

Agriculture / Pumping Subcommittee



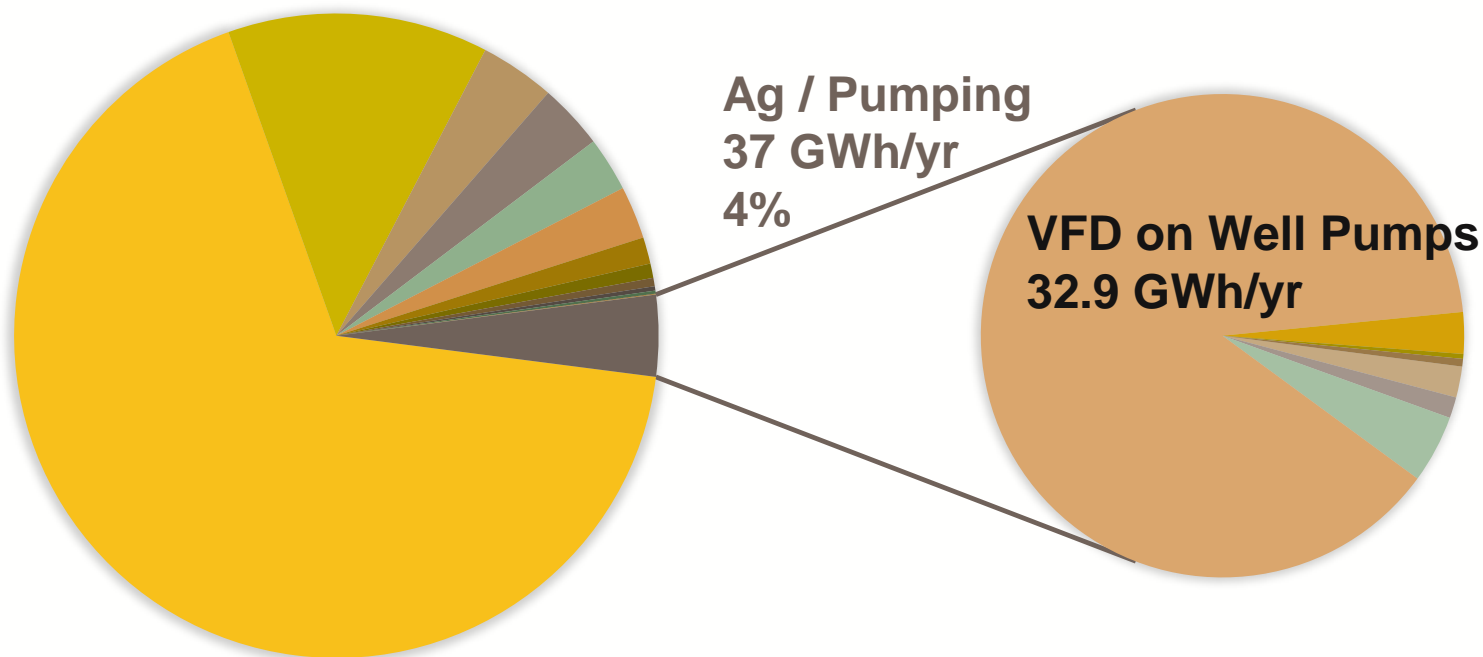
AYAD AL-SHAIKH
APRIL 2017

Ag/Pumping Category Deemed Savings

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- Savings Perspective

2016 CA Electric Savings
(Total = 912 GWh/yr)



Measure Overview

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Ref No	Name	Total Energy (kWh/vr)
★ 3.01	Agricultural Pump System Overhaul for Pumps Up To 25 HP	772,578
★ 3.02	Agricultural Ventilation Fans	523,200
★ 3.03	Farm Sprinkler to Micro Irrigation Conversion	1,693,437
★ 3.04	Low Pressure Sprinkler Nozzles	0
★ 3.05	Variable Frequency Drive on Agricultural Well Pumps	32,921,200
	Variable Frequency Drive on Agricultural Well Pumps (<=300hp)	11,200,000
	Variable Frequency Drive on Agricultural Well Pumps (<=300hp)	18,100,000
	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)	1,900,000
	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)	1,000,000
	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)	800,000
3.06	Milk Cooling Scroll Compressor	0
3.07	Vertical Hollow and Solid Shaft Pump Motors	1,035,326
3.08	CHR Unit - Electric and Gas	0
3.09	Milk Vacuum Pump VSD	0
3.10	Milk Transfer Pump VSD	0
3.11	Chilled Glycol Pipe Insulation	121,713
3.12	Glycol tank Insulation	189,645
		0
Grand Total		37,257,098

* Images used from workpapers and PG&E catalogs

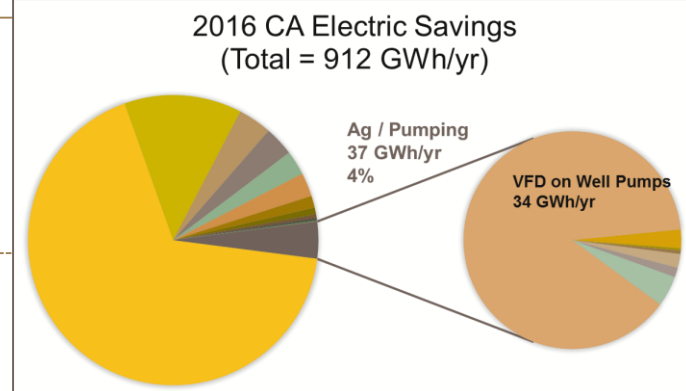
Before



Ag/Pumping Category Deemed Savings

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• Savings Perspective: 2016



Ref No	Name	Units Installed		Energy (kWh/yr)		Demand (kW)		Total		
		PGE	SCE	PGE	SCE	PGE	SCE	Units Installed	Total Energy (kWh/yr)	Demand (kW)
3.01	Agricultural Pump System Overhaul for Pumps Up To 25 HP	1,699	618	562,973	209,604	141	40	2,316	772,578	181
3.02	Agricultural Ventilation Fans	480		523,200		240		480	523,200	240
3.03	Farm Sprinkler to Micro Irrigation Conversion	3,565		1,693,437		1344		3,565	1,693,437	1,344
3.05	Variable Frequency Drive on Agricultural Well Pumps	130,195		32,921,200		15736		130,195	32,921,200	15,736
	Variable Frequency Drive on Agricultural Well Pumps (<=300hp)		REA					43,460	11,200,000	5,246
	Variable Frequency Drive on Agricultural Well Pumps (<=300hp)		NC					70,480	18,100,000	8,507
	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)		REA					8,320	1,900,000	1,015
	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)		NC					4,595	1,000,000	561
	Variable Frequency Drive on Agricultural Booster Pumps (<=150hp)		ROB					3,340	800,000	407
3.07	Vertical Hollow and Solid Shaft Pump Motors	29,445		1,035,326		428		29,445	1,035,326	428
3.11	Chilled Glycol Pipe Insulation	6,736		121,713		26		6,736	121,713	26
3.12	Glycol tank Insulation	4,577		189,645		50		4,577	189,645	50
3.13	Tank Insulation	528		0		0		528	0	-
Grand Total								177,842	37,257,098	18,005

- “VFD on Well and/or Booster Pumps” contributes the majority of the savings.

Measure Specific Issue Sprinkler Disposition (2015)

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- Issues related to:
 - ❑ 4 of 25 ineligible measures (added load)
 - ❑ Hours of Use lower (-25%)
 - ❑ Baseline irrigation method assumption (-33%)
 - ❑ Pumping equipment operation assumptions (-25%)
- 10% Realization Rate (Net Lifetime kWh)
- 7% Realization Rate (Net Lifetime kW)
- Recommendation:
 - ❑ Discontinuing “Low Pressure Sprinkler” and “Micro Conversion”
 - ❑ Shifting “Drip Irrigation” to custom
 - ❑ These Measures should be re-evaluated

Ref No	Name	Total Energy (kWh/yr)
3.01	Agricultural Pump System Overhaul for Pumps Up To 25 HP	772,578
3.02	Agricultural Ventilation Fans	533,200
3.03	Farm Sprinkler to Micro Irrigation Conversion	1,693,437
3.04	Low Pressure Sprinkler Nozzles	0
3.05	Variable Frequency Drive on Agricultural Well Pumps	32,921,200
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3.03 – Micro Irrigation

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SDG&E

MeasureID	Name	Description	Abbrev	BaseDescription	Eimpact	Gimpact	Pimpact	Life	IncEquipCost	InstalledCost
D03-972	Sprinkler to Micro irrigation - Field/Vegs - non well	Micro irrigation in fields without a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	277	0	285	20	\$0.00	\$1,000.00
D03-973	Sprinkler to Micro irrigation - Field/Vegs - well	Micro irrigation in fields with a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	324	0	286	20	\$0.00	\$1,000.00
D03-974	Sprinkler to Micro irrigation - Decid Trees - non well	Micro irrigation of deciduous trees without a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	434	0	249	20	\$0.00	\$1,000.00
D03-975	Sprinkler to Micro irrigation - Decid Trees - well	Micro irrigation of deciduous trees with a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	515	0	249	20	\$0.00	\$1,000.00
D03-976	Sprinkler to Micro irrigation - Citrus Trees - non well	Micro irrigation of citrus trees without a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	456	0	136	20	\$0.00	\$1,000.00
D03-977	Sprinkler to Micro irrigation - Citrus Trees - well	Micro irrigation of citrus trees with a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	541	0	136	20	\$0.00	\$1,000.00
D03-978	Sprinkler to Micro irrigation - grapes - non well	Micro irrigation of grapes without a well	Micro	Stadard 50+ PSI impact-driven sprinkler heads	300	0	172	20	\$0.00	\$1,000.00

Offerings based upon crop type.

Variation cost.

EUL.

PG&E

Measure Code	LIFE CYCLE (RUL if ER, RET, REA)	Base Case Cost (\$/unit)	MatlCost (\$/unit)	LaborCost (\$/unit)	Incremental/ Full Measure Cost (\$/unit)	NTG	DelivType
A266	20	168	448	0.00	280	0.60	PreRebDown
A266	20	0.00	285	163	448	0.60	DirlInstall

Measure Specific Issue

EUL Methodology Should be Examined

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- DEER EUL-ID (10 yrs) references an original PG&E workpaper, but 15 yrs is more typical in TRMs.

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Measure Summary Information	
Measure description	Retrofit of a pump or fan system by installing a variable frequency drive (VFD) for variable load or fixed constant load control.
End use	HVAC, process
Project eligibility	<ol style="list-style-type: none"> Constant-flow pump or fan serving a variable load. Oversized constant volume pump or fan serving a constant load. Variable flow pump or fan controlled inefficiently, such as a poorly functioning inlet guide vane or a throttling device (discharge damper, balancing valve). Not applicable for cooling tower fan control. Not applicable for systems with high static head. For example: <ol style="list-style-type: none"> Open-system irrigation water pumps. Water pump lift stations. Poorly designed VAV supply air fan systems with incorrectly positioned static pressure control sensor. Poorly designed water or air distribution systems with undersized branches or circuits. These types of systems are often operated with a high static pressure setting to overcome design deficiencies.
Savings type	Semi-custom
Unit energy savings	Project-specific savings can be calculated using either the TRM401, TRM405, TRM406, or TRM407 energy savings calculators.
Measure cost	Project-specific costs are used to determine cost-effectiveness.
EUL	15 years ¹

- REA Measure will use 1/3 of EUL of pump
- SCE requesting pump life data from their 3rd party contactor

Measure Specific Issue Savings Methodology

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- Savings supported by
 - ~200 well pump PG&E custom projects
 - ~100 booster PG&E pump custom projects
 - Include SCE data, if available
 - Because of impact of this measure, VFD on Ag Pumps could be a good candidate for a deeper sensitivity analysis

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Type	Pump HP	Count of # of Pumps
Booster	25	1
	30	4
	40	10
	50	10
	60	14
	75	28
	100	20
	125	9
	150	3
Well	25	2
	30	8
	40	2
	50	13
	60	5
	75	20
	100	24
	125	28
	150	28
	200	27
	250	17
	300	23

Questions

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