is still being piloted; planned to keep the offering

- Measure Extension

- ❑ Add POU's

<i>(source 2017, Q1-Q3 IOU Claims Data)</i>		Gross Therms			
Ref No	Name	PGE	SCE	SCG	SDGE
5.18	High Efficiency Furnaces - Residential			11,196	542

- Stage 2 Issues

- ❑ *Fan control impacts savings should be updated; PG&E is no longer using this measure, fan savings may be dropped; DEER measure may have been added in 2019.*
- ❑ *Measure case needs to be verified with claims*

# Measure Consensus -

## 5.18 – High Efficiency Furnaces

32

### • Savings Methodology

#### □ DEER values

Measure Name	Impact ID
High efficiency furnace	Res-Furnace-dHIR

#### □ Normalized units

- ✦ Translated from “cap-kBTUh” to “per Household”

#### □ Motor calculations

- ✦ Based upon scaled values from a disposition from a high efficiency blower motor workpaper (PGECO HVC139)
- ✦ Calculates kWh, kW, and negative gas impact

Blue text = Changing and first time that item is mentioned  
*Italics text* = Item that has not been completed



# Measure Consensus -

## 5.18 – High Efficiency Furnaces

33

### ● Stage 1 Issues

- Offering reduction:
  - ✦ SCG uses additional tiers

<i>(source 2017, Q1-Q3 IOU Claims Data)</i>		<b>Gross Therms</b>			
Ref No	Name	PGE	SCE	SCG	SDGE
5.18	High Efficiency Furnaces - Residential			11,196	542

SCG	PG&E	Measure Description	Number of Units	Gross Therms
540357		Central Gas Furnace 92% AFUE	7	169
540358	x	Central Gas Furnace 95% AFUE	237	6,338
530641		Central Gas Furnace 96% AFUE	85	2,805
530642	x	Central Gas Furnace 97% AFUE	54	1,885

### □ Notes

- ✦ Not a large savings measures
- ✦ More savings could be claimed with additional offerings (like SCG), but equivalent of about 6% increase.

# Input Consensus

## 5.18 – High Efficiency Furnaces, Residential

### • Measure Permutations

Measure Permutations		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR	ROB	No Value	No Value	ROB,RET
BldgType	SFm,DMo,MFm	DMo,MFm	No Value	No Value	SFm,MFm,Res
BldgVintage	Ex	Ex	No Value	No Value	Ex
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ11,CZ12,CZ13,CZ14,CZ15,CZ16	CZ01,CZ02,CZ03,CZ04,CZ05,CZ11,CZ12,CZ13,CZ16	No Value	No Value	CZ04,CZ05,CZ06,CZ07,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16,IOU
NormUnit	Household	Household	No Value	No Value	Each, Household
EUL ID	HV-EffFurn	HV-EffFurn	No Value	No Value	HV-EffFurn, ND-Wb-EUCA
RUL ID	HV-EffFurn	(blank)	No Value	No Value	No Value
NTGR	Res-Default>2	Res-Default>2	No Value	No Value	Res-Default>2 EUC-Default All-Default<=2yrs
DeliveryType	DnDeemDI, UpDeemed, DnDeemed	PreRebDown DirInstall	No Value	No Value	PreRebDown PreRebUp
GSIA	Def-GSIA	Def-GSIA	No Value	No Value	Def-GSIA
Electric Load Shape	<i>(use Existing)</i>	PGE:Residential:23 = Res. Ele. & Ht. Pump Heating	No Value	No Value	SCG:RES:DEER:Res:HVAC_Eff_AC
Gas Load Shape	WinterOnly	WinterOnly	No Value	No Value	WinterOnly
Sector	Res	Res	No Value	No Value	Res
PA/POU	Any				
BldgHVAC	rWtd	rWtd	No Value	No Value	Any, rWtd
Use Category	HVAC	HVAC	No Value	No Value	HVAC, BldgEnv
SubUseCategory	SpaceHeat	SpaceHeat	No Value	No Value	SpaceHeat
TechGroup	SpaceHtg_eq	SpaceHtg_eq	No Value	No Value	SpaceHtg_eq
TechType	GasFurnace	GasFurnace	No Value	No Value	GasFurnace
Cost Adjustment Type	None	None	No Value	No Value	No value
EnImpCalcType	Standard	(blank)	No Value	No Value	Standard
MeasImpactType	Deem-WP	DEER, IOU-Deemed	No Value	No Value	Deemed
MeasQualifierGroup	None	None	No Value	No Value	None

# Measure Consensus

## 5.20 – Gravity Wall Furnaces in Single-Family and Multi-Family Homes

Low

35



### ● Offering

- Implementation: NR
- MFm and SFm only (add DMO)
  - ✘ MFm: eQUEST models used
  - ✘ SFm
- Norm Unit: Each

### ● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (not developed with vintage prototypes)*

### ● Measure Extension

- Add PG&E, SDG&E
- Extend to all CZs

### ● Stage 2 Issues

- *Normalizing unit should be consistent*
- *Update cost data*
- Stage 2 item to improve electronic pilot control (implemented in a separate measure – 5.57)

BldgType	kWh SCG	kW SCG	Therms SCG
MFm	-	-	244
SFm	-	-	8

# Measure Consensus

## 5.20, Gravity Wall Furnaces in Single-Family and Multi-Family Homes

36

- Base Case:

Capacity	AFUE
over 19,000 Btu/hour up to 27,000 Btu/hour	65%
over 27,000 Btu/hour up to 46,000 Btu/hour	66%
over 46,000 Btu/hour	67%

- Measure Case:

- ❑ The Annual Fuel Utilization Efficiency (AFUE) on the new measure furnace must exceed 70%

Furnace Capacity (Btu/h):	25,000	35,000	50,000
Baseline AFUE:	65.0%	66.3%	66.8%
Measure AFUE:	70.0%	70.0%	70.0%
Savings:	7.1%	5.3%	4.6%

- Savings

- ❑ eQUEST models for MFm
  - ✦ DMO savings taken from regression data due to errors in model
- ❑ Calibrated against 889 homes in SCG Territory
  - ✦ Home size not available in customer data set, but collected for some homes from Internet data

# Input Consensus

## 5.20 – Gravity Wall Furnaces in Single-Family and Multi-Family Homes

- Measure Permutations

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR	No Value	No Value	No Value	ROB
BldgType	MFm,SFm	No Value	No Value	No Value	MFm,SFm
BldgVintage	Ex	No Value	No Value	No Value	Ex,Any
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05, CZ06,CZ07,CZ08,CZ09,CZ10, CZ11,CZ12,CZ13,CZ14,CZ15, CZ16	No Value	No Value	No Value	Any,CZ01,CZ02,CZ03,CZ04,CZ05, CZ06,CZ07,CZ08,CZ09,CZ10,CZ1 1,CZ12,CZ13,CZ14,CZ15,CZ16
NormUnit	Each	No Value	No Value	No Value	Each
EUL ID	HV-EffFurn	No Value	No Value	No Value	HV-EffFurn
RUL ID	N/A	No Value	No Value	No Value	No Value
NTGR	Res-Default>2	No Value	No Value	No Value	Res-Default>2
DeliveryType	UpDeemed, DnDeemed	No Value	No Value	No Value	PreRebUp, PreRebDown
GSIA	Def-GSIA	No Value	No Value	No Value	Def-GSIA
Electric Load Shape	<i>use existing</i>	No Value	No Value	No Value	SCG:RES:DEER:Res:HVAC_Eff_AC
Gas Load Shape	WinterOnly	No Value	No Value	No Value	WinterOnly
Sector	Res	No Value	No Value	No Value	Res
PA/POU					
BldgHVAC	rNCGF rWtd	No Value	No Value	No Value	rNCGF rWtd
Use Category	HVAC	No Value	No Value	No Value	HVAC
SubUseCategory	SpaceHeat	No Value	No Value	No Value	SpaceHeat
TechGroup	SpaceHtg_eq	No Value	No Value	No Value	SpaceHtg_eq
TechType	GasFurnace	No Value	No Value	No Value	GasFurnace
Cost Adjustment Type	None	No Value	No Value	No Value	No value
EnImpCalcType	Standard	No Value	No Value	No Value	Standard
MeasImpactType	Deem-WP	No Value	No Value	No Value	Deemed
MeasQualifierGroup	None	No Value	No Value	No Value	None

# Measure Consensus

## 5.57– Intermittent Pilot Light, Residential

Low

38

- Offering

- ❑ Implementation: AOE, **NC**
- ❑ MFm and SFm
- ❑ Norm Unit: Each

- Stage 1 Issues

- ❑ DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (not developed with vintage prototypes)*
- ❑ New workpaper supported by ET Study

- Measure Extension

- ❑ Add PG&E, SDG&E
- ❑ Extend to all CZs

- Stage 2 Issues

- ❑ None



# Measure Consensus

## 5.57– Intermittent Pilot Light, Residential

39

- Base case
  - Furnaces with continuously operating pilot light. Pilot light off from July to December. Pilot light efficiency of 66%
- Measure case
  - Savings calculated hourly based upon HDDs. No savings while pilot light if off.
- Savings
  - Based upon furnace capacity



# Input Consensus

## 5.57– Intermittent Pilot Light, Residential

### • Measure Permutations

Measure Permutations		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	AOE, NC	No Value	No Value	No Value	AOE, New
BldgType	SFm,MFm	No Value	No Value	No Value	SFm,MFm
BldgVintage	Ex	No Value	No Value	No Value	Ex
BldgLoc	CZ01,CZ02,CZ03,CZ04,CZ05,CZ06, CZ07,CZ08,CZ09,CZ10,CZ11,CZ12, CZ13,CZ14,CZ15,CZ16	No Value	No Value	No Value	No Value
NormUnit	Each	No Value	No Value	No Value	Each
EUL ID	HV-EffFurn	No Value	No Value	No Value	HV-EffFurn
RUL ID	HV-EffFurn	No Value	No Value	No Value	No Value
NTGR	ET-Default	No Value	No Value	No Value	ET-Default
DeliveryType	DnDeemed, DnDeemDI	No Value	No Value	No Value	PreRebDown, DirInstall
GSIA	Def-GSIA	No Value	No Value	No Value	Def-GSIA
Electric Load Shape	<i>(use existing)</i>	No Value	No Value	No Value	SCG:RES:DEER:Res:HVAC_Eff_AC
Gas Load Shape	Annual	No Value	No Value	No Value	Annual
Sector	Res	No Value	No Value	No Value	Res
PA/POU	Any				
BldgHVAC	rDXGF	No Value	No Value	No Value	No Value
HOU					
IE Factor	FALSE				
IETableName	None				
Use Category	HVAC	No Value	No Value	No Value	No Value
SubUseCategory	Space Heating	No Value	No Value	No Value	No Value
TechGroup	HV_Tech	No Value	No Value	No Value	No Value
TechType	Tstat	No Value	No Value	No Value	No Value
Cost Adjustment Type	None	No Value	No Value	No Value	No Value
EnImpCalcType	Standard	No Value	No Value	No Value	No Value
MeasImpactType	Deem-WP	No Value	No Value	No Value	No Value
MeasQualifierGroup	None	No Value	No Value	No Value	No Value



# Backup only

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