

Attachment 6



**Black Hills Power – South Dakota
Energy Efficiency Solutions Status Report
Docket No. EL11-002 - Program Year 3**

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Executive Summary

Black Hills Power (“BHP” or “Company”) is an investor-owned utility that provides electricity to approximately 70,000 customers in western South Dakota, northern Wyoming and southeastern Montana. Black Hills Power is part of Black Hills Corporation, which provides natural gas and electricity to more than 765,000 customers throughout the Midwest region of the United States.

BHP’s energy-efficiency portfolio is composed of residential and non-residential programs (i.e. commercial and industrial). Each program has been designed to address the needs of various customer types. The programs include:

Residential

- Water Heating
- Refrigerator Recycling
- Air Source Heat Pumps
- Geothermal Heat Pumps
- Air Source Heat Pump Retro-Commissioning
- Residential Audits
- School-Based Education
- Weatherization

Non-Residential

- C&I Lighting
- C&I Variable Frequency Drives (“VFD”)
- C&I Air Source Heat Pumps
- C&I Ground Source Heat Pumps
- C&I Water Heaters
- C&I Refrigerator Recycling
- C&I Custom Rebate

This report presents a status report of Program Year 3 (“PY3”), which ran from September 1, 2013 through August 31, 2014, for BHP’s Original Energy Efficiency Solution Plan. BHP had not submitted a summary of the results for the final year of the Plan. Residential and non-residential programs are discussed together throughout the status report. The following program groupings are presented to customers as one program. The program discussions within this status report provide detailed information for each program.

- Residential Heat Pump program will include air source heat pumps, geothermal heat pumps, and air source heat pump retro-commissioning.
- C&I Prescriptive program will include all non-residential programs except the C&I Custom program.

In PY3, BHP spent approximately 42 percent of the budget and achieved 28 percent of the energy savings goal.

Tables ES1 presents projected budgets and actual expenditures by sectors in PY3, including expenditures for incentives, marketing, and administration.

TABLE ES1: PY3 BUDGET BY SECTOR

Sector	PY3 Goal	PY3 Actual	% of Budget
Residential	\$391,838	\$101,863	26%
Non-Residential	\$519,464	\$184,506	36%
Cross Marketing & Training	\$100,000	\$69,459	69%
General Administration	\$16,000	\$79,717	498%
Total	\$1,027,302	\$435,545	42%

Table ES2 provides detailed goal and actual expenditures for PY3 by program.

TABLE ES2: PY3 UTILITY BUDGET AND EXPENDITURES BY PROGRAM

	PY3 Budget	PY3 Expenditures	% of Budget
Residential Programs			
Water Heating	\$16,100	\$2,243	14%
Refrigerator Recycling	\$61,400	\$18,283	30%
Heat Pumps	\$252,038	\$19,888	8%
Residential Audits	\$46,800	\$33,047	71%
School-Based Education	\$5,500	\$21,536	392%
Weatherization	\$10,000	\$6,866	69%
Non-Residential Programs			
C&I Prescriptive	\$260,804	\$21,205	8%
C&I Custom Rebate	\$258,660	\$163,301	63%
Cross Marketing & Training	\$100,000	\$69,459	69%
General Administration	\$16,000	\$79,717	498%
Total	\$1,027,302	\$435,545	42%

Tables ES3 presents PY3 goal and actual energy savings by sector.

TABLE ES3: PY3 ENERGY SAVINGS (kWH) BY SECTOR

	PY3 Goal	PY3 Actual	% of Goal
Residential	2,846,374	323,975	11%
Nonresidential	2,764,427	1,173,797	42%
Total	5,610,801	1,497,772	27%

Table ES4 provides PY3 goal and actual energy savings by program.

TABLE ES4: PY3 ENERGY SAVINGS (kWh) BY PROGRAM

	PY3 Goal	PY3 Actual	% of Budget
Residential Programs			
Water Heating	40,421	6,885	17%
Refrigerator Recycling	371,700	93,859	25%
Heat Pumps	2,240,719	98,906	4%
Residential Audits	169,784	34,809	21%
School-Based Education	23,750	89,516	377%
Weatherization	-	-	n/a
Non-Residential Programs			
C&I Prescriptive	1,438,395	194,797	19%
C&I Custom Rebate	1,326,032	979,000	74%
Total	5,610,801	1,497,772	27%

Table ES5 presents PY3 goal and actual demand savings by sector.

TABLE ES5: PY3 DEMAND SAVINGS (kW) BY SECTOR

	PY3 Goal	PY3 Actual	% of Goal
Residential	574.3	49.8	9%
Nonresidential	217.5	302.2	139%
Total	791.7	352.0	44%

Table ES6 presents PY3 goal and actual demand savings by program.

TABLE ES6: PY3 DEMAND SAVINGS (kW) BY PROGRAM

	PY3 Goal	PY3 Actual	% of Budget
Residential Programs			
Water Heating	15.38	2.62	0.23%
Refrigerator Recycling	56.58	12.63	22.31%
Heat Pumps	1,023.16	25.41	9%
Residential Audits	27.0	26.65	98.70%
School-Based Education	1.0	3.59	359.20%
Weatherization	-	-	n/a
Non-Residential Programs			
C&I Prescriptive	374.62	97.44	36%
C&I Custom Rebate	-	217.76	n/a
Total	791.7	386.1	49%

Table ES7 provides PY3 overall portfolio cost-effectiveness results.

TABLE ES7: TOTAL PORTFOLIO COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	0.73
Utility Cost Test	1.10
Societal Cost Test	0.91
Participant Test	2.57
Ratepayer Impact Measure Test	0.35

Residential Programs

BHE’s residential energy efficiency programs serve residential customers, encouraging investment in energy efficient measures such as lighting, cooling equipment and whole house efficiency.

Residential Water Heating

The Residential Water Heating Program offers rebates to BHP residential customers when they replace existing electric water heaters with high-efficiency models. Customers that install a water heater meeting the following requirements are eligible to receive a rebate of \$1.50 per tank gallon:

- EF of 0.94 or greater 30 to 50 gallons
- EF of 0.92 or greater over 50 gallons

Tables 1 compares the program goals to actual program performance.

TABLE 1: RESIDENTIAL WATER HEATING PY3 SUMMARY

	Goal	Actual	% Goal Achieved
Participation	160	24	15%
Expenditures	\$16,100	\$2,243	14%
Energy Impacts (kWh)	40,421	6,885	17%
Demand Impacts (kW)	15.38	2.62	17%

In PY3, BHP achieved 15 percent of the participation goal and less than 20 percent of the energy and demand savings goals while spending 14 percent of the budget.

Table 2 presents cost-effectiveness analysis results, based on program activity.

TABLE 2: RESIDENTIAL WATER HEATING PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	1.01
Utility Cost Test	0.75
Societal Cost Test	1.25
Participant Test	7.40
Ratepayer Impact Measure Test	0.29

Residential Refrigerator Recycling

The Refrigerator Recycling Program encourages customers to turn in old inefficient refrigerators. The program’s goal is to remove inefficient refrigerators from the electric system and dispose of them in an environmentally safe and responsible manner. Refrigerators must be between 10 and 30 cubic feet in size and in operating condition. Customers receive a \$30 rebate per qualifying unit recycled.

Tables 3 compares the program goals to actual program performance.

TABLE 3: RESIDENTIAL REFRIGERATOR RECYCLING PY1 SUMMARY

	Goal	Actual	% Goal Achieved
Participation	300	101	34%
Expenditures	\$61,400	\$18,283	30%
Energy Impacts (kWh)	371,700	93,859	25%
Demand Impacts (kW)	56.58	12.63	22%

In PY3, BHP achieved 34 percent of the participation goal and 25 percent of the energy savings goal.

Table 4 presents cost-effectiveness analysis results, based on program activity.

TABLE 4: RESIDENTIAL REFRIGERATOR RECYCLING PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	0.52
Utility Cost Test	0.58
Societal Cost Test	0.66
Participant Test	6.60
Ratepayer Impact Measure Test	0.25

Residential Heat Pumps

The Residential Heat Pump Program offers rebates to residential customers for replacing or upgrading heating and cooling equipment with energy efficient heat pumps. Customers are also eligible to receive an incentive for retro-commissioning an air source heat pump once every five years. Customers are eligible to receive the following:

Measure	Rebate
Air Source Heat Pump (1-5 tons, SEER ≥15 & HSPF ≥8.5)	\$150 per ton
Geothermal Heat Pump (1-5 tons, EER ≥16.5 and COP ≥3.6)	\$200 per ton
Electric Furnace to Heat Pump Replacement (1-5 tons, SEER ≥15 & HSPF ≥8.5)	\$1,500
Air Source Heat Pump Retro-Commissioning	\$60

The tables below compare program goals to actual program performance.

TABLE 5: RESIDENTIAL HEAT PUMP BUDGET VERSUS TO EXPENDITURES

	Goal	PY3	
		Actual	% of Budget
Air Source Heat Pump	\$172,038	\$17,268	10%
Geothermal Heat Pump	\$20,000	\$2,200	11%
Retro-Commissioning	\$60,000	\$420	0.7%

TABLE 6: RESIDENTIAL HEAT PUMP ENERGY SAVINGS GOAL VERSUS ACTUAL

	Goal	PY3	
		Actual	% of Goal
Air Source Heat Pump	478,080	85,369	18%
Geothermal Heat Pump	44,439	6,026	14%
Retro-Commissioning	1,718,200	7,511	0.4%

TABLE 7: RESIDENTIAL HEAT PUMP DEMAND SAVINGS GOAL VERSUS ACTUAL

	Goal	PY3	
		Actual	% of Goal
Air Source Heat Pump	218.3	19.49	9%
Geothermal Heat Pump	20.3	4.12	20%
Retro-Commissioning	784.6	1.80	0.2%

TABLE 8: RESIDENTIAL HEAT PUMP PARTICIPATION GOAL VERSUS ACTUAL

	Goal	PY3	
		Actual	% of Goal
Air Source Heat Pump	144	50	35%
Geothermal Heat Pump	10	4	40%
Retro-Commissioning	1000	5	0.5%

In PY3, BHP achieved about 5 percent of participation goal and 4 percent of the energy savings goal while spending 8 percent of the program budget.

Table 9 presents cost-effectiveness analysis results, based on program activity.

TABLE 9: RESIDENTIAL HEAT PUMP PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	2.16
Utility Cost Test	2.22
Societal Cost Test	2.68
Participant Test	5.66
Ratepayer Impact Measure Test	0.38

Residential Audit Program

The Residential Audit Program is composed of the Residential Online Energy Audit Tool and on-site customer audits. Customers receive a free energy audit to identify ways they can reduce the energy consumption in their homes. As part of the audit, auditors install low-cost energy saving measures and provide educational information.

Tables 10 compares the program goals to actual program performance.

TABLE 10: RESIDENTIAL AUDIT PROGRAM PY1 SUMMARY

	Goal	Actual	% Goal Achieved
Participation	200	41	21%
Expenditures	\$46,800	\$33,047	71%
Energy Impacts (kWh)	169,784	34,809	21%
Demand Impacts (kW)	27.0	5.54	21%

In PY3, BHP achieved 21 percent of participation and energy savings goals as well as 21 percent of demand goals and spent 71 percent of the budget.

Table 11 presents cost-effectiveness analysis results, based on program activity.

TABLE 11: RESIDENTIAL AUDIT PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	0.13
Utility Cost Test	0.13
Societal Cost Test	0.16
Participant Test	n/a
Ratepayer Impact Measure Test	0.10

School-Based Energy Education Program

The School-Based Energy Education Program seeks long-term energy savings through enhanced education and awareness of energy efficiency among students. The program is promoted to school districts and teachers throughout education associations and targets middle school children and their households. The program includes a kit which consists of a set of low-cost measures for installation in the home. The program will target middle school-aged children and their households.

Tables 12 compare the program goals to actual program performance.

TABLE 12: SCHOOL-BASED EDUCATION PROGRAM PY1 SUMMARY

	Goal	Actual	% Goal Achieved
Participation	125	449	359%
Expenditures	\$5,500	\$21,536	392%
Energy Impacts (kWh)	23,750	89,516	377%
Demand Impacts (kW)	1.0	3.59	359%

Based upon the program performance, the School-Based Energy Education Program was very popular among schools within BHP’s service territory. The PY3 program participation, expenditures and savings were more than triple the goals/budget

Table 13 presents cost-effectiveness analysis results, based on program activity.

TABLE 13: SCHOOL-BASED EDUCATION PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	0.35
Utility Cost Test	0.35
Societal Cost Test	0.45
Participant Test	n/a
Ratepayer Impact Measure Test	0.19

Weatherization Program

Qualifying low-income customers receive help with managing their energy use and utility bills through the Weatherization Program. This program is offered to any low-income residential customer receiving service from BHP, including senior citizens and disabled customers. Eligible customers receive free installation of energy savings measures in their residence.

Tables 14 compare the program goals to actual program performance.

TABLE 14: WEATHERIZATION PROGRAM PY1 SUMMARY

	Goal	Actual	% Goal Achieved
Participation	25	18	72%
Expenditures	\$10,000	\$6,866	69%

The program was successful in PY3, spending most of the entire budget and achieving most of the participation goals. The program is offered to eligible low-income customers, therefore energy and demand savings associated with the program are secondary to the program goal of helping customers manage their energy use.

Combined Residential Program Portfolio Cost-Effectiveness

Table 15 shows the cost-effectiveness of the residential programs.

TABLE 15: COMBINED RESIDENTIAL PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	0.67
Utility Cost Test	0.74
Societal Cost Test	0.84
Participant Test	6.30
Ratepayer Impact Measure Test	0.28

Non-Residential Programs

BHE’s non-residential energy efficiency programs serve commercial and industrial customers, encouraging investment in energy efficient measures such as lighting, cooling and heating equipment, motors and refrigerator recycling.

Commercial Prescriptive Rebate Program

The Commercial Prescriptive Rebate Program provides standardized prescriptive rebates to commercial and industrial customers that install, replace or retrofit electric savings measures. These measures, including lighting, cooling and heating equipment, electric motors and variable frequency drives, are proven technologies that are readily available with known performance characteristics. All C&I customers are eligible to participate in this program. The same customer can participate in more than one measure in the same year.

The tables below compare the program goals to actual program performance.

TABLE 16: COMMERCIAL PRESCRIPTIVE BUDGET VERSUS TO EXPENDITURES

	Budget	PY3	
		Actual	% of Budget
C&I Lighting	\$100,000	\$21,100	21%
C&I Motors	\$20,500	\$0	0%
C&I VFDs	\$68,000	\$0	0%
C&I Air Source Heat Pumps	\$20,000	\$0	0%
C&I Ground Source Heat Pumps	\$50,000	\$0	0%
C&I Water Heaters	\$1,000	\$75	0.75%
C&I Refrigerator Recycling	\$1,304	\$0	0%

TABLE 17: COMMERCIAL PRESCRIPTIVE ENERGY SAVINGS GOAL VERSUS ACTUAL

	Goal	PY3	
		Actual	% of Goal
C&I Lighting	937,821	193,998	21%
C&I Motors	32,795	-	0%
C&I VFDs	329,074	-	0%
C&I Air Source Heat Pumps	87,511	-	0%
C&I Ground Source Heat Pumps	39,996	-	0%
C&I Water Heaters	2,526	799	32%
C&I Refrigerator Recycling	8,673	-	0%

TABLE 18: COMMERCIAL PRESCRIPTIVE DEMAND SAVINGS GOAL VERSUS ACTUAL

	Goal	PY3	
		Actual	% of Goal
C&I Lighting	305.9	84.4	28%
C&I Motors	8.2	-	0%
C&I VFDs	-	-	n/a
C&I Air Source Heat Pumps	40.0	-	0%
C&I Ground Source Heat Pumps	18.3	-	0%
C&I Water Heaters	1.0	0.03	3%
C&I Refrigerator Recycling	1.3	-	0%

TABLE 19: COMMERCIAL PRESCRIPTIVE PARTICIPATION GOAL VERSUS ACTUAL

	Goal	PY3	
		Actual	% of Goal
C&I Lighting	204	7	3%
C&I Motors	41	-	0%
C&I VFDs	24	-	0%
C&I Air Source Heat Pumps	40	-	0%
C&I Ground Source Heat Pumps	9	-	0%
C&I Water Heaters	10	1	10%
C&I Refrigerator Recycling	7	-	0%

In PY3, BHP spent approximately 8 percent of the budget and achieved 14 percent of the energy savings goal and 23 percent of the demand savings goal.

Table 20 presents results from the cost-effectiveness analysis, based on program activity.

TABLE 20: COMMERCIAL PRESCRIPTIVE PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	1.38
Utility Cost Test	3.67
Societal Cost Test	1.70
Participant Test	2.76
Ratepayer Impact Measure Test	0.50

Commercial Custom Rebate Program

The Commercial Custom Rebate Program offers rebates to commercial and industrial customers that plan to install equipment that does not qualify for a prescriptive rebate. Custom rebates are determined individually for each project based upon the equipment energy savings and the cost difference between standard and high efficiency equipment (i.e. the incremental cost of the equipment).

Custom rebates, up to \$25,000 per year per facility, are the lesser of the following:

- 50% of the incremental cost
- \$0.30 per kWh savings

TABLE 21: COMMERCIAL CUSTOM PROGRAM PY3 SUMMARY

	Goal	Actual	% Goal Achieved
Participation	-	385	n/a
Expenditures	\$258,660	\$163,301	63%
Energy Impacts (kWh)	1,326,032	979,000	74%
Demand Impacts (kW)	-	217.76	n/a

The program spent approximately 63 percent of the budget in PY3. The program achieved 74 percent of the PY3 energy savings goal. In PY3, BHP provided reduced rebates for LED lighting projects that did not pass the TRC test. The rebates typically covered 5 to 10 percent of the incremental cost of the lighting project.

Table 22 presents cost-effectiveness analysis results, based on program activity.

TABLE 22: COMMERCIAL CUSTOM PROGRAM COST-EFFECTIVENESS RESULTS

Test	PY3
Total Resource Cost Test	0.70
Utility Cost Test	1.24
Societal Cost Test	0.88
Participant Test	2.06
Ratepayer Impact Measure Test	0.37