

HVAC - Residential Service Measures

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CALIFORNIA
TECHNICAL FORUM

AYAD AL-SHAIKH
TOMAS TORRES-GARCIA
APRIL 2019

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)

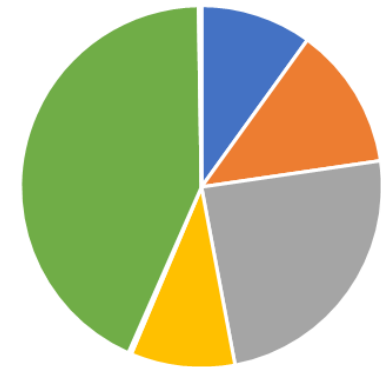
- HVAC Units (5 measures) – small savings

- HVAC Controls (5 measures) – large savings

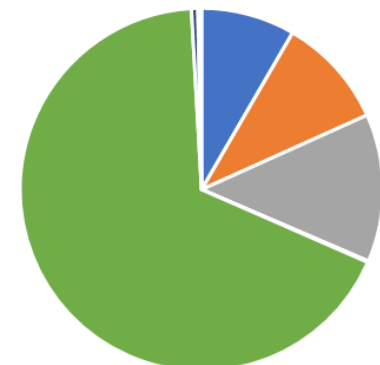
- Evaporative Units (4 measures) – small saving

- Gas Units (3 measures) – small savings

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

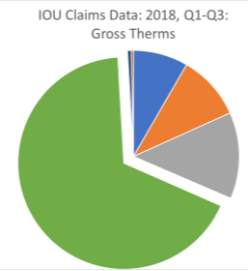
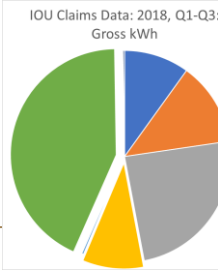


IOU Claims Data: 2018, Q1-Q3:
Gross Therms



Residential HVAC Measures

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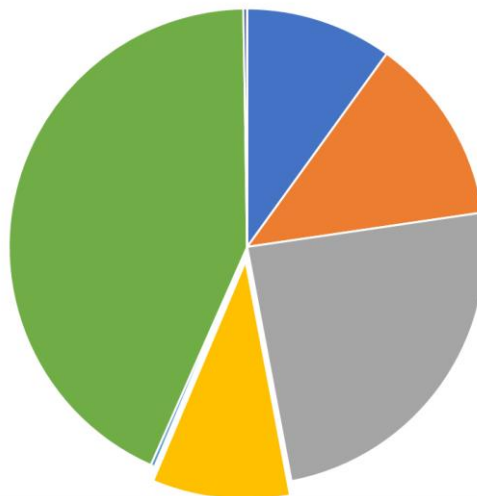
Ref No	Description	2016			2017			2018 (Q1-Q3)		
		Number of Units	First Year Gross kWh	First Year Gross Therm	Number of Units	First Year Gross kWh	First Year Gross Therm	Number of Units	First Year Gross kWh	First Year Gross Therm
5.10a	Refrigerant Charge, Residential	74,591	7,674,601	(1,066)	36,635	2,451,593	(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
Totals:			27,190,000	300,000		39,200,000	790,000		33,370,000	1,320,000

Residential HVAC Measures

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No	Description	IOU				2018 (Q1-Q3)		
		Modeled	Submittal	Lead	Rigor	Number of Units	First Year Gross kWh	First Year Gross Therm
5.10a	Refrigerant Charge, Residential	DEER	May	SCE	Low	16,959	671,757	(80)
5.10b	Condenser Coil Cleaning, Residential	DEER	May	SCE	Low	34,790	256,309	(1)
5.10c	Evaporator Coil Cleaning, Residential	DEER	May	SCE	Low			
5.10d	Air-flow Adjustment, Residential	DEER	May	SCE	Low	2,587	191,779	(1,728)
5.10e	Duct Seal, Residential	DEER	Apr	PG&E	Low	103,040	554,162	45,383
5.10f	Blower Motor Retrofit	DEER	May	SCE	Low	34,959	4,200,001	(44,687)

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



Measure Consensus

5.10a – Refrigerant Charge, Residential



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● Offering

- Implementation: BRO-RCx
- System Types: Packaged and Split System HVAC units
 - ✦ Decrease, Typical (8% rated charge)
 - System with NO thermal expansion valve (TXV)
 - System with thermal expansion valve (TXV)
 - ✦ Increase, Typical (8% rated charge)
 - System with NO thermal expansion valve (TXV)
 - System with thermal expansion valve (TXV)
- Norm Unit: Cap-Tons

● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Change AOE to BRO-RCx
- *Update EUL*

● Measure Extension

- Add POUs
- Extend to all CZs

● Stage 2 Issues

- *Review ID changes (EUL,NTG)*
- *Update cost methodology*
- *Review program requirements*
- *Updating workpaper based upon 2019/2020 update*
- *Savings are documented through a disposition; agreement with approach*

		Sum of First Year Gross kWh			
		PGE	SCE	SCG	SDGE
Ref No	Description	2018: Q1 - Q3			
5.10a	Refrigerant Charge, Residential	671,757	-	-	-
5.10b	Condenser Coil Cleaning, Residential	255,413	-	-	896
5.10c	Evaporator Coil Cleaning, Residential	-	-	-	-
5.10d	Air-flow Adjustment, Residential	-	-	-	191,779
5.10e	Duct Seal, Residential	344,392	-	209,769	-
5.10f	Blower Motor Retrofit	3,869,073	330,927	-	-
Grand Total		5,140,635	330,927	209,769	192,675

Measure Consensus -

5.10a-e – Residential Service Measures

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● Savings Methodology

□ Normalized units

- ✦ **Question**: What should be the normalized unit: “Cap-Tons” or “per Household”
- ✦ Use “Cap-Tons”
 - Concern that using “Cap-tons” may drive installations to larger home systems, while “Household” may drive installations to smaller home systems
 - We don’t have data to support this point since the last two years are “per household”
- ✦ Use “Household”
 - Better to describe this way to the customer
 - Some IOU systems cannot support two normalized units
 - Cannot rebate on “Household” and claim savings on “Cap-tons”
 - Concern that the reported “Cap-tons” may not be accurate
 - Concern that many residential systems are oversized, so savings may be over-claimed if using “Cap-tons”
- ✦ Use “1000sqft”
 - Requires additional information, but well known by customer
 - Best link to actual use by the home; assuming a single system is used

Measure Consensus

5.10a – Refrigerant Charge, Residential

MeasureID	Description	Methodology	Source
RE-HV-RefChrg-Dec-NoTXV-typ	Decrease Refrigerant Charge - System with No thermal expansion valve (TXV) - Typical (8% rated charge)	DEER	DEER2018
RE-HV-RefChrg-Dec-TXV-typ	Decrease Refrigerant Charge - System with thermal expansion valve (TXV) - Typical (8% rated charge)	DEER	DEER2018
RE-HV-RefChrg-Inc-NoTXV-typ	Increase Refrigerant Charge - System with No thermal expansion valve (TXV) - Typical (8% rated charge)	DEER	DEER2018
RE-HV-RefChrg-Inc-TXV-typ	Increase Refrigerant Charge - System with thermal expansion valve (TXV) - Typical (8% rated charge)	DEER	DEER2018
Res-DuctSeal-HighToLow-wtd	Residential: Duct Sealing (Total Leakage Reduced from High (40/35%) to Low (15/12%))	DEER	DEER2017
Res-DuctSeal-MedToLow-wtd	Residential: Duct Sealing (Total Leakage Reduced from Medium (25/24%) to Low (15/12%))	DEER	DEER2017
Non-DEER	Condenser Coil Cleaning	Savings = 0.1250 * (Res-RefrigCharge-Wtd)	Disposition/DEER2018
Non-DEER	Evaporator Coil Cleaning	Savings = 0.0625 * (Res-RefrigCharge-Wtd)	Disposition/DEER2018
Non-DEER	Air Flow Adjustment	(Res-RCA-wtd) – (Res-RefrigCharge-wtd)	Non-DEER (as a function of DEER2018)

Input Consensus

5.10a – Refrigerant Charge, Residential

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- Measure Permutations

Measure Data Field	Measure Value	Measure Data Field			
		PG&E	SCE	SDG&E	SCG
MeasureAppType	BRO-RCx	RC	REA,RobNc	No Value	REA
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm	SFm	DMo,MFm,SFm
BldgVintage	Ex	Ex	Any	Ex	Any
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	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16
NormUnit	Cap-Tons	Cap-Tons	Cap-Tons, Each, Household	Cap-Tons	Cap-Tons
EUL ID	EUL-BRO	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	HVAC-2Spd HVAC-RepEcono	HVAC-QMPkg
RUL ID	N/A	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	No Value	No Value
NTGR	Res-Default>2	Res-Default>2 Res-sAll-mHVAC-RCA	Res-Default>2	No Value	Res-Default>2
DeliveryType	DnDeemDI, DnDeemed	DirInstall PreRebDown	DirInstall PreRebDown	No Value	PreRebDown
GSIA	Def-GSIA	Def-GSIA, Res-RCA-PGE	Def-GSIA	No Value	No Value
Electric Load Shape	<i>(use existing)</i>	PGE:RES:DEER:HVAC_Refrig_Charge PGE:RES:DEER:HVAC_Eff_AC PGE:RES:DEER:Refg_Chrg_Duct_Seal	SCE:RES:DEER:HVAC_Eff_AC	SDGE:DEER:HVAC_Eff_AC SDGE:DEER:HVAC_Refrig_Charge	No Value
Gas Load Shape	Annual	WinterOnly Annual	Annual	WinterOnly	Annual
Sector	Res	Res	Res, Com	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rDXGF	Any	rDXGF	Any
Use Category	HVAC	HVAC	HVAC	HVAC	HVAC
SubUseCategory	HeatCool	VentAirDist SpaceCool HtRej	HeatCool VentAirDist	SpaceCool	HeatCool
TechGroup	dxAC equip	HV_AirDist dxAC equip	dxAC equip HV_AirDist	HV_AirDist	HV_Tech
TechType	spltSEER	VentFanMtr	spltSEER	SupFanMtr	spltSEER
Cost Adjustment Type	None	None	HVAC50	No value	No value
EnImpCalcType	Standard	(blank)	Standard	Standard	Standard
MeasImpactType	Deem-WP	IOU-Deemed, DEER	Standard	Deemed	Deemed
MeasQualifierGroup	None	(blank)	None	None	None



● Offering

- Implementation: BRO-RCx
- System Types: Packaged and Split System HVAC units
- Norm Unit: **Cap-Tons**

● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Estimate that non-charge related services may account for 25% of the savings from RCA
 - ✦ Apportioning of non-charge adjustment savings, Condenser Coil Cleaning: 50% of the total
 - ✦ Incidence fractions, Condenser Coil Cleaning: 0.80 (not used since implemented measures independently)
- Change AOE to BRO-RCx
- *Update EUL*

● Measure Extension

- Add POU's
- Extend to all CZs

● Stage 2 Issues

- *Savings are documented through a disposition*

		2018: Q1 - Q3		Sum of First Year Gross kWh		
Ref No	Description	PGE	SCE	SCG	SDGE	
5.10a	Refrigerant Charge, Residential	671,757	-	-	-	-
5.10b	Condenser Coil Cleaning, Residential	255,413	-	-	-	896
5.10c	Evaporator Coil Cleaning, Residential	-	-	-	-	-
5.10d	Air-flow Adjustment, Residential	-	-	-	-	191,779
5.10e	Duct Seal, Residential	344,392	-	209,769	-	-
5.10f	Blower Motor Retrofit	3,869,073	330,927	-	-	-
Grand Total		5,140,635	330,927	209,769	192,675	

Input Consensus

5.10b – Condenser Coil Cleaning, Residential

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Measure Permutations

Measure Data Field	Measure Value	Measure Data Field			
		PG&E	SCE	SDG&E	SCG
MeasureAppType	BRO-RCx	RC	REA,RobNc	No Value	REA
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,Res,SFm	DMo,MFm,SFm
BldgVintage	Ex	Ex	Any	Ex	Any
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	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16
NormUnit	Cap-Tons	Cap-Tons	Cap-Tons, Each, Household	Cap-Tons	Cap-Tons
EUL ID	EUL-BRO	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	HVAC-2Spd HVAC-RepEcono HV-ResAC-CleanCoil	HVAC-QMPkg
RUL ID	N/A	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	No Value	No Value
NTGR	Res-Default>2	Res-Default>2 Res-sAll-mHVAC-RCA	Res-Default>2	No Value	Res-Default>2
DeliveryType	DnDeemDI, DnDeemed	DirInstall PreRebDown	DirInstall PreRebDown	No Value	PreRebDown
GSIA	Def-GSIA	Def-GSIA Res-RCA-PGE	Def-GSIA	No Value	No Value
Electric Load Shape	<i>(use existing)</i>	PGE:RES:DEER:HVAC_Refrig_Charge PGE:RES:DEER:HVAC_Eff_AC PGE:RES:DEER:Refrg_Chrg_Duct_Seal	SCE:RES:DEER:HVAC_Eff_AC	SDGE:DEER:HVAC_Eff_AC SDGE:DEER:HVAC_Refrig_Charge	No Value
Gas Load Shape	Annual	WinterOnly, Annual	Annual	Annual	Annual
Sector	Res	Res	Res,Com	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rDXGF	Any	rDXGF	Any
Use Category	HVAC	HVAC	HVAC	HVAC	HVAC
SubUseCategory	HeatCool	VentAirDist SpaceCool HtRej	HeatCool VentAirDist	SpaceCool	HeatCool
TechGroup	dxAC_equip	HV_AirDist dxAC_equip	dxAC_equip HV_AirDist	dxAC_equip	HV_Tech
TechType	spltSEER	VentFanMtr	spltSEER	spltSEER	spltSEER
Cost Adjustment Type	None	None	HVAC50	0	No value
EnImpCalcType	Standard	(blank)	Standard	Standard	Standard
MeasImpactType	Deem-WP	IOU-Deemed, DEER	Standard	Deemed	Deemed
MeasQualifierGroup	None	(blank)	None	None	None



● Offering

- Implementation: BRO-RCx
- System Type: Packaged and Split System HVAC units
- Norm Unit: **Cap-Tons**

● Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Estimate that non-charge related services may account for 25% of the savings from RCA
 - ✦ Apportioning of non-charge adjustment savings, Evaporator Coil Cleaning: 50% of the total
 - ✦ Incidence fractions, Evaporator Coil Cleaning: 0.60 (not used since implemented measures independently)
- Change AOE to BRO-RCx
- *Update EUL*

● Measure Extension

- Add POUs
- Extend to all CZs

● Stage 2 Issues

- *Savings are documented through a disposition*

		2018: Q1 - Q3		Sum of First Year Gross kWh		
Ref No	Description	PGE	SCE	SCG	SDGE	
5.10a	Refrigerant Charge, Residential	671,757	-	-	-	-
5.10b	Condenser Coil Cleaning, Residential	255,413	-	-	-	896
5.10c	Evaporator Coil Cleaning, Residential	-	-	-	-	-
5.10d	Air-flow Adjustment, Residential	-	-	-	-	191,779
5.10e	Duct Seal, Residential	344,392	-	209,769	-	-
5.10f	Blower Motor Retrofit	3,869,073	330,927	-	-	-
Grand Total		5,140,635	330,927	209,769	192,675	

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

Input Consensus

5.10c – Evaporator Coil Cleaning, QM, Residential

• Measure Permutations

Measure Data Field	Measure Value	Measure Data Field			
		PG&E	SCE	SDG&E	SCG
MeasureAppType	BRO-RCx	RC	REA,RobNc	No Value	REA
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm	SFm	DMo,MFm,SFm
BldgVintage	Ex	Ex	Any	Ex	Any
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	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16
NormUnit	Cap-Tons	Cap-Tons	Cap-Tons Each Household	Cap-Tons	Cap-Tons
EUL ID	EUL-BRO	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	HVAC-2Spd HVAC-RepEcono	HVAC-QMPkg
RUL ID	N/A	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	No Value	No Value
NTGR	Res-Default>2	Res-Default>2 Res-sAll-mHVAC-RCA	Res-Default>2	No Value	Res-Default>2
DeliveryType	DnDeemDI, DnDeemed	DirInstall PreRebDown	DirInstall PreRebDown	No Value	PreRebDown
GSIA	Def-GSIA	Def-GSIA Res-RCA-PGE	Def-GSIA	No Value	No Value
Electric Load Shape	(use existing)	PGE:RES:DEER:HVAC_Refrig_Charge PGE:RES:DEER:HVAC_Eff_AC PGE:RES:DEER:Refrg_Chrg_Duct_Seal	SCE:RES:DEER:HVAC_Eff_AC	SDGE:DEER:HVAC_Eff_AC SDGE:DEER:HVAC_Refrig_Charge	No Value
Gas Load Shape	Annual	WinterOnly, Annual	Annual	WinterOnly	Annual
Sector	Res	Res	Res, Com	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rDXGF	Any	rDXGF	Any
Use Category	HVAC	HVAC	HVAC	HVAC	HVAC
SubUseCategory	HeatCool	VentAirDist SpaceCool HtRej	HeatCool VentAirDist	SpaceCool	HeatCool
TechGroup	dxAC equip	HV_AirDist dxAC equip	dxAC equip HV_AirDist	HV_AirDist	HV_Tech
TechType	spltSEER	VentFanMtr	spltSEER	SupFanMtr	spltSEER
Cost Adjustment Type	None	None	HVAC50	No value	No value
EnImpCalcType	Standard	(blank)	Standard	Standard	Standard
MeasImpactType	Deem-WP	IOU-Deemed, DEER	Standard	Deemed	Deemed
MeasQualifierGroup	None	(blank)	None	None	None



● Offering

- ❑ Implementation: BRO-RCx
- ❑ System Type: Packaged and Split System HVAC units
- ❑ Norm Unit: **Cap-Tons**

● Stage 1 Issues

- ❑ DEER 2020 updates: *Peak Period, Measure App Type, Delivery Type, Vintage (developed with vintage prototypes)*
- ❑ Savings are documented through a disposition
- ❑ Change AOE to BRO-RCx
- ❑ *Update EUL*

● Measure Extension

- ❑ Add POU's
- ❑ Extend to all CZs

2018: Q1 - Q3		Sum of First Year Gross kWh			
Ref No	Description	PGE	SCE	SCG	SDGE
5.10a	Refrigerant Charge, Residential	671,757	-	-	-
5.10b	Condenser Coil Cleaning, Residential	255,413	-	-	896
5.10c	Evaporator Coil Cleaning, Residential	-	-	-	-
5.10d	Air-flow Adjustment, Residential	-	-	-	191,779
5.10e	Duct Seal, Residential	344,392	-	209,769	-
5.10f	Blower Motor Retrofit	3,869,073	330,927	-	-
Grand Total		5,140,635	330,927	209,769	192,675

● Stage 2 Issues

- ❑ *Savings are documented through a disposition*

Input Consensus

5.10d – Air Flow Adjustment, QM, Residential

- Measure Permutations

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	BRO-RCx	RC	REA,RobNc	No Value	REA
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm	SFm	DMo,MFm,SFm
BldgVintage	Ex	Ex	Any	Ex	Any
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	CZ06,CZ08,CZ09,CZ10,CZ13,CZ14,CZ15,CZ16
NormUnit	Cap-Tons	Cap-Tons	Cap-Tons Each Household	Cap-Tons	Cap-Tons
EUL ID	EUL-BRO	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	HVAC-2Spd HVAC-RepEcono	HVAC-QMPkg
RUL ID	N/A	HV-ResRCx HV-RefChrg HV-ResAC-CleanCoil	HV-ResRCx	No Value	No Value
NTGR	Res-Default>2	Res-Default>2 Res-sAll-mHVAC-RCA	Res-Default>2	No Value	Res-Default>2
DeliveryType	DnDeemDI, DnDeemed	DirInstall PreRebDown	DirInstall PreRebDown	No Value	PreRebDown
GSIA	Def-GSIA	Def-GSIA Res-RCA-PGE	Def-GSIA	No Value	No Value
Electric Load Shape	<i>(use existing)</i>	PGE:RES:DEER:HVAC_Refrig_Charge PGE:RES:DEER:HVAC_Eff_AC PGE:RES:DEER:Refg_Chrg_Duct_Seal	SCE:RES:DEER:HVAC_Eff_AC	SDGE:DEER:HVAC_Eff_AC SDGE:DEER:HVAC_Refrig_Charge	No Value
Gas Load Shape	Annual	WinterOnly, Annual	Annual	WinterOnly	Annual
Sector	Res	Res	Res, Com	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rDXGF	Any	rDXGF	Any
Use Category	HVAC	HVAC	HVAC	HVAC	HVAC
SubUseCategory	HeatCool	VentAirDist SpaceCool HtRej	HeatCool VentAirDist	SpaceCool	HeatCool
TechGroup	dxAC equip	HV_AirDist dxAC equip	dxAC equip HV_AirDist	HV_AirDist	HV_Tech
TechType	spltSEER	VentFanMtr	spltSEER	SupFanMtr	spltSEER
Cost Adjustment Type	None	None	HVAC50	No value	No value
EnImpCalcType	Standard	(blank)	Standard	Standard	Standard
MeasImpactType	Deem-WP	IOU-Deemed, DEER	Standard	Deemed	Deemed
MeasQualifierGroup	None	(blank)	None	None	None



Offering

- Implementation: BRO-RCx
- Packaged and Split System HVAC units
 - ✦ Duct Seal Med to Low
 - ✦ Duct Seal High to Low
- Norm Unit: Cap-Tons

Stage 1 Issues

- DEER 2020 updates: *Peak Period*, Measure App Type, Delivery Type, *Vintage (developed with vintage prototypes)*
- Change AOE to BRO-RCx
- *Update EUL*
- *NTGR needs to be updated*

Measure Extension

- Add POUs
- Extend to all CZs

2018: Q1 - Q3		Sum of First Year Gross kWh			
Ref No	Description	PGE	SCE	SCG	SDGE
5.10a	Refrigerant Charge, Residential	671,757	-	-	-
5.10b	Condenser Coil Cleaning, Residential	255,413	-	-	896
5.10c	Evaporator Coil Cleaning, Residential	-	-	-	-
5.10d	Air-flow Adjustment, Residential	-	-	-	191,779
5.10e	Duct Seal, Residential	344,392	-	209,769	-
5.10f	Blower Motor Retrofit	3,869,073	330,927	-	-
Grand Total		5,140,635	330,927	209,769	192,675

Stage 2 Issues

- Add a Duct Replacement offering **specifically for mobile homes**; was being piloted by PG&E
- Review cost methodology
- Review EUL; duct sealing life may take back to life of original duct
- Savings could be underestimated

Input Consensus

5.10e – Duct Test and Seal, QM, Residential



- Measure Permutations

Measure Data Field	Measure Value	Measure Data Field			
		PG&E	SCE	SDG&E	SCG
MeasureAppType	BRO-RCx	RC	No Value	No Value	REA,RET
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	No Value	No Value	No Value
BldgVintage	Ex	Ex	No Value	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	No Value	No Value	No Value
NormUnit	Cap-tons	Household	No Value	No Value	No Value
EUL ID	EUL-BRO	HV-DuctSeal	No Value	No Value	No Value
RUL ID	HV-DuctSeal	HV-DuctSeal	No Value	No Value	No Value
NTGR	Res-sAll-mDuctSeal	Res-sAll-mDuctSeal	No Value	No Value	Res-Default-HTR-di NonRes-sGHS-mIRF-dn
DeliveryType	DnDeemDI	DirInstall	No Value	No Value	DirInstall
GSIA	Res-DuctSeal-PGE Res-DuctSeal-All	Res-DuctSeal-PGE	No Value	No Value	Res-DuctSeal-All
Electric Load Shape	<i>(use Existing)</i>	PGE:DEER:Com:HVAC_Duct_Sealing	No Value	No Value	No Value
Gas Load Shape	Annual	Winter Only	No Value	No Value	No Value
Sector	Res	Res	No Value	No Value	Res
PA/POU	Any				
BldgHVAC	rWtd	rDXGF	No Value	No Value	No Value
Use Category	HVAC	HVAC	No Value	No Value	No Value
SubUseCategory	VentAirDist	VentAirDist	No Value	No Value	No Value
TechGroup	HV_AirDist	HV_AirDist	No Value	No Value	No Value
TechType	DuctLeak	DuctLeak	No Value	No Value	No Value
Cost Adjustment Type	None	None	No Value	No Value	No Value
EnImpCalcType	Standard	(blank)	No Value	No Value	No Value
MeasImpactType	Deem-DEER	DEER	No Value	No Value	No Value
MeasQualifierGroup	None	(blank)	No Value	No Value	No Value

Measure Consensus

5.10f/5.42 - Brushless Fan Motor Replacement, Residential



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Offering

- ❑ Implementation: NR, AR
- ❑ Building Types: DMO, MFm, SFm
- ❑ Climate zones: CZ01-CZ16
- ❑ Norm Unit: Cap-Tons
- ❑ Offerings include:
 - ✦ Split Capacitor Motor (0.65 W/cfm) to Brushless Fan Motor (0.365 W/cfm)

PA	Building Type	Sum of First Year Gross kWh
SCE	Mobile Home	61,536
	Single Family	269,391
Grand Total		330,927

Stage 1 Issues

- ❑ *DEER 2020 Updates: Using the latest building prototypes and new Peak Period*
- ❑ Savings from Q3 2018 (4,000,000 kWh)

Measure Extension

- ❑ Add POUs, PG&E and SDG&E

Stage 2 Issues

- ❑ *Measure case improvement.*

Ref No	Description	Sum of First Year Gross kWh			
		PGE	SCE	SCG	SDGE
5.10a	Refrigerant Charge, Residential	671,757	-	-	-
5.10b	Condenser Coil Cleaning, Residential	255,413	-	-	896
5.10c	Evaporator Coil Cleaning, Residential	-	-	-	-
5.10d	Air-flow Adjustment, Residential	-	-	-	191,779
5.10e	Duct Seal, Residential	344,392	-	209,769	-
5.10f	Blower Motor Retrofit	3,869,073	330,927	-	-
Grand Total		5,140,635	330,927	209,769	192,675

Measure Consensus

5.10f/5.42 - Brushless Fan Motor Replacement, Residential

- Measure Permutations

		Measure Data Field			
Measure Data Field	Measure Value	PG&E	SCE	SDG&E	SCG
MeasureAppType	NR,AR	ROB	ROB,RET/ER	No Value	No Value
BldgType	DMo,MFm,SFm	DMo,MFm,SFm	DMo,MFm,SFm	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,IOU	CZ06,CZ08,CZ09,CZ10,CZ13 ,CZ14,CZ15,CZ16	No Value	No Value
NormUnit	Cap-Ton	Each	Cap-Tons	No Value	No Value
EUL ID	HV-ResRCx	HV-ResAC, Motors-fan	HV-ResRCx	No Value	No Value
RUL ID	N/A	(blank)	HV-ResRCx	No Value	No Value
NTGR	Res-Default>2	Res-Default>2	Res-Default>2	No Value	No Value
DeliveryType	UpDeemed,DnDeemed,DnDeemDI	DirInstall PreRebDown	DirInstall PreRebDown, PreRebUp	No Value	No Value
GSIA	Def-GSIA	Def-GSIA	Def-GSIA	No Value	No Value
Electric Load Shape	DEER:HVAC_Eff_AC	PGE:RES:DEER:HVAC_Eff_AC	DEER:HVAC_Eff_AC	No Value	No Value
Gas Load Shape	Annual	Annual	Annual	No Value	No Value
Sector	Res	Res	Res	No Value	No Value
PA/POU	Any				
BldgHVAC	rWtd	rWtd	rDXGF	No Value	No Value
Use Category	HVAC	HVAC	HVAC	No Value	No Value
SubUseCategory	VentAirDist	VentAirDist	VentAirDist	No Value	No Value
TechGroup	HV_AirDist	HV_AirDist	HV_AirDist	No Value	No Value
TechType	SupFanMtr	SupFanMtr	SupFanMtr	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	IOU-Deemed	IOU-Deemed	No Value	No Value