Black Hills/Colorado Electric Utility Company, LP d/b/a Black Hills Energy

Energy-Efficiency (Demand Side Management) Plan 2016-2018

Prepared for:
Public Utilities Commission of Colorado

Prepared by:
Black Hills/Colorado Electric Utility Company, LP d/b/a Black Hills Energy

Table of Contents

Executive Summary

Applied Energy Group, Inc. ("AEG") was retained by Black Hills/Colorado Electric Utility Company, LP d/b/a Black Hills Energy ("Black Hills" or "Company") to conduct an energy efficiency potential assessment and design the 2016 through 2018 Energy Efficiency (Demand Side Management) Program Portfolio ("2016-2018 DSM Plan" or "Plan").

As part of the Potential Assessment, technical, economic and achievable potential were utilized to determine the total potential savings that could be achieved through the installation of energy efficiency measures.

- The technical potential assessment evaluates the potential of all efficiency technologies and design practices, unconstrained by budgets or measure cost effectiveness.
- The economic potential assessment screens the list of potential efficiency measures, from the technical potential assessment, for cost-effectiveness according to societal cost effectiveness tests.
- Achievable potential is the maximum amount of energy savings from efficiency measures that can realistically be achieved in response to one or more of the following conditions:
    - The existence of real-world barriers with a need to encourage consumers to adopt energy efficiency measures;
    - The most aggressive program scenario possible, including rebates and incentives; and
    - Inclusion of comprehensive program costs including administration, marketing, data collection and tracking, and monitoring and evaluation.

Black Hills developed its energy efficiency program portfolio for 2016 through 2018 through a comprehensive planning process, including a comprehensive benefit-cost analysis of a wide range of measures that affect electricity consumption across all customer classes.

The Black Hills Plan is divided into three broad program categories based on customer sector – residential, commercial and industrial, and special programs. The residential, commercial and industrial programs provide a variety of energy efficiency opportunities for residential customers, small and large commercial customers, and industrial customers. Special programs target low-income residents, and education in schools.

The program portfolio is detailed in the table below by program by category.

TABLE ES1: ENERGY EFFICIENCY PORTFOLIO SUMMARY

Residential Energy Efficiency Programs	
High Efficiency Lighting	Point-of-purchase incentives for CFLs and LEDs.
Appliance Recycling	Incentives for recycling older, inefficient refrigerators, freezers, or room air conditioners.
On-Site Energy Evaluation	The program consists of two levels. • Level 1. Evaluation and Direct Install • Level 2. In-Depth Evaluation, Direct Install and Incentives (air sealing, insulation and duct sealing)
High Efficiency Cooling	Rebates to purchase and install heat pump water heaters, central air conditioners, heat pumps and evaporative coolers.
Home Energy Comparison Reports	Behavior program utilizing customized energy reports.
Commercial and Industrial Energy Efficiency Programs	
C&I New Construction	Incentives for the design and construction of new energy efficient buildings.
C&I Custom	Rebates for cost-effective non-prescriptive measures/equipment.
C&I Self Direct	Rebates for cost-effective non-prescriptive measures/equipment for customers with an aggregated peak demand higher than 1 MW in any single month and annual energy usage of 5,000 MWh.
C&I Prescriptive	Rebates for the purchase and installation of pre-qualified measures, including HVAC, motors and refrigeration.
C&I Lighting	The program is comprised of two components: • Prescriptive Lighting. Standardized prescriptive rebates customers that purchase and install qualifying lighting measures. • Small Business Direct Install Lighting. Small commercial customers receive free evaluation and incentives that cover up to 70% of the equipment and installation.
Special Programs	
Low Income Assistance Program	Qualifying customers receive: • Lighting, refrigerators, and evaporative coolers at no cost. • Evaluation and direct install of measures at no cost.
School Education Program	School children receive energy kits, plus education and information on how they can help parents save energy.

2016-2018 DSM Plan

1. Introduction

Black Hills is pleased to present this Energy Efficiency Program Portfolio to the Public Utilities Commission of the State of Colorado ("Commission") for years 2016 through 2018. This Plan follows the previous two program cycles rolled out by Black Hills in 2009 and 2012.

House Bill 07-1037, *Concerning Measures to Promote Energy Efficiency, and Making an Appropriation Therefore*, was passed by the Colorado General Assembly and signed into law by Governor Ritter in 2007, and codified in relevant part at §§ 40-1-102(5), (6) and (7), C.R.S., as well as §§ 40-3.2-101 and 104, C.R.S. The bill establishes that:

> …cost-effective natural gas and electricity demand-side management programs will save money for consumers and utilities and protect Colorado's environment. The general assembly further finds, determines, and declares that providing funding mechanisms to encourage Colorado's public utilities to reduce emissions or air pollutants and to increase energy efficiency are matters of statewide concern and that the public interest is served by providing such funding mechanisms. Such efforts will result in an improvement in the quality of life and health of Colorado citizens and an increase in the attractiveness of Colorado as a place to live and conduct business.[1]

Section 40-3.2-104(2), C.R.S., further charges the Commission to:

> …establish energy savings and peak demand reduction goals to be achieved by an investor-owned electric utility, taking into account the utility's cost-effective DSM potential, the need for electricity resources, the benefits of DSM investments, and other factors as determined by the commission. The energy savings and peak demand reduction goals shall be at least five percent of the utility's retail system peak demand measured in megawatts in the base year and at least five percent of the utility's retail energy sales measured in megawatt-hours in the base year. The base year shall be 2006. The goals shall be met in 2018, counting savings in 2018 from DSM measures installed starting in 2006. The commission may establish interim goals and may revise the goals as it deems appropriate.

Therefore, the Commission is tasked with ensuring that utilities develop and implement DSM programs that give customers an opportunity to participate, and consider the impact on non-participants and low income customers.

The Company's energy-efficiency portfolio is composed of three broad categories: residential programs, commercial and industrial programs and special programs. Each program has been designed to address the needs of various customer types. The residential programs include lighting,

[1] § 40-3.2-101, C.R.S.

appliance recycling, high efficiency cooling, energy evaluation, home energy reports, and online evaluations. The commercial and industrial programs include new construction, prescriptive rebates, lighting, and custom rebates. The special programs include those targeted at low-income homes and education in schools.

In conjunction with the 2016-2018 DSM Plan, Black Hills completed a comprehensive potential study, contained in a separately filed document titled *Demand Side Management Potential Study*.

2. General Program Design Approach

The Black Hills 2016-2018 DSM Plan is based upon the combination of Black Hill's existing energy efficiency portfolio, the potential study, and a multi-criteria program development selection approach. Criteria included the potential study, analysis of other utility programs, cost-effectiveness, and stakeholder input.

The two tenets that guide the design of Black Hill's programs are:

- **The service territory benefits from energy efficiency programs**. As part of the overall strategy for meeting the needs of its customers, cost-effective energy-efficiency programs offer an alternative to the construction of infrastructure and purchase of fuel for generation.
- **Black Hills customers benefit from energy efficiency programs.** Energy efficiency can result in lower energy bills, immediately reducing program participant's consumption of electricity. Furthermore, the programs are designed to be inclusive, giving all customers the opportunity to benefit from participating in Black Hill's energy efficiency programs.

The Plan's design adhered to a comprehensive planning process. Whenever possible, the portfolio leverages existing resources to ensure comprehensive, cost-effective programs. The 2016-2018 DSM Plan includes twelve energy efficiency programs administered by Black Hills.

a. Ability to Meet Commission Goals

The Black Hills program portfolio uses a combination of education, contractor training and customer incentives to advance energy efficiency in Colorado. To achieve the Commission's savings goals, it is important that the programs save energy and peak demand over the short- and long-term.

The programs have been designed to maximize participation given best practice marketing and incentive designs. In addition to ensuring participation while efficiently utilizing budget resources, incentives have been targeted to promote the adoption of qualifying Energy Efficiency Measures that maximize savings.[2]

Educating customers and trade allies on the benefits of energy efficiency can speed the adoption of energy efficient measures and promote the market transformation. This is a longer-term strategy of

[2] Energy Efficiency Measures are more efficient models of end-use appliances, such as central air conditioners or compact fluorescent lighting, or technological improvements that can make an end-use appliance more efficient in its use of energy (e.g. energy management systems). Energy Efficiency Measures that qualify for each program represent a substantial improvement over the standard efficiency model available on the market.

achieving savings with the end goal of market transformation. However, education complements the short-term strategy of offering rebates to achieve more immediate energy and demand savings.

b. Program Participation and Eligibility

Program eligibility has been defined broadly to make programs as inclusive as possible. For most residential programs, eligible participants include customers living in every type of residential structure, including single-family, multi-family and manufactured homes. For specific programs, customers who have recently participated in a Black Hills program may be limited because repeated participation would not render sufficient savings to justify the expense.[3] In general, participation guidelines are designed to include all customer sectors and end uses.

c. Customer and Trade Ally Engagement

Customer incentives are the primary mechanism for program delivery. Customers receive rebates to purchase energy efficient equipment and services through existing market actors, including contractors, equipment dealers and retailers. To achieve the portfolio's long-term savings goals, it will be necessary for Black Hills to engage customers, trade allies, and state and local agencies. Targeting trade allies and leveraging the Company's relationships with stakeholders will increase program awareness and promote the market adoption of high efficiency equipment/systems.

Marketing components of several programs include strategies to engage trade allies as well as state and local agencies. In some programs, portions of the budget have been reserved for training and informational outreach activities with trade allies. These activities are intended to keep key trade allies apprised of program changes, allowing them to better assist customers and ensure they maintain high-efficiency equipment in their stock.

Marketing and informational outreach activities are also aimed at customers, including the children of residential electric customers through targeted school programs. Creative and sustained marketing is important to a successful and robust energy efficiency program portfolio.

3. Benefit-Cost Analysis and Screening Inputs

To determine the Black Hills portfolio of energy efficiency measures, a comprehensive benefit-cost analysis was conducted on a wide range of measures that affect electricity consumption across all customer classes.

Black Hills uses the Colorado Modified Total Resource Cost Test (mTRC) as the primary method of assessing the cost-effectiveness of energy efficiency measures and programs. The mTRC test is a widely-accepted methodology that has been used specifically in Colorado to assess cost-effectiveness. The mTRC measures the net costs of an energy efficiency program as a resource option based on the total costs of the program, including both the participant and the utility costs. This test represents the combination of the effects of a program on both participating and non-participating customers.

[3] For example, if a customer recycled their primary refrigerator in 2015, they would not benefit from recycling a new refrigerator in 2016.

There are four other tests that analyze cost-effectiveness from different perspectives:

- ***Participant Cost Test:*** quantifies the benefits and costs to the customer due to participation in a program. The benefits include reduction in the participant's bill and incentives received. The costs are out-of-pocket expenses incurred as a result of participation.
- ***Ratepayer Impact Measure Cost Test:*** measures what happens to a customer's bill or rates due to changes in utility revenues and operating costs. Benefits are the savings from avoided supply costs of energy and demand. Costs are the program costs incurred by the utility, participant incentives, and decreased utility revenues.
- ***Utility Cost Test:*** measures the net costs of a program as a resource option based on the costs incurred by the program administrator, excluding any net costs incurred by the participant. The benefits are the avoided supply costs of energy and demand. The costs are the program costs incurred by the utility and participant incentives.
- ***Societal Cost Test:*** is a variant of the mTRC, intended to determine the effects of a program on society as a whole. The benefits are the avoided supply costs of energy and demand as well as externalities (including environmental benefits, etc.). The costs are the program costs incurred by the utility and the participants.

The benefit-cost screening model has been adapted from Minnesota Office of Energy Security "BenCost" software and is consistent with the California Standard Practice Manual. The benefit-cost tests were performed using utility-specific data. The input data required for the model includes:

TABLE 1: BENEFIT-COST MODEL INPUTS

General Inputs	Project-Specific Inputs
Retail Rate ($/kWh)	Utility Project Costs (Administrative & Incentives)
Commodity Cost ($/kWh)	Direct Participant Project Costs ($/Participant)
Demand Cost ($/kW-Year)	Project Life (Years)
Environmental Externality Cost ($/kWh)	kWh/Participant Saved (Net and Gross)
Discount Rate (%)	kW/Participant Saved (Net and Gross)
Growth Rate (%)	Number of Participants
Line Losses (%)	

Savings estimates for individual measures or programs were developed using a variety of sources. Colorado-specific data was utilized where available, with regional and national data filling the information gaps. Impacts were calculated using generally accepted engineering algorithms based on a set of reasonable assumptions. Because of the diversity in equipment and energy consumption patterns across multiple building types and end-uses, there exists a variability in these savings estimates as they relate to program design and target markets, particularly at the planning stage of these programs.

4. 2016-2018 DSM Plan Programs

The composition of the 2016-2018 DSM Plan is based upon the combination of Black Hill's existing energy efficiency portfolio, the potential study, and a multi-criteria program development selection approach. AEG updated measure inputs utilizing Black Hill's program evaluations, historical program achievements, United States Department of Energy (DOE) federal standards and ENERGY STAR® standards, as well as others.

Recent changes to the DOE federal appliance standards have significantly impacted the savings potential of a number of appliances, including, but not limited to, the following residential measures:

- Room Air Conditioners
- Refrigerators
- Freezers
- Dishwashers
- Air Source Heat Pumps
- Lighting
- Clothes Washers

Program modifications and new programs were considered to achieve the Commission's goals and provide all Black Hills customers with access to cost-effective energy efficiency programs.

a. Black Hills' 2016-2018 DSM Plan Portfolio – Budgets and Goals

The Black Hills Plan is divided into three broad program categories based on customer sector – residential, commercial and industrial, and special programs. The residential programs provide a variety of energy efficiency opportunities for residential customers. The C&I programs provide a range of energy efficiency opportunities for both small and large commercial and industrial customers. Special programs target low-income residents and provide education on energy efficiency to middle school aged children and their parents. The table below summarizes the Plan being proposed, segmented by sector.

TABLE 2: 2016-2018 DSM PLAN SUMMARY

Residential Energy Efficiency Programs	
High Efficiency Lighting	Point-of-purchase incentives for CFLs and LEDs.
Appliance Recycling	Incentives for recycling older, inefficient refrigerators, freezers or room air conditioners.
On-Site Energy Evaluation	The program consists of two levels. • Level 1. Evaluation and Direct Install • Level 2. In-Depth Evaluation, Direct Install and Incentives (air sealing, insulation and duct sealing)
High Efficiency Cooling	Rebates to purchase and install heat pump water heaters, central air conditioners, heat pumps and evaporative coolers.
Home Energy Comparison Reports	Behavior program utilizing customized energy reports.
Commercial and Industrial Energy Efficiency Programs	
C&I New Construction	Incentives for the design and construction of new energy efficient buildings.
C&I Custom	Rebates for cost-effective non-prescriptive measures/equipment.
C&I Self Direct	Rebates for cost-effective non-prescriptive measures/equipment for customers with an aggregated peak demand higher than 1 MW in any single month and annual energy usage of 5,000 MWh.
C&I Prescriptive	Rebates for the purchase and installation of pre-qualified measures, including HVAC, motors and refrigeration.
C&I Lighting	The program is comprised of two components: • Prescriptive Lighting. Standardized prescriptive rebates customers that purchase and install qualifying lighting measures. • Small Business Direct Install Lighting. Small commercial customers receive free evaluations and incentives that cover up to 70% of the equipment and installation.
Special Programs	
Low Income Assistance Program	Qualifying customers receive: • Lighting, refrigerators, and evaporative coolers at no cost. • Evaluation and direct install of measures at no cost.
School Education Program	School children receive energy kits, plus education and information on how they can help parents save energy.

The tables below summarize the 2016-2018 DSM Plan budgets, participants, energy and demand savings, and mTRC ratios. Detailed benefit-cost analysis modeling results are available in Appendix A.

TABLE 3: THREE YEAR PROGRAM SUMMARY, BY SECTOR[4]

Sector	3 Year mTRC	2016				
		Budget	kW Goal @ Meter	kWh Goal @ Meter	kW Goal @ Generator	kWh Goal @ Generator
Residential	2.32	$1,327,978	1,444	6,020,341	1,536	6,407,449
C&I	3.41	$2,945,307	2,513	8,891,014	2,675	9,462,706
Special	3.54	$1,028,026	959	2,013,891	1,020	2,143,384
General Administration		$187,500				
General Marketing/Education		$187,500				
Evaluation		$283,816				
Total	**2.88**	**$5,960,126**	**4,916**	**16,925,245**	**5,232**	**18,013,538**
		2017				
Residential		$1,353,506	1,646	7,117,048	1,751	7,574,675
C&I		$3,126,354	2,657	9,443,588	2,828	10,050,811
Special		$1,028,026	959	2,013,891	1,020	2,143,384
General Administration		$187,500				
General Marketing/Education		$187,500				
Evaluation		$294,144				
Total		**$6,177,030**	**5,261**	**18,574,528**	**5,599**	**19,768,870**
		2018				
Residential		$1,432,992	1,705	7,390,062	1,814	7,865,243
C&I		$3,303,271	2,803	9,982,329	2,983	10,624,193
Special		$1,028,026	959	2,013,891	1,020	2,143,384
General Administration		$187,500				
General Marketing/Education		$187,500				
Evaluation		$346,964				
Total		**$6,486,252**	**5,466**	**19,386,282**	**5,818**	**20,632,820**

[4] Note: For all budget and savings 'Totals' listed in each table, the sum of each line item may not equal the 'Total' due to rounding.

TABLE 4: DETAILED PROGRAM BUDGET FOR 2016

Program Name	Incentives	Admin	Market	Delivery	Total
High Efficiency Lighting	$317,175	$6,344	$6,344	$186,156	$516,018
Appliance Recycling	$8,500	$425	$680	$38,150	$47,755
On-Site Energy Evaluation	$52,473	$11,563	$18,500	$231,250	$313,786
High Efficiency Cooling	$93,150	$4,658	$7,452	$60,200	$165,460
Home Energy Comparison Report	$0	$5,480	$5,480	$274,000	$284,960
C&I New Construction	$15,300	$765	$1,224	$30,000	$47,289
C&I Custom	$551,000	$27,550	$44,080	$9,500	$632,130
C&I Self Direct	$31,900	$479	$391	$500	$33,270
C&I Prescriptive	$124,770	$4,991	$11,229	$6,900	$147,890
C&I Lighting	$1,386,225	$77,913	$124,760	$495,830	$2,084,728
Low-Income Assistance	$0	$22,818	$36,508	$781,450	$840,776
School Based Energy Education	$0	$8,750	$3,500	$175,000	$187,250
General Administration	$0	$0	$0	$0	$187,500
General Marketing/Education	$0	$0	$0	$0	$187,500
Evaluation	$0	$0	$0	$0	$283,816
Total Program	**$2,580,493**	**$171,733**	**$260,149**	**$2,288,936**	**$5,960,126**

TABLE 5: DETAILED PROGRAM BUDGET FOR 2017

Program Name	Incentives	Admin	Market	Delivery	Total
High Efficiency Lighting	$336,175	$6,724	$6,724	$191,906	$541,528
Appliance Recycling	$10,000	$500	$800	$44,900	$56,200
On-Site Energy Evaluation	$57,462	$12,719	$20,350	$254,375	$344,906
High Efficiency Cooling	$104,400	$5,220	$8,352	$64,100	$182,072
Home Energy Comparison Report	$0	$4,400	$4,400	$220,000	$228,800
C&I New Construction	$15,300	$765	$1,224	$30,000	$47,289
C&I Custom	$623,500	$31,175	$49,880	$10,750	$715,305
C&I Self Direct	$31,900	$479	$391	$500	$33,270
C&I Prescriptive	$130,520	$5,221	$11,747	$7,360	$154,848
C&I Lighting	$1,447,515	$81,171	$130,276	$516,681	$2,175,643
Low-Income Assistance	$0	$22,818	$36,508	$781,450	$840,776
School Based Energy Education	$0	$8,750	$3,500	$175,000	$187,250
General Administration	$0	$0	$0	$0	$187,500
General Marketing/Education	$0	$0	$0	$0	$187,500
Evaluation	$0	$0	$0	$0	$294,144
Total Program	**$2,756,772**	**$179,940**	**$274,152**	**$2,297,022**	**$6,177,030**

TABLE 6: DETAILED PROGRAM BUDGET FOR 2018

Program Name	Incentives	Admin	Market	Delivery	Total
High Efficiency Lighting	$355,175	$7,104	$7,104	$197,656	$567,038
Appliance Recycling	$11,500	$575	$920	$51,650	$64,645
On-Site Energy Evaluation	$62,709	$13,875	$22,200	$277,500	$376,284
High Efficiency Cooling	$113,650	$5,683	$9,092	$67,800	$196,225
Home Energy Comparison Report	$0	$4,400	$4,400	$220,000	$228,800
C&I New Construction	$15,300	$765	$1,224	$30,000	$47,289
C&I Custom	$696,000	$34,800	$55,680	$12,000	$798,480
C&I Self Direct	$31,900	$479	$391	$500	$33,270
C&I Prescriptive	$147,635	$5,905	$13,287	$8,050	$174,878
C&I Lighting	$1,498,790	$83,913	$134,891	$531,760	$2,249,354
Low-Income Assistance	$0	$22,818	$36,508	$781,450	$840,776
School Based Energy Education	$0	$8,750	$3,500	$175,000	$187,250
General Administration	$0	$0	$0	$0	$187,500
General Marketing/Education	$0	$0	$0	$0	$187,500
Evaluation	$0	$0	$0	$0	$346,964
Total Program	**$2,932,659**	**$189,066**	**$289,197**	**$2,353,366**	**$6,486,252**

TABLE 7: DETAILED PROGRAM SAVINGS AND PARTICIPANTS FOR 2016

Program Name	Participants	kW Goal @ Meter	kWh Goal @ Meter	kW Goal @ Generator	kWh Goal @ Generator
High Efficiency Lighting	161,875	324	2,811,718	345	2,992,511
Appliance Recycling	310	22	170,879	24	181,867
On-Site Energy Evaluation	1,000	89	260,739	95	277,504
High Efficiency Cooling	602	538	517,005	572	550,248
Home Energy Comparison Report	30,000	470	2,260,000	500	2,405,318
C&I New Construction	1	41	143,413	43	152,635
C&I Custom	38	319	1,889,619	339	2,011,121
C&I Self Direct	2	17	99,454	18	105,848
C&I Prescriptive	60	234	273,113	250	290,674
C&I Lighting	559	1,903	6,485,416	2,025	6,902,428
Low-Income Assistance	1,889	835	929,404	889	989,165
School Based Energy Education	2,500	124	1,084,487	132	1,154,219
Total Program	**198,836**	**4,916**	**16,925,245**	**5,232**	**18,013,538**

TABLE 8: DETAILED PROGRAM SAVINGS AND PARTICIPANTS FOR 2017

Program Name	Participants	kW Goal @ Meter	kWh Goal @ Meter	kW Goal @ Generator	kWh Goal @ Generator
High Efficiency Lighting	166,875	338	2,927,185	359	3,115,404
Appliance Recycling	365	26	201,473	27	214,427
On-Site Energy Evaluation	1,100	99	288,318	105	306,857
High Efficiency Cooling	641	563	544,263	600	579,259
Home Energy Comparison Report	27,300	620	3,155,809	660	3,358,728
Online Home Energy Evaluation	0	0	0	0	0
C&I New Construction	1	41	143,413	43	152,635
C&I Custom	43	361	2,138,253	384	2,275,742
C&I Self Direct	2	17	99,454	18	105,848
C&I Prescriptive	64	250	280,655	266	298,701
C&I Lighting	595	1,989	6,781,814	2,117	7,217,885
Low-Income Assistance	1,889	835	929,404	889	989,165
School Based Energy Education	2,500	124	1,084,487	132	1,154,219
Total Program	**201,375**	**5,261**	**18,574,528**	**5,599**	**19,768,870**

TABLE 9: DETAILED PROGRAM SAVINGS AND PARTICIPANTS FOR 2018

Program Name	Participants	kW Goal @ Meter	kWh Goal @ Meter	kW Goal @ Generator	kWh Goal @ Generator
High Efficiency Lighting	171,875	351	3,042,653	374	3,238,296
Appliance Recycling	420	29	232,066	31	246,988
On-Site Energy Evaluation	1,200	107	311,915	114	331,971
High Efficiency Cooling	678	587	569,908	625	606,553
Home Energy Comparison Report	24,843	630	3,233,521	671	3,441,436
Online Home Energy Evaluation	0	0	0	0	0
C&I New Construction	1	41	143,413	43	152,635
C&I Custom	48	403	2,386,887	428	2,540,363
C&I Self Direct	2	17	99,454	18	105,848
C&I Prescriptive	70	278	318,840	296	339,342
C&I Lighting	623	2,065	7,033,735	2,198	7,486,004
Low-Income Assistance	1,889	835	929,404	889	989,165
School Based Energy Education	2,500	124	1,084,487	132	1,154,219
Total Program	**204,149**	**5,466**	**19,386,282**	**5,818**	**20,632,820**

The following sections contain detailed program descriptions of the proposed energy efficiency programs. Each description contains the following components:

- Program objective, target market and description.
- Implementation strategy, including delivery channels, education and outreach.
- Eligible measures and incentive levels.
- Estimated participation.
- Estimated energy savings and demand reductions.
- Estimated program budgets.
- Cost-effectiveness.

b. Evaluation, Measurement, and Verification of Programs

Evaluation, measurement, and verification (EM&V) of programs will be performed on a three-year rotating schedule. That is, each program and sub-program will be analyzed to determine the extent to which implementation is achieving the desired goals(s) at some point during the life of the Plan. The schedule for EM&V for each program is:

TABLE 10: EM&V SCHEDULE

Program Name	Sector	Proposed EM&V Year
Low-Income Assistance	Residential	2016
On-Site Energy Evaluation	Residential	2016
Home Energy Comparison Report	Residential	2016
Appliance Recycling	Residential	2016
C&I Lighting	Non-residential	2017
C&I Custom	Non-residential	2017
C&I Prescriptive	Non-residential	2017
High Efficiency Cooling	Residential	2017
C&I New Construction	Non-residential	2018
C&I Self Direct	Non-residential	2018
School Based Energy Education	Residential	2018
High Efficiency Lighting	Residential	2018

Black Hills will file the EM&V reports with the Commission in this proceeding no later than April 1 of the year following the "Proposed EM&V Year"

The principal purpose of comprehensive program evaluations is to assess customer satisfaction with the program being evaluated, assess changes that should be made to technical assumptions, including but not limited to, net-to-gross (NTG) ratios, assess overall program cost effectiveness, and assess program processes based on the evaluator's own research as well as a thorough review of industry-wide and the Company's own technical assumptions.

The Company will consider implementing recommended changes in the program year following the period of evaluation. These changes will not be "backward looking" and so shall not affect calculations, including calculations for achieved savings or net economic benefits, for the Plan year covered by the EM&V. Black Hills will, within thirty days after the annual filing of the EM&V, provide 30-Day and/or 60-Day Notice, as applicable, detailing which EM&V recommendations will be implemented.

c. Budget Flexibility

Budget flexibility is important in order to effectively implement programs over multiple program years to meet energy savings targets. Black Hills will, during each Plan year, have the flexibility to move budget dollars between programs and customer segments within the Plan without further Commission authorization and approval, so long as the Company does not incur costs in excess of 115 percent of the applicable overall annual budget amount. This flexibility allows Black Hills to focus on achieving energy savings targets across the entire portfolio.

d. Residential Programs

Residential High Efficiency Lighting Program

Objective	Increase the penetration of efficient lighting in customer homes by providing incentives for the purchase of ENERGY STAR® qualified lighting.
Target Market	Residential customers, lighting manufacturers and local retailers.
Description	ENERGY STAR® qualified CFLs and LEDs use up to 75% less energy than typical incandescent light bulbs. They also offer superior performance by lasting up to 10 times longer than incandescent bulbs, reducing the need to change hard-to-reach light bulbs. Customers may purchase up to 12 CFLs and 10 LEDs from local participating retailers at a reduced cost. Instant incentives are available at participating stores at the time of purchase. Incentives vary depending upon the product, retail location and associated retail cost.
Program Goals	• Help residential customers reduce their electricity bills. • Educate customers about the program and the benefits of installing CFLs and LEDs. • Develop partnerships with retailers to market the program and benefits of energy efficient lighting. • Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort. • Effectively install efficient lighting through the Black Hills Program. • Encourage energy saving behavior and awareness.
Implementation Strategy	Black Hills will engage an implementation contractor to: • Establish relationships with lighting manufacturers and retailers throughout Black Hills' service territory. • Provide in-store promotional materials and retail sales staff training. • Track program performance, including tracking sales data, reviewing sales data for accuracy and payment to retailers. • Periodically report progress towards program goals and opportunities for improvement. Black Hills' marketing staff will work with the implementation contractor to market the program. Marketing tactics will include bill inserts, advertisements, and partnerships with participating retailers.
Measures & Incentives	**Eligible Measure** / **Incentive per Unit** Standard CFL — $0.90 Specialty LED — $5.00 Standard LED — $3.00

Estimated Participation

CFLs and LEDs are the number of bulbs that will be purchased through the progam. Each customer is eligible to purchase up to 12 CFLs and 10 LEDs.

``	2016	2017	2018
Standard CFL	94,500	94,500	94,500
Specialty LED	15,000	17,000	19,000
Standard LED	52,375	55,375	58,375
Total	**161,875**	**166,875**	**171,875**

Estimated Savings

Net Energy Savings Goals

Eligible Measure	Net kWh per Bulb @ Meter	Annual Net Energy Savings Goals (kWh) @ Meter		
		2016	2017	2018
Standard CFL	14	1,330,376	1,330,376	1,330,376
Specialty LED	27	402,577	456,254	509,931
Standard LED	21	1,078,765	1,140,556	1,202,347
	TOTAL	**2,811,718**	**2,927,185**	**3,042,653**

Eligible Measure	Net kWh per Bulb @ Generator	Annual Net Energy Savings Goals (kWh) @ Generator		
Standard CFL	15	1,415,919	1,415,919	1,415,919
Specialty LED	29	428,462	485,591	542,719
Standard LED	22	1,148,130	1,213,894	1,279,658
	TOTAL	**2,992,511**	**3,115,404**	**3,238,296**

Net Demand Savings Goals

Eligible Measure	Net kW per Bulb @ Meter	Annual Net Demand Savings Goals (kW) @ Meter		
		2016	2017	2018
Standard CFL	0.002	153.5	153.5	153.5
Specialty LED	0.003	46.4	52.6	58.8
Standard LED	0.002	124.4	131.6	138.7
	TOTAL	**324**	**338**	**351**

Eligible Measure	Net kW per Bulb @ Generator	Annual Net Demand Savings Goals (kW) @ Generator		
Standard CFL	0.002	163.3	163.3	163.3
Specialty LED	0.003	49.4	56.0	62.6
Standard LED	0.003	132.4	140.0	147.6
	TOTAL	**345**	**359**	**374**

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$317,175	$336,175	$355,175
Administration	$6,344	$6,724	$7,104
Marketing	$6,344	$6,724	$7,104
Delivery	$186,156	$191,906	$197,656
Total	**$516,018**	**$541,528**	**$567,038**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
1.42	0.66	3.03	1.51	2.68

Residential Appliance Recycling Program

Objective	Promote the retirement of old, inefficient appliances.
Target Market	Residential customers disposing of primary or secondary inefficient refrigerators, freezers, or room air conditioners.
Description	The program encourages residential customers to turn in their old inefficient refrigerators, freezers and room air conditioners, removing them from the electric system and disposing of them in an environmentally safe and responsible manner. Program requirements to recycle a refrigerator or freezer include: • Unit must be between 10 and 30 cubic feet in size. • Unit must be in working condition. • At time of pickup the unit must be empty and plugged into an electrical outlet. • The appliance must have a clear path for removal. • Units using ammonia or SO_2 refrigerant are excluded from participation. • Unit can be primary or secondary. Customers may recycle their old room air conditioners free of charge during a scheduled pick-up for a qualifying refrigerator/freezer. The recycled unit must be working at the time of pick-up. Customers are limited to two (2) refrigerator and freezer rebates and three (3) room air conditioners per household per year. Participating customers will receive a free energy savings kit, similar to the kit received in the School Based Energy Education program. A customer who is recycling multiple appliances will only receive one energy savings kit.
Program Goals	• Educate customers about the energy and environmental benefit of recycling their inefficient appliances. • Increase customer awareness of Black Hills energy efficiency programs. • Reduce household energy consumption. • Influence consumer behavior by encouraging residential customers to avoid replacing their second refrigerator or freezer after it is recycled.
Implementation Strategy	Black Hills will work with an implementation contractor to: • Schedule pickups from customer homes, verify appliance qualification, and remove appliance(s) from customer homes. • Process rebates. • Track program data. The implementation contractor will work with Black Hills to develop marketing strategies and materials. Marketing activities may include bill inserts, print and electronic advertisements, television and radio advertisements, media and community events, and direct mail.
Measures & Incentives	**Eligible Measure** / **Unit** / **Incentive per Unit** Refrigerator Recycle / per unit / $50 Freezer Recycle / per unit / $50 Room A/C Recycle / per unit / $50 Energy Savings Kit / per kit / $0

Estimated Participation

Eligible Measure	2016	2017	2018
Refrigerator Recycle	100	115	130
Freezer Recycle	40	50	60
Room A/C Recycle	30	35	40
Energy Savings Kit	140	165	190
Total	**170**	**200**	**230**

Estimated Savings

Net Energy Savings Goals

Eligible Measure	Unit	Net kWh per Unit @ Meter	Annual Net Energy Savings Goals (kWh) @ Meter		
			2016	2017	2018
Refrigerator Recycle	per unit	782	78,183	89,910	101,638
Freezer Recycle	per unit	855	34,190	42,738	51,286
Room A/C Recycle	per unit	361	10,835	12,641	14,446
Energy Savings Kit	per kit	341	47,671	56,183	64,696
		TOTAL	**170,879**	**201,473**	**232,066**

Eligible Measure	Unit	Net kWh per Unit @ Generator	Annual Net Energy Savings Goals (kWh) @ Generator		
Refrigerator Recycle	per unit	832	83,210	95,692	108,173
Freezer Recycle	per unit	910	36,389	45,486	54,583
Room A/C Recycle	per unit	384	11,532	13,453	15,375
Energy Savings Kit	per kit	362	50,736	59,796	68,856
		TOTAL	**181,867**	**214,427**	**246,988**

Net Demand Savings Goals

Eligible Measure	Unit	Net kW per Unit @ Meter	Annual Net Demand Savings Goals (kW) @ Meter		
			2016	2017	2018
Refrigerator Recycle	per unit	0.117	11.7	13.4	15.2
Freezer Recycle	per unit	0.027	1.1	1.4	1.6
Room A/C Recycle	per unit	0.130	3.9	4.5	5.2
Energy Savings Kit	per kit	0.039	5.4	6.4	7.4
		TOTAL	**22**	**26**	**29**

Eligible Measure	Unit	Net kW per Unit @ Generator	Annual Net Demand Savings Goals (kW) @ Generator		
Refrigerator Recycle	per unit	0.124	12.4	14.3	16.2
Freezer Recycle	per unit	0.029	1.2	1.4	1.7
Room A/C Recycle	per unit	0.138	4.1	4.8	5.5
Energy Savings Kit	per kit	0.041	5.8	6.8	7.9
		TOTAL	**24**	**27**	**31**

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$8,500	$10,000	$11,500
Administration	$425	$500	$575
Marketing	$680	$800	$920
Delivery	$38,150	$44,900	$51,650
Total	**$47,755**	**$56,200**	**$64,645**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
1.66	0.52	1.36	1.76	n/a

Residential On-Site Energy Evaluation Program

Objective	Encourage whole house improvement to existing homes.
Target Market	Residential customers that own or rent a residence.
Description	The program consists of: **Level 1.** Customers receive a home energy evaluation and direct installation of low-cost measures at no cost. The evaluation identifies potential efficiency improvements, educates the customer on managing energy costs and provides information about Company programs. The low-cost measures that may be installed include: faucet aerator, low-flow showerhead, water temperature setback, hot water pipe insulation and CFLs. **Level 2**. Customers pay $100 to receive a home energy evaluation with a blower door test. The evaluation identifies potential efficiency improvements, educates the customer on managing energy costs and provides information about Company programs. Low-cost measures will be installed at no cost to the customer. The measures that may be installed include: faucet aerator, low-flow showerhead, water temperature setback, hot water pipe insulation and CFLs. Customers are eligible to receive incentives for the purchase and installation of air sealing, insulation and duct sealing. Customers must have a second blower door test, verifying the savings, to receive an incentive for air sealing or duct sealing. Homeowner advisory services (concierge services) will be offered to homeowners on an as-needed basis. If the homeowner identifies that they need additional assistance, the auditor will spend up to 1.5 hours discussing energy efficiency options, equipment, and potential costs and savings. The number of hours per customer will vary, but will not exceed 1.5 hours. The discussion may take place via telephone, internet or telephone, based upon customer location, budget, and other constraints. Energy evaluations are limited to homes 10 years or older.
Program Goals	• Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort. • Encourage energy saving behavior and whole house improvements. • Help residential customers reduce their electricity bills.
Implementation Strategy	Black Hills will work with a third-party implementation contractor to: • Hire/sub-contract local staff to perform home evaluations, blower door test, direct measure installation and advisory services. • Engage customers and schedule home evaluation appointments. • Provide customer service support and advisory services. • Process rebate applications, including review and verification of applications and payment of customer rebates. • Track program performance. Marketing activities may include bill inserts, newspaper advertisements, direct mail, bill messaging, radio advertisements, and community events.

Measures & Incentives

Level 1 is provided at no cost to the customer. The Level 2 evaluation is provided at a cost of $100 per home. Measure incentives are presented in the table below.

Eligible Measure	Incentive per Unit
Air Sealing	50% of incremental cost, up to $200
Attic Insulation	$0.35 per square foot, up to $500
Wall Insulation	$0.65 per square foot, up to $750
Duct Sealing	50% of incremental cost, up to $200

Estimated Participation

Eligible Measure	2016	2017	2018
Customer Evaluation (Level 1)	750	825	900
Customer Evaluation (Level 2)	250	275	300
Air Sealing (Level 2)	86	94	103
Attic Insulation (Level 2)	65	72	79
Wall Insulation (Level 2)	26	28	30
Duct Sealing (Level 2)	50	55	61
Total Participants	**1,000**	**1,100**	**1,200**

Estimated Savings

Net Energy Savings Goals

Eligible Measure	Unit	Net kWh per Unit @ Meter	Annual Net Energy Savings Goals (kWh) @ Meter		
			2016	2017	2018
Customer Evaluation (Direct Install Measures)	per Home	145	144,630	159,093	173,556
Air Sealing	per Home	462	39,714	42,990	47,435
Attic Insulation	per Sq. Ft.	0.64	37,486	43,961	46,153
Wall Insulation	per Sq. Ft.	0.91	21,315	22,115	22,914
Duct Sealing	per Home	352	17,594	20,160	21,857
		TOTAL	**260,739**	**288,318**	**311,915**

Eligible Measure	Unit	Net kWh per Unit @ Generator	Annual Net Energy Savings Goals (kWh) @ Generator		
Home Evaluation & Measures	per Home	154	153,929	169,322	184,715
Air Sealing	per Home	491	42,267	45,754	50,486
Attic Insulation	per Sq Ft	1	39,897	46,787	49,121
Wall Insulation	per Sq Ft	1	22,686	23,536	24,387
Duct Sealing	per Home	375	18,725	21,457	23,262
		TOTAL	**277,504**	**306,857**	**331,971**

Net Demand Savings Goals

Eligible Measure	Unit	Net kW per Unit @ Meter	Annual Net Demand Savings Goals (kW) @ Meter		
			2016	2017	2018
Customer Evaluation (Direct Install Measures)	per Home	0.019	19	21	22
Air Sealing	per Home	0.288	25	27	30
Attic Insulation	per Sq. Ft.	0.0004	22	26	27
Wall Insulation	per Sq. Ft.	0.0005	12	13	13
Duct Sealing	per Home	0.230	12	13	14
		TOTAL	**89**	**99**	**107**

Eligible Measure	Unit	Net kW per Unit @ Generator	Annual Net Demand Savings Goals (kW) @ Generator		
Home Evaluation & Measures	per Home	0.020	20	22	24
Air Sealing	per Home	0.306	26	29	32
Attic Insulation	per Square Foot	0.000	24	27	29
Wall Insulation	per Square Foot	0.001	13	14	14
Duct Sealing	per Home	0.245	12	13	15
		TOTAL	**95**	**105**	**114**

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$52,473	$57,462	$62,709
Administration	$11,563	$12,719	$13,875
Marketing	$18,500	$20,350	$22,200
Delivery	$231,250	$254,375	$277,500
Total	**$313,786**	**$344,906**	**$376,284**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
1.74	0.72	2.22	1.78	4.92

Residential High Efficiency Cooling Program

Objective	Encourage contractors and distributors to use energy efficiency as a marketing tool, stocking and selling more efficient units and moving the entire residential cooling market toward greater energy efficiency.
Target Market	Residential customers, trade allies and distributors.
Description	The program encourages residential customers to purchase and install energy-efficient heat pump water heaters, evaporative coolers, central air conditioners, and heat pumps by providing financial incentives to offset a portion of the equipment's higher initial cost. HVAC contractors receive training on Quality Installations, which focus on air and duct sealing. The Manual J course trains HVAC contractors to properly size equipment and accurately perform and document cooling load calculations. The System Charging and Airflow course covers airflow and charging procedures, standards and includes hands-on training in the use of testing equipment. HVAC contractors will receive a $100 incentive for Quality Installation of the HVAC unit.
Program Goals	• Educate customers about the benefits of installing efficient HVAC equipment. • Develop partnerships with contractors to bring efficient cooling systems to the market. • Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort. • Effectively install efficient cooling equipment through the Black Hills program. • Help residential customers reduce their electricity bills. • Build consumer confidence in the reliability of savings estimates through an educated and highly trained contract services team.
Implementation Strategy	Strong relationships have been formed with retailers and trade to promote participation. These relationships will be cultivated to drive new participants into the program. Marketing activities may include bill inserts, direct mail, and newspaper, radio and billboard advertising.
Measures & Incentives	

Eligible Measure	Incentive
Heat Pump Water Heater	$500
Evaporative Cooler >2,500 CFM	$100
Evaporative Cooler Media Saturation >85%	$400
Evaporative Cooler – Whole House Cooler	$1,000
Heat Pump Ductless Mini Split	$300
Air Conditioner SEER 15	$250
Air Conditioner SEER 16	$400
Air Conditioner SEER 17	$550
Heat Pump SEER 15	$250
Heat Pump SEER 16	$450
Heat Pump SEER 17	$650
Quality Installation	$100
Geothermal Heat Pump	$1,500

Estimated Participation

Eligible Measure	2016	2017	2018
Heat Pump Water Heater	8	8	8
Evaporative Cooler >2,500 CFM	480	500	520
Evaporative Cooler Media Saturation >85%	8	8	8
Evaporative Cooler – Whole House Cooler	8	10	10
Heat Pump Ductless Mini Split	30	30	30
Air Conditioner SEER 15	20	25	30
Air Conditioner SEER 16	30	35	40
Air Conditioner SEER 17	5	7	9
Heat Pump SEER 15	6	8	10
Heat Pump SEER 16	2	4	6
Quality Installation	3	3	3
Geothermal Heat Pump	2	3	4
Total	**602**	**641**	**678**

Estimated Savings

Net Energy Savings Goals

Eligible Measure	Unit	Net kWh per Unit @ Meter	Annual Net Energy Savings Goals (kWh) @ Meter		
			2016	2017	2018
Heat Pump Water Heater	Unit	939	7,512	7,512	7,512
Evaporative Cooler >2,500 CFM	Unit	944	453,024	471,900	490,776
Evaporative Cooler Media Saturation >85%	Unit	944	7,550	7,550	7,550
Evaporative Cooler - Whole House Cooler	Unit	807	6,456	8,070	8,070
Heat Pump Ductless Mini Split	Ton	462	20,786	20,786	20,786
Air Conditioner SEER 15	Ton	62	3,695	4,619	5,543
Air Conditioner SEER 16	Ton	87	7,795	9,094	10,393
Air Conditioner SEER 17	Ton	109	1,630	2,282	2,934
Heat Pump SEER 15	Ton	91	1,640	2,187	2,734
Heat Pump SEER 16	Ton	116	697	1,394	2,091
Quality Installation SEER 16	Unit	313	626	626	626
Quality Installation SEER 17	Unit	295	295	295	295
Geothermal Heat Pump	Ton	883	5,299	7,949	10,598
		TOTAL	**517,005**	**544,263**	**569,908**

Eligible Measure	Unit	Net kWh per Unit @ Generator	Annual Net Energy Savings Goals (kWh) @ Generator		
Heat Pump Water Heater	Unit	999	7,995	7,995	7,995
Evaporative Cooler >2,500 CFM	Unit	1,004	482,153	502,243	522,333
Evaporative Cooler Media Saturation >85%	Unit	1,004	8,036	8,036	8,036
Evaporative Cooler - Whole House Cooler	Unit	859	6,871	8,589	8,589
Heat Pump Ductless Mini Split	Ton	492	22,123	22,123	22,123
Air Conditioner SEER 15	Ton	66	3,933	4,916	5,899
Air Conditioner SEER 16	Ton	92	8,296	9,679	11,061
Air Conditioner SEER 17	Ton	116	1,735	2,429	3,123
Heat Pump SEER 15	Ton	97	1,746	2,328	2,910
Heat Pump SEER 16	Ton	124	742	1,483	2,225
Quality Installation SEER 16	Unit	333	666	666	666
Quality Installation SEER 17	Unit	313	313	313	313
Geothermal Heat Pump	Ton	940	5,640	8,460	11,280
		TOTAL	**550,248**	**579,259**	**606,553**

Net Demand Savings Goals

Eligible Measure	Unit	Net kW per Unit	Annual Net Demand Savings Goals (kW)		
			2016	2017	2018
Heat Pump Water Heater	Unit	0.044	0.4	0.4	0.4
Evaporative Cooler >2,500 CFM	Unit	1.047	503	523	544
Evaporative Cooler Media Saturation >85%	Unit	1.047	8.4	8.4	8.4
Evaporative Cooler - Whole House Cooler	Unit	0.895	7.2	9.0	9.0
Heat Pump Ductless Mini Split	Ton	0.153	6.9	6.9	6.9
Air Conditioner SEER 15	Ton	0.053	3.2	4.0	4.8
Air Conditioner SEER 16	Ton	0.053	4.8	5.6	6.4
Air Conditioner SEER 17	Ton	0.068	1.0	1.4	1.8
Heat Pump SEER 15	Ton	0.033	0.6	0.8	1.0
Heat Pump SEER 16	Ton	0.033	0.2	0.4	0.6
Quality Installation SEER 16	Unit	0.480	1.0	1.0	1.0
Quality Installation SEER 17	Unit	0.462	0.5	0.5	0.5
		TOTAL	**538**	**563**	**587**

Eligible Measure	Unit	Net kW per Unit @ Generator	Annual Net Demand Savings Goals (kW) @ Generator		
Heat Pump Water Heater	Unit	0.047	0.4	0.4	0.4
Evaporative Cooler >2,500 CFM	Unit	1.114	534.8	557.1	579.4
Evaporative Cooler Media Saturation >85%	Unit	1.114	8.9	8.9	8.9
Evaporative Cooler - Whole House Cooler	Unit	0.953	7.6	9.5	9.5
Heat Pump Ductless Mini Split	Ton	0.163	7.3	7.3	7.3
Air Conditioner SEER 15	Ton	0.057	3.4	4.3	5.1
Air Conditioner SEER 16	Ton	0.057	5.1	6.0	6.8
Air Conditioner SEER 17	Ton	0.073	1.1	1.5	2.0
Heat Pump SEER 15	Ton	0.035	0.6	0.8	1.0
Heat Pump SEER 16	Ton	0.035	0.2	0.4	0.6
Quality Installation SEER 16	Unit	0.511	1.0	1.0	1.0
Quality Installation SEER 17	Unit	0.491	0.5	0.5	0.5
Geothermal Heat Pump	Ton	0.191	1.1	1.7	2.3
		TOTAL	**572**	**600**	**625**

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$93,150	$104,400	$113,650
Administration	$4,658	$5,220	$5,683
Marketing	$7,452	$8,352	$9,092
Delivery	$60,200	$64,100	$67,800
Total	**$165,460**	**$182,072**	**$196,225**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
8.37	2.71	11.77	8.50	5.99

Residential Home Energy Comparison Report Program

<table>
<tr><td>Objective</td><td>Encourage reduced energy consumption through behavioral change.</td></tr>
<tr><td>Target Market</td><td>Residential single family homes.</td></tr>
<tr><td>Description</td><td>The Home Energy Comparison Report Program provides individualized energy use information to customers while simultaneously offering recommendations on how to save money and energy by making changes to energy consuming behaviors. Energy reports are sent periodically to customer households to give them awareness and a peer comparison of their energy usage. Social competitiveness increases behavior to reduce energy consumption.</td></tr>
<tr><td>Program Goals</td><td>• Build utility-customer relationship.
• Increase awareness of the Black Hills energy efficiency portfolio.
• Increase customer awareness of energy consumption patterns.
• Educate residential customers about the opportunities to reduce energy consumption.</td></tr>
<tr><td>Implementation Strategy</td><td>The Company will work with an implementation contractor that specializes in developing and issuing residential energy reports. The implementation contractor will select report recipients and a control group, design the reports and develop customized energy reduction tips with input from Black Hills. The program will cross-promote the Black Hills energy efficiency portfolio.</td></tr>
<tr><td>Measures & Incentives</td><td>Customers receive energy reports. There is no monetary incentive.</td></tr>
<tr><td>Estimated Participation</td><td>
<table>
<tr><th>2016</th><th>2017</th><th>2018</th></tr>
<tr><td>30,000</td><td>27,300</td><td>24,843</td></tr>
</table>
</td></tr>
<tr><td>Estimated Savings</td><td>
Net Energy Savings Goals
<table>
<tr><th></th><th>2016</th><th>2017</th><th>2018</th></tr>
<tr><td>Net Energy Savings per Customer (kWh) @ Meter</td><td>75</td><td>116</td><td>130</td></tr>
<tr><td>Net Annual Energy Savings Goals (kWh) @ Meter</td><td>2,260,000</td><td>3,155,809</td><td>3,233,521</td></tr>
<tr><td>Net Energy Savings per Customer (kWh) @ Generator</td><td>80</td><td>123</td><td>139</td></tr>
<tr><td>Net Annual Energy Savings Goals (kWh) @ Generator</td><td>2,405,318</td><td>3,358,728</td><td>3,441,436</td></tr>
</table>
Net Demand Savings Goals
</td></tr>
</table>

	2016	2017	2018
Net Demand Savings per Customer (kW) @ Meter	0.02	0.02	0.03
Net Annual Demand Savings Goals (kW) @ Meter	470	620	630
Net Demand Savings per Customer (kW) @ Generator	80	123	139
Net Annual Demand Savings Goals (kW) @ Generator	2,405,318	3,358,728	3,441,436

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$0	$0	$0
Administration	$5,480	$4,400	$4,400
Marketing	$5,480	$4,400	$4,400
Delivery	$274,000	$220,000	$220,000
Total	**$284,960**	**$228,800**	**$228,800**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
1.19	0.55	1.19	1.25	n/a

e. Commercial and Industrial Programs

C&I New Construction Program

Objective	Promote energy-efficiency in new construction and major renovation projects.
Target Market	Commercial and industrial customers and builders for new construction and major renovations.
Description	The program encourages customers and builders to incorporate energy efficiency into new construction and major building renovations. Customers can follow one of four tracks: • **Track I.** Targets small commercial buildings, between 5,000 and 15,000 square feet in size, that are primarily design or construction. Buildings must achieve 15% savings over IECC code. • **Track II.** Targets buildings larger than 15,000 square feet that are straightforward in design and may be on a faster design schedule. Track II provides evaluation of efficiency options of one type of mechanical system solution. Buildings must achieve 15% savings over IECC code. • **Track III.** Targets buildings larger than 15,000 square feet that have energy savings goals in mind and time to integrate new ideas and strategies into the design. Buildings are typically modeled to achieve energy savings of 30 to 40% greater than IECC code. • **Track IV.** Track IV offers incentives and assistance to help building owners or developers achieve energy savings of 40 to 60% better than current IECC code. Customers are eligible for design and construction incentives: • **Design Incentives**. BHE's independent energy design consultant facilitates design team planning of various energy-saving strategies. Incentives are provided to the owner's team of professionals to help offset expenses associated with program participation. The design team payment is a one-time lump sum amount paid to the design team lead and based on the program track. • **Construction Incentives**. Must achieve a minimum energy savings of 15% higher than IECC code. Incentives are paid upon receipt of the final energy verification report. Incentives cannot reduce overall payback to less than one year. Customers cannot receive incentives for these measures through other energy efficiency programs offered by BHE.

Track	Design Incentive	Construction Incentive
I	$1,000	$0.06–0.19/kWh
II	$3,500	$0.06–0.19/kWh
III	$5,500	$0.06–0.19/kWh
IV	$6,500 - $8,500	$0.17–0.19/kWh

Program Goals

- Education of C&I customers about the benefits of green buildings.
- Develop partnerships with design and construction firms that specialize in green building.
- Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort.
- Help commercial and industrial customers reduce their electricity bills.

Implementation Strategy

The Company will engage an implementation contractor to:

- Review, screen and pre-qualify energy design projects.
- As needed, facilitate meetings with the client design team to develop energy conservation strategies.
- Develop the energy design report, detailing implementation, energy savings and payback for potential strategies.
- Review construction documents and verify equipment/system installation.
- Process customer applications and customer incentives.
- Track program performance.

The program will be marketed primarily through partnerships with Black Hills trade allies, design firms, and building developers. Other marketing may include newspaper advertisements, email blasts or targeted mailings to customers and contractors, bill inserts, and advertising in building development trade publications.

Measures & Incentives

Incentives vary depending upon the building square footage and energy savings.

Track	Design Incentive	Construction Incentive
I	$1,000	$0.06–0.19/kWh
II	$3,500	$0.06–0.19/kWh
III	$5,500	$0.06–0.19/kWh
IV	$6,500 - $8,500	$0.17–0.19/kWh

Estimated Participation

2016	2017	2018
1	1	1

Estimated Savings

The savings in the table below are estimated based upon average historical customer savings. Actual savings will vary by project.

Annual Net Energy and Demand Savings Goals

	2016	2017	2018
Annual Net Energy Savings Goals (kWh) @ Meter	143,413	143,413	143,413
Annual Net Energy Savings Goals (kWh) @ Generator	152,635	152,635	152,635
Annual Net Demand Savings Goals (kW) @ Meter	41	41	41
Annual Net Demand Savings Goals (kW) @ Generator	43	43	43

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$15,300	$15,300	$15,300
Administration	$765	$765	$765
Marketing	$1,224	$1,224	$1,224
Delivery	$30,000	$30,000	$30,000
Total	**$47,289**	**$47,289**	**$47,289**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
3.59	1.57	5.57	3.73	3.41

C&I Custom Program

<table>
<tr><td>Objective</td><td>Encourage commercial and industrial facilities to purchase and install energy efficient equipment.</td></tr>
<tr><td>Target Market</td><td>Commercial and industrial customers.</td></tr>
<tr><td>Description</td><td>Equipment that does not qualify for a prescriptive rebate will be eligible for a custom rebate. Applications must be pre-approved by Black Hills before equipment is purchased and installed. The projects must (1) have an incremental payback of 1 year or longer and (2) have a societal benefit-to-cost ratio of 1.0 or higher.

Incentives are the lesser of:

• 50% of the incremental project cost
• $ per kWh saved based on project size

<table><tr><th>kWh Savings</th><th>Incentive $ per kWh Savings</th></tr><tr><td>0 – 30,000</td><td>$0.30</td></tr><tr><td>30,000 – 100,000</td><td>$0.25</td></tr><tr><td>100,000 – 250,000</td><td>$0.20</td></tr><tr><td>>250,000 kWh</td><td>$0.15</td></tr></table>
A $500,000 incentive cap is imposed per facility per program year. Multiple rebate applications for different measures may be submitted.</td></tr>
<tr><td>Goals</td><td>• Educate C&I customers about the benefits of installing energy efficient equipment.
• Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort.
• Effectively install efficient equipment/systems through the Black Hills program.
• Help commercial and industrial customers reduce their electricity bills.</td></tr>
<tr><td>Implementation Strategy</td><td>Black Hills will engage an implementation contractor to:

• Review pre-approved applications
• Process customer applications, verify eligibility, and process customer rebates.
• Conduct QA/QC to verify equipment installation.
• Track program performance.

The marketing strategy includes partnerships with Black Hills trade allies and distributors as well as direct customer marketing. The implementation contractor may work with Black Hills program staff to develop partnerships with contractors and distributors through trade ally breakfasts and other informational events. Direct customer marketing may include newspaper advertisements, email blasts or targeted mailings, bill inserts, and advertising in trade publications.</td></tr>
<tr><td>Measures & Incentives</td><td>Incentives, up to a maximum cap of $500,000 per facility, are the lesser of:

• 50% of the incremental project cost
• $ per kWh saved based on project size

<table><tr><th>kWh Savings</th><th>Incentive $ per kWh Savings</th></tr><tr><td>0 – 30,000</td><td>$0.30</td></tr><tr><td>30,000 – 100,000</td><td>$0.25</td></tr><tr><td>100,000 – 250,000</td><td>$0.20</td></tr><tr><td>>250,000 kWh</td><td>$0.15</td></tr></table></td></tr>
</table>

Estimated Participation

2016	2017	2018
38	43	48

Estimated Savings

The savings per customer in the table below are estimated based upon average historical customer savings. Actual savings will vary by project.

Annual Net Energy and Demand Savings Goals

	Net Savings per Customer	2016	2017	2018
Annual Net Energy Savings Goals (kWh) @ Meter	49,727	1,989,072	2,237,706	2,486,340
Annual Net Energy Savings Goals (kWh) @ Generator	52,924	2,011,121	2,275,742	2,540,363
Annual Net Demand Savings Goals (kW) @ Meter	8.4	335	377	419
Annual Net Demand Savings Goals (kW) @ Generator	8.9	339	384	428

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$551,000	$623,500	$696,000
Administration	$27,550	$31,175	$34,800
Marketing	$44,080	$49,880	$55,680
Delivery	$9,500	$10,750	$12,000
Total	**$632,130**	**$715,305**	**$798,480**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
2.76	1.20	4.21	2.90	2.74

C&I Self Direct

<table>
<tr><td>Objective</td><td>Encourage commercial and industrial facilities to purchase and install energy efficient equipment.</td></tr>
<tr><td>Target Market</td><td>Commercial and industrial customers.</td></tr>
<tr><td>Description</td><td>Equipment that does not qualify for a prescriptive rebate will be eligible for a custom rebate. Applications must be pre-approved by Black Hills before equipment is purchased and installed. The projects must (1) have an incremental payback of 1 year or longer, (2) have a societal benefit-to-cost ratio of 1.0 or higher, and (3) customers must have an aggregated peak load greater than 1 MW in any single month and aggregated annual energy usage of 5,000 MWh.

Incentives are consistent with the Custom program and are the lesser of:

• 50% of the incremental project cost
• $ per kWh saved based on project size

<table><tr><th>kWh Savings</th><th>Incentive $ per kWh Savings</th></tr><tr><td>0 – 30,000</td><td>$0.30</td></tr><tr><td>30,000 – 100,000</td><td>$0.25</td></tr><tr><td>100,000 – 250,000</td><td>$0.20</td></tr><tr><td>>250,000 kWh</td><td>$0.15</td></tr></table>
Self-direct incentives will have a 10% adder to the value of the incentive from the Custom rebate. Incentives are reflected as a bill credit against the customer’s monthly DSM surcharge until the total amount of the rebate has been recouped through bill credits.

Multiple rebate applications for different measures may be submitted.</td></tr>
<tr><td>Goals</td><td>• Educate C&I customers about the benefits of installing energy efficient equipment.
• Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort.
• Effectively install efficient equipment/systems through the Black Hills program.
• Help commercial and industrial customers reduce their electricity bills.</td></tr>
<tr><td>Implementation Strategy</td><td>Black Hills will engage an implementation contractor to:

• Review pre-approved applications
• Process customer applications, verify eligibility, and process customer rebates.
• Conduct QA/QC to verify equipment installation.
• Track program performance.

The marketing strategy includes partnerships with Black Hills trade allies and distributors as well as direct customer marketing. The implementation contractor may work with Black Hills program staff to develop partnerships with contractors and distributors through trade ally breakfasts and other informational events. Direct customer marketing may include newspaper advertisements, email blasts or targeted mailings, bill inserts, and advertising in trade publications.</td></tr>
</table>

Measures & Incentives

Incentives, are the lesser of:

- 50% of the incremental project cost
- $ per kWh saved based on project size

kWh Savings	Incentive $ per kWh Savings
0 – 30,000	$0.30
30,000 – 100,000	$0.25
100,000 – 250,000	$0.20
>250,000 kWh	$0.15

Self-direct incentives will have a 10% adder to the value of the incentive from the Custom rebate.

Estimated Participation

2016	2017	2018
2	2	2

Estimated Savings

Actual savings will vary by project.

Annual Net Energy and Demand Savings Goals

	Net Savings per Customer	2016	2017	2018
Annual Net Energy Savings Goals (kWh) @ Meter	49,727	99,454	99,454	99,454
Annual Net Energy Savings Goals (kWh) @ Generator	52,924	105,848	105,848	105,848
Annual Net Demand Savings Goals (kW) @ Meter	8.4	17	17	17
Annual Net Demand Savings Goals (kW) @ Generator	8.9	18	18	18

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$31,900	$31,900	$31,900
Administration	$479	$479	$479
Marketing	$391	$391	$391
Delivery	$500	$500	$500
Total	**$33,270**	**$33,270**	**$33,270**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
2.92	1.20	4.19	3.07	2.80

C&I Prescriptive Program

Objective	Encourage commercial and industrial facilities to purchase and install energy efficient equipment.
Target Market	Commercial and industrial customers.
Description	The program provides standardized prescriptive rebates to commercial and industrial customers that purchase and install qualifying energy efficient equipment/systems. Pre-qualified rebates are available for proven technologies that are readily available with known performance characteristics, including HVAC equipment, motors and refrigeration.
Program Goals	• Educate C&I customers about the benefits of energy efficient equipment/systems. • Develop partnerships with contractors and distributors to bring energy efficient products and systems to the market. • Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort. • Effectively install efficient equipment and systems through the Black Hills program. • Help commercial and industrial customers reduce their electricity bills.
Implementation Strategy	Black Hills will engage an implementation contractor to: • Process customer applications, verify eligibility, and process customer rebates. • Conduct QA/QC to verify equipment installation. • Track program performance. The marketing strategy includes partnerships with Company trade allies and distributors as well as direct customer marketing. The implementation contractor may work with Black Hills program staff to develop partnerships with contractors and distributors through trade ally breakfasts and other informational events. Direct customer marketing may include newspaper advertisements, email blasts or targeted mailings, bill inserts, and advertising in trade publications.

Measures & Incentives

Eligible Measure	Unit	Incentive per Unit
ECM for Refrigeration Evaporators	per unit	$40
Evaporative Fan Control	per unit	$50
Strip Curtains	per unit	$100
Pre-Rinse Spray Valves	per unit	$50
Automatic Door Closer for Walk-In Cooler/Freezer	per unit	$75
Door Heater Controls for Freezer	per Door	$125
VSD Air Compressor	per HP	$100
No Air Loss Drain	per Drain	$300
NEMA ODP/TEFC Motor	per HP	$50
Variable Frequency Drive (Fan/Pump)	per HP	$100
Air Cooled Chiller	per Ton	$40
Water Cooled Chiller, Rotary Screw & Roll (<75 Tons)	per Ton	$50
Water Cooled Chiller, Rotary Screw & Roll (75 < 150 Tons)	per Ton	$40
Water Cooled Chiller, Rotary Screw & Roll (≥150 Tons)	per Ton	$30
PTAC	per Ton	$50
Air/Water Source Heat Pump	per Ton	$50
Air Conditioner	per Ton	$35
Air Conditioner Tune-Up	per Ton	$15
Direct Evaporative Pre-Cooling for Air Cooled Condensers	per Ton	$15

Estimated Participation

2016	2017	2018
60	64	70

Estimated Savings

Net Energy and Demand Savings per Unit

Eligible Measure	Unit	Net Energy Savings per Unit (kWh) @ Meter	Net Demand Savings per Unit (kW) @ Meter
ECM for Refrigeration Evaporators	per unit	469	0.051
Evaporative Fan Control	per unit	41	0.044
Strip Curtains	per unit	2,379	0.280
Pre-Rinse Spray Valves	per unit	2,094	-
Automatic Door Closer for Walk-In Cooler	per unit	754	0.110
Automatic Door Closer for Walk-In Freezer	per unit	1,846	0.247
Door Heater Controls for Freezer	per Door	1,022	-
VSD Air Compressor	per HP	422	0.176
No Air Loss Drain	per Drain	2,894	0.286
NEMA ODP/TEFC Motor	per HP	66	0.012
Variable Frequency Drive (Fan)	per HP	1,049	0.190
Variable Frequency Drive (Pump)	per HP	1,156	0.219
Air Cooled Chiller	per Ton	29	0.118
Water Cooled Chiller, Rotary Screw & Roll (<75 Tons)	per Ton	10	0.043
Water Cooled Chiller, Rotary Screw & Roll (75 < 150 Tons)	per Ton	15	0.040
Water Cooled Chiller, Rotary Screw & Roll (150 < 300 Tons)	per Ton	69	0.036
Water Cooled Chiller, Rotary Screw & Roll (≥300 Tons)	per Ton	29	0.043
PTAC	per Ton	159	0.910
Air Source Heat Pump (<65 kBtuh)	per Ton	301	0.052
Air Source Heat Pump (65<135 kBtuh)	per Ton	79	0.021
Air Source Heat Pump (135<240 kBtuh)	per Ton	31	0.022
Air Source Heat Pump (≥240 kBtuh)	per Ton	96	0.071
Water Source Heat Pump	per Ton	257	0.103
Air Conditioner (<65 kBtuh)	per Ton	65	0.052
Air Conditioner (65<135 kBtuh)	per Ton	45	0.033
Air Conditioner (135<240 kBtuh)	per Ton	64	0.047
Air Conditioner (240<760 kBtuh)	per Ton	56	0.041
Air Conditioner (≥760 kBtuh)	per Ton	24	0.018
Air Conditioner Tune-Up	per Ton	702	0.312
Direct Evaporative Pre-Cooling for Air Cooled Condensers	per Ton	223	0.236

Eligible Measure	Unit	Net kWh per Unit @ Generator	Net kW per Unit @ Generator
ECM for Refrigeration Evaporators	per unit	499	0.054
Evaporative Fan Control	per unit	43	0.047
Strip Curtains	per unit	2,532	0.298
Pre-Rinse Spray Valves	per unit	2,228	0.000
Automatic Door Closer for Walk-In Cooler	per unit	803	0.117
Automatic Door Closer for Walk-In Freezer	per unit	1,964	0.263
Door Heater Controls for Freezer	per Door	1,088	0.000
VSD Air Compressor	per HP	449	0.187
No Air Loss Drain	per Drain	3,080	0.304
NEMA ODP Motor	per HP	70	0.013
NEMA TEFC Motor	per HP	70	0.013
Variable Frequency Drive (Fan)	per HP	1,116	0.202
Variable Frequency Drive (Pump)	per HP	1,230	0.233
Air Cooled Chiller	per Ton	31	0.126
Water Cooled Chiller, Rotary Screw & Roll (<75 Tons)	per Ton	10	0.046
Water Cooled Chiller, Rotary Screw & Roll (75 < 150 Tons)	per Ton	16	0.042
Water Cooled Chiller, Rotary Screw & Roll (150 < 300 Tons)	per Ton	73	0.038
Water Cooled Chiller, Rotary Screw & Roll (≥300 Tons)	per Ton	31	0.046
PTAC	per Ton	169	0.968
Air Source Heat Pump (<65 kBtuh)	per Ton	321	0.056
Air Source Heat Pump (65<135 kBtuh)	per Ton	84	0.022
Air Source Heat Pump (135<240 kBtuh)	per Ton	32	0.024
Air Source Heat Pump (≥240 kBtuh)	per Ton	102	0.075
Water Source Heat Pump	per Ton	274	0.109
Air Conditioner (<65 kBtuh)	per Ton	69	0.056
Air Conditioner (65<135 kBtuh)	per Ton	48	0.035
Air Conditioner (135<240 kBtuh)	per Ton	68	0.050
Air Conditioner (240<760 kBtuh)	per Ton	60	0.044
Air Conditioner (≥760 kBtuh)	per Ton	26	0.019
Air Conditioner Tune-Up	per Ton	748	0.332
Direct Evaporative Pre-Cooling for Air Cooled Condensers	per Ton	237	0.251

Annual Net Energy and Demand Savings Goals

	2016	2017	2018
Annual Net Energy Savings Goals (kWh) @ Meter	273,113	280,655	318,840
Annual Net Energy Savings Goals (kWh) @ Generator	290,674	298,701	339,342
Annual Net Demand Savings Goals (kW) @ Meter	234	250	278
Annual Net Demand Savings Goals (kW) @ Generator	250	266	296

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$124,770	$130,520	$147,635
Administration	$4,991	$5,221	$5,905
Marketing	$11,229	$11,747	$13,287
Delivery	$6,900	$7,360	$8,050
Total	**$147,890**	**$154,848**	**$174,878**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
2.95	3.05	6.60	2.99	1.06

C&I Lighting Program

Objectives	Encourage commercial and industrial customers to purchase and install energy efficient lighting measures. Effectively engage small business customers.
Target Market	Commercial and industrial customers; commercial customers with an average electric demand of 350 kW or less per year.
Description	The program is comprised of two components: **Prescriptive Lighting.** Provide standardized prescriptive rebates to all commercial and industrial customers that purchase and install qualifying energy efficient lighting measures. Pre-qualified rebates are available for proven technologies that are readily available with known performance characteristics. **Small Business Direct Install Lighting.** Commercial customers with an average electric demand of less than 350 kW per year will receive the following: • Free lighting energy evaluation identifying potential energy savings. • Customized proposal, including information on potential energy savings, installation costs, and anticipated payback. • Incentives are up to 70% of the equipment and installation costs.
Program Goals	• Develop new partnerships with contractors to bring efficient lighting to the market. • Increase awareness of and participation in BHE's program through improved branding, marketing, and coordination between market actors. • Educate customers and trade allies on the benefits of new efficient lighting technologies. • Help commercial customers reduce their electricity bills. • Build consumer confidence in the reliability of savings estimates through an educated sales force and a highly tailored program approach.
Implementation Strategy	Black Hills will engage an implementation contractor(s) to assist in delivery of the program. **Prescriptive Lighting.** The implementation contractor will: • Process customer applications, verify eligibility, and process customer rebates. • Conduct QA/QC to verify equipment installation. • Track program performance. **Small Business Direct Install Lighting.** The implementation strategy will incorporate the following components: • *Walk-Through Evaluations.* Trained evaluators complete a walk-through evaluation of the business using standard audit software, identifying specific energy saving opportunities. The evaluator will review the anticipated costs and savings of the measures, along with information on financial resources available to help defray costs. Customers will be provided with a customized proposal. • *Direct Installation of Measures.* Upon customer approval of the proposal, the implementation contractor will install the lighting measures. • *Customer Education.* Customers will be educated on energy efficient lighting and Company commercial and industrial programs.

The implementation contractor will:

- Hire qualified, local individuals to conduct energy evaluations and install efficient lighting. Provide training, ongoing as needed, to evaluators.
- Schedule customer evaluators and lighting upgrades.
- Assist with program marketing and outreach.
- Provide customer service support.
- Track program performance, including evaluation requests, evaluation activities and customer actions.

Black Hills will market the program through its website and bill inserts, as well as directly to business owners, operators, property owners and tenants. Program representatives will participate in trade association and business organization meetings, trade fairs, and other events. As projects are completed, case studies will be prepared and used to inform the utility's marketing efforts.

Measures & Incentives

Small Business Direct Install incentives up to 70% of the equipment and installation costs.

Eligible Measure	Incentive per Unit
LED Exit Sign	$10
Ceiling Occupancy Sensor	$40
Wall Occupancy Sensor	$15
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 2-3 lamp)	$55
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 4-6 lamp)	$75
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 8-lamp)	$85
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 10-lamp)	$95
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 4-lamp)	$55
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 6-8 lamp)	$75
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 12-16 lamp)	$85
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 18-20 lamp)	$95
Low Wattage T8 Lamp	$1.00
Ceramic Metal Halide Fixture (≤150W)	$35
Ceramic Metal Halide Fixture (150-250W)	$45
Ceramic Metal Halide Fixture (≥250W)	$55
Ceramic Metal Halide Fixture w/ Integrated Ballast	$25
Pulse Start Metal Halide Fixture (≤175W)	$25
Pulse Start Metal Halide Fixture (175-320W)	$40
Pulse Start Metal Halide Fixture (320-750W)	$55
Pulse Start Metal Halide Fixture (≥750W)	$70
Energy Star LED Lamp (≤5W)	$10
Energy Star LED Lamp (5-10W)	$15
Energy Star LED Lamp (10-20W)	$20
Energy Star LED Lamp (20-22W)	$25
Energy Star LED Downlight Fixture	$35
High Performance T8	$9
LED Recessed Light Fixture (2x2)	$30
LED Recessed Light Fixture (2x4)	$40
LED Recessed Light Fixture (1x4)	$50
LED Parking Garage/Canopy (<30W)	$60
LED Parking Garage/Canopy (30-75W)	$100
LED Parking Garage/Canopy (≥75W)	$140
LED Flood Light (<15W)	$12
LED Flood Light (≥15W)	$15
LED Outdoor Pole/Arm Mounted Parking/Roadway (<30W)	$60
LED Outdoor Pole/Arm Mounted Parking/Roadway (30-75W)	$100
LED Outdoor Pole/Arm Mounted Parking/Roadway (≥75W)	$140
Lighting Optimization - Remove Lamp from T8 System	$8
Exterior LED Wall Pack Fixtures (≤25W)	$35
Exterior LED Wall Pack Fixtures (25-60W)	$75
Exterior LED Wall Pack Fixtures (≥60W)	$100
LED Refrigerator Case Light	$60
Stairwell Fixtures w/ Integral Occupancy	$30

Estimated Participation

	2016	2017	2018
Prescriptive Lighting	364	393	415
Small Business Direct Install Lighting	195	202	208
Total	**559**	**595**	**623**

Estimated Savings

Prescriptive Lighting Net Energy and Demand Savings per Lighting Unit

Eligible Measure	Net Energy Savings per Unit (kWh) @ Meter	Net Demand Savings per Unit (kW) @ Meter
LED Exit Sign	348	0.047
Ceiling Occupancy Sensor	558	0.381
Wall Occupancy Sensor	333	0.227
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 2-3 lamp)	216	0.060
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 4-6 lamp)	374	0.104
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 8-lamp)	886	0.248
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 10-lamp)	1,149	0.321
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 4-lamp)	226	0.063
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 6-8 lamp)	666	0.186
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 12-16 lamp)	1,058	0.296
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 18-20 lamp)	1,330	0.372
Low Wattage T8 Lamp	14	0.004
Ceramic Metal Halide Fixture (≤150W)	130	0.036
Ceramic Metal Halide Fixture (150-250W)	246	0.069
Ceramic Metal Halide Fixture (≥250W)	248	0.069
Ceramic Metal Halide Fixture w/ Integrated Ballast	186	0.052
Pulse Start Metal Halide Fixture (≤175W)	49	0.014
Pulse Start Metal Halide Fixture (175-320W)	146	0.041
Pulse Start Metal Halide Fixture (320-750W)	200	0.056
Pulse Start Metal Halide Fixture (≥750W)	622	0.174
Energy Star LED Lamp (≤5W)	37	0.010
Energy Star LED Lamp (5-10W)	56	0.016
Energy Star LED Lamp (10-20W)	88	0.025
Energy Star LED Lamp (20-22W)	111	0.031
Energy Star LED Downlight Fixture	123	0.034
High Performance T8	23	0.006
LED Recessed Light Fixture (2x2)	37	0.010
LED Recessed Light Fixture (2x4)	80	0.022
LED Recessed Light Fixture (1x4)	62	0.017
LED Parking Garage/Canopy (<30W)	245	0.106
LED Parking Garage/Canopy (30-75W)	303	0.130
LED Parking Garage/Canopy (≥75W)	568	0.245
LED Flood Light (<15W)	100	-
LED Flood Light (≥15W)	112	-
LED Outdoor Pole/Arm Mounted Parking/Roadway (<30W)	245	-

LED Outdoor Pole/Arm Mounted Parking/Roadway (30-75W)	303	-
LED Outdoor Pole/Arm Mounted Parking/Roadway (≥75W)	568	-
Lighting Optimization - Remove Lamp from T8 System	71	-
Lighting Optimization - Remove 2 Lamps from T8 System	141	-
Exterior LED Wall Pack Fixtures (≤25W)	216	-
Exterior LED Wall Pack Fixtures (25-60W)	513	-
Exterior LED Wall Pack Fixtures (≥60W)	789	-
LED Refrigerator Case Light	422	0.029
Stairwell Fixtures w/ Integral Occupancy (T8 1-2 lamp)	363	0.025
Stairwell Fixtures w/ Integral Occupancy (LED 20-30W)	380	0.026

Eligible Measure	**Net kWh per Unit @ Generator**	**Net kW per Unit @ Generator**
LED Exit Sign	371	0.050
Ceiling Occupancy Sensor	594	0.405
Wall Occupancy Sensor	354	0.242
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 2-3 lamp)	230	0.064
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 4-6 lamp)	398	0.111
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 8-lamp)	943	0.264
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T5 10-lamp)	1,223	0.342
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 4-lamp)	240	0.067
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 6-8 lamp)	709	0.198
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 12-16 lamp)	1,126	0.315
High Bay Fluorescent Fixture w/ HE Electronic Ballast (T8 18-20 lamp)	1,415	0.396
Low Wattage T8 Lamp	15	0.004
Ceramic Metal Halide Fixture (≤150W)	138	0.039
Ceramic Metal Halide Fixture (150-250W)	262	0.073
Ceramic Metal Halide Fixture (≥250W)	264	0.074
Ceramic Metal Halide Fixture w/ Integrated Ballast	198	0.055
Pulse Start Metal Halide Fixture (≤175W)	52	0.015
Pulse Start Metal Halide Fixture (175-320W)	156	0.044
Pulse Start Metal Halide Fixture (320-750W)	212	0.059
Pulse Start Metal Halide Fixture (≥750W)	662	0.185
Energy Star LED Lamp (≤5W)	40	0.011
Energy Star LED Lamp (5-10W)	59	0.017
Energy Star LED Lamp (10-20W)	94	0.026
Energy Star LED Lamp (20-22W)	119	0.033
Energy Star LED Downlight Fixture	131	0.037
High Performance T8	25	0.007
LED Recessed Light Fixture (2x2)	40	0.011

LED Recessed Light Fixture (2x4)	85	0.024
LED Recessed Light Fixture (1x4)	66	0.019
LED Parking Garage/Canopy (<30W)	261	0.113
LED Parking Garage/Canopy (30-75W)	322	0.139
LED Parking Garage/Canopy (≥75W)	604	0.260
LED Flood Light (<15W)	106	0.000
LED Flood Light (≥15W)	119	0.000
LED Outdoor Pole/Arm Mounted Parking/Roadway (<30W)	261	0.000
LED Outdoor Pole/Arm Mounted Parking/Roadway (30-75W)	322	0.000
LED Outdoor Pole/Arm Mounted Parking/Roadway (≥75W)	604	0.000
Lighting Optimization - Remove Lamp from T8 System	75	0.000
Lighting Optimization - Remove 2 Lamps from T8 System	150	0.000
Exterior LED Wall Pack Fixtures (≤25W)	229	0.000
Exterior LED Wall Pack Fixtures (25-60W)	546	0.000
Exterior LED Wall Pack Fixtures (≥60W)	839	0.000
LED Refrigerator Case Light	449	0.031
Stairwell Fixtures w/ Integral Occupancy (T8 1-2 lamp)	386	0.027
Stairwell Fixtures w/ Integral Occupancy (LED 20-30W)	404	0.028

The Small Business Direct Install Lighting savings per customer are estimated based upon average historical customer savings. Actual savings will vary by project.

Unit	Net kWh per Unit	Net kW per Unit
per Customer @ Meter	25,709	7.664
per Customer @ Generator	27,363	8.157

Net kWh Savings Goals

	2016	2017	2018
Prescriptive Lighting @ Meter	1,472,076	1,588,508	1,686,173
Small Business Direct Install Lighting @ Meter	5,013,340	5,193,306	5,347,563
TOTAL @ Meter	**5,667,756**	**5,971,669**	**6,261,676**
Prescriptive Lighting @ Generator	1,566,730	1,690,649	1,794,594
Small Business Direct Install Lighting @ Generator	5,335,698	5,527,236	5,691,411
TOTAL @ Generator	**6,902,428**	**7,217,885**	**7,486,004**

Net kW Savings Goals

	2016	2017	2018
Prescriptive Lighting @ Meter	409	441	471
Small Business Direct Install Lighting @ Meter	1,494	1,548	1,594
TOTAL @ Meter	**1,903**	**1,989**	**2,065**
Prescriptive Lighting @ Generator	435	470	502
Small Business Direct Install Lighting @ Generator	1,591	1,648	1,697
TOTAL @ Generator	**2,025**	**2,117**	**2,198**

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$1,386,225	$1,447,515	$1,498,790
Administration	$77,913	$81,171	$83,913
Marketing	$124,760	$130,276	$134,891
Delivery	$495,830	$516,681	$531,760
Total	**$2,084,728**	**$2,175,643**	**$2,249,354**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
3.69	1.58	5.37	3.83	2.70

f. Special Programs

Low-Income Assistance Program

<table>
<tr><td>Objective</td><td>Assist low-income customers in reducing their energy consumption.</td></tr>
<tr><td>Target Market</td><td>Income-eligible residential customers in the Black Hills service territory.</td></tr>
<tr><td>Description</td><td>Qualifying low-income customers receive help managing their energy use and utility bills. The program works directly with local community action program (CAP) agencies that already provide services to low-income customers through the Colorado Energy Office (CEO) as well as NeighborWorks of Pueblo (NWP).

Black Hills funds will be used in two ways:

(1) Pay the full cost of measures that reduce electric cooling, refrigeration and lighting.
• Standard LEDs
• ENERGY STAR® Refrigerators
• Window/Wall Evaporative Coolers

(2) Customers receive a home energy evaluation and direct installation of low-cost measures at no cost. The evaluation identifies potential efficiency improvements, educates the customer on managing energy costs. The low-cost measures that may be installed include: faucet aerator, low-flow showerhead, water temperature setback, hot water pipe insulation and CFLs.

Up to $1,500 in free measures are available to customers.</td></tr>
<tr><td>Program Goals</td><td>• Demonstrate persistent energy savings and provide other benefits to end-users such as improved health, safety, and comfort.
• Encourage energy saving behavior.
• Help residential customers reduce their electricity bills.
• Assist income-eligible customers achieve energy savings.</td></tr>
<tr><td>Implementation Strategy</td><td>Black Hills will work with the CAP agencies, CEO, and NWP to implement and directly market the program to income-eligible residential customers. Marketing may also include bill inserts and direct mailing. Home energy evaluation/direct install participants will be provided with a list of local agencies providing bill payment assistance, in addition to Black Hills Energy Assistance Program (BHEAP) materials.</td></tr>
<tr><td>Measures & Incentives</td><td>Participants receive LEDs, refrigerators, and evaporative coolers at no cost.</td></tr>
<tr><td>Estimated Participation</td><td>
<table>
<tr><th>Eligible Measure</th><th>2016</th><th>2017</th><th>2018</th></tr>
<tr><td>Customer Evaluation (Direct Install Measures)</td><td>750</td><td>750</td><td>750</td></tr>
<tr><td>Standard LED</td><td>240</td><td>240</td><td>240</td></tr>
<tr><td>ENERGY STAR Refrigerator</td><td>435</td><td>435</td><td>435</td></tr>
<tr><td>Evaporative Cooling</td><td>464</td><td>464</td><td>464</td></tr>
<tr><td>Total</td><td>1,889</td><td>1,889</td><td>1,889</td></tr>
</table>
</td></tr>
</table>

Estimated Savings

Net Energy Savings Goals

Eligible Measure	Unit	Net kWh per Unit @ Meter	Annual Net Energy Savings Goals (kWh) @ Meter		
			2016	2017	2018
Customer Evaluation (Direct Install Measures)	per Home	167	125,337	125,337	125,337
Standard LED	per bulb	23	54,925	54,925	54,925
ENERGY STAR Refrigerator	per unit	44	19,270	19,270	19,270
Evaporative Cooler	per unit	1,573	729,872	729,872	729,872
		TOTAL	**929,404**	**929,404**	**929,404**

Eligible Measure	Unit	Net kWh per Unit @ Generator	Annual Net Energy Savings Goals (kWh) @ Generator		
			2016	2017	2018
Customer Evaluation (Direct Install Measures)	per Home	167	133,396	133,396	133,396
Standard LED	per bulb	23	58,457	58,457	58,457
ENERGY STAR Refrigerator	per unit	44	20,509	20,509	20,509
Evaporative Cooler	per unit	1,573	776,803	776,803	776,803
		TOTAL	**989,165**	**989,165**	**989,165**

Net Demand Savings Goals

Eligible Measure	Unit	Net kW per Unit @ Meter	Annual Net Demand Savings Goals (kW) @ Meter		
			2016	2017	2018
Customer Evaluation (Direct Install Measures)	per Home	0.021	15.97	15.97	15.97
Standard LED	per bulb	0.003	6.34	6.34	6.34
ENERGY STAR Refrigerator	per unit	0.007	2.91	2.91	2.91
Evaporative Cooler	per unit	1.745	810	810	810
		TOTAL	**835**	**835**	**835**

Eligible Measure	Unit	Net kW per Unit @ Generator	Annual Net Demand Savings Goals (kW) @ Generator		
			2016	2017	2018
Customer Evaluation (Direct Install Measures)	per Home	0.023	16.99	16.99	16.99
Standard LED	per bulb	0.003	6.74	6.74	6.74
ENERGY STAR Refrigerator	per unit	0.007	3.09	3.09	3.09
Evaporative Cooler	per unit	1.857	862	862	862
		TOTAL	**889**	**889**	**889**

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$0	$0	$0
Administration	$22,818	$22,818	$22,818
Marketing	$36,508	$36,508	$36,508
Delivery	$781,450	$781,450	$781,450
Total	**$840,776**	**$840,776**	**$840,776**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
3.81	1.68	3.81	3.87	n/a

School Based Energy Education Program

Objective	Enhance student education and awareness of energy efficiency and conservation.
Target Market	Middle school and high school children, teachers, principals, parents
Description	The program provides hands-on education lessons and energy savings kits to middle and high school students within Black Hills' service territory. The energy savings kits consist of a set of low-cost measures to be installed in the home, providing hands-on methods for the students to evaluate the impact of measure implementation. Each teacher/classroom receives lesson plans, classroom posters, a program video, step-by-step checklist and supplemental activities. The energy savings kits may include: • Standard LED bulbs • Standard CFL bulbs • Low-flow Showerhead • Kitchen Aerator • LED Light Bulb • Furnace/Air Conditioner Filter Alarm • Efficient Night Light • Digital Thermometer • Toilet Leak Detector Tablets • Flow Rate Test Bag • Natural Resources Fact Chart • Mini Tape Measure
Program Goals	• Increase awareness of efficiency and conservation among students, teachers, and parents. • Educate students about the benefits of efficiency and the opportunities to reduce energy consumption in the home and at school. • Increase awareness of and participation in other Company energy efficiency programs. • Expand school curricula to include lessons on efficiency and conservation.
Implementation Strategy	Black Hills promotes the program to school districts and teachers through education associations and targets middle and high school children and their households. The program is marketed to school officials including teachers, principals and school district personnel. Information on the benefits of this program is explained to teachers or principals prior to handing out the energy kits. The Company will target middle and high schools to minimize the number of students that would participate in the program twice.
Measures & Incentives	Each student is provided with an energy savings kit at no cost.
Estimated Participation	High school students will account for 500 participants and middle school students will account for 2,000 participants. **2016**: 2,500 **2017**: 2,500 **2018**: 2,500

Estimated Savings

Net Energy Savings Goals

Unit	Net kWh per Unit	Annual Net Energy Savings Goals (kWh)		
		2016	2017	2018
per Customer @ Meter	434	1,084,487	1,084,487	1,084,487
per Customer @ Generator	462	1,154,219	1,154,219	1,154,219

Net Demand Savings Goals

Unit	Net kW per Unit	Annual Net Demand Savings Goals (kW)		
		2016	2017	2018
per Customer @ Meter	0.050	123.8	123.8	123.8
per Customer @ Generator	0.053	131.8	131.8	131.8

Estimated Budget

Budget Categories	2016	2017	2018
Incentives	$0	$0	$0
Administration	$8,750	$8,750	$8,750
Marketing	$3,500	$3,500	$3,500
Delivery	$175,000	$175,000	$175,000
Total	**$187,250**	**$187,250**	**$187,250**

Cost-Effectiveness

mTRC Test	RIM Test	Utility Cost Test	Societal Cost Test	Participant Cost Test
2.37	0.60	2.37	2.52	n/a

Appendix A. Detailed Benefit-Cost Analysis Results

Detailed Benefit-Cost Analysis Results are contained in a separate file.