



PG&E's 2009-2011 Energy Efficiency Program Offerings

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Today's Discussion


Objectives:

- Design of PG&E 2009-2011 Energy Efficiency Portfolio
- Similarity with SCE (Statewide) Programs
- EE Project Examples: Motors and VSD Drive Projects



PG&E's Market-Segment Based Programs

- Mass Market:
 1. Residential
 2. Small Commercial
- Targeted Markets:
 1. Heavy Industrial and Manufacturing
 2. Agricultural and Food Processing
 3. Schools, Colleges and Universities
 4. Retail
 5. Medical Facilities: Hospitals, Clinics, etc.
 6. Large Commercial and Institutional
 7. Hospitality: Hotels, Motels, etc.
 8. High Technology
 9. Residential New Construction



PG&E's Market-Segment Based Programs

- PG&E Core Programs (Primary):
 1. NRR (Non-Residential Retrofit) Calculated Program
 2. NRNC (Non-Residential New Construction) Calculated Program
 3. Integrated Audit & or Calculation Assistance
 4. Retro-Commissioning Program
 5. Demand Response Program

- Third Party Programs:
 1. Industrial: Boilers, Air Compressors, Process/Lighting/HVAC, Industrial Sector, Oil Field Production, Refineries Industrial
 2. Other: Schools, Retail, Commercial, Hospitality, Agriculture, Residential New Construction, High Tech, Wastewater, Medical/Hospitals/Assisted Living, Mass Market Non-Residential.



PG&E's Market-Segment Based Programs – Continued

- Government Partnership Programs:
 1. Statewide programs: UC's, CSU's, Community Colleges, Dept of Corrections
 2. Various City Governments/Examples: Monterey Bay Area, East Bay, Fresno, Kern County, Madera, Marin, Mendocino, Redwood Coast, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Sierra Nevada, Silicon Valley, Sonoma



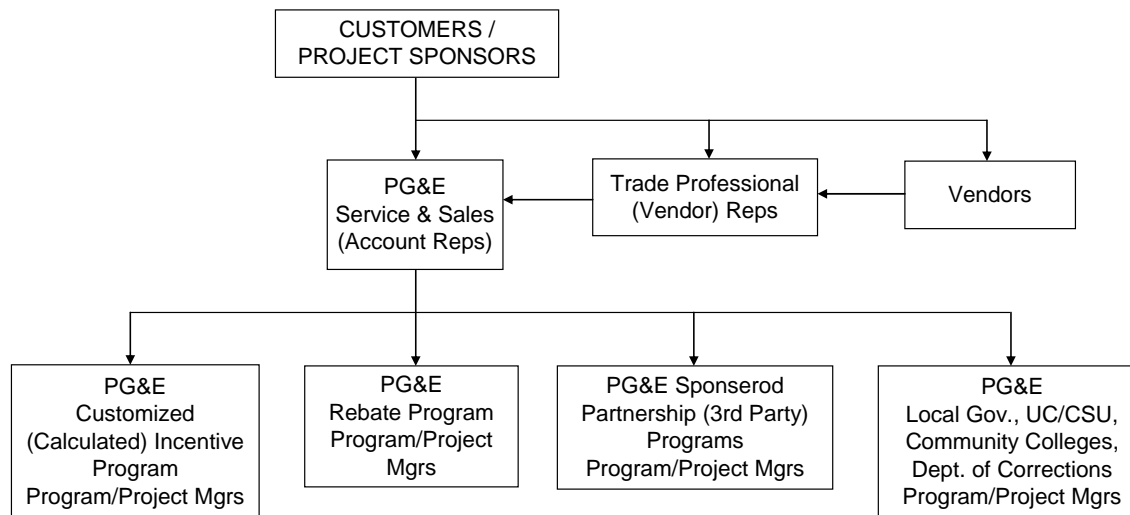
Calculated Program

- Methods of Calculation for NRR & NRNC Industrial Programs:
 - Hand Calculation
 - NRR (SPC) Software (PG&E Modeling Programs)
 - Other Modeling Programs Used by Industry
- Baselines:
 - Individual Equipment: Meet Government Requirements (when Applicable) or Standard Industry Practice.
 - Systems: Generally Standard Industry Practice; for Retrofit, Existing Equipment Operation is Often Used (Subject to PG&E Approval)



PG&E Energy Efficiency Project Flow Chart

HOW TO MAKE INITIAL PG&E CONTACT for Energy Efficiency Projects



NOTE: Don't know your Service/Sales Reps, Contact Regional Trade Professional Reps:

-Northern Region*: Daniel Ngo, (916) 599-7986, dtn5@pge.com

-Bay Area Region*: Kristine Gallegos-Haehl, (408) 282-7114 or (408) 209-3629 (cell), ktg2@pge.com

-Southern Region: Raymond Gish, (559) 263-5560 or (559) 840-5455 (cell), regr@pge.com

*Reference: Trade Professional Representative Regional Territory Map



Heavy Industry & Manufacturing

- The Incentives for PG&E NRR & NRNC Calculated Programs (Same as SCE):
 - Motors, drives, other: 9 cents/kWh saved.
 - Refrigeration: 14 cents/kWh
 - Lighting: 5 cents/kWh
 - Gas projects: \$1.00/therm

 - kW Kicker: \$100/kW (based on summer peak reduction)
- Pays up to 50% of project cost (NRR) or 50% of incremental cost (NRNC).
- Capped @ \$3.6 Million



PG&E versus SCE

- Key Differences for PG&E Programs (reference SCE Slides):

(#4): Names for the Rebate & Calculated Programs:

- PG&E = Rebate Program, SCE = Express Efficiency
- PG&E = NRR retrofit calculated, SCE = SPC
- PG&E = NRNC new construction, SCE = SPC

(#4): PG&E requires separate applications for Calculated & Rebate programs.

(#5): PG&E Cap on NRR & NRNC = \$3.6 Million

(#6): Inspections for NRR/NRNC/Rebate Programs: May be slightly different than SCE

(#11): PG&E Applications are different than SCE

(#15): Energy Centers: PGE has "Pacific Energy Center" in San Francisco, the "Stockton Training Center", and the "Food Technology Center" in San Ramon that provide similar services to SCE and also include many opportunities for training on programs and technical applications.



Examples of Qualified Energy Efficiency Measures

- Popular Measures / Typical “Actual” Savings*
 - Air compressors - (10% to 40%)
 - Process and Non-process Boilers - (2 to 5%) or more for condensing
 - Motors - (2% to 10%)
 - Variable Speed Drives - (15% to 50%)
 - Refrigeration - (10%+)
 - Lighting - (15% to 35%)
 - Process Equipment - (10% or more)
 - Chillers - (10% to 30%)
 - HVAC Equipment/Energy Management Systems - (10% to 30%)
 - Waste Water Treatment Process - (10% to 30%)

*Savings Potential is Dependent on Design/Condition of Existing System and Specifications of New Systems & Equipment

*Many Projects Have Good Simple Paybacks, Often Less Than 2 Years.



MOTOR EFFICIENCY & MOTOR COSTS for Various Past & Current Standards

5/24/2007

BASED ON INFORMATION AVAILABLE IN EARLY 2007						BASED ON "MOTOR MASTER" ACTUAL MAY VARY	
Horsepower Range	<u>% Efficiency Before 1985</u> <u>"Rewound Only"</u>	<u>% Efficiency 1985 - 2000</u>	<u>Required Efficiency % 2004 Min Satandard</u>	<u>Energy Efficient NEMA Std. 12-12</u>	<u>Best Efficiency Reference Motor Master</u>	<u>New Motor Estimated Cost 2004 Min. Standard</u>	<u>Added Est. Cost High Efficiency NEMA 12-12 Standard</u>
1	76	76.6	82.5	85.5	85.5	\$250	\$50
1.5	78	78.5	84	86.5	86.5	\$300	\$50
2	80	80.9	84	86.5	88.5	\$300	\$50
3	81	81.9	86.5	89.5	90.2	\$350	\$100
5	84	84.1	87.5	89.5	89.5	\$400	\$100
7.5	84	85.3	88.5	91	91.7	\$600	\$200
10	85	86.5	89.5	91.7	93	\$700	\$200
15	85.5	88	91	93	93	\$900	\$200
20	86	89	91	93	93.6	\$1,200	\$200
25	87	89.8	91.7	93.6	94.1	\$1,400	\$300
30	88	90.3	92.4	94.1	94.1	\$1,500	\$300
40	88	90.7	93	94.1	94.5	\$1,800	\$300
50	89	91.4	93	94.5	95	\$2,100	\$300
60	89	91.8	93.6	95	95.4	\$2,600	\$300
75	90	92.3	94.1	95	95.4	\$2,900	\$300
100	91	92.6	94.1	95.4	95.4	\$3,900	\$500
125	91	92.8	94.5	95.4	95.4	\$4,300	\$500
150	92	93	95	95.8	96.2	\$6,300	\$1,000
200	92	93.6	95	95.8	96.2	\$7,800	\$1,200
250	93	93.9	95.4	95.8	96.5	\$10,200	\$1,200
300	93	94.5	95.4	95.8	96.2	\$13,000	\$1,200
400	94	95	95.4	95.8	96.5	\$16,000	\$1,200
500	94	95	95.4	95.8	96.2	\$23,000	\$1,500



APPROXIMATE % ENERGY SAVINGS Applicable for Incentives for Motor Upgrades

5/24/2007		APPROXIMATE ESTIMATE OF SAVINGS - NRR "CD"					
		NORMAL INCENTIVE		EARLY RETIREMENT STANDARD MOTORS 1994 OR LATER (Non Rewound - 13 Yrs or Newer)		EARLY RETIREMENT REWOUND MOTORS 1999 OR LATER (8 Yrs Since Rewind)	
Horsepower Range	<u>% Efficiency Improvement 2004 Req'm to High Effic'y</u>	<u>% Efficiency Improvement 2004 Req'm to Prem Hi Eff'y</u>	<u>% Efficiency Improvement 1985/2000 to High Effic'y</u>	<u>% Efficiency Improvement 1985/2000 to Prem Hi Eff'y</u>	<u>% Efficiency Improvement before 1985 to High Effic'y</u>	<u>% Efficiency Improvement before 1985 to Prem Hi Eff'y</u>	
1	4.3%	4.3%	13.6%	13.6%	14.6%	14.6%	
1.5	3.4%	3.4%	11.8%	11.8%	12.6%	12.6%	
2	3.4%	6.1%	8.0%	10.6%	9.4%	12.0%	
3	3.9%	4.7%	10.4%	11.2%	11.7%	12.6%	
5	2.6%	2.6%	7.2%	7.2%	7.3%	7.3%	
7.5	3.1%	3.9%	7.3%	8.2%	9.2%	10.0%	
10	2.7%	4.2%	6.6%	8.1%	8.6%	10.1%	
15	2.4%	2.4%	6.1%	6.1%	9.4%	9.4%	
20	2.4%	3.1%	4.8%	5.5%	8.8%	9.4%	
25	2.2%	2.8%	4.5%	5.1%	8.1%	8.7%	
30	2.0%	2.0%	4.5%	4.5%	7.4%	7.4%	
40	1.3%	1.7%	4.0%	4.4%	7.4%	7.8%	
50	1.7%	2.3%	3.6%	4.1%	6.5%	7.1%	
60	1.6%	2.0%	3.7%	4.1%	7.1%	7.5%	
75	1.0%	1.4%	3.1%	3.5%	5.8%	6.3%	
100	1.4%	1.4%	3.2%	3.2%	5.1%	5.1%	
125	1.0%	1.0%	2.9%	2.9%	5.1%	5.1%	
150	0.9%	1.3%	3.1%	3.6%	4.3%	4.7%	
200	0.9%	1.3%	2.5%	2.9%	4.3%	4.7%	
250	0.4%	1.2%	2.1%	2.9%	3.1%	3.9%	
300	0.4%	0.9%	1.4%	1.9%	3.1%	3.6%	
400	0.4%	1.2%	0.9%	1.6%	2.0%	2.8%	
500	0.4%	0.9%	0.9%	1.3%	2.0%	2.4%	



Example of Motor Project – 1 of 3

■ Project Description:

■ Replace 20 hp motor (90% load factor):

- Case 1: Replacement of Standard 1990 Motor
 - 2.8% savings compared to Epaact Standard (incentive)
 - 4.9% actual savings
- Case 2: Early Retirement of 1995 Motor (5 years remaining useful life)*
 - 4.9% savings compared to nameplate (incentive)
 - 4.9% actual savings
- Case 3: Early Retirement of 2000 Rewound Motor, Original Mfg 1980, (5 yrs remaining useful life)**
 - 9.2% savings compared to nameplate-less 1% (incentive)
 - 9.2% actual savings (assumes 1% degradation)

■ Motor Replacement Project Cost: \$2,000 (Labor & Material)

■ Operating Conditions: 8,000 hrs/yr, 90% load factor,
13.7 kW

* Useful Life of Standard Motor = 18 Years

** Useful Life of Rewound Motor = 13 Years



Example of Motor Project – 2 of 3

- Calculation, EE Savings: $20 \text{ hp} \times 0.746 \text{ kW/hp} \times 8000 \text{ hrs} \times 0.9 \text{ l.f.} = 107,400 \text{ kWh/yr}$
- Case 1 – 1990 Std Motor:
 - Standard to high efficiency (Incentive): $0.028 \times 119,400 = 3,300 \text{ kWh}$
 - Actual to high efficiency (Savings): $0.049 \times 119,400 = 5,800 \text{ kWh}$
 - Incentive (@ 0.09/kWh & \$100/kW) = \$337
 - Power Cost Savings (@ 0.10/kWh) = \$580
 - Simple payback = 2.9 year
- Case 2 – 1995 Std Motor/Early Retirement:
 - Actual to high efficiency (Incentive): $0.049 \times 119,400 = 5,800 \text{ kWh}$
 - Actual to high efficiency (Savings): $0.049 \times 119,400 = 5,800 \text{ kWh}$
 - Incentive (0.09 & \$100) = \$592
 - Power Cost Savings (0.10) = \$580
 - Simple payback = 2.4 year



Example of Motor Project – 3 of 3

- Calculation, EE Savings: $20 \text{ hp} \times 0.746 \text{ kW/hp} \times 8000 \text{ hrs} \times 0.9 \text{ l.f.} = 107,400 \text{ kWh/yr}$

- Case 3 – 2000 Rewound Motor (Mfg 1980) /Early Retirement:
 - Actual to high efficiency (Incentive): $0.092 \times 119,400 = 11,000 \text{ kWh}$
 - Actual to high efficiency (Savings): $0.092 \times 119,400 = 11,000 \text{ kWh}$
 - Incentive (0.09/kWh & \$100/kW) = \$1130
 - Power Cost Savings (0.10/kWh) = \$1,100
 - Simple payback = 0.8 year



Example of VSD project – 1 of 2

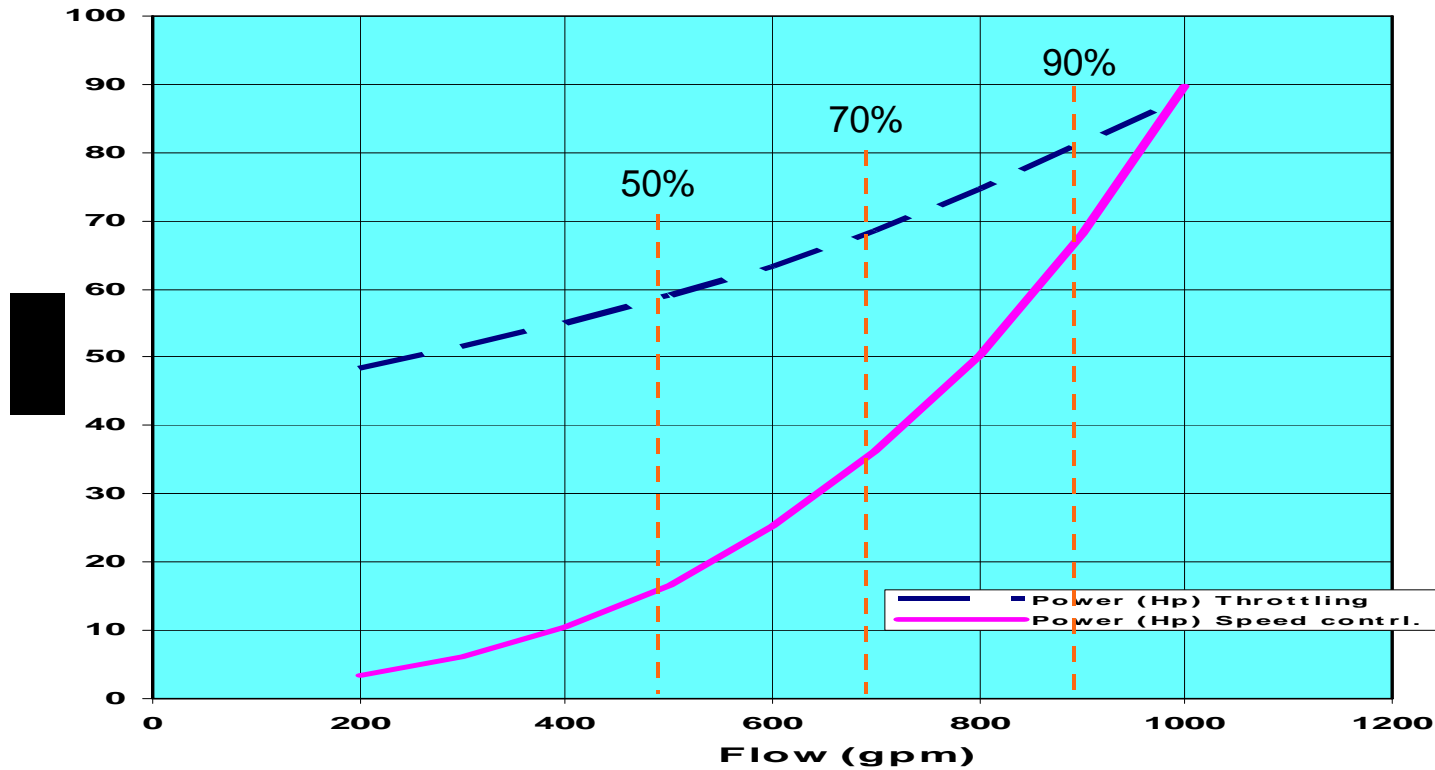
- Project Description: Add VSD to Existing 100 hp Pump/Throttling Valve Control
- VSD Project Cost: \$250/hp (Labor & Material) = \$25,000
- Flow Conditions: 1000 gpm
100 psig (231 feet), 90% dynamic, 10% static
- Basis of Calculation: 8000 hrs/yr
30% hrs @ 90% flow
40% hrs @ 70% flow
30% hrs @ 50% flow
- Project EE Savings: 194,000 kWh / Yr
- Incentive paid @ \$0.09 & \$100/kW: \$12,500 (cap @ 50%)
- Simple Payback (\$0.10 electricity): 8 Months



Example of VSD project – 2 of 2

Power consumption vs. Flow
with Throttling and Frequency Converter control

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PG&E Contact Information

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