

**Montana-Dakota Utilities Co.
Gas Utility - South Dakota
Conservation Portfolio Summary
2024 - 2026 Program Years**

<u>Programs</u>	<u>Total Participants</u>	<u>Total Energy Reduction</u>	<u>Total Cost</u>	<u>Lifetime Cost/Dk</u>
Conservation Programs				
Residential Program				
Furnaces - 95+% AFUE - New	390	44,460	\$68,208	\$1.53
Furnaces - 95+% AFUE - Replacement	750	294,000	262,321	0.89
Programmable Thermostats - Tier 1	215	4,950	3,760	0.76
Programmable Thermostats - Tier 2	585	33,930	40,923	1.21
	<u>1,940</u>	<u>377,340</u>	<u>\$375,212</u>	<u>\$0.99</u>
Commercial Program				
Furnaces - 95+% AFUE - New	26	2,341	\$4,548	\$1.94
Furnaces - 95+% AFUE - Replacement	60	22,080	20,986	0.95
Custom Efficiency	9	67,500	31,479	0.47
	<u>95</u>	<u>91,921</u>	<u>\$57,013</u>	<u>\$0.62</u>
Total Programs	<u><u>2,035</u></u>	<u><u>469,261</u></u>	<u><u>\$432,225</u></u>	<u>\$0.92</u>

**Montana-Dakota Utilities Co.
Gas Utility - South Dakota
Conservation Portfolio Summary
2024 - 2026 Program Years**

Programs	2024			2025			2026			Lifetime
	Participants	Cost	Dk Savings	Participants	Cost	Dk Savings	Participants	Cost	Dk Savings	Dk Savings
Residential Program										
Furnaces - 95+% AFUE - New	120	20,961	684	130	22,734	741	140	24,513	798	44,460
Furnaces - 95+% AFUE - Repl.	250	87,338	4,900	250	87,439	4,900	250	87,544	4,900	294,000
Programmable Thermostats - Tier 1	75	1,310	173	70	1,224	161	70	1,226	161	4,950
Programmable Thermostats - Tier 2	190	13,275	1,102	195	13,641	1,131	200	14,007	1,160	33,930
Total Residential	635	122,884	6,859	645	125,038	6,933	660	127,290	7,019	377,340
Commercial Program										
Furnaces - 95+% AFUE - New	7	1,223	32	9	1,574	41	10	1,751	45	2,341
Furnaces - 95+% AFUE - Repl.	20	6,987	368	20	6,995	368	20	7,004	368	22,080
Custom Efficiency	3	10,481	1,500	3	10,493	1,500	3	10,505	1,500	67,500
Total Commercial	30	\$18,691	1,900	32	\$19,062	1,909	33	\$19,260	1,913	91,921
Total Programs	665	\$141,575	8,759	677	\$144,100	8,842	693	\$146,550	8,932	469,261

Montana-Dakota Utilities Co.
South Dakota Gas DSM Program Summary
2024 - 2026 Program Years
Benefit/Cost Ratios

Program	Customer Class	RIM	Utility	Societal	Participant	Total Resource Cost
Total Portfolio		1.71	3.57	3.78	3.37	1.88
Furnace (95+%) - New	Residential	1.22	2.07	4.12	3.75	1.91
Furnace (95+%) - Replacement	Residential	1.61	3.56	4.08	3.81	2.02
Programmable Thermostats - Tier 1	Residential	1.90	5.14	4.88	4.63	2.77
Programmable Thermostats - Tier 2	Residential	1.56	3.23	2.51	2.62	1.44
Furnace (95+%) - New	Commercial	1.29	1.65	3.28	2.85	1.52
Furnace (95+%) - Replacement	Commercial	2.12	3.34	3.21	2.18	1.49
Custom Efficiency	Commercial	3.30	7.53	3.32	2.22	1.70

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **Total South Dakota Program**

t	Year	Benefits								Costs					Annual Benefits Less Costs (P)		
		Total Energy Reduction (A)	Gas Commodity Cost/Dk (B)	Gas Commodity Savings (C)	Variable O & M Cost/Dk (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Dmd Savings '/ Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)		Incentive Costs (N)	Total Program Costs (O)
		1	2024	8,759		\$26,329		\$0	\$26,329	88.0	\$14,525	\$40,854		\$11,684		\$20,000	\$121,575
2	2025	17,600		54,490		0	54,490	176.0	29,567	84,057		24,193	20,500	123,600	168,293	(84,236)	
3	2026	26,532		84,611		0	84,611	265.0	44,836	129,447		37,572	21,000	125,550	184,122	(54,675)	
4	2027	26,532		87,132		0	87,132	265.0	45,366	132,498		38,698	0	0	38,698	93,800	
5	2028	26,532		89,759		0	89,759	265.0	45,898	135,657		39,857	0	0	39,857	95,800	
6	2029	26,532		92,438		0	92,438	265.0	46,163	138,601		41,056	0	0	41,056	97,545	
7	2030	26,532		95,223		0	95,223	265.0	46,692	141,915		42,294	0	0	42,294	99,621	
8	2031	26,532		98,062		0	98,062	265.0	47,224	145,286		43,566	0	0	43,566	101,720	
9	2032	26,532		101,007		0	101,007	265.0	47,754	148,761		44,874	0	0	44,874	103,887	
10	2033	26,532		104,058		0	104,058	265.0	48,284	152,342		46,209	0	0	46,209	106,133	
11	2034	25,257		102,014		0	102,014	253.0	46,209	148,223		45,032	0	0	45,032	103,191	
12	2035	23,965		99,696		0	99,696	240.0	44,326	144,022		43,726	0	0	43,726	100,296	
13	2036	22,644		97,031		0	97,031	226.0	42,336	139,367		42,217	0	0	42,217	97,150	
14	2037	22,644		99,950		0	99,950	226.0	42,790	142,740		43,485	0	0	43,485	99,255	
15	2038	22,644		102,940		0	102,940	226.0	43,242	146,182		44,785	0	0	44,785	101,397	
16	2039	21,144		99,017		0	99,017	211.0	40,801	139,818		44,361	0	0	44,361	95,457	
17	2040	19,644		94,744		0	94,744	196.0	38,298	133,042		43,879	0	0	43,879	89,163	
18	2041	18,144		90,140		0	90,140	181.0	35,735	125,875		43,319	0	0	43,319	82,556	
19	2042	18,144		92,843		0	92,843	181.0	36,099	128,942		44,608	0	0	44,608	84,334	
20	2043	18,144		95,619		0	95,619	181.0	36,461	132,080		45,952	0	0	45,952	86,128	
21	2044	12,161		66,010		0	66,010	122.0	24,705	90,715		31,724	0	0	31,724	58,991	
22	2045	6,111		34,167		0	34,167	61.0	12,547	46,714		16,417	0	0	16,417	30,297	
23	2046	0		0		0	0	0.0	0	0		0	0	0	0	0	
Total =		469,261								\$2,767,138					\$1,291,733	\$1,475,405	
NPV =										\$1,439,618					\$841,297	\$598,320	
Total NPV =		\$598,320															
Benefit/Cost Ratio =		1.71															

Worksheet Calculations

(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)

**Table 2
Utility Cost Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Total South Dakota Program**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$26,329	\$14,525	\$40,854	\$20,000	\$121,575	\$141,575	(\$100,721)
2025	54,490	29,567	84,057	20,500	123,600	144,100	(60,043)
2026	84,611	44,836	129,447	21,000	125,550	146,550	(17,103)
2027	87,132	45,366	132,498	0	0	0	132,498
2028	89,759	45,898	135,657	0	0	0	135,657
2029	92,438	46,163	138,601	0	0	0	138,601
2030	95,223	46,692	141,915	0	0	0	141,915
2031	98,062	47,224	145,286	0	0	0	145,286
2032	101,007	47,754	148,761	0	0	0	148,761
2033	104,058	48,284	152,342	0	0	0	152,342
2034	102,014	46,209	148,223	0	0	0	148,223
2035	99,696	44,326	144,022	0	0	0	144,022
2036	97,031	42,336	139,367	0	0	0	139,367
2037	99,950	42,790	142,740	0	0	0	142,740
2038	102,940	43,242	146,182	0	0	0	146,182
2039	99,017	40,801	139,818	0	0	0	139,818
2040	94,744	38,298	133,042	0	0	0	133,042
2041	90,140	35,735	125,875	0	0	0	125,875
2042	92,843	36,099	128,942	0	0	0	128,942
2043	95,619	36,461	132,080	0	0	0	132,080
2044	66,010	24,705	90,715	0	0	0	90,715
2045	34,167	12,547	46,714	0	0	0	46,714
2046	0	0	0	0	0	0	0
Total =			\$2,767,138			\$432,225	\$2,334,913
NPV =			\$1,439,618			\$403,464	\$1,036,154
Total NPV =			\$1,036,154				
Benefit/Cost Ratio =			<u>3.57</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Total South Dakota Program**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$26,329	\$14,525		\$6,197		\$18,439	\$65,490	\$141,575	\$174,800	\$316,375	(\$250,885)
2025	54,490	29,567		12,777		37,682	134,516	144,100	175,380	319,480	(184,964)
2026	84,611	44,836		19,739		57,761	206,947	146,550	176,020	322,570	(115,623)
2027	87,132	45,366		20,303		58,742	211,543	0	0	0	211,543
2028	89,759	45,898		20,867		59,724	216,248	0	0	0	216,248
2029	92,438	46,163		21,431		60,732	220,764	0	0	0	220,764
2030	95,223	46,692		21,995		61,766	225,676	0	0	0	225,676
2031	98,062	47,224		22,559		62,802	230,647	0	0	0	230,647
2032	101,007	47,754		23,123		63,863	235,747	0	0	0	235,747
2033	104,058	48,284		24,251		64,951	241,544	0	0	0	241,544
2034	102,014	46,209		24,473		62,864	235,560	0	0	0	235,560
2035	99,696	44,326		24,669		60,655	229,346	0	0	0	229,346
2036	97,031	42,336		25,380		58,286	223,033	0	0	0	223,033
2037	99,950	42,790		25,920		59,260	227,920	0	0	0	227,920
2038	102,940	43,242		26,460		60,278	232,920	0	0	0	232,920
2039	99,017	40,801		27,540		57,238	224,596	0	0	0	224,596
2040	94,744	38,298		28,080		54,060	215,182	0	0	0	215,182
2041	90,140	35,735		29,160		50,784	205,819	0	0	0	205,819
2042	92,843	36,099		30,240		51,638	210,820	0	0	0	210,820
2043	95,619	36,461		30,780		52,509	215,369	0	0	0	215,369
2044	66,010	24,705		21,240		35,789	147,744	0	0	0	147,744
2045	34,167	12,547		10,980		18,290	75,984	0	0	0	75,984
2046	0	0		0		0	0	0	0	0	0
Total =							\$4,433,415			\$958,425	\$3,474,990
NPV =							\$3,538,867			\$937,446	\$2,601,421
Total NPV =		\$2,601,421									
Benefit/Cost Ratio =		<u>3.78</u>									

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated..	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Total South Dakota Program**

Year	Benefits						Costs	Annual Benefits Less Costs (I)	
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)		Direct Participant Costs (H)
2024	\$121,575	8,759		\$58,516		\$19,530	\$199,621	\$296,375	(\$96,754)
2025	123,600	17,600		121,124		40,585	285,309	298,980	(13,671)
2026	125,550	26,532		188,101		62,602	376,253	301,570	74,683
2027	0	26,532		193,737		64,294	258,031	0	258,031
2028	0	26,532		199,538		66,550	266,088	0	266,088
2029	0	26,532		205,535		68,242	273,777	0	273,777
2030	0	26,532		211,693		70,498	282,191	0	282,191
2031	0	26,532		218,052		72,190	290,242	0	290,242
2032	0	26,532		224,597		74,446	299,043	0	299,043
2033	0	26,532		231,322		76,702	308,024	0	308,024
2034	0	25,257		226,480		77,867	304,347	0	304,347
2035	0	23,965		220,954		79,489	300,443	0	300,443
2036	0	22,644		214,620		80,460	295,080	0	295,080
2037	0	22,644		221,064		82,620	303,684	0	303,684
2038	0	22,644		227,691		85,320	313,011	0	313,011
2039	0	21,144		220,611		88,020	308,631	0	308,631
2040	0	19,644		212,914		90,720	303,634	0	303,634
2041	0	18,144		204,542		93,420	297,962	0	297,962
2042	0	18,144		210,689		96,120	306,809	0	306,809
2043	0	18,144		217,001		98,820	315,821	0	315,821
2044	0	12,161		149,801		68,040	217,841	0	217,841
2045	10	6,111		77,534		34,920	112,464	0	112,464
2046	0	0		0		0	0	0	0
Total =		469,261					\$6,218,306	\$896,925	\$5,321,381
NPV =							\$2,757,134	\$818,318	1,938,816
Total NPV =		\$1,938,816							
Benefit/Cost Ratio =		<u>3.37</u>							

Worksheet Calculations
(A) = Table 1 (N)
(B) = Table 1 (A)
(C) = Retail Rate (1) escalated.
(D) = (B) x (C)
(E) = Non-Gas Fuel Retail Rate (2), escalated.
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]
(G) = (A) + (D) + (F)
(H) = Direct Participant Costs (17) x Number of Participants (23)

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Total South Dakota Program**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$26,329	\$14,525	\$6,197	\$47,051	\$141,575	\$174,800	\$316,375	(\$269,324)
2025	54,490	29,567	12,777	96,834	144,100	175,380	319,480	(222,646)
2026	84,611	44,836	19,739	149,186	146,550	176,020	322,570	(173,384)
2027	87,132	45,366	20,303	152,801	0	0	0	152,801
2028	89,759	45,898	20,867	156,524	0	0	0	156,524
2029	92,438	46,163	21,431	160,032	0	0	0	160,032
2030	95,223	46,692	21,995	163,910	0	0	0	163,910
2031	98,062	47,224	22,559	167,845	0	0	0	167,845
2032	101,007	47,754	23,123	171,884	0	0	0	171,884
2033	104,058	48,284	24,251	176,593	0	0	0	176,593
2034	102,014	46,209	24,473	172,696	0	0	0	172,696
2035	99,696	44,326	24,669	168,691	0	0	0	168,691
2036	97,031	42,336	25,380	164,747	0	0	0	164,747
2037	99,950	42,790	25,920	168,660	0	0	0	168,660
2038	102,940	43,242	26,460	172,642	0	0	0	172,642
2039	99,017	40,801	27,540	167,358	0	0	0	167,358
2040	94,744	38,298	28,080	161,122	0	0	0	161,122
2041	90,140	35,735	29,160	155,035	0	0	0	155,035
2042	92,843	36,099	30,240	159,182	0	0	0	159,182
2043	95,619	36,461	30,780	162,860	0	0	0	162,860
2044	66,010	24,705	21,240	111,955	0	0	0	111,955
2045	34,167	12,547	10,980	57,694	0	0	0	57,694
2046	0	0	0	0	0	0	0	0
Total =				\$3,265,302			\$958,425	\$2,306,877
NPV =				\$1,684,378			\$894,964	789,414

Total NPV = \$789,414
Benefit/Cost Ratio = 1.88

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (T)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - New**
Program Years: **2024 - 2026**

Input Data		First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$6.683			
Escalation Rate =	3.00%			
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.10137			
Escalation Rate =	3.00%			
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh			
3) Commodity Cost (\$/Dk) =	\$2.918			
Escalation Rate =	3.00%			
4) Demand Cost (\$/Unit/Yr) =	\$164.36			
Escalation Rate =	1.00%			
5) Peak Reduction Factor =	1.000%			
6) Variable O&M (\$/Dk) =	\$0.000			
Escalation Rate =	0.00%			
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931			
Escalation Rate =	3.00%			
8) Non-Gas Fuel Loss Factor	7.72%			
9) Gas Environmental Damage Factor =	\$2.070			
Escalation Rate =	1.69%			
10) Non Gas Fuel Environmental Damage Factor =	\$0.000			
Escalation Rate =	0.00%			
11) Participant Discount Rate =	9.87%			
12) Utility Discount Rate =	7.22%			
13) Societal Discount Rate =	2.24%			
14) General Input Data Year =	2023			
15) Project Analysis Year 1 =	2024			
Project Analysis Year 2 =	2025			
Project Analysis Year 3 =	2026			
16) Utility Project Costs				
16a) Administrative & Operating Costs =		\$2,961	\$3,234	\$3,513
16b) Incentive Costs =		18,000	19,500	21,000
16c) Total Utility Project Costs =		\$20,961	\$22,734	\$24,513
17) Direct Participant Costs (\$/Part.) =		\$165	\$165	\$165
18) Participant Non-Energy Costs (Annual \$/Part.) =		\$0	\$0	\$0
Escalation Rate =		0.00%	0.00%	0.00%
19) Participant Non-Energy Savings (Annual \$/Part) =		\$0	\$0	\$0
Escalation Rate =		0.00%	0.00%	0.00%
20) Project Life (Years) =		20	20	20
21) Avg. Dk/Part. Saved =		5.700	5.700	5.700
22) Avg Non-Gas Fuel Units/Part. Saved =		0	0	0
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =		0	0	0
23) Number of Participants =		120	130	140
24) Total Annual Dk Saved =		684	741	798
25) Incentive/Participant =		\$150	\$150	\$150
26) Distribution Delivery Charge				\$1.836
27) Effective Income Tax Rate = (Federal & State Taxes)				21.000%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$23,422	1.22
Utility Cost Test	\$68,117	2.07
Societal Test	\$225,725	4.12
Participant Test	\$160,719	3.75
Total Resource Cost Test	\$62,671	1.91

**Table 1
Ratepayer Impact Measure Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - New**

t	Year	Benefits									Costs					Annual Benefits Less Costs (P)	
		Total Energy Reduction (A)	Gas Commodity Cost/DK (B)	Gas Commodity Savings (C)	Variable O & M Cost/DK (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Demand Savings Per Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)	Incentive Costs (N)		Total Program Costs (O)
		1	2024	684	\$3,006	\$2,056	\$0.000	\$0	\$2,056	6.8	\$166	\$1,129	\$3,185	\$1.891	\$1,022		\$2,961
2	2025	1,425	3,096	4,412	0.000	0	4,412	14.3	168	2,402	6,814	1.948	2,193	3,234	19,500	24,927	(18,113)
3	2026	2,223	3,189	7,089	0.000	0	7,089	22.2	169	3,752	10,841	2.006	3,523	3,513	21,000	28,036	(17,195)
4	2027	2,223	3,284	7,300	0.000	0	7,300	22.2	171	3,796	11,096	2.066	3,628	0	0	3,628	7,468
5	2028	2,223	3,383	7,520	0.000	0	7,520	22.2	173	3,841	11,361	2.128	3,737	0	0	3,737	7,624
6	2029	2,223	3,484	7,745	0.000	0	7,745	22.2	174	3,863	11,608	2.192	3,850	0	0	3,850	7,758
7	2030	2,223	3,589	7,978	0.000	0	7,978	22.2	176	3,907	11,885	2.258	3,965	0	0	3,965	7,920
8	2031	2,223	3,696	8,216	0.000	0	8,216	22.2	178	3,952	12,168	2.326	4,085	0	0	4,085	8,083
9	2032	2,223	3,807	8,463	0.000	0	8,463	22.2	180	3,996	12,459	2.396	4,208	0	0	4,208	8,251
10	2033	2,223	3,922	8,719	0.000	0	8,719	22.2	182	4,040	12,759	2.467	4,332	0	0	4,332	8,427
11	2034	2,223	4,039	8,979	0.000	0	8,979	22.2	183	4,063	13,042	2.541	4,462	0	0	4,462	8,580
12	2035	2,223	4,160	9,248	0.000	0	9,248	22.2	185	4,107	13,355	2.618	4,598	0	0	4,598	8,757
13	2036	2,223	4,285	9,526	0.000	0	9,526	22.2	187	4,151	13,677	2.696	4,735	0	0	4,735	8,942
14	2037	2,223	4,414	9,812	0.000	0	9,812	22.2	189	4,196	14,008	2.777	4,877	0	0	4,877	9,131
15	2038	2,223	4,546	10,106	0.000	0	10,106	22.2	191	4,240	14,346	2.860	5,023	0	0	5,023	9,323
16	2039	2,223	4,683	10,410	0.000	0	10,410	22.2	193	4,285	14,695	2.946	5,174	0	0	5,174	9,521
17	2040	2,223	4,823	10,722	0.000	0	10,722	22.2	195	4,329	15,051	3.035	5,330	0	0	5,330	9,721
18	2041	2,223	4,968	11,044	0.000	0	11,044	22.2	197	4,373	15,417	3.126	5,490	0	0	5,490	9,927
19	2042	2,223	5,117	11,375	0.000	0	11,375	22.2	199	4,418	15,793	3.219	5,653	0	0	5,653	10,140
20	2043	2,223	5,270	11,715	0.000	0	11,715	22.2	201	4,462	16,177	3.316	5,823	0	0	5,823	10,354
21	2044	1,539	5,428	8,354	0.000	0	8,354	15.4	203	3,126	11,480	3.416	4,153	0	0	4,153	7,327
22	2045	798	5,591	4,462	0.000	0	4,462	8.0	205	1,640	6,102	3.518	2,218	0	0	2,218	3,884
23	2046	0	5,759	0	0.000	0	0	0.0	207	0	0	3.624	0	0	0	0	0
Total =		44,460									\$267,319					\$160,287	\$107,032
																\$108,184	\$23,422
Total NPV =			\$23,422														
Benefit/Cost Ratio =			1.22														

Worksheet Calculations	
(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)
(H) = Demand Cost (4) escalated.	(P) = (J) - (O)

Table 2
Utility Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - New**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$2,056	\$1,129	\$3,185	\$2,961	\$18,000	\$20,961	(\$17,776)
2025	4,412	2,402	6,814	3,234	19,500	22,734	(15,920)
2026	7,089	3,752	10,841	3,513	21,000	24,513	(13,672)
2027	7,300	3,796	11,096	0	0	0	11,096
2028	7,520	3,841	11,361	0	0	0	11,361
2029	7,745	3,863	11,608	0	0	0	11,608
2030	7,978	3,907	11,885	0	0	0	11,885
2031	8,216	3,952	12,168	0	0	0	12,168
2032	8,463	3,996	12,459	0	0	0	12,459
2033	8,719	4,040	12,759	0	0	0	12,759
2034	8,979	4,063	13,042	0	0	0	13,042
2035	9,248	4,107	13,355	0	0	0	13,355
2036	9,526	4,151	13,677	0	0	0	13,677
2037	9,812	4,196	14,008	0	0	0	14,008
2038	10,106	4,240	14,346	0	0	0	14,346
2039	10,410	4,285	14,695	0	0	0	14,695
2040	10,722	4,329	15,051	0	0	0	15,051
2041	11,044	4,373	15,417	0	0	0	15,417
2042	11,375	4,418	15,793	0	0	0	15,793
2043	11,715	4,462	16,177	0	0	0	16,177
2044	8,354	3,126	11,480	0	0	0	11,480
2045	4,462	1,640	6,102	0	0	0	6,102
2046	0	0	0	0	0	0	0
Total =			\$267,319			\$68,208	\$199,111
NPV =			\$131,606			\$63,489	\$68,117
Total NPV =			\$68,117				
Benefit/Cost Ratio =			<u>2.07</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - New**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$2,056	\$1,129	\$0.033	\$0	\$2.105	\$1,440	\$4,625	\$20,961	\$1,800	\$22,761	(\$18,136)
2025	4,412	2,402	0.034	0	2.141	3,051	9,865	22,734	1,950	24,684	(14,819)
2026	7,089	3,752	0.035	0	2.177	4,839	15,680	24,513	2,100	26,613	(10,933)
2027	7,300	3,796	0.036	0	2.214	4,922	16,018	0	0	0	16,018
2028	7,520	3,841	0.037	0	2.251	5,004	16,365	0	0	0	16,365
2029	7,745	3,863	0.038	0	2.289	5,088	16,696	0	0	0	16,696
2030	7,978	3,907	0.039	0	2.328	5,175	17,060	0	0	0	17,060
2031	8,216	3,952	0.040	0	2.367	5,262	17,430	0	0	0	17,430
2032	8,463	3,996	0.041	0	2.407	5,351	17,810	0	0	0	17,810
2033	8,719	4,040	0.043	0	2.448	5,442	18,201	0	0	0	18,201
2034	8,979	4,063	0.044	0	2.489	5,533	18,575	0	0	0	18,575
2035	9,248	4,107	0.045	0	2.531	5,626	18,981	0	0	0	18,981
2036	9,526	4,151	0.047	0	2.574	5,722	19,399	0	0	0	19,399
2037	9,812	4,196	0.048	0	2.617	5,818	19,826	0	0	0	19,826
2038	10,106	4,240	0.049	0	2.662	5,918	20,264	0	0	0	20,264
2039	10,410	4,285	0.051	0	2.707	6,018	20,713	0	0	0	20,713
2040	10,722	4,329	0.052	0	2.752	6,118	21,169	0	0	0	21,169
2041	11,044	4,373	0.054	0	2.799	6,222	21,639	0	0	0	21,639
2042	11,375	4,418	0.056	0	2.846	6,327	22,120	0	0	0	22,120
2043	11,715	4,462	0.057	0	2.894	6,433	22,610	0	0	0	22,610
2044	8,354	3,126	0.059	0	2.943	4,529	16,009	0	0	0	16,009
2045	4,462	1,640	0.061	0	2.993	2,388	8,490	0	0	0	8,490
2046	0	0	0.063	0	3.043	0	0	0	0	0	0

Total = NPV = \$379,545 \$74,058 \$305,487
\$298,089 \$72,364 \$225,725

Total NPV = \$225,725
Benefit/Cost Ratio = 4.12

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated..	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - New**

Year	Benefits						Costs		Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$18,000	684	\$6.883	\$4,708	\$0.104	\$0	\$22,708	\$19,800	\$2,908
2025	19,500	1,425	7.090	10,103	0.108	0	29,603	21,450	8,153
2026	21,000	2,223	7.303	16,235	0.111	0	37,235	23,100	14,135
2027	0	2,223	7.522	16,721	0.114	0	16,721	0	16,721
2028	0	2,223	7.747	17,222	0.118	0	17,222	0	17,222
2029	0	2,223	7.980	17,740	0.121	0	17,740	0	17,740
2030	0	2,223	8.219	18,271	0.125	0	18,271	0	18,271
2031	0	2,223	8.466	18,820	0.128	0	18,820	0	18,820
2032	0	2,223	8.720	19,385	0.132	0	19,385	0	19,385
2033	0	2,223	8.981	19,965	0.136	0	19,965	0	19,965
2034	0	2,223	9.251	20,565	0.140	0	20,565	0	20,565
2035	0	2,223	9.528	21,181	0.145	0	21,181	0	21,181
2036	0	2,223	9.814	21,817	0.149	0	21,817	0	21,817
2037	0	2,223	10.109	22,472	0.153	0	22,472	0	22,472
2038	0	2,223	10.412	23,146	0.158	0	23,146	0	23,146
2039	0	2,223	10.724	23,839	0.163	0	23,839	0	23,839
2040	0	2,223	11.046	24,555	0.168	0	24,555	0	24,555
2041	0	2,223	11.377	25,291	0.173	0	25,291	0	25,291
2042	0	2,223	11.719	26,051	0.178	0	26,051	0	26,051
2043	0	2,223	12.070	26,832	0.183	0	26,832	0	26,832
2044	0	1,539	12.432	19,133	0.189	0	19,133	0	19,133
2045	0	798	12.805	10,218	0.194	0	10,218	0	10,218
2046	0	0	13.189	0	0.200	0	0	0	0
Total =		44,460					\$482,770	\$64,350	\$418,420
							NPV = \$219,178	\$58,459	160,719
Total NPV =		\$160,719							
Benefit/Cost Ratio =		3.75							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - New**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$2,056	\$1,129	\$0	\$3,185	\$20,961	\$1,800	\$22,761	(\$19,576)
2025	4,412	2,402	0	6,814	22,734	1,950	24,684	(17,870)
2026	7,089	3,752	0	10,841	24,513	2,100	26,613	(15,772)
2027	7,300	3,796	0	11,096	0	0	0	11,096
2028	7,520	3,841	0	11,361	0	0	0	11,361
2029	7,745	3,863	0	11,608	0	0	0	11,608
2030	7,978	3,907	0	11,885	0	0	0	11,885
2031	8,216	3,952	0	12,168	0	0	0	12,168
2032	8,463	3,996	0	12,459	0	0	0	12,459
2033	8,719	4,040	0	12,759	0	0	0	12,759
2034	8,979	4,063	0	13,042	0	0	0	13,042
2035	9,248	4,107	0	13,355	0	0	0	13,355
2036	9,526	4,151	0	13,677	0	0	0	13,677
2037	9,812	4,196	0	14,008	0	0	0	14,008
2038	10,106	4,240	0	14,346	0	0	0	14,346
2039	10,410	4,285	0	14,695	0	0	0	14,695
2040	10,722	4,329	0	15,051	0	0	0	15,051
2041	11,044	4,373	0	15,417	0	0	0	15,417
2042	11,375	4,418	0	15,793	0	0	0	15,793
2043	11,715	4,462	0	16,177	0	0	0	16,177
2044	8,354	3,126	0	11,480	0	0	0	11,480
2045	4,462	1,640	0	6,102	0	0	0	6,102
2046	0	0	0	0	0	0	0	0
			Total =	\$267,319			\$74,058	\$193,261
			NPV =	\$131,606			\$68,935	62,671

Total NPV = \$62,671
Benefit/Cost Ratio = 1.91

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - Replacement**
Program Years: **2024 - 2026**

Input Data			First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$6.683	16) Utility Project Costs			
Escalation Rate =	3.00%	16a) Administrative & Operating Costs =	\$12,338	\$12,439	\$12,544
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.10137	16b) Incentive Costs =	75,000	75,000	75,000
Escalation Rate =	3.00%	16c) Total Utility Project Costs =	\$87,338	\$87,439	\$87,544
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh	17) Direct Participant Costs (\$/Part.) =	\$736	\$736	\$736
3) Commodity Cost (\$/Dk) =	\$2.918	18) Participant Non-Energy Costs (Annual \$/Part.) =	\$0	\$0	\$0
Escalation Rate =	3.00%	Escalation Rate =	0.00%	0.00%	0.00%
4) Demand Cost (\$/Unit/Yr) =	\$164.36	19) Participant Non-Energy Savings (Annual \$/Part) =	\$0	\$0	\$0
Escalation Rate =	1.00%	Escalation Rate =	0.00%	0.00%	0.00%
5) Peak Reduction Factor =	1.000%	20) Project Life (Years) =	20	20	20
6) Variable O&M (\$/Dk) =	\$0.000	21) Avg. Dk/Part. Saved =	19.600	19.600	19.600
Escalation Rate =	0.00%	22) Avg Non-Gas Fuel Units/Part. Saved =	720	720	720
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931	22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0	0
Escalation Rate =	3.00%	23) Number of Participants =	250	250	250
8) Non-Gas Fuel Loss Factor	7.72%	24) Total Annual Dk Saved =	4,900	4,900	4,900
9) Gas Environmental Damage Factor =	\$2.070	25) Incentive/Participant =	\$300	\$300	\$300
Escalation Rate =	1.69%	26) Distribution Delivery Charge			\$1.836
10) Non Gas Fuel Environmental Damage Factor =	\$0.000	27) Effective Income Tax Rate =			21.000%
Escalation Rate =	0.00%	(Federal & State Taxes)			
11) Participant Discount Rate =	9.87%				
12) Utility Discount Rate =	7.22%				
13) Societal Discount Rate =	2.24%				
14) General Input Data Year =	2023				
15) Project Analysis Year 1 =	2024				
Project Analysis Year 2 =	2025				
Project Analysis Year 3 =	2026				

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$331,452	1.61
Utility Cost Test	\$627,607	3.56
Societal Test	\$1,777,435	4.08
Participant Test	\$1,417,216	3.81
Total Resource Cost Test	\$560,535	2.02

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - Replacement**

t	Year	Benefits									Costs					Annual Benefits Less Costs (P)	
		Total Energy Reduction (A)	Gas Commodity Cost/Dk (B)	Gas Commodity Savings (C)	Variable O & M Cost/Dk (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Demand Savings Per Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)	Incentive Costs (N)		Total Program Costs (O)
		1	2024	4,900	\$3,006	\$14,729	\$0.000	\$0	\$14,729	49.0	\$166	\$8,134	\$22,863	\$1,891	\$7,320		\$12,338
2	2025	9,800	3,096	30,341	0.000	0	30,341	98.0	168	16,464	46,805	1,948	15,081	12,439	75,000	102,520	(55,715)
3	2026	14,700	3,189	46,878	0.000	0	46,878	147.0	169	24,843	71,721	2,006	23,296	12,544	75,000	110,840	(39,119)
4	2027	14,700	3,284	48,275	0.000	0	48,275	147.0	171	25,137	73,412	2,066	23,992	0	0	23,992	49,420
5	2028	14,700	3,383	49,730	0.000	0	49,730	147.0	173	25,431	75,161	2,128	24,712	0	0	24,712	50,449
6	2029	14,700	3,484	51,215	0.000	0	51,215	147.0	174	25,578	76,793	2,192	25,456	0	0	25,456	51,337
7	2030	14,700	3,589	52,758	0.000	0	52,758	147.0	176	25,872	78,630	2,258	26,222	0	0	26,222	52,408
8	2031	14,700	3,696	54,331	0.000	0	54,331	147.0	178	26,166	80,497	2,326	27,012	0	0	27,012	53,485
9	2032	14,700	3,807	55,963	0.000	0	55,963	147.0	180	26,460	82,423	2,396	27,825	0	0	27,825	54,598
10	2033	14,700	3,922	57,653	0.000	0	57,653	147.0	182	26,754	84,407	2,467	28,649	0	0	28,649	55,758
11	2034	14,700	4,039	59,373	0.000	0	59,373	147.0	183	26,901	86,274	2,541	29,509	0	0	29,509	56,765
12	2035	14,700	4,160	61,152	0.000	0	61,152	147.0	185	27,195	88,347	2,618	30,403	0	0	30,403	57,944
13	2036	14,700	4,285	62,990	0.000	0	62,990	147.0	187	27,489	90,479	2,696	31,309	0	0	31,309	59,170
14	2037	14,700	4,414	64,886	0.000	0	64,886	147.0	189	27,783	92,669	2,777	32,249	0	0	32,249	60,420
15	2038	14,700	4,546	66,826	0.000	0	66,826	147.0	191	28,077	94,903	2,860	33,213	0	0	33,213	61,690
16	2039	14,700	4,683	68,840	0.000	0	68,840	147.0	193	28,371	97,211	2,946	34,212	0	0	34,212	62,999
17	2040	14,700	4,823	70,898	0.000	0	70,898	147.0	195	28,665	99,563	3,035	35,245	0	0	35,245	64,318
18	2041	14,700	4,968	73,030	0.000	0	73,030	147.0	197	28,959	101,989	3,126	36,302	0	0	36,302	65,687
19	2042	14,700	5,117	75,220	0.000	0	75,220	147.0	199	29,253	104,473	3,219	37,382	0	0	37,382	67,091
20	2043	14,700	5,270	77,469	0.000	0	77,469	147.0	201	29,547	107,016	3,316	38,509	0	0	38,509	68,507
21	2044	9,800	5,428	53,194	0.000	0	53,194	98.0	203	19,894	73,088	3,416	26,447	0	0	26,447	46,641
22	2045	4,900	5,591	27,396	0.000	0	27,396	49.0	205	10,045	37,441	3,518	13,618	0	0	13,618	23,823
23	2046	0	5,759	0	0.000	0	0	0.0	207	0	0	3,624	0	0	0	0	0
Total =		294,000									\$1,766,165					\$870,284	\$895,881
												\$872,656				\$541,204	\$331,452
Total NPV =			\$331,452														
Benefit/Cost Ratio =			1.61														

Worksheet Calculations	
(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)
(H) = Demand Cost (4) escalated.	(P) = (J) - (O)

**Table 2
Utility Cost Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - Replacement**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$14,729	\$8,134	\$22,863	\$12,338	\$75,000	\$87,338	(\$64,475)
2025	30,341	16,464	46,805	12,439	75,000	87,439	(40,634)
2026	46,878	24,843	71,721	12,544	75,000	87,544	(15,823)
2027	48,275	25,137	73,412	0	0	0	73,412
2028	49,730	25,431	75,161	0	0	0	75,161
2029	51,215	25,578	76,793	0	0	0	76,793
2030	52,758	25,872	78,630	0	0	0	78,630
2031	54,331	26,166	80,497	0	0	0	80,497
2032	55,963	26,460	82,423	0	0	0	82,423
2033	57,653	26,754	84,407	0	0	0	84,407
2034	59,373	26,901	86,274	0	0	0	86,274
2035	61,152	27,195	88,347	0	0	0	88,347
2036	62,990	27,489	90,479	0	0	0	90,479
2037	64,886	27,783	92,669	0	0	0	92,669
2038	66,826	28,077	94,903	0	0	0	94,903
2039	68,840	28,371	97,211	0	0	0	97,211
2040	70,898	28,665	99,563	0	0	0	99,563
2041	73,030	28,959	101,989	0	0	0	101,989
2042	75,220	29,253	104,473	0	0	0	104,473
2043	77,469	29,547	107,016	0	0	0	107,016
2044	53,194	19,894	73,088	0	0	0	73,088
2045	27,396	10,045	37,441	0	0	0	37,441
2046	0	0	0	0	0	0	0
Total =			\$1,766,165			\$262,321	\$1,503,844
NPV =			\$872,656			\$245,049	\$627,607
Total NPV =			\$627,607				
Benefit/Cost Ratio =			<u>3.56</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - Replacement**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$14,729	\$8,134	\$0.033	\$5,940	\$2.105	\$10,315	\$39,118	\$87,338	\$109,000	\$196,338	(\$157,220)
2025	30,341	16,464	0.034	12,240	2.141	20,982	80,027	87,439	109,000	196,439	(116,412)
2026	46,878	24,843	0.035	18,900	2.177	32,002	122,623	87,544	109,000	196,544	(73,921)
2027	48,275	25,137	0.036	19,440	2.214	32,546	125,398	0	0	0	125,398
2028	49,730	25,431	0.037	19,980	2.251	33,090	128,231	0	0	0	128,231
2029	51,215	25,578	0.038	20,520	2.289	33,648	130,961	0	0	0	130,961
2030	52,758	25,872	0.039	21,060	2.328	34,222	133,912	0	0	0	133,912
2031	54,331	26,166	0.040	21,600	2.367	34,795	136,892	0	0	0	136,892
2032	55,963	26,460	0.041	22,140	2.407	35,383	139,946	0	0	0	139,946
2033	57,653	26,754	0.043	23,220	2.448	35,986	143,613	0	0	0	143,613
2034	59,373	26,901	0.044	23,760	2.489	36,588	146,622	0	0	0	146,622
2035	61,152	27,195	0.045	24,300	2.531	37,206	149,853	0	0	0	149,853
2036	62,990	27,489	0.047	25,380	2.574	37,838	153,697	0	0	0	153,697
2037	64,886	27,783	0.048	25,920	2.617	38,470	157,059	0	0	0	157,059
2038	66,826	28,077	0.049	26,460	2.662	39,131	160,494	0	0	0	160,494
2039	68,840	28,371	0.051	27,540	2.707	39,793	164,544	0	0	0	164,544
2040	70,898	28,665	0.052	28,080	2.752	40,454	168,097	0	0	0	168,097
2041	73,030	28,959	0.054	29,160	2.799	41,145	172,294	0	0	0	172,294
2042	75,220	29,253	0.056	30,240	2.846	41,836	176,549	0	0	0	176,549
2043	77,469	29,547	0.057	30,780	2.894	42,542	180,338	0	0	0	180,338
2044	53,194	19,894	0.059	21,240	2.943	28,841	123,169	0	0	0	123,169
2045	27,396	10,045	0.061	10,980	2.993	14,666	63,087	0	0	0	63,087
2046	0	0	0.063	0	3.043	0	0	0	0	0	0

Total = \$2,996,524 NPV = \$2,353,934 \$589,321 \$2,407,203
\$576,499 \$1,777,435

Total NPV = \$1,777,435
Benefit/Cost Ratio = 4.08

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated..	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - Replacement**

Year	Benefits							Costs	Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$75,000	4,900	\$6.883	\$33,727	\$0.104	\$18,720	\$127,447	\$184,000	(\$56,553)
2025	75,000	9,800	7.090	69,482	0.108	38,880	183,362	184,000	(638)
2026	75,000	14,700	7.303	107,354	0.111	59,940	242,294	184,000	58,294
2027	0	14,700	7.522	110,573	0.114	61,560	172,133	0	172,133
2028	0	14,700	7.747	113,881	0.118	63,720	177,601	0	177,601
2029	0	14,700	7.980	117,306	0.121	65,340	182,646	0	182,646
2030	0	14,700	8.219	120,819	0.125	67,500	188,319	0	188,319
2031	0	14,700	8.466	124,450	0.128	69,120	193,570	0	193,570
2032	0	14,700	8.720	128,184	0.132	71,280	199,464	0	199,464
2033	0	14,700	8.981	132,021	0.136	73,440	205,461	0	205,461
2034	0	14,700	9.251	135,990	0.140	75,600	211,590	0	211,590
2035	0	14,700	9.528	140,062	0.145	78,300	218,362	0	218,362
2036	0	14,700	9.814	144,266	0.149	80,460	224,726	0	224,726
2037	0	14,700	10.109	148,602	0.153	82,620	231,222	0	231,222
2038	0	14,700	10.412	153,056	0.158	85,320	238,376	0	238,376
2039	0	14,700	10.724	157,643	0.163	88,020	245,663	0	245,663
2040	0	14,700	11.046	162,376	0.168	90,720	253,096	0	253,096
2041	0	14,700	11.377	167,242	0.173	93,420	260,662	0	260,662
2042	0	14,700	11.719	172,269	0.178	96,120	268,389	0	268,389
2043	0	14,700	12.070	177,429	0.183	98,820	276,249	0	276,249
2044	0	9,800	12.432	121,834	0.189	68,040	189,874	0	189,874
2045	0	4,900	12.805	62,745	0.194	34,920	97,665	0	97,665
2046	0	0	13.189	0	0.200	0	0	0	0
Total =		294,000					\$4,588,171	\$552,000	\$4,036,171
							NPV = \$1,921,113	\$503,897	1,417,216
Total NPV =		\$1,417,216							
Benefit/Cost Ratio =		<u>3.81</u>							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Residential 95+% AFUE Furnace - Replacement**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$14,729	\$8,134	\$5,940	\$28,803	\$87,338	\$109,000	\$196,338	(\$167,535)
2025	30,341	16,464	12,240	59,045	87,439	109,000	196,439	(137,394)
2026	46,878	24,843	18,900	90,621	87,544	109,000	196,544	(105,923)
2027	48,275	25,137	19,440	92,852	0	0	0	92,852
2028	49,730	25,431	19,980	95,141	0	0	0	95,141
2029	51,215	25,578	20,520	97,313	0	0	0	97,313
2030	52,758	25,872	21,060	99,690	0	0	0	99,690
2031	54,331	26,166	21,600	102,097	0	0	0	102,097
2032	55,963	26,460	22,140	104,563	0	0	0	104,563
2033	57,653	26,754	23,220	107,627	0	0	0	107,627
2034	59,373	26,901	23,760	110,034	0	0	0	110,034
2035	61,152	27,195	24,300	112,647	0	0	0	112,647
2036	62,990	27,489	25,380	115,859	0	0	0	115,859
2037	64,886	27,783	25,920	118,589	0	0	0	118,589
2038	66,826	28,077	26,460	121,363	0	0	0	121,363
2039	68,840	28,371	27,540	124,751	0	0	0	124,751
2040	70,898	28,665	28,080	127,643	0	0	0	127,643
2041	73,030	28,959	29,160	131,149	0	0	0	131,149
2042	75,220	29,253	30,240	134,713	0	0	0	134,713
2043	77,469	29,547	30,780	137,796	0	0	0	137,796
2044	53,194	19,894	21,240	94,328	0	0	0	94,328
2045	27,396	10,045	10,980	48,421	0	0	0	48,421
2046	0	0	0	0	0	0	0	0
			Total =	\$2,255,045			\$589,321	\$1,665,724
			NPV =	\$1,111,069			\$550,534	560,535

Total NPV = \$560,535
Benefit/Cost Ratio = 2.02

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
 Project: **Programmable Thermostats - Tier 1**
 Program Years: **2024 - 2026**

Input Data			First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$6.683	16) Utility Project Costs			
Escalation Rate =	3.00%	16a) Administrative & Operating Costs =	\$185	\$174	\$176
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.10137	16b) Incentive Costs =	1,125	1,050	1,050
Escalation Rate =	3.00%	16c) Total Utility Project Costs =	\$1,310	\$1,224	\$1,226
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh	17) Direct Participant Costs (\$/Part.) =	\$30	\$30	\$30
3) Commodity Cost (\$/Dk) =	\$2.918	18) Participant Non-Energy Costs (Annual \$/Part.) =	\$0	\$0	\$0
Escalation Rate =	3.00%	Escalation Rate =	0.00%	0.00%	0.00%
4) Demand Cost (\$/Unit/Yr) =	\$164.36	19) Participant Non-Energy Savings (Annual \$/Part) =	\$0	\$0	\$0
Escalation Rate =	1.00%	Escalation Rate =	0.00%	0.00%	0.00%
5) Peak Reduction Factor =	1.000%	20) Project Life (Years) =	10	10	10
6) Variable O&M (\$/Dk) =	\$0.000	21) Avg. Dk/Part. Saved =	2,300	2,300	2,300
Escalation Rate =	0.00%	22) Avg Non-Gas Fuel Units/Part. Saved =	0	0	0
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931	22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0	0
Escalation Rate =	3.00%	23) Number of Participants =	75	70	70
8) Non-Gas Fuel Loss Factor	7.72%	24) Total Annual Dk Saved =	173	161	161
9) Gas Environmental Damage Factor =	\$2.070	25) Incentive/Participant =	\$15	\$15	\$15
Escalation Rate =	1.69%	26) Distribution Delivery Charge			\$1.836
10) Non Gas Fuel Environmental Damage Factor =	\$0.000	27) Effective Income Tax Rate =			21.000%
Escalation Rate =	0.00%	(Federal & State Taxes)			
11) Participant Discount Rate =	9.87%				
12) Utility Discount Rate =	7.22%				
13) Societal Discount Rate =	2.24%				
14) General Input Data Year =	2023				
15) Project Analysis Year 1 =	2024				
Project Analysis Year 2 =	2025				
Project Analysis Year 3 =	2026				

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$8,588	1.90
Utility Cost Test	\$14,566	5.14
Societal Test	\$26,516	4.88
Participant Test	\$21,423	4.63
Total Resource Cost Test	\$11,548	2.77

**Table 1
Ratepayer Impact Measure Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 1**

t	Year	Benefits										Costs				Annual Benefits Less Costs (P)	
		Total Energy Reduction (A)	Gas Commodity Cost/Dk (B)	Gas Commodity Savings (C)	Variable O & M Cost/Dk (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Demand Savings Per Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)	Incentive Costs (N)		Total Program Costs (O)
1	2024	173	\$3,006	\$520	\$0.000	\$0	\$520	1.7	\$166	\$282	\$802	\$1,891	\$258	\$185	\$1,125	\$1,568	(\$766)
2	2025	334	3,096	1,034	0.000	0	1,034	3.3	168	554	1,588	1,948	514	174	1,050	1,738	(150)
3	2026	495	3,189	1,579	0.000	0	1,579	5.0	169	845	2,424	2,006	784	176	1,050	2,010	414
4	2027	495	3,284	1,626	0.000	0	1,626	5.0	171	855	2,481	2,066	808	0	0	808	1,673
5	2028	495	3,383	1,675	0.000	0	1,675	5.0	173	865	2,540	2,128	832	0	0	832	1,708
6	2029	495	3,484	1,725	0.000	0	1,725	5.0	174	870	2,595	2,192	857	0	0	857	1,738
7	2030	495	3,589	1,777	0.000	0	1,777	5.0	176	880	2,657	2,258	883	0	0	883	1,774
8	2031	495	3,696	1,830	0.000	0	1,830	5.0	178	890	2,720	2,326	910	0	0	910	1,810
9	2032	495	3,807	1,884	0.000	0	1,884	5.0	180	900	2,784	2,396	937	0	0	937	1,847
10	2033	495	3,922	1,941	0.000	0	1,941	5.0	182	910	2,851	2,467	965	0	0	965	1,886
11	2034	322	4,039	1,301	0.000	0	1,301	3.2	183	586	1,887	2,541	646	0	0	646	1,241
12	2035	161	4,160	670	0.000	0	670	1.6	185	296	966	2,618	333	0	0	333	633
13	2036	0	4,285	0	0.000	0	0	0.0	187	0	0	2,696	0	0	0	0	0
14	2037	0	4,414	0	0.000	0	0	0.0	189	0	0	2,777	0	0	0	0	0
15	2038	0	4,546	0	0.000	0	0	0.0	191	0	0	2,860	0	0	0	0	0
16	2039	0	4,683	0	0.000	0	0	0.0	193	0	0	2,946	0	0	0	0	0
17	2040	0	4,823	0	0.000	0	0	0.0	195	0	0	3,035	0	0	0	0	0
18	2041	0	4,968	0	0.000	0	0	0.0	197	0	0	3,126	0	0	0	0	0
19	2042	0	5,117	0	0.000	0	0	0.0	199	0	0	3,219	0	0	0	0	0
20	2043	0	5,270	0	0.000	0	0	0.0	201	0	0	3,316	0	0	0	0	0
21	2044	0	5,428	0	0.000	0	0	0.0	203	0	0	3,416	0	0	0	0	0
22	2045	0	5,591	0	0.000	0	0	0.0	205	0	0	3,518	0	0	0	0	0
23	2046	0	5,759	0	0.000	0	0	0.0	207	0	0	3,624	0	0	0	0	0
Total =		4,950									\$26,295					\$12,487	\$13,808
																\$9,496	\$8,588
Total NPV =			\$8,588														
Benefit/Cost Ratio =			1.90														

Worksheet Calculations	
(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)
(H) = Demand Cost (4) escalated.	(P) = (J) - (O)

**Table 2
Utility Cost Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 1**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$520	\$282	\$802	\$185	\$1,125	\$1,310	(\$508)
2025	1,034	554	1,588	174	1,050	1,224	364
2026	1,579	845	2,424	176	1,050	1,226	1,198
2027	1,626	855	2,481	0	0	0	2,481
2028	1,675	865	2,540	0	0	0	2,540
2029	1,725	870	2,595	0	0	0	2,595
2030	1,777	880	2,657	0	0	0	2,657
2031	1,830	890	2,720	0	0	0	2,720
2032	1,884	900	2,784	0	0	0	2,784
2033	1,941	910	2,851	0	0	0	2,851
2034	1,301	586	1,887	0	0	0	1,887
2035	670	296	966	0	0	0	966
2036	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
Total =			\$26,295			\$3,760	\$22,535
		NPV =	\$18,084			\$3,518	\$14,566
Total NPV =			\$14,566				
Benefit/Cost Ratio =			<u>5.14</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 1**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$520	\$282	\$0.033	\$0	\$2.105	\$364	\$1,166	\$1,310	\$1,125	\$2,435	(\$1,269)
2025	1,034	554	0.034	0	2.141	715	2,303	1,224	1,050	2,274	29
2026	1,579	845	0.035	0	2.177	1,078	3,502	1,226	1,050	2,276	1,226
2027	1,626	855	0.036	0	2.214	1,096	3,577	0	0	0	3,577
2028	1,675	865	0.037	0	2.251	1,114	3,654	0	0	0	3,654
2029	1,725	870	0.038	0	2.289	1,133	3,728	0	0	0	3,728
2030	1,777	880	0.039	0	2.328	1,152	3,809	0	0	0	3,809
2031	1,830	890	0.040	0	2.367	1,172	3,892	0	0	0	3,892
2032	1,884	900	0.041	0	2.407	1,191	3,975	0	0	0	3,975
2033	1,941	910	0.043	0	2.448	1,212	4,063	0	0	0	4,063
2034	1,301	586	0.044	0	2.489	801	2,688	0	0	0	2,688
2035	670	296	0.045	0	2.531	407	1,373	0	0	0	1,373
2036	0	0	0.047	0	2.574	0	0	0	0	0	0
2037	0	0	0.048	0	2.617	0	0	0	0	0	0
2038	0	0	0.049	0	2.662	0	0	0	0	0	0
2039	0	0	0.051	0	2.707	0	0	0	0	0	0
2040	0	0	0.052	0	2.752	0	0	0	0	0	0
2041	0	0	0.054	0	2.799	0	0	0	0	0	0
2042	0	0	0.056	0	2.846	0	0	0	0	0	0
2043	0	0	0.057	0	2.894	0	0	0	0	0	0
2044	0	0	0.059	0	2.943	0	0	0	0	0	0
2045	0	0	0.061	0	2.993	0	0	0	0	0	0
2046	0	0	0.063	0	3.043	0	0	0	0	0	0
Total =							\$37,730			\$6,985	\$30,745
							NPV =	\$33,353		\$6,837	\$26,516
Total NPV =		\$26,516									
Benefit/Cost Ratio =		<u>4.88</u>									

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated.	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 1**

Year	Benefits							Costs	Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$1,125	173	\$6.883	\$1,191	\$0.104	\$0	\$2,316	\$2,250	\$66
2025	1,050	334	7.090	2,368	0.108	0	3,418	2,100	1,318
2026	1,050	495	7.303	3,615	0.111	0	4,665	2,100	2,565
2027	0	495	7.522	3,723	0.114	0	3,723	0	3,723
2028	0	495	7.747	3,835	0.118	0	3,835	0	3,835
2029	0	495	7.980	3,950	0.121	0	3,950	0	3,950
2030	0	495	8.219	4,068	0.125	0	4,068	0	4,068
2031	0	495	8.466	4,191	0.128	0	4,191	0	4,191
2032	0	495	8.720	4,316	0.132	0	4,316	0	4,316
2033	0	495	8.981	4,446	0.136	0	4,446	0	4,446
2034	0	322	9.251	2,979	0.140	0	2,979	0	2,979
2035	0	161	9.528	1,534	0.145	0	1,534	0	1,534
2036	0	0	9.814	0	0.149	0	0	0	0
2037	0	0	10.109	0	0.153	0	0	0	0
2038	0	0	10.412	0	0.158	0	0	0	0
2039	0	0	10.724	0	0.163	0	0	0	0
2040	0	0	11.046	0	0.168	0	0	0	0
2041	0	0	11.377	0	0.173	0	0	0	0
2042	0	0	11.719	0	0.178	0	0	0	0
2043	0	0	12.070	0	0.183	0	0	0	0
2044	0	0	12.432	0	0.189	0	0	0	0
2045	0	0	12.805	0	0.194	0	0	0	0
2046	0	0	13.189	0	0.200	0	0	0	0
Total =		4,950					\$43,441	\$6,450	\$36,991
							NPV = \$27,324	\$5,901	21,423
Total NPV =		\$21,423							
Benefit/Cost Ratio =		<u>4.63</u>							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 1**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$520	\$282	\$0	\$802	\$1,310	\$1,125	\$2,435	(\$1,633)
2025	1,034	554	0	1,588	1,224	1,050	2,274	(686)
2026	1,579	845	0	2,424	1,226	1,050	2,276	148
2027	1,626	855	0	2,481	0	0	0	2,481
2028	1,675	865	0	2,540	0	0	0	2,540
2029	1,725	870	0	2,595	0	0	0	2,595
2030	1,777	880	0	2,657	0	0	0	2,657
2031	1,830	890	0	2,720	0	0	0	2,720
2032	1,884	900	0	2,784	0	0	0	2,784
2033	1,941	910	0	2,851	0	0	0	2,851
2034	1,301	586	0	1,887	0	0	0	1,887
2035	670	296	0	966	0	0	0	966
2036	0	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0	0
			Total =	\$26,295			\$6,985	\$19,310
			NPV =	\$18,084			\$6,536	11,548

Total NPV = \$11,548
Benefit/Cost Ratio = 2.77

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 2**
Program Years: **2024 - 2026**

Input Data			First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$6.683	16) Utility Project Costs			
Escalation Rate =	3.00%	16a) Administrative & Operating Costs =	\$1,875	\$1,941	\$2,007
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.10137	16b) Incentive Costs =	11,400	11,700	12,000
Escalation Rate =	3.00%	16c) Total Utility Project Costs =	\$13,275	\$13,641	\$14,007
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh	17) Direct Participant Costs (\$/Part.) =	\$155	\$155	\$155
3) Commodity Cost (\$/Dk) =	\$2.918	18) Participant Non-Energy Costs (Annual \$/Part.) =	\$0	\$0	\$0
Escalation Rate =	3.00%	Escalation Rate =	0.00%	0.00%	0.00%
4) Demand Cost (\$/Unit/Yr) =	\$164.36	19) Participant Non-Energy Savings (Annual \$/Part) =	\$0	\$0	\$0
Escalation Rate =	1.00%	Escalation Rate =	0.00%	0.00%	0.00%
5) Peak Reduction Factor =	1.000%	20) Project Life (Years) =	10	10	10
6) Variable O&M (\$/Dk) =	\$0.000	21) Avg. Dk/Part. Saved =	5,800	5,800	5,800
Escalation Rate =	0.00%	22) Avg Non-Gas Fuel Units/Part. Saved =	41	41	41
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931	22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0	0
Escalation Rate =	3.00%	23) Number of Participants =	190	195	200
8) Non-Gas Fuel Loss Factor	7.72%	24) Total Annual Dk Saved =	1,102	1,131	1,160
9) Gas Environmental Damage Factor =	\$2.070	25) Incentive/Participant =	\$60	\$60	\$60
Escalation Rate =	1.69%	26) Distribution Delivery Charge			\$1,836
10) Non Gas Fuel Environmental Damage Factor =	\$0.000	27) Effective Income Tax Rate =			21.000%
Escalation Rate =	0.00%	(Federal & State Taxes)			
11) Participant Discount Rate =	9.87%				
12) Utility Discount Rate =	7.22%				
13) Societal Discount Rate =	2.24%				
14) General Input Data Year =	2023				
15) Project Analysis Year 1 =	2024				
Project Analysis Year 2 =	2025				
Project Analysis Year 3 =	2026				

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$44,339	1.56
Utility Cost Test	\$85,254	3.23
Societal Test	\$142,066	2.51
Participant Test	\$133,842	2.62
Total Resource Cost Test	\$39,744	1.44

Table 2
Utility Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 2**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$3,313	\$1,826	\$5,139	\$1,875	\$11,400	\$13,275	(\$8,136)
2025	6,913	3,746	10,659	1,941	11,700	13,641	(2,982)
2026	10,820	5,729	16,549	2,007	12,000	14,007	2,542
2027	11,143	5,797	16,940	0	0	0	16,940
2028	11,479	5,865	17,344	0	0	0	17,344
2029	11,821	5,899	17,720	0	0	0	17,720
2030	12,177	5,966	18,143	0	0	0	18,143
2031	12,541	6,034	18,575	0	0	0	18,575
2032	12,917	6,102	19,019	0	0	0	19,019
2033	13,307	6,170	19,477	0	0	0	19,477
2034	9,253	4,191	13,444	0	0	0	13,444
2035	4,826	2,146	6,972	0	0	0	6,972
2036	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
Total =			\$179,981			\$40,923	\$139,058
		NPV =	\$123,437			\$38,183	\$85,254
Total NPV =			\$85,254				
Benefit/Cost Ratio =			<u>3.23</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 2**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$3,313	\$1,826	\$0.033	\$257	\$2.105	\$2,320	\$7,716	\$13,275	\$18,050	\$31,325	(\$23,609)
2025	6,913	3,746	0.034	537	2.141	4,781	15,977	13,641	18,525	32,166	(16,189)
2026	10,820	5,729	0.035	839	2.177	7,387	24,775	14,007	19,000	33,007	(8,232)
2027	11,143	5,797	0.036	863	2.214	7,512	25,315	0	0	0	25,315
2028	11,479	5,865	0.037	887	2.251	7,638	25,869	0	0	0	25,869
2029	11,821	5,899	0.038	911	2.289	7,767	26,398	0	0	0	26,398
2030	12,177	5,966	0.039	935	2.328	7,899	26,977	0	0	0	26,977
2031	12,541	6,034	0.040	959	2.367	8,031	27,565	0	0	0	27,565
2032	12,917	6,102	0.041	983	2.407	8,167	28,169	0	0	0	28,169
2033	13,307	6,170	0.043	1,031	2.448	8,306	28,814	0	0	0	28,814
2034	9,253	4,191	0.044	713	2.489	5,702	19,859	0	0	0	19,859
2035	4,826	2,146	0.045	369	2.531	2,936	10,277	0	0	0	10,277
2036	0	0	0.047	0	2.574	0	0	0	0	0	0
2037	0	0	0.048	0	2.617	0	0	0	0	0	0
2038	0	0	0.049	0	2.662	0	0	0	0	0	0
2039	0	0	0.051	0	2.707	0	0	0	0	0	0
2040	0	0	0.052	0	2.752	0	0	0	0	0	0
2041	0	0	0.054	0	2.799	0	0	0	0	0	0
2042	0	0	0.056	0	2.846	0	0	0	0	0	0
2043	0	0	0.057	0	2.894	0	0	0	0	0	0
2044	0	0	0.059	0	2.943	0	0	0	0	0	0
2045	0	0	0.061	0	2.993	0	0	0	0	0	0
2046	0	0	0.063	0	3.043	0	0	0	0	0	0
Total =							\$267,711		\$96,498	\$171,213	
NPV =							\$236,429		\$94,363	\$142,066	
Total NPV =		\$142,066									
Benefit/Cost Ratio =		<u>2.51</u>									

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated..	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 2**

Year	Benefits							Costs	Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$11,400	1,102	\$6.883	\$7,585	\$0.104	\$810	\$19,795	\$29,450	(\$9,655)
2025	11,700	2,233	7.090	15,832	0.108	1,705	29,237	30,225	(988)
2026	12,000	3,393	7.303	24,779	0.111	2,662	39,441	31,000	8,441
2027	0	3,393	7.522	25,522	0.114	2,734	28,256	0	28,256
2028	0	3,393	7.747	26,286	0.118	2,830	29,116	0	29,116
2029	0	3,393	7.980	27,076	0.121	2,902	29,978	0	29,978
2030	0	3,393	8.219	27,887	0.125	2,998	30,885	0	30,885
2031	0	3,393	8.466	28,725	0.128	3,070	31,795	0	31,795
2032	0	3,393	8.720	29,587	0.132	3,166	32,753	0	32,753
2033	0	3,393	8.981	30,473	0.136	3,262	33,735	0	33,735
2034	0	2,291	9.251	21,194	0.140	2,267	23,461	0	23,461
2035	0	1,160	9.528	11,052	0.145	1,189	12,241	0	12,241
2036	0	0	9.814	0	0.149	0	0	0	0
2037	0	0	10.109	0	0.153	0	0	0	0
2038	0	0	10.412	0	0.158	0	0	0	0
2039	0	0	10.724	0	0.163	0	0	0	0
2040	0	0	11.046	0	0.168	0	0	0	0
2041	0	0	11.377	0	0.173	0	0	0	0
2042	0	0	11.719	0	0.178	0	0	0	0
2043	0	0	12.070	0	0.183	0	0	0	0
2044	0	0	12.432	0	0.189	0	0	0	0
2045	0	0	12.805	0	0.194	0	0	0	0
2046	0	0	13.189	0	0.200	0	0	0	0
Total =		33,930					\$340,693	\$90,675	\$250,018
							NPV = \$216,482	\$82,640	133,842
Total NPV =		\$133,842							
Benefit/Cost Ratio =		<u>2.62</u>							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Programmable Thermostats - Tier 2**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$3,313	\$1,826	\$257	\$5,396	\$13,275	\$18,050	\$31,325	(\$25,929)
2025	6,913	3,746	537	11,196	13,641	18,525	32,166	(20,970)
2026	10,820	5,729	839	17,388	14,007	19,000	33,007	(15,619)
2027	11,143	5,797	863	17,803	0	0	0	17,803
2028	11,479	5,865	887	18,231	0	0	0	18,231
2029	11,821	5,899	911	18,631	0	0	0	18,631
2030	12,177	5,966	935	19,078	0	0	0	19,078
2031	12,541	6,034	959	19,534	0	0	0	19,534
2032	12,917	6,102	983	20,002	0	0	0	20,002
2033	13,307	6,170	1,031	20,508	0	0	0	20,508
2034	9,253	4,191	713	14,157	0	0	0	14,157
2035	4,826	2,146	369	7,341	0	0	0	7,341
2036	0	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0	0
			Total =	\$189,265			\$96,498	\$92,767
			NPV =	\$129,784			\$90,040	39,744

Total NPV = \$39,744
Benefit/Cost Ratio = 1.44

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
 Project: **Commercial 95+% AFUE Furnace - New**
 Program Years: **2024 - 2026**

Input Data			First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$5.777	16) Utility Project Costs			
Escalation Rate =	3.00%	16a) Administrative & Operating Costs =	\$173	\$224	\$251
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.09753	16b) Incentive Costs =	1,050	1,350	1,500
Escalation Rate =	3.00%	16c) Total Utility Project Costs =	\$1,223	\$1,574	\$1,751
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh	17) Direct Participant Costs (\$/Part.) =	\$165	\$165	\$165
3) Commodity Cost (\$/Dk) =	\$2.918	18) Participant Non-Energy Costs (Annual \$/Part.) =	\$0	\$0	\$0
Escalation Rate =	3.00%	Escalation Rate =	0.00%	0.00%	0.00%
4) Demand Cost (\$/Unit/Yr) =	\$164.36	19) Participant Non-Energy Savings (Annual \$/Part) =	\$0	\$0	\$0
Escalation Rate =	1.00%	Escalation Rate =	0.00%	0.00%	0.00%
5) Peak Reduction Factor =	1.000%	20) Project Life (Years) =	20	20	20
6) Variable O&M (\$/Dk) =	\$0.000	21) Avg. Dk/Part. Saved =	4.500	4.500	4.500
Escalation Rate =	0.00%	22) Avg Non-Gas Fuel Units/Part. Saved =	0	0	0
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931	22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0	0
Escalation Rate =	3.00%	23) Number of Participants =	7	9	10
8) Non-Gas Fuel Loss Factor	7.72%	24) Total Annual Dk Saved =	32	41	45
9) Gas Environmental Damage Factor =	\$2.070	25) Incentive/Participant =	\$150	\$150	\$150
Escalation Rate =	1.69%	26) Distribution Delivery Charge			\$0.930
10) Non Gas Fuel Environmental Damage Factor =	\$0.000	27) Effective Income Tax Rate =			21.000%
Escalation Rate =	0.00%	(Federal & State Taxes)			
11) Participant Discount Rate =	9.87%				
12) Utility Discount Rate =	7.22%				
13) Societal Discount Rate =	2.24%				
14) General Input Data Year =	2023				
15) Project Analysis Year 1 =	2024				
Project Analysis Year 2 =	2025				
Project Analysis Year 3 =	2026				

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$1,557	1.29
Utility Cost Test	\$2,747	1.65
Societal Test	\$10,965	3.28
Participant Test	\$7,174	2.85
Total Resource Cost Test	\$2,385	1.52

**Table 1
Ratepayer Impact Measure Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - New**

t	Year	Benefits									Costs					Annual Benefits Less Costs (P)	
		Total Energy Reduction (A)	Gas Commodity Cost/Dk (B)	Gas Commodity Savings (C)	Variable O & M Cost/Dk (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Demand Savings Per Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)	Incentive Costs (N)		Total Program Costs (O)
1	2024	32	\$3,006	\$96	\$0.000	\$0	\$96	0.3	\$166	\$50	\$146	\$0.958	\$24	\$173	\$1,050	\$1,247	(\$1,101)
2	2025	72	3,096	223	0.000	0	223	0.7	168	118	341	0.987	56	224	1,350	1,630	(1,289)
3	2026	117	3,189	373	0.000	0	373	1.2	169	203	576	1.016	94	251	1,500	1,845	(1,269)
4	2027	117	3,284	384	0.000	0	384	1.2	171	205	589	1.047	97	0	0	97	492
5	2028	117	3,383	396	0.000	0	396	1.2	173	208	604	1.078	100	0	0	100	504
6	2029	117	3,484	408	0.000	0	408	1.2	174	209	617	1.110	103	0	0	103	514
7	2030	117	3,589	420	0.000	0	420	1.2	176	211	631	1.144	106	0	0	106	525
8	2031	117	3,696	432	0.000	0	432	1.2	178	214	646	1.178	109	0	0	109	537
9	2032	117	3,807	445	0.000	0	445	1.2	180	216	661	1.213	112	0	0	112	549
10	2033	117	3,922	459	0.000	0	459	1.2	182	218	677	1.250	116	0	0	116	561
11	2034	117	4,039	473	0.000	0	473	1.2	183	220	693	1.287	119	0	0	119	574
12	2035	117	4,160	487	0.000	0	487	1.2	185	222	709	1.326	123	0	0	123	586
13	2036	117	4,285	501	0.000	0	501	1.2	187	224	725	1.366	126	0	0	126	599
14	2037	117	4,414	516	0.000	0	516	1.2	189	227	743	1.407	130	0	0	130	613
15	2038	117	4,546	532	0.000	0	532	1.2	191	229	761	1.449	134	0	0	134	627
16	2039	117	4,683	548	0.000	0	548	1.2	193	232	780	1.492	138	0	0	138	642
17	2040	117	4,823	564	0.000	0	564	1.2	195	234	798	1.537	142	0	0	142	656
18	2041	117	4,968	581	0.000	0	581	1.2	197	236	817	1.583	146	0	0	146	671
19	2042	117	5,117	599	0.000	0	599	1.2	199	239	838	1.631	151	0	0	151	687
20	2043	117	5,270	617	0.000	0	617	1.2	201	241	858	1.680	155	0	0	155	703
21	2044	86	5,428	467	0.000	0	467	0.9	203	183	650	1.730	118	0	0	118	532
22	2045	45	5,591	252	0.000	0	252	0.5	205	103	355	1.782	63	0	0	63	292
23	2046	0	5,759	0	0.000	0	0	0.0	207	0	0	1.835	0	0	0	0	0
Total =		2,341									\$14,215					\$7,010	\$7,205
																\$5,404	\$1,557
Total NPV =			\$1,557														
Benefit/Cost Ratio =			1.29														

Worksheet Calculations	
(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)
(H) = Demand Cost (4) escalated.	(P) = (J) - (O)

Table 2
Utility Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - New**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$96	\$50	\$146	\$173	\$1,050	\$1,223	(\$1,077)
2025	223	118	341	224	1,350	1,574	(1,233)
2026	373	203	576	251	1,500	1,751	(1,175)
2027	384	205	589	0	0	0	589
2028	396	208	604	0	0	0	604
2029	408	209	617	0	0	0	617
2030	420	211	631	0	0	0	631
2031	432	214	646	0	0	0	646
2032	445	216	661	0	0	0	661
2033	459	218	677	0	0	0	677
2034	473	220	693	0	0	0	693
2035	487	222	709	0	0	0	709
2036	501	224	725	0	0	0	725
2037	516	227	743	0	0	0	743
2038	532	229	761	0	0	0	761
2039	548	232	780	0	0	0	780
2040	564	234	798	0	0	0	798
2041	581	236	817	0	0	0	817
2042	599	239	838	0	0	0	838
2043	617	241	858	0	0	0	858
2044	467	183	650	0	0	0	650
2045	252	103	355	0	0	0	355
2046	0	0	0	0	0	0	0
Total =			\$14,215			\$4,548	\$9,667
NPV =			\$6,961			\$4,214	\$2,747
Total NPV =			\$2,747				
Benefit/Cost Ratio =			<u>1.65</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - New**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$96	\$50	\$0.033	\$0	\$2.105	\$67	\$213	\$1,223	\$105	\$1,328	(\$1,115)
2025	223	118	0.034	0	2.141	154	495	1,574	135	1,709	(1,214)
2026	373	203	0.035	0	2.177	255	831	1,751	150	1,901	(1,070)
2027	384	205	0.036	0	2.214	259	848	0	0	0	848
2028	396	208	0.037	0	2.251	263	867	0	0	0	867
2029	408	209	0.038	0	2.289	268	885	0	0	0	885
2030	420	211	0.039	0	2.328	272	903	0	0	0	903
2031	432	214	0.040	0	2.367	277	923	0	0	0	923
2032	445	216	0.041	0	2.407	282	943	0	0	0	943
2033	459	218	0.043	0	2.448	286	963	0	0	0	963
2034	473	220	0.044	0	2.489	291	984	0	0	0	984
2035	487	222	0.045	0	2.531	296	1,005	0	0	0	1,005
2036	501	224	0.047	0	2.574	301	1,026	0	0	0	1,026
2037	516	227	0.048	0	2.617	306	1,049	0	0	0	1,049
2038	532	229	0.049	0	2.662	311	1,072	0	0	0	1,072
2039	548	232	0.051	0	2.707	317	1,097	0	0	0	1,097
2040	564	234	0.052	0	2.752	322	1,120	0	0	0	1,120
2041	581	236	0.054	0	2.799	327	1,144	0	0	0	1,144
2042	599	239	0.056	0	2.846	333	1,171	0	0	0	1,171
2043	617	241	0.057	0	2.894	339	1,197	0	0	0	1,197
2044	467	183	0.059	0	2.943	253	903	0	0	0	903
2045	252	103	0.061	0	2.993	135	490	0	0	0	490
2046	0	0	0.063	0	3.043	0	0	0	0	0	0
Total =							\$20,129			\$4,938	\$15,191
							NPV = \$15,783			\$4,818	\$10,965
Total NPV =		\$10,965									
Benefit/Cost Ratio =		<u>3.28</u>									

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated.	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - New**

Year	Benefits							Costs	Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$1,050	32	\$5.950	\$190	\$0.100	\$0	\$1,240	\$1,155	\$85
2025	1,350	72	6.129	441	0.103	0	1,791	1,485	306
2026	1,500	117	6.313	739	0.107	0	2,239	1,650	589
2027	0	117	6.502	761	0.110	0	761	0	761
2028	0	117	6.697	784	0.113	0	784	0	784
2029	0	117	6.898	807	0.116	0	807	0	807
2030	0	117	7.105	831	0.120	0	831	0	831
2031	0	117	7.318	856	0.124	0	856	0	856
2032	0	117	7.538	882	0.127	0	882	0	882
2033	0	117	7.764	908	0.131	0	908	0	908
2034	0	117	7.997	936	0.135	0	936	0	936
2035	0	117	8.237	964	0.139	0	964	0	964
2036	0	117	8.484	993	0.143	0	993	0	993
2037	0	117	8.738	1,022	0.148	0	1,022	0	1,022
2038	0	117	9.000	1,053	0.152	0	1,053	0	1,053
2039	0	117	9.270	1,085	0.157	0	1,085	0	1,085
2040	0	117	9.549	1,117	0.161	0	1,117	0	1,117
2041	0	117	9.835	1,151	0.166	0	1,151	0	1,151
2042	0	117	10.130	1,185	0.171	0	1,185	0	1,185
2043	0	117	10.434	1,221	0.176	0	1,221	0	1,221
2044	0	86	10.747	924	0.181	0	924	0	924
2045	0	45	11.069	498	0.187	0	498	0	498
2046	0	0	11.401	0	0.192	0	0	0	0
Total =		2,341					\$23,248	\$4,290	\$18,958
							NPV = \$11,048	\$3,873	7,174
Total NPV =		\$7,174							
Benefit/Cost Ratio =		<u>2.85</u>							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - New**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$96	\$50	\$0	\$146	\$1,223	\$105	\$1,328	(\$1,182)
2025	223	118	0	341	1,574	135	1,709	(1,368)
2026	373	203	0	576	1,751	150	1,901	(1,325)
2027	384	205	0	589	0	0	0	589
2028	396	208	0	604	0	0	0	604
2029	408	209	0	617	0	0	0	617
2030	420	211	0	631	0	0	0	631
2031	432	214	0	646	0	0	0	646
2032	445	216	0	661	0	0	0	661
2033	459	218	0	677	0	0	0	677
2034	473	220	0	693	0	0	0	693
2035	487	222	0	709	0	0	0	709
2036	501	224	0	725	0	0	0	725
2037	516	227	0	743	0	0	0	743
2038	532	229	0	761	0	0	0	761
2039	548	232	0	780	0	0	0	780
2040	564	234	0	798	0	0	0	798
2041	581	236	0	817	0	0	0	817
2042	599	239	0	838	0	0	0	838
2043	617	241	0	858	0	0	0	858
2044	467	183	0	650	0	0	0	650
2045	252	103	0	355	0	0	0	355
2046	0	0	0	0	0	0	0	0
			Total =	\$14,215			\$4,938	\$9,277
			NPV =	\$6,961			\$4,576	2,385

Total NPV = \$2,385
Benefit/Cost Ratio = 1.52

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
 Project: **Commercial 95+% AFUE Furnace - Replacement**
 Program Years: **2024 - 2026**

Input Data			First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$5.777	16) Utility Project Costs			
Escalation Rate =	3.00%	16a) Administrative & Operating Costs =	\$987	\$995	\$1,004
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.09753	16b) Incentive Costs =	6,000	6,000	6,000
Escalation Rate =	3.00%	16c) Total Utility Project Costs =	\$6,987	\$6,995	\$7,004
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh	17) Direct Participant Costs (\$/Part.) =	\$736	\$736	\$736
3) Commodity Cost (\$/Dk) =	\$2.918	18) Participant Non-Energy Costs (Annual \$/Part.) =	\$0	\$0	\$0
Escalation Rate =	3.00%	Escalation Rate =	0.00%	0.00%	0.00%
4) Demand Cost (\$/Unit/Yr) =	\$164.36	19) Participant Non-Energy Savings (Annual \$/Part) =	\$0	\$0	\$0
Escalation Rate =	1.00%	Escalation Rate =	0.00%	0.00%	0.00%
5) Peak Reduction Factor =	1.000%	20) Project Life (Years) =	20	20	20
6) Variable O&M (\$/Dk) =	\$0.000	21) Avg. Dk/Part. Saved =	18.400	18.400	18.400
Escalation Rate =	0.00%	22) Avg Non-Gas Fuel Units/Part. Saved =	0	0	0
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931	22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0	0
Escalation Rate =	3.00%	23) Number of Participants =	20	20	20
8) Non-Gas Fuel Loss Factor	7.72%	24) Total Annual Dk Saved =	368	368	368
9) Gas Environmental Damage Factor =	\$2.070	25) Incentive/Participant =	\$300	\$300	\$300
Escalation Rate =	1.69%	26) Distribution Delivery Charge			\$0.930
10) Non Gas Fuel Environmental Damage Factor =	\$0.000	27) Effective Income Tax Rate =			21.000%
Escalation Rate =	0.00%	(Federal & State Taxes)			
11) Participant Discount Rate =	9.87%				
12) Utility Discount Rate =	7.22%				
13) Societal Discount Rate =	2.24%				
14) General Input Data Year =	2023				
15) Project Analysis Year 1 =	2024				
Project Analysis Year 2 =	2025				
Project Analysis Year 3 =	2026				

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$34,614	2.12
Utility Cost Test	\$45,880	3.34
Societal Test	\$101,873	3.21
Participant Test	\$47,635	2.18
Total Resource Cost Test	\$21,441	1.49

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - Replacement**

t	Year	Benefits									Costs					Annual Benefits Less Costs (P)	
		Total Energy Reduction (A)	Gas Commodity Cost/Dk (B)	Gas Commodity Savings (C)	Variable O & M Cost/Dk (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Demand Savings Per Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)	Incentive Costs (N)		Total Program Costs (O)
1	2024	368	\$3,006	\$1,106	\$0.000	\$0	\$1,106	3.7	\$166	\$614	\$1,720	\$0.958	\$279	\$987	\$6,000	\$7,266	(\$5,546)
2	2025	736	3,096	2,279	0.000	0	2,279	7.4	168	1,243	3,522	0.987	574	995	6,000	7,569	(4,047)
3	2026	1,104	3,189	3,521	0.000	0	3,521	11.0	169	1,859	5,380	1.016	886	1,004	6,000	7,890	(2,510)
4	2027	1,104	3,284	3,626	0.000	0	3,626	11.0	171	1,881	5,507	1.047	913	0	0	913	4,594
5	2028	1,104	3,383	3,735	0.000	0	3,735	11.0	173	1,903	5,638	1.078	940	0	0	940	4,698
6	2029	1,104	3,484	3,846	0.000	0	3,846	11.0	174	1,914	5,760	1.110	968	0	0	968	4,792
7	2030	1,104	3,589	3,962	0.000	0	3,962	11.0	176	1,936	5,898	1.144	998	0	0	998	4,900
8	2031	1,104	3,696	4,080	0.000	0	4,080	11.0	178	1,958	6,038	1.178	1,027	0	0	1,027	5,011
9	2032	1,104	3,807	4,203	0.000	0	4,203	11.0	180	1,980	6,183	1.213	1,058	0	0	1,058	5,125
10	2033	1,104	3,922	4,330	0.000	0	4,330	11.0	182	2,002	6,332	1.250	1,090	0	0	1,090	5,242
11	2034	1,104	4,039	4,459	0.000	0	4,459	11.0	183	2,013	6,472	1.287	1,122	0	0	1,122	5,350
12	2035	1,104	4,160	4,593	0.000	0	4,593	11.0	185	2,035	6,628	1.326	1,156	0	0	1,156	5,472
13	2036	1,104	4,285	4,731	0.000	0	4,731	11.0	187	2,057	6,788	1.366	1,191	0	0	1,191	5,597
14	2037	1,104	4,414	4,873	0.000	0	4,873	11.0	189	2,079	6,952	1.407	1,227	0	0	1,227	5,725
15	2038	1,104	4,546	5,019	0.000	0	5,019	11.0	191	2,101	7,120	1.449	1,264	0	0	1,264	5,856
16	2039	1,104	4,683	5,170	0.000	0	5,170	11.0	193	2,123	7,293	1.492	1,301	0	0	1,301	5,992
17	2040	1,104	4,823	5,325	0.000	0	5,325	11.0	195	2,145	7,470	1.537	1,341	0	0	1,341	6,129
18	2041	1,104	4,968	5,485	0.000	0	5,485	11.0	197	2,167	7,652	1.583	1,381	0	0	1,381	6,271
19	2042	1,104	5,117	5,649	0.000	0	5,649	11.0	199	2,189	7,838	1.631	1,422	0	0	1,422	6,416
20	2043	1,104	5,270	5,818	0.000	0	5,818	11.0	201	2,211	8,029	1.680	1,465	0	0	1,465	6,564
21	2044	736	5,428	3,995	0.000	0	3,995	7.4	203	1,502	5,497	1.730	1,006	0	0	1,006	4,491
22	2045	368	5,591	2,057	0.000	0	2,057	3.7	205	759	2,816	1.782	518	0	0	518	2,298
23	2046	0	5,759	0	0.000	0	0	0.0	207	0	0	1.835	0	0	0	0	0
Total =		22,080									\$132,533					\$44,113	\$88,420
																\$30,870	\$34,614
Total NPV =			\$34,614														
Benefit/Cost Ratio =			2.12														

Worksheet Calculations	
(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)
(H) = Demand Cost (4) escalated.	(P) = (J) - (O)

Table 2
Utility Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - Replacement**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$1,106	\$614	\$1,720	\$987	\$6,000	\$6,987	(\$5,267)
2025	2,279	1,243	3,522	995	6,000	6,995	(3,473)
2026	3,521	1,859	5,380	1,004	6,000	7,004	(1,624)
2027	3,626	1,881	5,507	0	0	0	5,507
2028	3,735	1,903	5,638	0	0	0	5,638
2029	3,846	1,914	5,760	0	0	0	5,760
2030	3,962	1,936	5,898	0	0	0	5,898
2031	4,080	1,958	6,038	0	0	0	6,038
2032	4,203	1,980	6,183	0	0	0	6,183
2033	4,330	2,002	6,332	0	0	0	6,332
2034	4,459	2,013	6,472	0	0	0	6,472
2035	4,593	2,035	6,628	0	0	0	6,628
2036	4,731	2,057	6,788	0	0	0	6,788
2037	4,873	2,079	6,952	0	0	0	6,952
2038	5,019	2,101	7,120	0	0	0	7,120
2039	5,170	2,123	7,293	0	0	0	7,293
2040	5,325	2,145	7,470	0	0	0	7,470
2041	5,485	2,167	7,652	0	0	0	7,652
2042	5,649	2,189	7,838	0	0	0	7,838
2043	5,818	2,211	8,029	0	0	0	8,029
2044	3,995	1,502	5,497	0	0	0	5,497
2045	2,057	759	2,816	0	0	0	2,816
2046	0	0	0	0	0	0	0
Total =			\$132,533			\$20,986	\$111,547
NPV =			\$65,484			\$19,604	\$45,880
Total NPV =			\$45,880				
Benefit/Cost Ratio =			<u>3.34</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

Table 3
Societal Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - Replacement**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$1,106	\$614	\$0.033	\$0	\$2.105	\$775	\$2,495	\$6,987	\$8,720	\$15,707	(\$13,212)
2025	2,279	1,243	0.034	0	2.141	1,576	5,098	6,995	8,720	15,715	(10,617)
2026	3,521	1,859	0.035	0	2.177	2,403	7,783	7,004	8,720	15,724	(7,941)
2027	3,626	1,881	0.036	0	2.214	2,444	7,951	0	0	0	7,951
2028	3,735	1,903	0.037	0	2.251	2,485	8,123	0	0	0	8,123
2029	3,846	1,914	0.038	0	2.289	2,527	8,287	0	0	0	8,287
2030	3,962	1,936	0.039	0	2.328	2,570	8,468	0	0	0	8,468
2031	4,080	1,958	0.040	0	2.367	2,613	8,651	0	0	0	8,651
2032	4,203	1,980	0.041	0	2.407	2,657	8,840	0	0	0	8,840
2033	4,330	2,002	0.043	0	2.448	2,703	9,035	0	0	0	9,035
2034	4,459	2,013	0.044	0	2.489	2,748	9,220	0	0	0	9,220
2035	4,593	2,035	0.045	0	2.531	2,794	9,422	0	0	0	9,422
2036	4,731	2,057	0.047	0	2.574	2,842	9,630	0	0	0	9,630
2037	4,873	2,079	0.048	0	2.617	2,889	9,841	0	0	0	9,841
2038	5,019	2,101	0.049	0	2.662	2,939	10,059	0	0	0	10,059
2039	5,170	2,123	0.051	0	2.707	2,989	10,282	0	0	0	10,282
2040	5,325	2,145	0.052	0	2.752	3,038	10,508	0	0	0	10,508
2041	5,485	2,167	0.054	0	2.799	3,090	10,742	0	0	0	10,742
2042	5,649	2,189	0.056	0	2.846	3,142	10,980	0	0	0	10,980
2043	5,818	2,211	0.057	0	2.894	3,195	11,224	0	0	0	11,224
2044	3,995	1,502	0.059	0	2.943	2,166	7,663	0	0	0	7,663
2045	2,057	759	0.061	0	2.993	1,101	3,917	0	0	0	3,917
2046	0	0	0.063	0	3.043	0	0	0	0	0	0
Total =							\$188,219			\$47,146	\$141,073
NPV =							\$147,993			\$46,120	\$101,873
Total NPV =		\$101,873									
Benefit/Cost Ratio =		<u>3.21</u>									

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated.	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - Replacement**

Year	Benefits							Costs	Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$6,000	368	\$5.950	\$2,190	\$0.100	\$0	\$8,190	\$14,720	(\$6,530)
2025	6,000	736	6.129	4,511	0.103	0	10,511	14,720	(4,209)
2026	6,000	1,104	6.313	6,970	0.107	0	12,970	14,720	(1,750)
2027	0	1,104	6.502	7,178	0.110	0	7,178	0	7,178
2028	0	1,104	6.697	7,393	0.113	0	7,393	0	7,393
2029	0	1,104	6.898	7,615	0.116	0	7,615	0	7,615
2030	0	1,104	7.105	7,844	0.120	0	7,844	0	7,844
2031	0	1,104	7.318	8,079	0.124	0	8,079	0	8,079
2032	0	1,104	7.538	8,322	0.127	0	8,322	0	8,322
2033	0	1,104	7.764	8,571	0.131	0	8,571	0	8,571
2034	0	1,104	7.997	8,829	0.135	0	8,829	0	8,829
2035	0	1,104	8.237	9,094	0.139	0	9,094	0	9,094
2036	0	1,104	8.484	9,366	0.143	0	9,366	0	9,366
2037	0	1,104	8.738	9,647	0.148	0	9,647	0	9,647
2038	0	1,104	9.000	9,936	0.152	0	9,936	0	9,936
2039	0	1,104	9.270	10,234	0.157	0	10,234	0	10,234
2040	0	1,104	9.549	10,542	0.161	0	10,542	0	10,542
2041	0	1,104	9.835	10,858	0.166	0	10,858	0	10,858
2042	0	1,104	10.130	11,184	0.171	0	11,184	0	11,184
2043	0	1,104	10.434	11,519	0.176	0	11,519	0	11,519
2044	0	736	10.747	7,910	0.181	0	7,910	0	7,910
2045	0	368	11.069	4,073	0.187	0	4,073	0	4,073
2046	0	0	11.401	0	0.192	0	0	0	0
Total =		22,080					\$199,865	\$44,160	\$155,705
							NPV = \$87,947	\$40,312	47,635
Total NPV =		\$47,635							
Benefit/Cost Ratio =		<u>2.18</u>							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial 95+% AFUE Furnace - Replacement**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$1,106	\$614	\$0	\$1,720	\$6,987	\$8,720	\$15,707	(\$13,987)
2025	2,279	1,243	0	3,522	6,995	8,720	15,715	(12,193)
2026	3,521	1,859	0	5,380	7,004	8,720	15,724	(10,344)
2027	3,626	1,881	0	5,507	0	0	0	5,507
2028	3,735	1,903	0	5,638	0	0	0	5,638
2029	3,846	1,914	0	5,760	0	0	0	5,760
2030	3,962	1,936	0	5,898	0	0	0	5,898
2031	4,080	1,958	0	6,038	0	0	0	6,038
2032	4,203	1,980	0	6,183	0	0	0	6,183
2033	4,330	2,002	0	6,332	0	0	0	6,332
2034	4,459	2,013	0	6,472	0	0	0	6,472
2035	4,593	2,035	0	6,628	0	0	0	6,628
2036	4,731	2,057	0	6,788	0	0	0	6,788
2037	4,873	2,079	0	6,952	0	0	0	6,952
2038	5,019	2,101	0	7,120	0	0	0	7,120
2039	5,170	2,123	0	7,293	0	0	0	7,293
2040	5,325	2,145	0	7,470	0	0	0	7,470
2041	5,485	2,167	0	7,652	0	0	0	7,652
2042	5,649	2,189	0	7,838	0	0	0	7,838
2043	5,818	2,211	0	8,029	0	0	0	8,029
2044	3,995	1,502	0	5,497	0	0	0	5,497
2045	2,057	759	0	2,816	0	0	0	2,816
2046	0	0	0	0	0	0	0	0
			Total =	\$132,533			\$47,146	\$85,387
			NPV =	\$65,484			\$44,043	21,441

Total NPV = \$21,441
Benefit/Cost Ratio = 1.49

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

**NATURAL GAS CONSERVATION PROGRAMS/DEMAND-SIDE MANAGEMENT
BEN/COST ANALYSIS FOR GAS CONSERVATION**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial Custom Efficiency**
Program Years: **2024 - 2026**

Input Data			First Year	Second Year	Third Year
1) Retail Rate (\$/Dk) =	\$5.777	16) Utility Project Costs			
Escalation Rate =	3.00%	16a) Administrative & Operating Costs =	\$1,481	\$1,493	\$1,505
2) Non-Gas Fuel Retail Rate (\$/Fuel Unit) =	\$0.09753	16b) Incentive Costs =	9,000	9,000	9,000
Escalation Rate =	3.00%	16c) Total Utility Project Costs =	\$10,481	\$10,493	\$10,505
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	Kwh	17) Direct Participant Costs (\$/Part.) =	\$15,000	\$15,000	\$15,000
3) Commodity Cost (\$/Dk) =	\$2.918	18) Participant Non-Energy Costs (Annual \$/Part.) =	\$0	\$0	\$0
Escalation Rate =	3.00%	Escalation Rate =	0.00%	0.00%	0.00%
4) Demand Cost (\$/Unit/Yr) =	\$164.36	19) Participant Non-Energy Savings (Annual \$/Part) =	\$0	\$0	\$0
Escalation Rate =	1.00%	Escalation Rate =	0.00%	0.00%	0.00%
5) Peak Reduction Factor =	1.000%	20) Project Life (Years) =	15	15	15
6) Variable O&M (\$/Dk) =	\$0.000	21) Avg. Dk/Part. Saved =	500.000	500.000	500.000
Escalation Rate =	0.00%	22) Avg Non-Gas Fuel Units/Part. Saved =	0	0	0
7) Non-Gas Fuel Cost (\$/Fuel Unit) =	\$0.02931	22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0	0
Escalation Rate =	3.00%	23) Number of Participants =	3	3	3
8) Non-Gas Fuel Loss Factor	7.72%	24) Total Annual Dk Saved =	1,500	1,500	1,500
9) Gas Environmental Damage Factor =	\$2.070	25) Incentive/Participant =	\$3,000	\$3,000	\$3,000
Escalation Rate =	1.69%	26) Distribution Delivery Charge			\$0.930
10) Non Gas Fuel Environmental Damage Factor =	\$0.000	27) Effective Income Tax Rate =			21.000%
Escalation Rate =	0.00%	(Federal & State Taxes)			
11) Participant Discount Rate =	9.87%				
12) Utility Discount Rate =	7.22%				
13) Societal Discount Rate =	2.24%				
14) General Input Data Year =	2023				
15) Project Analysis Year 1 =	2024				
Project Analysis Year 2 =	2025				
Project Analysis Year 3 =	2026				

Test Results	NPV	B/C
Ratepayer Impact Measure Test	\$154,348	3.30
Utility Cost Test	\$191,983	7.53
Societal Test	\$316,841	3.32
Participant Test	\$150,805	2.22
Total Resource Cost Test	\$91,089	1.70

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial Custom Efficiency**

t	Year	Benefits									Costs					Annual Benefits Less Costs (P)	
		Total Energy Reduction (A)	Gas Commodity Cost/Dk (B)	Gas Commodity Savings (C)	Variable O & M Cost/Dk (D)	Variable O & M Savings (E)	Total Energy Savings (F)	Peak Dk Demand Reduction (G)	Demand Savings Per Unit (H)	Total Demand Savings (I)	Total Savings (J)	Distribution Delivery Charge (K)	Lost Margin (L)	Program Admin Costs (M)	Incentive Costs (N)		Total Program Costs (O)
1	2024	1,500	\$3,006	\$4,509	\$0.000	\$0	\$4,509	15.0	\$166	\$2,490	\$6,999	\$0.958	\$1,135	\$1,481	\$9,000	\$11,616	(\$4,617)
2	2025	3,000	3,096	9,288	0.000	0	9,288	30.0	168	5,040	14,328	0.987	2,339	1,493	9,000	12,832	1,496
3	2026	4,500	3,189	14,351	0.000	0	14,351	45.0	169	7,605	21,956	1.016	3,612	1,505	9,000	14,117	7,839
4	2027	4,500	3,284	14,778	0.000	0	14,778	45.0	171	7,695	22,473	1.047	3,722	0	0	3,722	18,751
5	2028	4,500	3,383	15,224	0.000	0	15,224	45.0	173	7,785	23,009	1.078	3,832	0	0	3,832	19,177
6	2029	4,500	3,484	15,678	0.000	0	15,678	45.0	174	7,830	23,508	1.110	3,946	0	0	3,946	19,562
7	2030	4,500	3,589	16,151	0.000	0	16,151	45.0	176	7,920	24,071	1.144	4,067	0	0	4,067	20,004
8	2031	4,500	3,696	16,632	0.000	0	16,632	45.0	178	8,010	24,642	1.178	4,188	0	0	4,188	20,454
9	2032	4,500	3,807	17,132	0.000	0	17,132	45.0	180	8,100	25,232	1.213	4,312	0	0	4,312	20,920
10	2033	4,500	3,922	17,649	0.000	0	17,649	45.0	182	8,190	25,839	1.250	4,444	0	0	4,444	21,395
11	2034	4,500	4,039	18,176	0.000	0	18,176	45.0	183	8,235	26,411	1.287	4,575	0	0	4,575	21,836
12	2035	4,500	4,160	18,720	0.000	0	18,720	45.0	185	8,325	27,045	1.326	4,714	0	0	4,714	22,331
13	2036	4,500	4,285	19,283	0.000	0	19,283	45.0	187	8,415	27,698	1.366	4,856	0	0	4,856	22,842
14	2037	4,500	4,414	19,863	0.000	0	19,863	45.0	189	8,505	28,368	1.407	5,002	0	0	5,002	23,366
15	2038	4,500	4,546	20,457	0.000	0	20,457	45.0	191	8,595	29,052	1.449	5,151	0	0	5,151	23,901
16	2039	3,000	4,683	14,049	0.000	0	14,049	30.0	193	5,790	19,839	1.492	3,536	0	0	3,536	16,303
17	2040	1,500	4,823	7,235	0.000	0	7,235	15.0	195	2,925	10,160	1.537	1,821	0	0	1,821	8,339
18	2041	0	4,968	0	0.000	0	0	0.0	197	0	0	1.583	0	0	0	0	0
19	2042	0	5,117	0	0.000	0	0	0.0	199	0	0	1.631	0	0	0	0	0
20	2043	0	5,270	0	0.000	0	0	0.0	201	0	0	1.680	0	0	0	0	0
21	2044	0	5,428	0	0.000	0	0	0.0	203	0	0	1.730	0	0	0	0	0
22	2045	0	5,591	0	0.000	0	0	0.0	205	0	0	1.782	0	0	0	0	0
23	2046	0	5,759	0	0.000	0	0	0.0	207	0	0	1.835	0	0	0	0	0
Total =		67,500									\$380,630					\$96,731	\$283,899
											NPV =	\$221,389				\$67,041	\$154,348
Total NPV =			\$154,348														
Benefit/Cost Ratio =			3.30														

Worksheet Calculations	
(A) = Average Dk/Participant Saved (21) x Number of Participants (23) for Project Life (20)	(I) = (G) x (H)
(B) = Commodity Cost (3) escalated	(J) = (F) + (I)
(C) = (A) x (B)	(K) = Distribution Delivery Charge (26) escalated.
(D) = Variable O&M Cost (6), escalated	(L) = (A) x (K) x (1-Inverse of Tax Rate (27))
(E) = (A) x (D)	(M) = Admin & Operating Costs (16a)
(F) = (C) + (E)	(N) = Incentive Costs (16b)
(G) = (A) x Peak Reduction Factor (5)	(O) = (L) + (M) + (N)
(H) = Demand Cost (4) escalated.	(P) = (J) - (O)

**Table 2
Utility Cost Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial Custom Efficiency**

Year	Benefits			Costs			Annual Benefits Less Costs (G)
	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	
2024	\$4,509	\$2,490	\$6,999	\$1,481	\$9,000	\$10,481	(\$3,482)
2025	9,288	5,040	14,328	1,493	9,000	10,493	3,835
2026	14,351	7,605	21,956	1,505	9,000	10,505	11,451
2027	14,778	7,695	22,473	0	0	0	22,473
2028	15,224	7,785	23,009	0	0	0	23,009
2029	15,678	7,830	23,508	0	0	0	23,508
2030	16,151	7,920	24,071	0	0	0	24,071
2031	16,632	8,010	24,642	0	0	0	24,642
2032	17,132	8,100	25,232	0	0	0	25,232
2033	17,649	8,190	25,839	0	0	0	25,839
2034	18,176	8,235	26,411	0	0	0	26,411
2035	18,720	8,325	27,045	0	0	0	27,045
2036	19,283	8,415	27,698	0	0	0	27,698
2037	19,863	8,505	28,368	0	0	0	28,368
2038	20,457	8,595	29,052	0	0	0	29,052
2039	14,049	5,790	19,839	0	0	0	19,839
2040	7,235	2,925	10,160	0	0	0	10,160
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
Total =			\$380,630		\$31,479	\$349,151	
NPV =			\$221,389		\$29,406	\$191,983	
Total NPV =			\$191,983				
Benefit/Cost Ratio =			<u>7.53</u>				

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 1 (J)
(D) = Table 1 (M)
(E) = Table 1 (N)
(F) = (D) + (E)
(G) = (C) - (F)

**Table 3
Societal Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial Custom Efficiency**

Year	Benefits							Costs			Annual Benefits Less Costs (K)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (\$/Part.) (C)	Non-Gas Energy Savings (D)	Environmental Damage Savings/Dk (E)	Environmental Damage Savings (F)	Annual Total Savings (G)	Utility Program Costs (H)	Participants' Costs Net of Rebate (I)	Annual Total Costs (J)	
2024	\$4,509	\$2,490	\$0.033	\$0	\$2.105	\$3,158	\$10,157	\$10,481	\$36,000	\$46,481	(\$36,324)
2025	9,288	5,040	0.034	0	2.141	6,423	20,751	10,493	36,000	46,493	(25,742)
2026	14,351	7,605	0.035	0	2.177	9,797	31,753	10,505	36,000	46,505	(14,752)
2027	14,778	7,695	0.036	0	2.214	9,963	32,436	0	0	0	32,436
2028	15,224	7,785	0.037	0	2.251	10,130	33,139	0	0	0	33,139
2029	15,678	7,830	0.038	0	2.289	10,301	33,809	0	0	0	33,809
2030	16,151	7,920	0.039	0	2.328	10,476	34,547	0	0	0	34,547
2031	16,632	8,010	0.040	0	2.367	10,652	35,294	0	0	0	35,294
2032	17,132	8,100	0.041	0	2.407	10,832	36,064	0	0	0	36,064
2033	17,649	8,190	0.043	0	2.448	11,016	36,855	0	0	0	36,855
2034	18,176	8,235	0.044	0	2.489	11,201	37,612	0	0	0	37,612
2035	18,720	8,325	0.045	0	2.531	11,390	38,435	0	0	0	38,435
2036	19,283	8,415	0.047	0	2.574	11,583	39,281	0	0	0	39,281
2037	19,863	8,505	0.048	0	2.617	11,777	40,145	0	0	0	40,145
2038	20,457	8,595	0.049	0	2.662	11,979	41,031	0	0	0	41,031
2039	14,049	5,790	0.051	0	2.707	8,121	27,960	0	0	0	27,960
2040	7,235	2,925	0.052	0	2.752	4,128	14,288	0	0	0	14,288
2041	0	0	0.054	0	2.799	0	0	0	0	0	0
2042	0	0	0.056	0	2.846	0	0	0	0	0	0
2043	0	0	0.057	0	2.894	0	0	0	0	0	0
2044	0	0	0.059	0	2.943	0	0	0	0	0	0
2045	0	0	0.061	0	2.993	0	0	0	0	0	0
2046	0	0	0.063	0	3.043	0	0	0	0	0	0
Total =							\$543,557			\$139,479	\$404,078
							NPV =	\$453,286		\$136,445	\$316,841
Total NPV =		\$316,841									
Benefit/Cost Ratio =		<u>3.32</u>									

Worksheet Calculations	
(A) = Table 1 (F)	(H) = Table 2 (F)
(G) = Table 1 (I)	(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated..	(J) = (H) + (I)
(D) = (C) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Table 1 (A) x (E)	
(G) = (A) + (B) + (D) + (F)	

**Table 4
Participant Test**

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial Custom Efficiency**

Year	Benefits						Costs		Annual Benefits Less Costs (I)
	Incentives Received (A)	Total Energy Reduction (B)	Retail Rate (C)	Gas Bill Savings (D)	Non-Gas Fuel Retail Rate (E)	Non-Gas Energy Savings (F)	Total Annual Benefits (G)	Direct Participant Costs (H)	
2024	\$9,000	1,500	\$5.950	\$8,925	\$0.100	\$0	\$17,925	\$45,000	(\$27,075)
2025	9,000	3,000	6.129	18,387	0.103	0	27,387	45,000	(17,613)
2026	9,000	4,500	6.313	28,409	0.107	0	37,409	45,000	(7,591)
2027	0	4,500	6.502	29,259	0.110	0	29,259	0	29,259
2028	0	4,500	6.697	30,137	0.113	0	30,137	0	30,137
2029	0	4,500	6.898	31,041	0.116	0	31,041	0	31,041
2030	0	4,500	7.105	31,973	0.120	0	31,973	0	31,973
2031	0	4,500	7.318	32,931	0.124	0	32,931	0	32,931
2032	0	4,500	7.538	33,921	0.127	0	33,921	0	33,921
2033	0	4,500	7.764	34,938	0.131	0	34,938	0	34,938
2034	0	4,500	7.997	35,987	0.135	0	35,987	0	35,987
2035	0	4,500	8.237	37,067	0.139	0	37,067	0	37,067
2036	0	4,500	8.484	38,178	0.143	0	38,178	0	38,178
2037	0	4,500	8.738	39,321	0.148	0	39,321	0	39,321
2038	0	4,500	9.000	40,500	0.152	0	40,500	0	40,500
2039	0	3,000	9.270	27,810	0.157	0	27,810	0	27,810
2040	0	1,500	9.549	14,324	0.161	0	14,324	0	14,324
2041	0	0	9.835	0	0.166	0	0	0	0
2042	0	0	10.130	0	0.171	0	0	0	0
2043	0	0	10.434	0	0.176	0	0	0	0
2044	0	0	10.747	0	0.181	0	0	0	0
2045	0	0	11.069	0	0.187	0	0	0	0
2046	0	0	11.401	0	0.192	0	0	0	0
Total =		67,500					\$540,108	\$135,000	\$405,108
							NPV = \$274,041	\$123,236	150,805
Total NPV =		\$150,805							
Benefit/Cost Ratio =		<u>2.22</u>							

Worksheet Calculations	
(A) = Table 1 (N)	(G) = (A) + (D) + (F)
(B) = Table 1 (A)	(H) = Direct Participant Costs (17) x Number of Participants (23)
(C) = Retail Rate (1) escalated.	(I) = (G) - (H)
(D) = (B) x (C)	
(E) = Non-Gas Fuel Retail Rate (2), escalated.	
(F) = (E) x [Avg. Non-Gas Fuel Units/Part.Saved (22) x No. of Part. (23)]	

Table 5
Total Resource Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **Commercial Custom Efficiency**

Year	Benefits				Costs			Annual Benefits Less Costs (H)
	Total Energy Savings (A)	Total Demand Savings (B)	Non-Gas Energy Savings (C)	Total Annual Benefits (D)	Utility Program Costs (E)	Participants' Costs Net of Rebate (F)	Total Costs (G)	
2024	\$4,509	\$2,490	\$0	\$6,999	\$10,481	\$36,000	\$46,481	(39,482)
2025	9,288	5,040	0	14,328	10,493	36,000	46,493	(32,165)
2026	14,351	7,605	0	21,956	10,505	36,000	46,505	(24,549)
2027	14,778	7,695	0	22,473	0	0	0	22,473
2028	15,224	7,785	0	23,009	0	0	0	23,009
2029	15,678	7,830	0	23,508	0	0	0	23,508
2030	16,151	7,920	0	24,071	0	0	0	24,071
2031	16,632	8,010	0	24,642	0	0	0	24,642
2032	17,132	8,100	0	25,232	0	0	0	25,232
2033	17,649	8,190	0	25,839	0	0	0	25,839
2034	18,176	8,235	0	26,411	0	0	0	26,411
2035	18,720	8,325	0	27,045	0	0	0	27,045
2036	19,283	8,415	0	27,698	0	0	0	27,698
2037	19,863	8,505	0	28,368	0	0	0	28,368
2038	20,457	8,595	0	29,052	0	0	0	29,052
2039	14,049	5,790	0	19,839	0	0	0	19,839
2040	7,235	2,925	0	10,160	0	0	0	10,160
2041	0	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0	0
			Total =	\$380,630			\$139,479	\$241,151
			NPV =	\$221,389			\$130,301	91,089

Total NPV = \$91,089
Benefit/Cost Ratio = 1.70

Worksheet Calculations
(A) = Table 1 (F)
(B) = Table 1 (I)
(C) = Table 3 (D)
(D) = (A) + (B) + (C)
(E) = Table 3 (H)
(F) = Table 3 (I)
(G) = (E) + (F)
(H) = (D) - (G)

Montana-Dakota Utilities Co.
2024 Input Data Summary
South Dakota Natural Gas Conservation Model

Input No.	Input Data Description	Information Source	SD Res.	SD Comm.
1	Retail Rate (\$/dk)	Weighted Average of SD retail rate using projected 2023-2024 winter gas costs & October 2023 pipeline and distribution rates	6.683	5.777
	Escalation Rate		3.00%	3.00%
2	Non-Gas Fuel Retail (\$/fuel/unit)	Average retail cost of non gas fuel if measures also saves kWh, gallons of water, etc. (for analysis purposes, used electric as Non-Gas Fuel Retail Rate)	0.10137	0.09753
	Escalation Rate		3.00%	3.00%
	Non-Gas Fuel Units (ie. kWh, Gallons, etc)		Kwh	Kwh
3	Commodity Cost (\$/dk)	Estimated gas costs using projected 2023-24 winter gas costs October 2023 pipeline commodity	2.918	2.918
	Escalation Rate		3.00%	3.00%
4	Demand Cost (\$/dk/Yr)	Annual cost of firm capacity on pipeline	\$164.36	\$164.36
	Escalation Rate		1.00%	1.00%
5	Peak Reduction Factor	Estimated average peak day reduction factor caused by implementing the measure (s)	1.000%	1.000%
6	Variable O&M (\$/dk)	Estimated variable O&M that will be avoided due the implementing the measure	\$0	\$0
	Escalation Rate		0.00%	0.00%
7	Non-Gas Fuel Cost (\$/Fuel Unit)	Average commodity cost of non gas fuel if measures also saves kWh, gallons of water, etc. (for analysis purposes, used electric as Non-Gas Fuel Cost)	\$0.02931	\$0.02931
	Escalation Rate		3.00%	3.00%
8	Non-Gas Fuel Loss Factor	Non-Gas fuel loss factor (for analysis purposes, used total energy loss factor from Class Cost of Service in Docket No. EL23-020)	7.719%	7.719%
9	Gas Environmental Damage Factor	Per Minnesota CIP triennial 2024-2026	2.07	2.07
	Escalation Rate		1.69%	1.69%
10	Non Gas Fuel Environmental Damage Factor	Not Applicable	\$0	\$0
	Escalation Rate		0.00%	0.00%
11	Participant Discount Rate	Federal Reserve Consumer Credit Interest Rate 12 Months ended December 31, 2022	9.87%	9.87%
12	Utility Discount Rate	Montana-Dakota's authorized average cost of capital	7.216%	7.216%
13	Societal Discount Rate	Equal to the 30 year T-Bill rate average for Twelve Months Ending December 31, 2022	2.24%	2.24%
14	General Input Data Year =	Year data was input	2023	2023
15	Project Analysis Year	Year(s) program will be implemented	2024	2024

**Montana-Dakota Utilities Co.
2024 Input Data Summary
South Dakota Natural Gas Conservation Model**

Input No.	Input Data Description	Information Source	SD Res.	SD Comm.
			2025	2025
			2026	2026
16	Utility Project Costs	Total direct cost to the utility caused by implementing the program(s)		
17	Direct Participant Costs (\$/Part.)	Direct costs that the participant would have to participate in the program		
18	Participant Non-Energy Costs (Annual \$/Part.)	Annual participant non-energy costs if applicable caused by implementing the measure (Not Applicable)	\$0	\$0
	Yr. 1		\$0	\$0
	Yr. 2		\$0	\$0
	Yr. 3		\$0	\$0
	Escalation Rate Yr. 1		0.00%	0.00%
	Escalation Rate Yr. 2		0.00%	0.00%
	Escalation Rate Yr. 3		0.00%	0.00%
19	Participant Non-Energy Savings (Annual \$/Part) Yr. 1	Participant non energy savings if applicable caused by implementing the measure (Not Applicable)	\$0	\$0
	Yr. 2		\$0	\$0
	Yr. 3		\$0	\$0
	Escalation Rate Yr. 1		0.00%	0.00%
	Escalation Rate Yr. 2		0.00%	0.00%
	Escalation Rate Yr. 3		0.00%	0.00%
20	Project Life (Years)	Based on the estimated useful life of the energy saving equipment (20 years maximum)		
21	Avg. Dk/Part. Saved	Avg energy reduction (Dk) caused by the program(s)		
22	Avg Non-Gas Fuel Units/Part. Saved Yr. 1	Average non-gas fuel units saved or added due to implementing the measure (for analysis purposes, used Kwh)		
	Yr. 2		0	0
	Yr. 3		0	0
22a	Avg Additional Non-Gas Fuel Units/ Part. Used Yr. 1		0	0
	Yr. 2		0	0
	Yr. 3		0	0
23	Number of Participants	Total number of expected participants is the program(s)		
24	Total Annual Dk Saved	Total Dk saved from the program in the year implemented		
25	Incentive/Participant	Incentive provided to the participant		
26	Distribution Delivery Charge	Weighted Average of Montana-Dakota's Distribution Delivery Charge	1.836	0.930
27	Effective Fed & State Income Tax Rate	Montana-Dakota's effective tax rate	21%	21%

**South Dakota Natural Gas DSM Programs
Technical Assumptions**

<u>2024 - 2026 Program Years</u>	<u>Customer Class</u>	<u># of Particip Year 1</u>	<u>Number of Particip Year 2</u>	<u>Number of Particip Year 3</u>	<u>Project Life</u>	<u>Baseline Efficiency</u>	<u>Average High Efficiency</u>	<u>Average dk Saved / part</u>	<u>Average Non-Energy Benefits / Part</u>	<u>Increm Cost</u>	<u>Avg Incentive / Part</u>
Residential											
Furnace Tier 2 - 95%+ AFUE - New	Res	120	130	140	20	90	95	5.7	0.0	165	150
Furnace Tier 2 - 95%+ AFUE - Replacement	Res	250	250	250	20	80	95	19.6	720.0	736	300
Programmable Thermostats - Tier 1	Res	75	70	70	10	NA	NA	2.3	0.0	30	15
Programmable Thermostats - Tier 2	Res	190	195	200	10	NA	NA	5.8	41.0	155	60
Commercial											
Furnace Tier 2 - 95%+ AFUE - New	Comm	7	9	10	20	90	95	4.5	0.0	165	150
Furnace Tier 2 - 95%+ AFUE - Replacement	Comm	20	20	20	20	80	95	18.4	0.0	736	300
Custom Efficiency	Comm	3	3	3	15	NA	NA	500.0	0.0	15,000	3,000
Totals	2,035	665	677	693							