



FY 2009 ENERGY EFFICIENCY PROGRAM
EVALUATION

for

City of Biggs Municipal Utility

September 3, 2010



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

TABLE OF CONTENTS

1	Introduction	1
1.1	General Utility Background Information	1
1.2	Energy Efficiency Programs Offered	2
1.3	Evaluation Priorities	3
2	Impact Evaluation	4
2.1	Methodology	4
2.1.1	Summary of Verified Energy Savings	4

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 2009 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 2009 energy conservation program efforts. The largest amount of claimed savings was for non-residential refrigeration. These savings came through a refrigeration project within the Biggs school district and through the new Keep Your Cool Program. Non-residential lighting savings, which all came from projects within the Biggs school district, was the next largest. Residential shell measures (windows) provide the remaining claimed program savings.

Table 2: FY 2009 Summary of Program Impacts

Program Sector	Category	Units Installed	Net Demand (kW)	Net Peak (kW)	Gross Annual (kWh)	Net Annual (kWh)
Appliances	Res Clothes Washer					
HVAC	Res Cooling					
Appliances	Res Dishwashers					
Lighting	Res Lighting					
HVAC	Res Shell	3	1	1	1,119	895
Water Heat	Water Heating					
HVAC	Non-Res Cooling					
HVAC	Non-Res Heating					
Lighting	Non-Res Lighting	314	7	5	36,554	29,243
Refrigeration	Non-Res Refrigeration	241	37	5	100,642	80,514
HVAC	Non-Res Shell					
Other	Other					
TOTAL		558	45	11	138,315	110,652

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 2009 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 2009 E3 calculator, which included detailed measure information claimed for FY 2009, 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 2009 along with the measures verified as being installed. The overall realization rates, which is the percentage of verified savings to claimed savings, is a high 96% for energy and 97% for demand. Differences were found with auto closers and delamping. All other measure installations matched.

For auto closers, it was claimed that three were installed in reach-in coolers. However, the invoice review found that two were installed in reach-in coolers but the third in a walk-in enclosure. This error resulted in a small increase in savings. For de-lamping, it was claimed that 74 three-foot lamps were de-lamped. The invoices and supporting documents found that these 74 were four-foot lamps. The savings per four-foot lamp is slightly smaller than for three-foot and thus the overall affect was to lower savings.

At the measure level, the greatest amount of verified savings came from strip-curtains for walk-in enclosures. This refrigeration measure was followed by two additional refrigeration measures: replacing a vintage walk-in freezer with two reach-in freezers and the removal of a reach-in refrigerated case. The greatest amount of non-refrigeration savings came from the delamping of the 74 four-foot fixtures.

Table 3: FY 2009 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
Commercial	Auto Closers for Glass Reach-in Cooler or Freezer Doors	454	1.21	3	1,362	3.62	2	908	2.41		
Commercial	Door Auto Closers for Walk-in Enclosures	1,244	0.83	0	0	0.00	1	1,244	0.83		
Commercial	Delamp: 3 foot lamp w/ Interact Effects	350	0.07	74	25,900	5.18	0	0	0.00		
Commercial	Delamp: 4 foot lamp w/ Interact Effects	262	0.05	0	0	0.00	74	19,388	3.85		
Commercial	Door Gaskets	100	0.02	163	16,300	2.61	163	16,300	2.61		
Commercial	14-26 W replacing Incandescent w/ Interact Effects	370	0.07	2	740	0.15	2	740	0.15		
Commercial	Strip-Curtains for Walk-in Enclosures	465	0.43	72	33,480	30.60	72	33,480	30.60		
Commercial	T-12 to T-8: 4 foot lamp w/ Interact Effects	41	0.01	178	7,298	1.42	178	7,298	1.42		
Residential	Window Replacement: Tinted Windows Early Replacement	373	0.35	3	1,119	1.05	3	1,119	1.05		
Commercial	4' Super T8 (2 lamp) replaces 4 75W incan	503	0.25	1	503	0.25	1	503	0.25		
Commercial	Delamp 4' 2 lamp T8 w/ballast	111	0.06	15	1,665	0.90	15	1,665	0.90		
Commercial	Replace 4' 2 Imp T8 w/4' 2 Imp Super T8	10,175	0.01	44	448	0.48	44	448	0.48		
Commercial	Replace vintage walk/in freezer w/2 reach-ins	12654	2.89	2	25,308	5.78	2	25,308	5.78		
Commercial	Remove reach-in refrigerated cases	24192	3.36	1	24,192	3.36	1	24,192	3.36		
TOTAL					138,315	55.40		132,593	53.70	95.9%	96.9%