



Black Hills Energy
Natural Gas Energy Efficiency
Programs
Annual Report
2020

*Prepared for
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***Prepared by
Black Hills Energy***

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Executive Summary

Black Hills/Iowa Gas Utility Company, LLC d/b/a Black Hills Energy (Black Hills Energy or the Company) is pleased to present this 2020 annual report on its gas energy efficiency plan, pursuant to Docket No. EEP-2018-0004 of the Iowa Utilities Board. This report includes planned and actual values for January through December 2020, the first full year of the 2019-2023 energy efficiency plan. The planned values include \$159,547 carried over from the 2019 program year.

The goal of the 2019-2023 energy efficiency plan is the same as past plans in that it is based on achieving cost-effective savings for Black Hills Energy's customers to reduce their energy bills. However, the budgetary caps that were established by Senate File 2311 (SF 2311) reduced the number of programs and energy saving measures that the Company was able to offer. Despite these changes and the challenges imposed by COVID, the overall portfolio benefit/cost ratio was 1.13, achieving 129% of savings, and expenditures at 98% of budget.

Expenditures were \$43,811 less than budgeted. In accordance with the settlement reached in Docket No. EEP-2018-0004, Black Hills Energy will carry over \$43,811 of flex spending that was not utilized in 2020 into the 2021 program year for a supplemental low-income weatherization program and will collaborate with OCA and other interested entities to determine how the low-income supplemental weatherization funding should be allocated. Specifically, Black Hills Energy is considering additional funding for the Low-Income Home Energy Assistance Program - Energy Crisis Intervention Program and providing additional weatherization kits in partnership with local Iowa Community Action Agencies.

Program Portfolio Overview

Black Hills Energy designed its programs to address the needs of its residential, non-residential, low-income, and public purpose customers through the following programs:

- Residential Prescriptive
- Non-Residential Prescriptive
- Non-Residential Custom
- Non-Residential New Construction
- Low-Income Weatherization
- School-Based Energy Education
- Tree Planting

In addition, Black Hills Energy provides funding for the Iowa Energy Center and the Center for Global and Regional Environmental Research.

Program Budgets, Savings, and Cost-Effectiveness

Table ES-1 presents the projected 2020 budgets and actual expenditures by sector.

Table ES-1. 2020 Utility Budget

Sector/Category	2020 Projected Budget ^a	2020 Actual	Percentage of Projected Budget
Residential	\$1,050,362	\$1,264,926	120%
Non-Residential	\$247,576	\$284,981	115%
Low-Income	\$300,216	\$177,798	59%
Public Purpose	\$353,670	\$248,155	70%
Flexible Spending	\$67,848	\$0	0%
Total^b	\$2,019,671	\$1,975,860	98%

^a Includes \$159,547 carried over from 2019

^b May not sum due to rounding.

Table ES-2 shows the projected 2020 budget and actual expenditures by program.

Table ES-2. 2020 Budget Summaries by Program

Program Category	2020 Projected Budget ^a	2020 Actual Expenditures	Percentage of Budget
Residential Programs			
Prescriptive Program	\$1,050,362	\$1,264,926	120%
Non-Residential Programs			
Prescriptive Program	\$105,825	\$157,843	149%
Custom Program	\$141,751	\$59,533	42%
New Construction Program	\$0	\$67,604	NA
Low-Income Programs			
Weatherization Program	\$293,826	\$177,798	61%
LIHEAP Additional Incentives	\$6,390	\$0	0%
Public Purpose Programs			
School-Based Energy Education Program	\$237,243	\$198,155	84%
Tree Planting	\$116,427	\$50,000	43%
Cross-Program Expenditures			
Flexible Spending	\$67,848	\$0	N/A
Total^b	\$2,019,671	\$1,975,860	98%

^a Includes \$159,547 carried over from 2019

^b May not sum due to rounding.

Table ES-3 presents the projected and actual savings by sector for the 2020 programs.

Table ES-3. 2020 Projected and Actual Savings (Net MCF) by Sector

Sector	2020 Projected ^a	2020 Actual	Percentage of Projected
Residential	11,046	12,621	114%
Non-Residential	5,033	9,265	184%
Low-Income	782	449	57%
Public Purpose	4,564	5,235	115%
Total^b	21,425	27,570	129%

^a Includes 1,212 MCF projected from 2019 carry-over funding.

^b May not sum due to rounding.

Table ES-4 provides the 2020 projected and actual savings by program.

Table ES-4. 2020 Projected and Actual Savings (Net MCF) by Program

Program Category	2020 Projected MCF ^a	2020 Actual MCF	Percent of Goal
Residential Programs			
Prescriptive Program	11,046	12,621	114%
Non-Residential Programs			
Prescriptive Program	2,383	1,188	50%
Custom Program	2,650	810	31%
New Construction Program	-	7,266	NA
Low-Income Programs			
Weatherization Program	782	449	57%
Public Purpose Programs			
School Based Energy Education Program	4,564	5,235	115%
Total^b	21,425	27,570	129%

^a Includes 1,212 MCF projected from 2019 carry-over funding.

^b May not sum due to rounding.

Table ES-5 provides 2020 projected and actual peak demand savings by program.

Table ES-5. 2020 Projected and Actual Peak Demand Savings (MCF/day) by Program

Program Category	2020 Projected MCF ^a	2020 Actual MCF	Percentage of Projected Achieved
Residential Programs			
Prescriptive Program	177	199	113%
Non-Residential Programs			
Prescriptive Program	26	14	54%
Custom Program	7	10	134%
New Construction Program	-	20	na
Low-Income Programs			
Weatherization Program	8	7	92%
Public Purpose Programs			
School Based Energy Education Program	12	14	116%
Total^b	230	264	115%

^a Includes 14 MCF projected from 2019 carry-over funding.

^b May not sum due to rounding.

Table ES-6 provides the overall 2020 portfolio cost-effectiveness results.

Table ES-6. 2020 Portfolio Cost-Effectiveness^a

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$2,211,277	\$2,491,713	\$280,436	1.13
Utility Cost (UCT)	\$1,748,062	\$1,063,149	(\$684,913)	0.61
Ratepayer Impact (RIM)	\$4,159,433	\$1,063,149	(\$3,096,284)	0.26
Participant Cost (PCT)	\$1,539,001	\$3,857,557	\$2,318,556	2.51

^a Excludes Low-Income Weatherization and Tree Planting

Report Contents

Following this Executive Summary, this document presents the following chapters and appendices:

- Chapters 1 through 4 describe each program and present the program budget and expenditures, 2020 cost-effectiveness results, program participation and savings, and a summary of highlights and challenges in 2020.
- Appendix A includes confidential cost-effectiveness assumptions.
- Appendix B includes confidential detailed cost-effectiveness workbooks (in Microsoft Excel format).
- Appendix C includes a reconciliation of 2020 program year expenses with the energy cost recovery filing.

1. Residential Prescriptive Program

Program Description

The Residential Prescriptive program provided incentives to customers who improved their homes' efficiency by installing measures such as high-efficiency furnaces, water heaters, and advanced thermostats. The program is limited to a small range of measures to stay within the budget restrictions established by SF 2311.

Table 1 lists the full range of eligible measures, incentive levels, and associated dealer spiffs.

Table 1. Residential Prescriptive Program Measure Summary

Measure Name	Measure Description	Incentive Level
Advanced Thermostats	Advanced Thermostat – Single-Zone or Multi-Zone	\$70
Duct Insulation	Duct Insulation - R8	\$50
Floor Insulation above Crawlspace	R-38	\$350
Furnace	94% AFUE	\$150
Furnace	96% AFUE	\$200
Furnace with Quality Install	94% AFUE with Quality Install	\$175
Furnace with Quality Install	96% AFUE with Quality Install	\$225
Furnace with Quality Install and ECM	94% AFUE with Quality Install and ECM	\$175
Furnace with Quality Install and ECM	96% AFUE with Quality Install and ECM	\$225
Furnace Tune-Up	Furnace Tune-Up - HVAC Save Tune-up	\$50
Gas Water Heater	Efficient Storage Gas Water Heater EF = 0.67	\$125
Gas Water Heater	Efficient Tankless Gas Water Heater EF = 0.90	\$300

Program Summary

As shown in Table 2, projected participation for the 2020 program was 5,180 participants and reached 5,869 participants.

Table 2. 2020 Residential Prescriptive Program Summary

	Projected	Actual	Percentage of Projected Achieved
Participation (measures) ¹	5,180	5,869	113%
Expenditures	\$1,050,362	\$1,264,926	120%
Energy Target (MCF)	11,046	12,621	114%
Demand Impacts (MCF/day)	177	199	113%

Table 3 summarizes the total number of installations per measure. The following five measures achieved over 100% of projected installations during the 2020 program.

- Advanced Thermostat
- Furnace (≥96.0 AFUE)
- Furnace Tune-Up
- Gas Water Heater (EF=0.90)
- Online Evaluation

¹ Includes all individual measures. Excludes furnace/boiler quality install and rebate bundles to avoid double counting.

Table 3. 2020 Residential Prescriptive Program Installations by Measure

Measure Name	Measure Description	Projected Installations	Actual Installations	Percentage of Projected	New Home Installations
Advanced Thermostats	Advanced Thermostat – Single-Zone or Multi-Zone	250	439	176%	14
Duct Insulation	Duct Insulation - R8	2	-	0%	-
Floor Insulation above Crawlspace	R-38	25	-	0%	-
Furnace	94.0–95.9% AFUE	555	174	31%	15
Furnace	≥96.0% AFUE	1,448	2,479	171%	488
Furnace with Quality Install	94.0-95.9% AFUE with Quality Install	139	-	0%	-
Furnace with Quality Install	≥96.0% AFUE with Quality Install	333	-	0%	-
Furnace with Quality Install and ECM	94.0-95.9% AFUE with Quality Install and ECM	139	-	-	-
Furnace with Quality Install and ECM	≥96.0% AFUE with Quality Install and ECM	333	-	0%	-
Furnace Tune-Up	Furnace Tune-Up	1,274	2,716	213%	4
Gas Water Heater	Efficient Storage Gas Water Heater - EF = 0.67	291	266	91%	16
Gas Water Heater	Efficient Tankless Gas Water Heater - EF = 0.90	98	149	152%	37
Online Evaluation	Online Evaluation	256	294	115%	-
LIHEAP Additional Incentives ^a	Double Incentive for LIHEAP Customers	37	-	0%	-
Total Measures Installed		5,180	6,517	126%	574

^a Black Hills Energy did not receive any qualifying LIHEAP additional incentive applications in 2020.

Table 4 summarizes the total savings (MCF) per measure. In 2020, Black Hills Energy’s highest total energy-savings measure in the Residential Prescriptive program was the furnace install (≥96.0 AFUE).

Table 4. 2020 Residential Prescriptive Program Savings by Measure

Measure Name	Measure Description	Projected Savings (MCF)	Savings (MCF)	Percentage of Projected
Advanced Thermostats	Advanced Thermostat – Single-Zone or Multi-Zone	561	1,088	194%
Duct Insulation	Duct Insulation - R8	9	-	0%
Floor Insulation above Crawlspace	R-38	145	-	0%
Furnace	94.0–95.9 AFUE	1,180	378	32%
Furnace	≥96.0 AFUE	3,761	6,442	171%
Furnace with Quality Install	94% AFUE with Quality Install	474	-	0%
Furnace with Quality Install	96% AFUE with Quality Install	1,293	-	0%
Furnace with Quality Install and ECM	94% AFUE with Quality Install and ECM	407	-	0%
Furnace with Quality Install and ECM	96% AFUE with Quality Install and ECM	1,132	-	0%
Furnace Tune-Up	Furnace Tune-Up	1,637	4,025	246%
Gas Water Heater	Efficient Storage Gas Water Heater - EF = 0.67	216	202	94%
Gas Water Heater	Efficient Tankless Gas Water Heater - EF = 0.90	232	353	152%
Online Evaluation	Online Evaluation	145	132	91%
LIHEAP Additional Incentives	Double Incentive for LIHEAP Customers	-	-	
Total		11,191	12,621	113%

Cost-Effectiveness Results

Table 5 presents the cost-effectiveness analysis results for the 2020 program.

Table 5. 2020 Residential Prescriptive Program Cost-Effectiveness Results

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$1,379,697	\$954,789	(\$424,908)	0.69
Utility Cost (UCT)	\$1,264,926	\$560,973	(\$703,953)	0.44
Ratepayer Impact (RIM)	\$2,036,101	\$560,973	(\$1,475,128)	0.28
Participant Cost (PCT)	\$889,803	\$1,534,643	\$644,840	1.72

Highlights and Challenges

The Company focused on re-establishing strong ties with trade allies by keeping them informed throughout the year of the available budget dollars and program opportunities with personal communications and quarterly emails, accepting all eligible applications in 2020. Due to the COVID-19 pandemic, travel and in-person meeting restrictions did create challenges when working with trade allies and customers. The Company worked with trade allies and customers through alternative correspondence, primarily online meetings, phone calls, emails, etc. through 2020. In 2021, the Company representative intends to spend time with trade allies once travel is allowed to continue building out the trade ally network in Iowa.

2. Non-Residential Programs

Introduction

This chapter describes Black Hills Energy’s non-residential energy efficiency programs (shown in Table 6), beginning with sector-level cost-effectiveness, followed by a detailed description of each program.

Table 6. Non-Residential Programs

Program
Prescriptive Program
Custom Program

Non-Residential Sector Portfolio Cost-Effectiveness

Table 7 shows the three non-residential programs’ combined cost-effectiveness for the 2020 program.

Table 7. 2020 Non-Residential Programs Cost-Effectiveness Results

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$646,453	\$574,217	(\$72,236)	0.89
Utility Cost (UCT)	\$284,981	\$355,903	\$70,922	1.25
Ratepayer Impact (RIM)	\$820,677	\$355,903	(\$464,774)	0.43
Participant Cost (PCT)	\$494,443	\$645,906	\$151,463	1.31

Non-Residential Prescriptive Program

Program Description

The Non-Residential Prescriptive program, which primarily focused on the small business sector, provided a range of energy efficiency options for space and water heating and commercial cooking equipment, and infiltration measures, as shown in Table 8. The program offered cash incentives to non-residential customers for purchases of high-efficiency natural gas equipment.

Table 8. Non-Residential Prescriptive Program Measure Summary

Measure Name	Measure Description	Base Equipment	Incentive Level
Commercial Steam Cooker	ENERGY STAR® Commercial Gas Steam Cooker	Standard Commercial Gas Steam Cooker	\$100
Controls for Central Domestic Hot Water (DHW)	Temperature and DHW Demand Controlled Recirculation Pump	Uncontrolled Recirculation Pump	\$475
Convection Oven	ENERGY STAR Gas Convection Oven	Non-ENERGY STAR Full Size Convection Oven	\$150
Conveyor Oven	Above Standard Efficiency Conveyor Oven	Standard Efficiency Conveyor Oven	\$725
Dishwasher	ENERGY STAR Commercial Dishwasher	Standard Commercial Dishwasher	\$275
Drainwater Heat Recovery	Install Drainwater Heat Recovery System	No Drainwater Heat Recovery System	\$275
Duct Insulation	Duct Insulation - R8	Uninsulated Duct	\$50

Measure Name	Measure Description	Base Equipment	Incentive Level
Duct Insulation	Duct Insulation - R8	Duct Insulation - R3	\$10
Fryer	ENERGY STAR Commercial Gas Fryer - Large Vat	Standard Commercial Gas Fryer - Large Vat	\$450
Furnace	94% AFUE	85% AFUE	\$150
Furnace	96% AFUE	85% AFUE	\$200
Gas Water Heater	Efficient Tankless or Condensing Storage Gas Water Heater - EF = 0.90	Storage Gas Water Heater - EF = 0.60	\$175
Griddle	ENERGY STAR Commercial Gas Griddle	Standard Commercial Gas Griddle	\$150
Hydronic Heating Pipe Insulation	Hydronic Heating Pipe Insulation - Outdoor	Bare Pipe	\$75
Steam Trap Repair or Replacement	Replacement of Faulty Steam Trap	Existing Conditions	\$75
High-Efficiency Combination Oven	ENERGY STAR (56% convection mode; 41% steam mode)	Standard (52% convection mode; 39% steam mode)	\$325
Rotating Rack Oven	50% efficient or greater	Standard (35% efficient)	\$1,200
Gas Infrared Heating System	Above 92% TE	80% TE	\$300

Program Summary

As shown in Table 9, projected participation for the 2020 program was 401 participants and reached 174 participants.

Table 9. 2020 Non-Residential Prescriptive Program Summary

	Projected	Actual	Percentage of Projected Achieved
Participation (measures)	401	174	43%
Expenditures	\$105,825	\$157,843	149%
Energy Savings (MCF)	2,383	1,188	50%
Demand Impacts (MCF/day)	26	14	54%

Table 10 summarizes the total number of installations per measure, with furnaces achieving the highest number of installations in 2020.

Table 10. 2020 Non-Residential Prescriptive Program Installations by Measure

Measure Name	Measure Description	Projected Installations	Actual Installations	Percentage of Projected
Commercial Steam Cooker	ENERGY STAR Commercial Gas Steam Cooker	1	0	0%
Controls for Central Domestic Hot Water	Temperature and DHW Demand Controlled Recirculation Pump	1	0	0%
Convection Oven	ENERGY STAR Gas Convection Oven	1	0	0%
Conveyor Oven	Above Standard Efficiency Conveyor Oven	1	0	0%
Dishwasher	ENERGY STAR Commercial Dishwasher	1	0	0%
Drainwater Heat Recovery	Install Drainwater Heat Recovery System	1	0	0%
Duct Insulation	Duct Insulation - R8	2	0	0%
Fryer	ENERGY STAR Commercial Gas Fryer - Large Vat	1	2	200%
Furnace	94% AFUE	128	20	16%
Furnace	96% AFUE	245	145	59%
Gas Water Heater	Efficient Tankless Gas Water Heater - EF = 0.90	13	7	54%
Griddle	ENERGY STAR Commercial Gas Griddle	1	0	0%
Hydronic Heating Pipe Insulation	Hydronic Heating Pipe Insulation - Outdoor	1	0	0%
Steam Trap Repair or Replacement	Replacement of Faulty Steam Trap	1	0	0%
High-Efficiency Combination Oven	ENERGY STAR (56% convection mode; 41% steam mode)	1	0	0%
Rotating Rack Oven	50% efficient or greater	1	0	0%
Gas Infrared Heating System	Above 92% TE	1	0	0%
Total Installations		401	174	43%

Table 11 summarizes the total number of savings (MCF) per measure. In 2020, furnaces (96.0 AFUE or greater) achieved the highest total energy savings.

Table 11. 2020 Non-Residential Prescriptive Program Savings by Measure

Measure Name	Measure Description	Projected Savings (MCF)	Actual Savings (MCF)	Percentage of Projected
Commercial Steam Cooker	ENERGY STAR Commercial Gas Steam Cooker	47	0	0%
Controls for Central DHW	Temperature and DHW Demand Controlled Recirculation Pump	20	0	0%
Convection Oven	ENERGY STAR Gas Convection Oven	6	0	0%
Conveyor Oven	Above Standard Efficiency Conveyor Oven	27	0	0%
Dishwasher	ENERGY STAR Commercial Dishwasher	26	0	0%
Drainwater Heat Recovery	Install Drainwater Heat Recovery System	7	0	0%
Duct Insulation	Duct Insulation - R8	12	0	0%
Fryer	ENERGY STAR Commercial Gas Fryer - Large Vat	19	37	200%
Furnace	94% AFUE	612	108	18%
Furnace	96% AFUE	1,431	1,021	71%
Gas Water Heater	Efficient Tankless Gas Water Heater - EF = 0.90	39	21	54%
Griddle	ENERGY STAR Commercial Gas Griddle	6	0	0%
Hydronic Heating Pipe Insulation	Hydronic Heating Pipe Insulation - Outdoor	5	0	0%
Steam Trap Repair or Replacement	Replacement of Faulty Steam Trap	13	0	0%
High-Efficiency Combination Oven	ENERGY STAR (56% convection mode; 41% steam mode)	13	0	0%
Rotating Rack Oven	50% efficient or greater	62	0	0%
Gas Infrared Heating System	Above 92% TE	41	0	0%
Total Savings		2,383	1,188	50%

Cost-Effectiveness Results

Table 12 presents the cost-effectiveness analysis results for the 2020 program.

Table 12. 2020 Non-Residential Prescriptive Program Cost-Effectiveness Results

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$161,662	\$79,855	(\$81,807)	0.49
Utility Cost (UCT)	\$157,843	\$50,192	(\$107,651)	0.32
Ratepayer Impact (RIM)	\$225,515	\$50,192	(\$175,323)	0.22
Participant Cost (PCT)	\$37,944	\$98,992	\$61,048	2.61

Highlights and Challenges

Very similar to the residential programs, the Company focused on re-establishing strong ties with non-residential trade allies by keeping them informed throughout the year of the available budget dollars and program opportunities with personal communications and quarterly emails. In addition, the Company also sent out an additional bill insert during Q4 to promote the program as the year ended. Ultimately, the Company was able to accept all eligible applications in 2020. In 2021, the Company

representative intends to spend time with trade allies once travel is allowed to continue building out the trade ally network in Iowa.

Non-Residential Custom Program

Program Description

Through the Non-Residential Custom program, Black Hills Energy provided customer incentives for installations of energy-efficient natural gas equipment, not specified in the Non-Residential Prescriptive program (such as custom envelope, heating and cooling, and hot water projects).

The Non-Residential Custom program bought down energy-efficient upgrades to a two-year payback or up to one-half of the equipment’s incremental cost (whichever was less). In most cases, the program required expert analyses to determine potential energy savings, base case, incremental costs, and other project parameters. Black Hills Energy provided funding to support such analysis.

Black Hills Energy delivered this program through a third-party implementation contractor.

Program Summary

As shown in Table 13, projected participation for the 2020 program was 16 participants and it reached five participant.

Table 13. 2020 Non-Residential Custom Program Summary

	Projected	Actual	Percentage of Projected Achieved
Participation (projects)	16	5	31%
Expenditures	\$141,751	\$59,533	42%
Energy Savings (MCF)	2,650	810	31%
Demand Impacts (MCF/day)	7	10	134%

Table 14 describes the project type and its associated savings for the Non-Residential Custom program.

Table 14. 2020 Non-Residential Custom Project Savings

Non-Residential Custom Project Type	Measures Installed	Savings (MCF)
Custom Heating and Cooling	3	753
Custom DHW	1	53
Custom Building Envelope	1	4
Total	5	810

Cost-Effectiveness Results

Table 15 lists cost-effectiveness analysis results for the 2020 program.

Table 15. 2020 Non-Residential Custom Program Cost-Effectiveness Results

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$51,559	\$71,994	\$20,435	1.40
Utility Cost (UCT)	\$59,533	\$40,079	(\$19,455)	0.67
Ratepayer Impact (RIM)	\$113,122	\$40,079	(\$73,043)	0.35
Participant Cost (PCT)	\$26,501	\$85,276	\$58,775	3.22

Highlights and Challenges

The Company fell short of reaching projected participation and energy-savings targets, in part due to project and pipeline delays due to COVID-19. The Company focused on inter-vendor communication to ensure more Prescriptive and Custom program projects were aligned to provide appropriate rebates to customers.

Non-Residential New Construction Program

Program Description

The Company did not offer the Non-residential New Construction program in 2020 due to the budget restrictions required by SF 2311; however, the Company honored existing projects that commenced under the 2014-2018 energy efficiency plan and completed during 2020.

Table 16 summarizes the eight projects that completed in 2020.

Table 16. 2020 Non-Residential New Construction Program Summary

	Projected	Actual	Percentage of Projected Achieved
Participation (Buildings)	0	8	NA
Expenditures	\$0	\$67,604	NA
Energy Target (MCF)	0	7,266	NA
Demand Impacts (MCF/day)	0	20	NA

Cost-Effectiveness Results

Table 17 lists cost-effectiveness analysis results for the 2020 program.

Table 17. 2020 Non-Residential New Construction Program Cost-Effectiveness Results

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$433,231	\$422,368	(\$10,863)	0.97
Utility Cost (UCT)	\$67,604	\$265,632	\$198,028	3.93
Ratepayer Impact (RIM)	\$482,040	\$265,632	(\$216,408)	0.55
Participant Cost (PCT)	\$429,999	\$461,638	\$31,640	1.07

Highlights and Challenges

In 2020, the Commercial New Construction program continued to verify and pay incentives to projects that enrolled in the program prior to January 1, 2019. These projects previously went through the energy-design phase of the program and completed the verification process in 2020 after construction completion. The projects spanned the entire state, located in Baxter, Council Bluffs, Dubuque, Elkader, Monticello, and Newton. Project types spanned multiple building categories and included K-12 schools, community college facilities, public gathering and entertainment, retail, and private businesses.

There were five other projects listed as complete in 2020; however, three of these were on a transport gas rate that was ineligible for incentives, and two did not have gas savings but were in Black Hills Energy's gas service territory. These five projects received electric incentives from the partnering utilities.

3. Low-Income Weatherization Program

This chapter describes Black Hills Energy’s Low-Income Weatherization program.

The Low-Income Weatherization program provided energy efficiency savings opportunities to the most vulnerable energy customers in the Iowa service area. Black Hills Energy coordinated with MidAmerican Energy Company and Alliant Energy through the Iowa Utility Association in delivering the program.

Program Description

The Low-Income Weatherization program provides funding for weatherization efforts performed by local Community Action Agencies (CAAs). Black Hills Energy provided this funding to the Iowa Department of Human Rights, which, in turn, distributed the funding to CAAs.

The Low-Income Weatherization program offered services to a broad range of low-income customers throughout Black Hills Energy’s service territory. The CAAs delivered the weatherization improvements, including infiltration, insulation, energy-efficient equipment, and the following direct install measures:

- Building shell and heating system inspections and adjustments (e.g., cleaning furnace and caulking)
- Furnace replacements
- Wall, ceiling, band joint, and foundation/crawlspace insulation
- Infiltration reduction
- Hot water temperature turn-down
- Water heater wraps and pipe insulation
- Water heater replacements
- Low-flow showerheads
- Faucet aerators

Program Summary

As shown in Table 18, projected participation for the 2020 program was 54 participants and reached 31 participants.

Table 18. 2020 Low-Income Weatherization Program Summary

	Projected	Actual	Percentage of Projected Achieved
Participation (Homes)	54	31	57%
Expenditures	\$293,826	\$177,798	61%
Energy Target (MCF)	782	449	57%
Demand Impacts (MCF/day)	8	7	92%

Highlights and Challenges

The Iowa Department of Human Rights continues to successfully administer the Low-Income Weatherization program and continues as a strong performer for Black Hills Energy, despite the budget restrictions imposed in SF2311. In 2020, the Company viewed the program as a top priority,

bringing together staff from across departments such as Government Affairs and Community Outreach for biweekly meetings. Due to the COVID-19 pandemic, travel and in-person meeting restrictions did create communication challenges. This staff engaged communities to explain what the program offers to interested communities through alternative correspondence, primarily online meetings, phone calls, emails, etc. In addition, the Company continued to participate in various low-income collaborative meetings held with interested stakeholders, including other utility partners, to develop more efficient ways to reach additional customers. Overall, the Company reached 94% of its projected participants and achieved 94% of its energy-savings goal.

4. Public Purpose Programs

Introduction

This chapter describes Black Hills Energy’s Public Purpose (PP) programs (as shown in Table 19), beginning with the sector-level cost-effectiveness and followed by a detailed description of each program.

Table 19. Public Purpose Programs

Programs
PP.1 School-Based Energy Education Program
PP.2 Tree Planting Programs
PP.3 Iowa Energy Center and Center for Global and Regional Environmental Research

PP.1 – School-Based Energy Education Program

Program Description

The School-Based Energy Education program increased energy efficiency awareness among youth within Black Hills Energy’s service territory. A specific curriculum, designed to complement existing, science-based education, served as the primary means of engendering these subtle, yet significant behavioral changes.

Each student and teacher participating in the program received a kit that included the following measures:

- Efficient Faucet Aerators
- Efficient Showerheads
- Filtritone Alarms
- Digital Thermometer
- Flow Rate Test Bag

In addition, each student received a natural resources fact chart, a parent/guardian program evaluation sheet, a Quick Start Guide, and an illustrated instruction booklet with instructions on how to save energy.

Teachers also received a complete energy education curriculum, including recommended lesson plans, activities, and tests. The curriculum and kit provided educational and hands-on methods for teaching students to evaluate energy-efficient retrofit impacts and to change behaviors.

Program Summary

As shown in Table 20, projected participation for the 2020 program was 4,500 participants and reached 3,905 participants.

Table 20. 2020 School-Based Energy Education Program Summary

	Projected	Actual	Percentage of Projected Achieved
Participation (Kits)	4,500	3,905	87%
Expenditures	\$237,243	\$198,155	84%
Energy Savings (MCF)	4,564	5,235	115%
Demand Impacts (MCF/day)	12	14	116%

Cost-Effectiveness Results

Table 21 lists cost-effectiveness analysis results for the 2020 program.

Table 21. 2020 School-Based Energy Education Program Cost-Effectiveness Results

Cost-Effectiveness Test	Costs	Benefits	Net Benefits	Benefit/Cost Ratio
Societal Cost (SCT)	\$185,127	\$962,708	\$777,580	5.20
Utility Cost (UCT)	\$198,155	\$146,274	(\$51,881)	0.74
Ratepayer Impact (RIM)	\$1,302,655	\$146,274	(\$1,156,382)	0.11
Participant Cost (PCT)	\$154,755	\$1,677,008	\$1,522,253	10.84

Highlights and Challenges

The School-Based Energy Education program was slowed substantially in the spring of 2020 due to COVID-19; however, in the fall and early winter when schools reopened, the Company offered an additional \$50 incentive to participating teachers to accelerate kit promotion. In 2020, Black Hills Energy provided 3,905 energy-saving kits to students (2,835 High School / 1,143 Middle School) in its territory, which resulted in 115% of savings. The Company spent 84% of the budget.

PP.2 – Tree Planting Programs

Since 1992, Black Hills Energy has partnered with Trees Forever to encourage tree planting to save energy and to improve the environment. In 2020, the Company has again partnered with Trees Forever, a nonprofit organization, to provide annual funding for the “Power of Trees” program. The organization emphasizes energy efficiency and conservation as it encourages and provides support for community-based tree planting efforts. During 2020, the program planted 517 trees throughout its Iowa territory.

After the devastating derecho in August, the Company reached out to Trees Forever to find out how to best assist communities that had devastating tree loss. The Black Hills Energy Iowa operations team provided a \$20,000 donation and Black Hills Corporation Foundation matched that amount for a total contribution of \$40,000 to the Trees Forever “Planting Hope” project over the next two years.

Table 22. 2020 Tree Planting Program Summary

	Budget or Goal	Actual	Percentage of Budget or Goal Achieved
Expenditures	\$50,000	\$50,000	100%

Appendix A. Confidential Cost-Effectiveness Assumptions

Avoided Costs

Black Hills Energy generates avoided natural gas costs, pursuant to Iowa Utility Board rules for measure- and program-level cost-effectiveness tests, which contributed to development of this energy efficiency plan. Table A-1 shows avoided energy costs.

Table A-1. Natural Gas Avoided Energy Costs

Year	Avoided Energy Cost (\$/therm)
2019	\$0.368
2020	\$0.365
2021	\$0.366
2022	\$0.369
2023	\$0.378
2024	\$0.387
2025	\$0.397
2026	\$0.407
2027	\$0.416
2028	\$0.427
2029	\$0.439
2030	\$0.448
2031	\$0.457
2032	\$0.466
2033	\$0.476
2034	\$0.485
2035	\$0.495
2036	\$0.505
2037	\$0.515
2038	\$0.525
2039	\$0.536
2040	\$0.546
2041	\$0.557
2042	\$0.568
2043	\$0.580

Table A-2 shows avoided capacity costs.

Table A-2. Natural Gas Avoided Capacity Costs

Year	Avoided Capacity Cost (\$/peak therm)
2019	\$6.94
2020	\$7.08
2021	\$7.22
2022	\$7.37
2023	\$7.51
2024	\$7.66
2025	\$7.82
2026	\$7.97
2027	\$8.13
2028	\$8.30
2029	\$8.46
2030	\$8.63
2031	\$8.80
2032	\$8.98
2033	\$9.16
2034	\$9.34
2035	\$9.53
2036	\$9.72
2037	\$9.91
2038	\$10.11
2039	\$10.32
2040	\$10.52
2041	\$10.73
2042	\$10.95
2043	\$11.17

Discount Rates

The analysis used other key parameters, including discount rates, which varied depending on the cost-effectiveness test. Table A-3 summarizes these values and their associated data sources.

Table A-3. Discount Rates

	Rate	Data Source
Societal Cost Test Discount Rate	2.65%	12-month average of the 20-year treasury bond (data pulled February 14, 2018)
Utility Cost Test Ratepayer Impact Test	9.18%	Post-tax weighted average cost of capital
Participant Cost Test Discount Rate	10.0%	Assumption

Appendix B. Confidential Detailed Cost-Effectiveness Workbooks

This report provides the cost-effectiveness workbook separately. The Benefit-Cost Model_IA_2020.xls workbook contains program-specific inputs, assumptions and calculations for 2020.

Appendix C. Reconciliation of PY 2020 Expenses with ECR Filings

Work Order Description	Work Order	2020 Annual Report	ECR 2020 Expenses	4/1/2020-12/31/2020	1/1/2021 - 3/1/2021
Residential Evaluation Program		\$36,474	\$36,474		
Res Evaluation Admin	9514354120	\$3,135	\$3,135	\$2,838	\$297
Res Evaluation Program Delivery	9514356120	\$31,486	\$31,486	\$31,302	\$184
Res Evaluation Evaluation Delivery	9514355120	\$1,853	\$1,853	\$1,853	
Residential Prescriptive Program		\$1,047,548	\$1,047,548		
Res Prescriptive Admin	9514359120	\$272,516	\$272,516	\$241,385	\$31,131
Res Prescriptive Customer Incentive	9514361120	\$767,091	\$767,091	\$582,205	\$184,886
Res Prescriptive - DI	9514362120	\$7,941	\$7,941	\$7,941	
TOTAL RESIDENTIAL SECTOR		\$1,084,022	\$1,084,022		
New Construction Program Total		\$67,604	\$67,604		
New Construction Admin	9514382120	\$3,233	\$3,233	\$3,160	\$73
New Construction Program Delivery	9514384120	\$22,131	\$22,131	\$20,035	\$2,096
Res New Construction Customer Incentive	9514385120	\$42,241	\$42,241	\$12,954	\$29,287
Nonresidential Prescriptive Rebate Total		\$138,691	\$138,691		
Nonres Prescriptive Admin	9514372120	\$104,566	\$104,566	\$94,188	\$10,377
Nonres Prescriptive Customer Incentive	9514374120	\$34,125	\$34,125	\$30,175	\$3,950
Nonresidential Custom Rebate Total		\$34,474	\$34,474		
Nonres Custom Customer Incentive	9514380120	\$29,217	\$29,217	\$7,846	\$21,371
Nonres Custom Program Delivery	9514379120	\$5,257	\$5,257	\$4,410	848
TOTAL NONRESIDENTIAL SECTOR		\$240,768	\$240,768		
Low Income Weatherization		\$177,798	\$177,798		
LI Weatherization Admin	9514387120	\$67,423	\$67,423	\$51,523	\$15,900
LI Weatherization Evaluation Delivery	9514388120	\$110,375	\$110,375	\$110,225	\$150
TOTAL LI SECTOR		\$177,798	\$177,798		
School Based EE		\$198,156	\$198,156		
School Based EE Admin	9514405120	\$30,372	\$30,372		\$30,372
School Based EE Evaluation Delivery	9514406120	\$167,784	\$167,784	\$135,987	\$31,796
Tree Planting		\$50,000	\$50,000		
Tree Program Program Delivery	9514330920	\$50,000	\$50,000	\$50,000	
TOTAL PUBLIC PURPOSE SECTOR		\$248,156	\$248,156		
TOTAL PROGRAMS					
EEIS Software	9514343920	\$37,530	\$37,530	\$35,275	\$2,255
Labor Cost	9514344920	\$84,391	\$84,391	\$76,164	\$8,227
Total Admin/Marketing		\$121,921	\$121,921		
Regulatory Support	9514345920	\$80,679	\$80,679	\$74,313	\$6,366
Expenses	9514346920	\$795	\$795	\$721	\$75
Total Other Cross Program		\$81,474	\$81,474		
Cross Program Admin	9514353120	\$287	\$287	\$287	
Cross Program Marketing	9514353220	\$21,433	\$21,433	\$17,180	\$4,253
		\$21,720	\$21,720		
TOTAL Admin/Marketing and Cross Programs		\$225,115	\$225,115		
TOTAL ALL *		\$1,975,860	\$1,975,860	\$1,591,966	\$383,893
*May not sum due to rounding					