



FY 2010 ENERGY EFFICIENCY PROGRAM  
EVALUATION

for

City of Biggs Municipal Utility

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Submitted to:

Contact name: Marlee Mattos  
Biggsar@biggs-ca.gov

Client Address: Biggs Municipal Utilities  
PO Box 307  
Biggs, CA 95917-0307

Submitted by:

Gary Cullen  
Navigant Consulting  
NW Regional Office, Portland/Vancouver  
1001 Officers Row  
Vancouver, WA 98661

*(360) 828-4008*  
*gary.cullen@navigantconsulting.com*

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# 1 Introduction

The City of Biggs (Biggs) has a number of energy efficiency programs offered through its utility department. This report describes the results of an Evaluation, Measurement, and Verification (EM&V) study of Biggs' FY 2010 energy efficiency incentive programs.

Two legislative bills (SB1037 and AB2021) were signed into law a year apart. SB1037 requires that the Publicly Owned Utilities (POUs), similar to the Investor Owned Utilities (IOUs), place cost effective, reliable, and feasible energy efficiency and demand reduction resources at the top of the loading order. They must now procure "negawatts" first. Additionally, SB1037 (signed September 29, 2005) requires an annual report that describes the programs, expenditures, expected energy savings, and actual energy savings.

Assembly Bill 2021, signed by the Governor a year later (September 29, 2006), reiterated the loading order and annual report stated in SB1037 as well as expanded on the annual report requirements. The expanded report must include investment funding, cost-effectiveness methodologies, and an independent evaluation that measures and verifies the energy efficiency savings and reductions in energy demand achieved by the energy efficiency and demand reduction programs. AB2021 additionally requires a report every three years that highlights cost-effective electrical and natural gas potential savings from energy efficiency and established annual targets for energy efficiency and demand reduction over ten years. The legislative reports require both an on-going assessment of what is occurring within the programs along with a comparison of how much possible savings are left within the POU service territory.

## 1.1 General Utility Background Information

The City of Biggs was founded in 1871 to serve the agricultural commerce in the region. The town has a population of about 1,800 and is located in the Sacramento Valley about 65 miles north of Sacramento. Currently, the utility serves 611 residential customers, 37 commercial customers, 12 municipal customers, and 3 industrial customers. This is a summer peaking utility with a peak demand of about 4 megawatts. Its annual energy usage is just over 16 GWh.

Biggs is located in Climate Zone 11, which is in the central California valley, north of Sacramento. Here the seasons are cool to cold in the winter and hot in the summer. Annual precipitation is about 27" per year with the wettest month being January with about 5". The wettest months are November through March and the summers are generally dry. Table 1 illustrates the heating and cooling degree-days for the nearby weather station at Oroville.

**Table 1: Temperature Reference Points for Biggs**

Base Temperature	65F
Heating Degree Days (HDD)	2,818
Cooling Degree Days (CDD)	1,422

## 1.2 Energy Efficiency Programs Offered

Biggs has developed a portfolio of programs for its residential and non-residential customers to encourage energy conservation and to meet its long-term reduction goals. These include:

1. **Keep Your Cool Program:** This third-party program is offered by the City of Biggs through a partnership with The Bay Area Gasket Guy. The goal of this program is to deliver a comprehensive program of prescriptive and calculated demand-side management measures within the food service and grocery industries where commercial refrigeration equipment represents a significant portion of energy demand. The first phase of this program concentrated on the replacement of worn, ineffectual refrigerator door gaskets, strip curtains and auto closers.
2. **Commercial Energy Audits:** The City of Biggs offers free, customized commercial energy audits, including lighting assessment, HVAC assessment, equipment assessment and a review of energy usage. Specific recommendations to improve energy efficiency and reduce energy use are provided.
3. **Commercial Energy Rebate Program:** The City of Biggs offers customized demand-side management incentive programs to commercial customers, focusing on peak load reduction and energy savings. Generous rebates and comprehensive technical support are available to commercial customers to promote the installation of energy efficient lighting, HVAC, refrigeration, equipment and controls.
4. **Investment Grade Audit Program:** The City of Biggs offers, free of charge, Investment Grade Audits for all school district buildings as a way to support the district in acquiring grant funding for energy efficiency retrofits.
5. **Education Services:** The City of Biggs supports the 3-12 Solar Schoolhouse Program by funding teacher participation in the “Summer Institute for Educators” and by supplying Solar Schoolhouse Educational Tools for classroom use.
6. **Residential Energy Rebate Program:** The City of Biggs manages a comprehensive residential demand-side management incentive program, focusing on peak load reduction and energy savings. Generous rebates are available to residential customers for weatherization measures such as attic/wall insulation, dual pane windows, shade screens, radiant barriers and cool roof products. Biggs offers rebates for measures that reduce summer cooling load such as high efficiency HVAC, whole house fans and attic fans. Biggs also offers rebates for Energy Star refrigerators and lighting controls.

Table 2 summarizes the claimed impacts from the City of Biggs FY 2010 energy conservation program efforts. The largest amount of claimed savings was for non-residential lighting. These savings came through a lighting project within the Biggs school district. Non-residential lighting accounts for 92% of all the claimed gross energy savings for the City of Biggs. A variety of residential measures accounted for the remaining claimed program savings.

**Table 2: FY 2010 Summary of Program Impacts**

<b>Program Sector</b>	<b>Category</b>	<b>Units Installed</b>	<b>Net Demand (kW)</b>	<b>Net Peak (kW)</b>	<b>Gross Annual (kWh)</b>
Appliances	Res Clothes Washer				
HVAC	Res Cooling	5	1	1	408
Appliances	Res Dishwashers				
Lighting	Res Refrigeration	2	-	-	2,137
HVAC	Res Shell	7	1	1	1,304
Water Heat	Water Heating				
HVAC	Non-Res Cooling				
HVAC	Non-Res Heating				
Lighting	Non-Res Lighting	227	13	-	42,248
Refrigeration	Non-Res Refrigeration				
HVAC	Non-Res Shell				
Other	Other				
<b>TOTAL</b>		<b>241</b>	<b>15</b>	<b>2</b>	<b>46,097</b>

## 1.3 Evaluation Priorities

Evaluation priorities are generally based on a combination of relative size of the savings achieved as well as the degree of uncertainty with *ex ante* estimates of the savings. The cost of different evaluation approaches also is a key element in determining priorities. Normally, these considerations lead to having EM&V efforts directed toward a subset of program offerings. However, the number of participants within the City's energy conservation programs is not large and therefore the EM&V efforts are directed toward all of the program offerings.

## 2 Impact Evaluation

The primary objectives of an impact analysis are to assess demand and energy savings from a utility's portfolio of energy conservation programs. An impact evaluation verifies measure installations, identifies key energy assumptions and provides the research necessary to calculate defensible and accurate savings attributable to the program.

None of the measures installed or projects completed in FY 2010 are complex. In all cases, the evaluation consisted of NCI staff reviewing all invoices and supporting documentation for completeness and accuracy.

### 2.1 Methodology

NCI staff requested from the City of Biggs a copy of the FY 2010 E3 calculator, which included detailed measure information claimed for FY 2010, as well as copies of all invoices and supporting calculations. The E3 calculator information was used as the identifier of each specific measure claimed, the number of installations, and the expected energy savings. The mix of measures included both deemed measures as well as custom measures.

The expected energy savings from the deemed measures was accepted as reasonable. The supporting calculations for the non-deemed measures were reviewed for reasonableness. Some of the documentation was difficult to follow as much of it consisted of hand written formulas and assumptions scattered across several pages. NCI found that the calculations and assumptions were reasonable, but recommend that this supporting documentation be better organized in the future. The limited number of measures involved kept this issue from becoming a problem.

Once the measures were identified and the claimed measure savings deemed to be reasonable, the NCI team then reviewed each invoice to insure that the measures claimed matched those installed. For the most part, invoices matched the measures claimed. However, this was not true in all cases.

#### 2.1.1 Summary of Verified Energy Savings

Table 3 identifies the energy and demand impacts claimed by the City of Biggs in FY 2010 along with the measures verified as being installed. The overall realization rates, which is the percentage of verified savings to claimed savings, is nearly 100 percent for both energy and demand. Differences were found with A/C replacement and window replacement. All other measure installations matched.

For the two measures in question, the only issue was a rounding of the installed units value. For the A/C unit, the number of tons/unit is the measurement unit. A/C units are generally measured in one-half ton increments and the unit in questions was a 2.5 ton unit. Within E3, this 2.5 ton unit was rounded to be a 3 ton unit. Rounding was also the issue with the window replacement measure. The unit of measure is per 100 square feet of window installed. Generally, these are measured to the level of one significant decimal. The amount actually installed was 5.3 units of window, or 530 square feet of window area. Within E3, this 5.3 window replacement unit was rounded to 5.0.

**Table 3: FY 2010 Claimed and Verified Measure Impacts**

Customer Sector	Measure	Annual kWh Savings	Demand Savings (kW) per unit	Units Installed	Claimed kWh	Claimed kW	Verified Units Installed	Verified kWh	Verified kW	Realization kWh	Realization kW
Residential	Ceiling Vintage to R38 Insulation-Batts	159	0.18	1.6	254	0.3	1.6	254	0.3	100%	100%
Residential	Programmable Thermostat	(216.00)	(0.41)	1.00	(216.00)	(0.41)	1.00	(216.00)	(0.41)	100%	100%
Residential	Whole House Fan with Air Conditioning	(6.00)	(0.01)	1.00	(6.00)	(0.01)	1.00	(6.00)	(0.01)	100%	100%
Residential	14 SEER (11.99 EER)- Split System Early Replacement	210	0.49	3.0	630	1.5	2.5	525	1.2	83%	83%
Residential	Refrigerator: Side Mount Freezer Early Replacement	191	0.03	1.0	191	0.0	1.0	191	0.0	100%	100%
Residential	Refrigerator Recycling	1,946	0.30	1.0	1,946	0.3	1.0	1,946	0.3	100%	100%
Residential	Window Replacement: Clear Windows Early Replacement	210	0.20	5.0	1,050	1.0	5.3	1,113	1.1	106%	106%
Commercial	4' Super T8 (2 lamp) replaces 4' 2-lamp T12	103	0.05	106.0	10,918	5.1	106.0	10,918	5.1	100%	100%
Commercial	Delamp 4' 2 lamp T12 w/vintage ballast	206	0.10	38.0	7,828	3.6	38.0	7,828	3.6	100%	100%
Commercial	Delamp 4' 1 lamp T12 w/vintage ballast	92	0.04	71.0	6,532	3.1	71.0	6,532	3.1	100%	100%
Commercial	50W HPS replaces 300W Halogen	1025	0.25	4.0	4,100	1.0	4.0	4,100	1.0	100%	100%
Commercial	13W CFL replaces 100W incandescent	356.7	0.09	7.0	2,497	0.6	7.0	2,497	0.6	100%	100%
Commercial	50 & 70W HPS replace 300W Halogen & 150W MH	10373	2.38	1.0	10,373	2.4	1.0	10,373	2.4	100%	100%
<b>TOTAL</b>					<b>46,097</b>	<b>18.4</b>		<b>46,055</b>	<b>18.2</b>	<b>99.9%</b>	<b>99.0%</b>