MONTANA-DAKOTA
UTILITIES CO.
A Division of MDU Resources Group, Inc.

400 North Fourth Street
Bismarck, ND 58501
(701) 222-7900

March 2, 2009

Ms. Patricia Van Gerpen
Executive Director
South Dakota Public Utilities Commission
State Capitol Building
500 East Capitol
Pierre, SD 57501-5070

Re: Natural Gas Conservation Programs & Conservation Tracking Adjustment
Docket No. NG09-___

Dear Ms. Van Gerpen:

Montana-Dakota Utilities Co. (Montana-Dakota), a Division of MDU Resources Group, Inc., herewith requests Commission approval to remove the experimental qualifier associated with its Gas Conservation Program. This request, including an updated portfolio of Natural Gas Conservation Programs and the proposed Table of Contents and Conservation Program Tracking Mechanism Rate 90 designated as 4th Revised Sheet No. 1 and 3rd Revised Sheet No. 31, respectively, have been electronically submitted to the Commission.

In November 2005, Montana-Dakota requested Commission approval to offer to its customers a portfolio of natural gas conservation programs in order to recognize the natural gas market conditions facing customers. The Company also requested approval of a Conservation Tracking Adjustment mechanism to recover the actual costs of the programs and the lost distribution revenues resulting from customer participation in these programs. The Commission approved Experimental Conservation Program Tracking Mechanism Rate 90 on February 10, 2006 in Docket No. NG05-16 on an experimental basis for a period encompassing three heating seasons or a program expiration date of April 30, 2009. Conservation programs authorized under the Experimental Rate 90 include Customer Conservation Starter Kits, High-Efficiency Furnaces and Programmable Thermostats.

Since the programs were introduced in February 2006, the Company has seen modest success with steady increases in the number of customers participating and associated gas load reductions each year. While the cost of gas has been, and will continue to be a primary influence on a customer's decision to participate in a conservation program, the Company also attributes some of this increase to a growing familiarity with the programs as is evidenced by the positive response to Question 2 of the Company's

Demand-Side Management Survey, included herein as Attachment A, page 1 for the 2006-2007 and 2007-2008 program years. A summary of the number of customers participating in the programs and the Dk saved are included in Attachment A, page 2.

The Company is proposing to continue the application of Rate 90 and expand its natural gas portfolio to include four additional gas conservation programs and remove the experimental nature of the current tariff through the implementation of a biennial review of the Company's portfolio of programs to be filed by June 1 of every other year. The Company remains committed to the South Dakota Energy Smart initiative undertaken in late 2007 by focusing its efforts on programs that provide the opportunity to be implemented in a near-term time frame and by providing cash incentives in order to make certain energy efficiency measures more cost effective to customers.

Montana-Dakota is proposing the following six natural gas conservation programs and education and outreach plans be included in its 2010-2011 portfolio. As the Company's current program is set to expire on April 30, 2009, the Company proposes that the current programs (Conservation Starter Kits, High-Efficiency Furnace (90+% AFUE) and Programmable Thermostats) be continued through the remainder of 2009 with the new portfolio starting January 1, 2010. All programs will continue to be promoted through local advertising, Montana-Dakota's web site, home shows, bill inserts and community meetings. Additional details regarding each program are provided in Attachment B.

1. *High-Efficiency Furnace (90-93%) Incentive.* The program will provide residential and qualifying firm general customers with a rebate of $150 for purchasing and installing an ENERGY STAR rated furnace with an Annual Fuel Utilization Efficiency (AFUE) rating between 90% and 93% to replace an existing less efficient furnace.

2. *High-Efficiency Furnace (94%) Incentive.* This program provides residential and qualifying firm general customers with a higher cash incentive ($300) for taking the next step and purchasing an ENERGY STAR rated furnace with an AFUE rating of 94% or higher to replace an existing less efficient furnace.

3. *High-Efficiency Water Heater Incentive.* This new program will provide residential and qualifying firm general customers with a rebate of $50 for purchasing and installing a high efficiency water heater (defined as a unit with an energy factor of at least .62 (.67 in fall of 2010) to replace an existing less efficient water heater.

4. *Programmable Thermostats.* Montana-Dakota will offer a $20 incentive for the purchase of a programmable thermostat that meets the ENERGY STAR guidelines.

5. *Attic Insulation.* This program has been designed to provide customers an incentive to install attic insulation with higher insulation R-Values, at the time of remodeling/replacement. R-Value is a measure of thermal resistance. The higher the R-Value the better the building insulation's effectiveness. Customers will receive a rebate dependent on the R-value of the insulation installed with the average rebate approximately $300 per installation.

6. *New Construction Bundle.* This program has been designed to attract new residential and small commercial construction to include a bundle of the above mentioned programs in their projects. Two levels of incentives would be made available: (1) a $300 rebate for the installation of a ENERGY STAR rated furnace of at least 94% or greater AFUE and a natural gas water heater with a minimum energy factor of .62 and (2) a $400 rebate for the installation of a 94% or greater AFUE furnace, a natural gas water heater with a energy factor of .62 and a qualifying insulation package.

Four tests were performed on each of the programs to measure the cost effectiveness based on the benefit/cost ratios produced under the Rate Payer, Utility, Societal and Participant tests. The results of the four tests are summarized, by program, in Attachment C. The total cost of the Company's conservation portfolio is estimated to be approximately $93,000 in the first year while producing an annual energy savings of approximately 2,200 Dk as shown in Attachment C, page 1. Based on estimated participation rates the portfolio of programs is expected to reduce annual natural gas requirements by approximately 94,000 dk over the life of the installed equipment.

Montana-Dakota is also proposing to continue to provide Customer Conservation Starter Kits as part of its outreach efforts. The program includes a packet of materials that provide information on ways to conserve energy along with wall and switch plate gaskets, a tube of caulk, a filter whistle and V-type weather stripping.

The Home*EnergySuite* is a new feature within the education and outreach portion of the Company's portfolio. Home*EnergySuite* is a web based tool that will provide customers the opportunity to evaluate their energy consumption and perform energy conservation scenarios.

The costs to be recovered through the Conservation Tracking Adjustment will continue to be the actual costs incurred as well as the lost distribution revenue, priced at the applicable distribution delivery charge, resulting from customer participation. The annual update for the Conservation Tracking Adjustments reflecting costs through the end of February 2009 will be filed under separate cover letter by March 31, 2009. A revised Conservation Program Tracking Mechanism Rate 90 tariff is provided in Attachment D.

Attached as Exhibit A is the South Dakota "Report of Tariff Schedule Change" form required pursuant to ARSD 20:10:13:26.

The Company will comply with ARSD 20:10:13:18 by posting the Notice shown in Exhibit B in a conspicuous place in each business office in its affected gas service territory in South Dakota for at least 30 days before the change becomes effective.

Montana-Dakota respectfully requests an expedited review by the Commission with approval of the programs and the Conservation Program Tracking Mechanism Rate 90 on an expedited basis.

Please refer all inquiries regarding this filing to:

Ms. Tamie A. Aberle
Pricing & Tariff Manager
Montana-Dakota Utilities Co.
400 North Fourth Street
Bismarck, ND 58501

Also, please send copies of all written inquiries, correspondence and pleadings to:

Mr. Daniel S. Kuntz
Associate General Counsel
MDU Resources Group, Inc.
P.O. Box 5650
Bismarck, ND 58503-5650

This filing has been electronically submitted to the Commission in accordance with ARSD 20:10:01:02:05. Montana-Dakota respectfully requests that this filing be accepted as being in full compliance with the filing requirements of this Commission.

Sincerely,

Donald R. Ball
Vice President – Regulatory Affairs

Attachments
cc: D. A. Gerdes

Exhibit A

Report of Tariff Schedule Change

NAME OF UTILITY: Montana-Dakota Utilities Co.
ADDRESS: 400 North Fourth Street
Bismarck, ND 58501

Section No.	Class of Service	New Sheet No.
1	Table of Contents	4th Revised Sheet No. 31
3	Conservation Program Tracking Mechanism	3rd Revised Sheet No. 31

Change: Applicability (eliminate experimental component, introduce biennial updates to programs)
(State part of tariff schedule affected by change, such as: Applicability, availability, rates, etc.)

Reason for Change Continue Natural Gas Conservation Programs

Present Rates .....
Proposed Rates .....
Approximate annual reduction in revenue ..... N/A
Approximate annual increase in revenue ..... N/A

Points Affected	Estimated Number of Customers Whose Cost of Service will be:					
	Reduced		Increased		Unchanged	
	# of Customers	Amount in $	# of Customers	Amount in $	# of Customers	Amount in $
All	N/A	N/A	N/A	N/A	N/A	N/A

Include Statement of Facts, expert opinions, documents and exhibits supporting the change requested.

Received: _____

Montana-Dakota Utilities Co.
(Reporting Utility)

By: _____
Executive Director
South Dakota
Public Utilities Commission

By: Donald R. Ball
Vice President- Regulatory Affairs
(Name and Title)

SD-20:10:13:26

On March 2, 2009 Montana-Dakota Utilities Co., a Division of MDU Resources Group, Inc., filed with the South Dakota Public Utilities Commission revised Rate 90 which affects Montana-Dakota Utilities Co.'s residential and firm general gas customers in South Dakota. The revised rate and South Dakota rules and regulations are available in this office for inspection. Please inquire at cashier's desk.

Exhibit B

MONTANA-DAKOTA UTILITIES CO.

Summary of Demand-Side Management Survey
Program Years 2007 and 2008

1) If you purchased an ENERGY STAR rated furnace, what is the age of the furnace that was replaced?

	2007	2008	Change
1 - 5 yrs old	3.57%	1.47%	-2.10%
6 - 10 yrs old	10.71%	7.35%	-3.36%
11 - 15 yrs old	0.00%	2.94%	2.94%
16 - 20 yrs old	14.29%	7.35%	-6.94%
21 - 30 yrs old	28.57%	32.35%	3.78%
31 - 40 yrs old	25.00%	25.00%	0.00%
More than 40 yrs old	14.29%	20.59%	6.30%
Don't know	3.57%	2.94%	-0.63%

2) Did the incentive offer influence your decision to purchase an ENERGY STAR rated programmable thermostat and/or furnace?

	2007	2008	Change
Yes	31.82%	48.72%	16.90%
No	61.36%	47.86%	-13.50%
No Answer	6.82%	3.42%	-3.40%

3) Did the current price of natural gas influence your decision to purchase an ENERGY STAR rated programmable thermostat and/or furnace?

	2007	2008	Change
Yes	75.00%	76.07%	1.07%
No	20.45%	22.22%	1.77%
No Answer	4.55%	1.71%	-2.84%

4) On average over the winter heating season, how many hours per week do you intend to set back your programmable thermostat?

	2007	2008	Change
0 - 5 hours	0.00%	7.50%	7.50%
6 - 10 hours	14.29%	17.50%	3.21%
11 - 15 hours	7.14%	7.50%	0.36%
16 - 20 hours	7.14%	7.50%	0.36%
21 - 25 hours	7.14%	3.75%	-3.39%
26 - 30 hours	14.29%	8.75%	-5.54%
More than 30 hours	50.00%	47.50%	-2.50%

5) At what temperature change (the difference from the high and low setting) do you intend to program your thermostat?

	2007	2008	Change
0 Degrees	0.00%	2.41%	2.41%
1 - 3 Degrees	13.79%	7.23%	-6.56%
4 - 5 Degrees	31.04%	31.34%	0.30%
6 - 8 Degrees	20.69%	28.92%	8.23%
9 - 10 Degrees	24.14%	22.89%	-1.25%
More than 10 Degrees	10.34%	7.23%	-3.11%

6) What is your total household income level?

	2007	2008	Change
Less than $25,000/year	22.73%	17.09%	-5.64%
$25,001 - $50.000/year	25.00%	26.50%	1.50%
$50,001 - $75,000/year	25.00%	27.35%	2.35%
$75,001 - $100,000/year	11.36%	15.38%	4.02%
More than $100,000/year	9.09%	7.69%	-1.40%
No Answer	6.82%	5.98%	-0.84%

MONTANA-DAKOTA UTILITIES CO.
GAS UTILITY - SOUTH DAKOTA

Summary of SD DSM Programs
Program Years 2007 and 2008

	High Efficiency Furnaces				
			Increase in		Lifetime
	Customers	Dk Saved	Customers	Dk Saved	Dk Savings 1/
2006 - 2007	39	318			5,724
2007 - 2008	53	471	35.897%	48.113%	8,478
					14,202

	Programmable Thermostats				
			Increase in		
	Customers	Dk Saved	Customers	Dk Saved	
2006 - 2007	42	125			1,875
2007 - 2008	83	242	97.619%	93.600%	3,630
					5,505

1/ Expected lifetime of furnace is 18 years.
2/ Expected lifetime of programmable thermostat is 15 years.

Montana-Dakota Utilities Co.
Natural Gas Conservation Programs

Most successful utility conservation programs focus on both existing building stock and new construction and use a combination of indirect and direct impact programs. Indirect programs energy savings are qualitative in nature and include items such as customer education and outreach, energy savings calculators (typically web based), and trade ally meetings designed to assist with transforming the market towards energy efficiency. Direct impact programs provide quantifiable energy savings and include programs such as equipment rebates and building envelope upgrades that are designed to reduce the participant's entry cost which is one of the barriers to choosing the energy efficient product.

Montana-Dakota is proposing a portfolio approach to conservation using indirect and direct impact programs to potentially increase the amount of conservation in South Dakota. The analysis of the portfolio of programs involved a benefit/cost analysis of each program taking into account the cost associated with the program and savings generated as a result of the program. A utility, rate payer, societal and participant test was run for each direct impact program. The cost associated with the indirect impact programs is included in the total program benefit/cost analysis to ensure the total portfolio remains cost effective. The results are provided in Attachment C.

Education and Outreach

Montana-Dakota's education and outreach efforts are designed to educate customers and HVAC dealers about the benefits of conservation, provide energy conservation resources for customers and dealers to use, and promote energy conservation. To accomplish this Montana-Dakota plans to focus its resources in four primary areas: 1) Energy conservation starter kits 2) A web-based home energy calculator 3) Dealer and Builder meetings 4) Customer education and promotion.

The customer conservation starter kits are designed to provide the consumer weatherization resources and information on ways they can begin to reduce their energy use at home. Although it is difficult to quantify the effects on a customer's consumption level of providing the conservation packets to customers, they are a valuable resource for providing an educational tool to customers who are interested in controlling their energy use. The kit includes wall & switch plate gaskets, a tube of caulk, a caulk gun, a filter whistle, V-type weather-stripping, installation instructions, and energy conservation tips.

The Home*Energy*Suite is a hosted service of APOGEE that is a web based tool that will provide customers the opportunity to evaluate their energy consumption, perform

energy conservation scenarios. The product also provides special purpose calculators for heating, water heating, and thermostats. Automated links back to Montana-Dakota's energy conservation programs and application forms will also be provided.

In an effort to educate home builders and dealers on the benefits of conservation and Montana-Dakota's specific conservation programs, Montana-Dakota will host meetings in key locations across the service territory.

Montana-Dakota's customer education and promotion efforts will include participation in trade shows, energy awareness events, developing K-12 education tools using available resources and media advertising such as billboards, flyers, and inserts.

High Efficiency Furnaces (ENERGY STAR Rated)

Furnaces are the most common residential heating system in the United States and, according to Montana-Dakota's customer energy use survey 79% of South Dakota natural gas customers use a furnace to heat their home.

This program would be for existing buildings and be applicable to residential and small commercial customers replacing an 80% or less annual fuel utilization efficiency (AFUE) furnace with a ENERGY STAR rated furnace of 90% or greater AFUE. In order for a commercial customer to qualify the furnace would need to have a input rating of 125,000 btuh or less.

Montana-Dakota proposes to promote a two tiered incentive level that would increase once a customer moves to a 94% AFUE or higher furnace. The incentive would be $150 towards the purchase of a furnace that has an AFUE between 90-93% and a $300 incentive would be offered for the purchase of a 94% and above furnace.

High Efficiency Water Heaters (Energy Star Rated)

Water heating represents between thirteen and seventeen percent of national residential energy consumption, making it the third largest energy end use in homes, behind heating and cooling and kitchen appliances. As homes become more efficient, the percentage of energy used for water heating steadily increases. ENERGY STAR has recognized this and since this was the only major residential energy end use that ENERGY STAR had not addressed they will start rating water heaters in 2009.

Qualified water heaters must achieve a minimum 0.62 energy factor in order to be rated as ENERGY STAR qualified. This minimum energy factor will be increased to

0.67 energy factor beginning September 1, 2010. Therefore, in an effort to begin to build awareness of the new rating, Montana-Dakota's water heating incentive will being with 0.62 energy factor models through 2010 and in 2011 will move to the higher minimum level of a 0.67 energy factor.

Montana-Dakota's high efficiency water heater program will offer a $50 incentive for the purchase and installation of an 0.62 energy factor ENERGY STAR water heater in 2010. In 2011 the incentive level will increase to $100 for the 0.67 energy factor ENERGY STAR water heater as the incremental cost difference is estimated to increase substantially.

Programmable Thermostats (Energy Star Rated)

Programmable thermostats automatically adjust a customer's home temperature settings, allowing them to save energy while away or sleeping. The programmable units are more convenient and accurate than manual thermostats and improve the comfort of the home. The programmable thermostats save energy by offering 4 convenient, pre-programmed temperature settings. Typical cost of the thermostats range from $50-$200.

Montana-Dakota's programmable thermostat program will continue to offer a $20 incentive for the purchase and installation of a programmable thermostat that meets the ENERGY STAR guidelines. Typically a customer will save 1% of their heating energy use for every degree of setback, with an eight hour minimum setback period. Thermostats that meet the ENERGY STAR guidelines are pre-programmed for a 8 degree set back for two eight hour setback periods per day.

Attic Insulation Incentive Program

Montana-Dakota believes that many existing homes have under-insulated attics as compared to currently recommended levels by the 2004 International Energy Conservation Code (IECC). Energy savings from adding insulation has a diminishing scale with the amount of insulation added. Therefore the energy savings are higher with homes that have little or no insulation than those with some minimum levels of insulation.

Montana-Dakota's natural gas heating customers retrofitting their existing home with additional insulation will qualify for incentives according to the following chart which matches the incentive level per square foot to the energy savings based on the existing R-Value. Rebate levels are also dependant on self-install or contract install as the actual cost of installation changes significantly.

Base insulation to IECC Standard	$/Sq Ft Contractor	$/Sq Ft Self-Install
R11 to R49	$ 0.41	$ 0.20
R19 to R49	$ 0.26	$ 0.12
R25 to R49	$ 0.15	$ 0.06

New Construction Bundled Incentive

This program is designed to improve the energy efficiency of a newly constructed home using natural gas for heating and water heating requirements. Montana-Dakota is taking a bundle approach to increasing the efficiency of new homes. This bundled approach has two levels that address heating and water heating equipment in the first level and building envelope items of attic and wall insulation in the second level.

The first level to qualify for any incentive would be that a minimum of a 94% AFUE furnace and a 0.62 energy factor water heater would need to be installed to qualify for a $300 incentive. The second level is targeting increased insulation levels in the walls and attic and would add another $100 incentive for R-21 walls and R-49 attic insulation levels which are recommended by the 2004 IECC. The total bundled incentive would be $400 per home that achieves the equipment efficiencies and building envelope requirements.

Program Summary, Costs & Participation

Montana-Dakota Utilities Co.
SD Gas Conservation Program Summary

Benefit/Cost Ratios

Program	RIM	Utility	Societal	Participant
High Eff Furnace 90%	2.50	3.59	1.83	2.45
High Eff Furnace 94%	1.91	2.49	1.07	1.50
High Eff Water Heater	1.80	2.31	1.22	1.83
Programmable Thermostats	3.00	4.77	4.56	11.53
Attic Insulation	2.10	2.83	1.87	2.87
New Construction Bundle	1.76	2.26	1.22	1.78
Education and Outreach	N/A	N/A	N/A	N/A
Total Portfolio	1.88	2.44	1.59	2.41

Program	2010 Participation	Cost per Dk saved	2010 Total Cost	2010 Dk Saved	2011 Participation	Cost per Dk Saved	2011 Total Cost	2011 Dk Saved
High Eff Furnace 90%	60	$25.37	$11,111	438	60	$24.72	$10,829	438
High Eff Furnace 94%	30	39.25	10,126	258	30	38.16	9,844	258
High Eff Water Heater	55	44.95	4,720	105	85	35.03	11,033	315
Programmable Thermostats	110	19.25	6,140	319	135	17.30	6,780	392
Attic Insulation	55	36.43	18,250	501	85	35.78	27,693	774
New Construction Bundle	78	50.78	30,114	593	78	40.32	29,551	733
Education and Outreach	N/A	N/A	12,500	N/A	N/A	N/A	12,500	NA
Totals	388	$36.01	$92,961	2,214	473	$31.89	$108,230	2,910

Cost per dk residential	2010	2011
Total Customers (2008)	45,982	45,982
Total Dk (2004)	3,340,824	3,340,824
Less Dk Saved	2,214	2,910
Cost per Dk	**$0.028**	**$0.032**
Average Residential Customer	2.33	2.67

SD Residential High Efficiency Furnace
90% & 94% Efficiency (< 125,000 btuh)

Customer Class:	Residential & Small Commercial

Program Cost

	90% - 93%			94%		
	$/Part	Total $ Yr 1	Total $ Yr 2	$/Part	Total $ Yr 1	Total $ Yr 2
Direct Operating Costs	$ -	$ -	$ -	$ -	$ -	$ -
Incentive Costs	$ 150	$ 9,000	$ 9,000	$ 300	$ 9,000	$ 9,000
Administrative Costs	$ 33	$ 2,111	$ 1,829	33	$ 1,126	$ 844
Total Program Costs	$ 183	$ 11,111	$ 10,829	$ 333	$ 10,126	$ 9,844

Project Life		18
Incentive 92%	$	150
Incentive 94%	$	300

Participant Costs (Incremental Cost Basis)

Cost of STD Eff Model (80% AFUE)	$ 880	75,000 BTUH	
Cost of High Efficiency Model (90% AFUE)	$ 1,380	75,000 BTUH	
Cost of High Efficiency Model (94% AFUE)	$ 2,000	75,000 BTUH	
Increased cost of 90% Model	$ 500		
Increased cost of 94% model	$ 1,120		

Participation

	% of Cust	Cust	
Total Customers in Class	100.00%	45,982	
Total Customers with gas forced air heating (Available for Program)	79.10%	36,372	Estimated

	90%	94%	Total Furnace
East River Annual Participation	10	5	15
BH Annual Participation	50	25	75
Total Participants	**60**	**30**	**90**

Total Dk
696.0

Percentage of total customers available for program	0.2%
Percentage of Total Customer Base	0.2%

Energy Savings

Equipment	Eff	DK Saved	Part %
Baseline Eff	80%	-	0.0%
High Eff	90%	6.44	4.7%
	91%	7.01	7.0%
	92%	7.57	84.9%
	93%	8.11	3.5%
Average dk Saved		**7.3**	

Baseline Eff	80%	-
High Eff	94%	8.640
Energy Reduction		**8.6**

Energy Star LBNL 2004

Actual Savings will vary by customer depending on use and other factors

SD Residential Energy Star Water Heaters
Minimum Energy Factor of .62 (.67 in Fall 2010)

Customer Class:	Residential & Small Commercial

Program Cost

			$/Part	Total $ Yr 1	Total $ Yr 2	Total $
Operating Costs			$ -	$ -	$ -	$ -
Incentive Costs	$ 50.00	Incentive	$ 50	$ 2,750	$ 8,500	$ 11,250
Administrative Costs			$ 36	$ 1,970	$ 2,533	$ 4,503
Total Cost			$ 86	$ 4,720	$ 11,033	$ 15,753

Notes

Incentive	$ 50.00	0.62	2010
Incentive	$ 100.00	0.67	2011

Participant Costs (Incremental Cost Basis)

Cost of STD Eff Model .57	$ 440	50 Gallon
Cost of High Efficiency Model .62 EF	$ 505	50 Gallon
Increased cost of Higher Eff Model	$ 65	
Cost of STD Eff Model .57	$ 440	50 Gallon
Cost of High Efficiency Model .67 EF	$ 848	50 Gallon
Increased cost of Higher Eff Model	$ 408	

Participation

	% of Cust	Cust
Total Customers in Class	100.00%	45,982
Total Customers with gas water heaters	67.70%	31,130

		SD	ER	Total
Participation Year 1	2010	50	5	55
Participation Year 2	2011	75	10	85
Total Participants		**125**	**15**	**140**

Energy Savings

Equipment	Energy Factor	Annual DK
Standard Efficiency	0.57	26.1
Energy Star	0.62	24.2
Energy Reduction	**5%**	**1.9**

American Council for an Energy Efficient Economy & Energy Star

Actual Savings will vary by customer depending on use and other factors

	Per Part
Gas Reduction Annual	1.9 dk

Energy Savings At .67 in 2011			
Standard Efficiency	0.57	26.1	Energy Star
Energy Star	0.67	22.4	Energy Star
Energy Reduction	**10%**	**3.7**	

SD Residential Programmable Thermostats
Energy Star Rated

Customer Class:	Residential

Program Cost

				$/Part	Total $ Yr 1	Total $ Yr 2	Total $
Operating Costs				$ -	$ -	$ -	$ -
Incentive Costs	$	20.00	Incentive	$ 20	$ 2,200	$ 2,700	$ 4,900
Administrative Costs				$ 33	$ 3,940	$ 4,080	$ 8,020
Total Cost				$ 53	$ 6,140	$ 6,780	$ 12,920

Notes
Incentive $ 20.00

Participant Costs (Incremental Cost Basis)

Standard Thermostat	$	40	Industry Data Energy Star
Programmable thermostat	$	100	Industry Data Energy Star
Increased cost of Higher Eff Model	$	60	

Participation Rate Calc

	% of Cust	Cust
Total Customers in Class	100.00%	45,982
Customer available for T-Stat	75.00%	34,487

Total Available for program 34,487

		SD	ER	Total
Participation Year 1	2010	100	10	110
Participation Year 2	2011	125	10	135
Total Participation		**225**	**20**	**245**

Energy Savings

Heating

Equipment	Degree Setback	% Saving per degree	Annual DK	
Standard T-Stat	-	NA	57.3	Avg use per MDU Customer (Res)
Programmable T-Stat	5	1%	54.4	Per Energy Star 1% per degree per 8 hour setback period
Energy Reduction		**5%**	**2.9**	Actual Savings will vary by customer depending on use and other factors

	Per Part
Gas Reduction Annual	2.9 dk

Cooling

Equipment	Degree Setback	% Saving per degree	annual kWH	
Standard T-Stat	-	NA	2,160	Avg use per MDU Customer (Res)
Programmable T-Stat	5	2%	1,944	Per Energy Star 2% per degree per 8 hour setback period for cooling
Energy Reduction			**216**	Actual Savings will vary by customer depending on use and other factors

SD Retrofit Attic Insulation

Customer Class:	Residential

Program Cost

	$/Part	Total $ Yr 1	Total $ Yr 2	Total $
Operating Costs	$ -	$ -	$ -	$ -
Incentive Costs (average)	$ 296	$ 16,280	$ 25,160	$ 41,440
Administrative Costs	$ 32	$ 1,970	$ 2,533	$ 4,503
Total Cost	$ 328	$ 18,250	$ 27,693	$ 45,943

	Total incentive Contractor	Self-Install	Average Rebate	$/Sq Ft Contractor	Self-Install	
R11 to R49	$ 492	$ 240	$ 366	0.41	$ 0.20	40% installed cost
R19 to R49	$ 312	$ 144	$ 228	0.26	$ 0.12	30% installed cost
R25 to R49	$ 180	$ 72	$ 126	0.15	$ 0.06	20% installed cost
Est. Install percentage	50%	50%				

Participant Costs (Incremental Cost Basis)

	Total Cost average home Contractor	Self Installed	$/Square Foot Contractor	Self Installed
Attic Insulation (R11 base to R49)	$ 1,236	$ 597	1.03	$ 0.50
Attic Insulation (R19 base to R49)	1,020	471	0.85	$ 0.39
Attic Insulation (R25 base to R49)	900	377	0.75	$ 0.31
Average Cost	$ 1,052	$ 482		
	AVG	$ 767		

Average Square Feet *1,200*

Cost are based on Fiberglass

Participation

	% of Cust	Cust
Total Customer in Class	100.00%	45,982

		SD	ER	Total
Participation Year 1	2010	50	5	55
Participation Year 2	2011	75	10	85
Total Participants		**125**	**15**	**140**

Energy Savings Summary

Equipment	Annual DK	% Participation estimate		kWH
R11 to R49	12.05	60%	7.2	255
R19 to R49	5.51	25%	1.4	116
R25 to R49	3.35	15%	0.5	71
Weighted Average dk saved per part			**9.1**	**193**

SD New Construction Incentive Bundle
Furnace, Water Heater, Insulation Levels

Customer Class:	Residential

Program Cost

	$/Part	Total $ Yr 1	Total $ Yr 2	Total $
Operating Costs	$ -	$ -	$ -	$ -
Incentive Costs (50/50 average)	$ 350	$ 27,300	$ 27,300	$ 54,600
Administrative Costs	$ 32	$ 2,814	$ 2,251	$ 5,065
Total Cost	$ 382	$ 30,114	$ 29,551	$ 59,665

Incentive Furnace & Water Heater	$	300
Incentive full package	$	400

Participant Costs (Incremental Cost Basis)

Incremental Cost with .62 Water Heater			
Furnace 90% AFUE to 94% AFUE	$ 620	75,000 Btuh	
Standard Water Heater .57 EF to .62 EF	$ 65	50 Gallon	
Ceiling Insulation (R44 base to R49 and R 38 in Cathedral Ceilings) ($.077/sq ft)	$ 92	1200 Square Feet	
Wall Insulation ($0.25 pr Sq Ft incremental Cost) R-19 to R-21	$ 281	1123 Square Feet of wall	
	$ 1,058		

Incremental Cost with .67 Water Heater			
Standard Furnace 90% AFUE to 94% AFUE	$ 620	75,000 Btuh	
Standard Water Heater .57 EF to .62 EF	$ 408	50 Gallon	
Ceiling Insulation (R44 base to R49 and R 38 in Cathedral Ceilings) ($.077/sq ft)	$ 92	1200 Square Feet	
Wall Insulation ($0.25 pr Sq Ft incremental Cost) R-19 to R-21	$ 281	1123 Square Feet of wall	
	$ 1,401		

Participation Rate Calc

	% of Cust	Cust		
3 Year Average number of new homes	100.00%	630	SD BH	2006-2008
	100.00%	147	ER	2006-2008

Total Available for program	777	
Total Estimated Saturation Percentage	10.0%	

		SD	ER	Total
Participation Year 1	2010	63	15	78
Participation Year 2	2011	63	15	78
Total Participants				**156**

Energy Savings Calculation

Equipment	Eff	Annual DK
Furnace	94%	4.65
Water Heater	.62 EF	1.90
Attic Insulation	R - 49	0.34
Wall Insulation	R-21	0.68
Energy Reduction		**7.6**

Equipment	Eff	Annual DK
Furnace	94%	4.65
Water Heater	.67 EF	3.70
Attic Insulation	R - 49	0.34
Wall Insulation	R-21	0.68
Energy Reduction		**9.4**

Furnace Savings is based calculated baseline efficiency based on % of GAMA shipment Data for various efficiency levels

Additional Cooling kWh 25

Space Heating – 90% Furnace Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 90% Furnace**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	1.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	1.00%
4) Demand Cost ($/Unit/Yr) =	$123.68
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
16a) Administrative & Operating Costs =	$2,111	$1,829
16b) Incentive Costs =	9,000	9,000
16c) Total Utility Project Costs =	$11,111	$10,829
17) Direct Participant Costs ($/Part.) =	$500	$500
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	1.40%	1.40%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	1.40%	1.40%
20) Project Life (Years) =	18	18
21) Avg. Dk/Part. Saved =	7.30	7.30
22) Avg Non-Gas Fuel Units/Part. Saved =	0	0
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Number of Participants =	60	60
24) Total Annual Dk Saved =	438	438
25) Incentive/Participant =	$150	$150
26) Distribution Delivery Charge		$1.571
27) Effective Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$45,453	2.50
Utility Cost Test	$54,719	3.59
Societal Test	$52,276	1.83
Participant Test	$85,037	2.45

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 90% Furnace**

			Benefits										Costs				
t	Year	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)	Annual Benefits Less Costs (P)
1	2010	438	$7.107	$3,113	$0.052	$23	$3,136	4.4	$125	$550	$3,686	$1.587	$451	$2,111	$9,000	$11,562	($7,876)
2	2011	876	7.178	6,288	0.053	46	6,334	8.8	126	1,109	7,443	1.603	911	1,829	9,000	11,740	(4,297)
3	2012	876	7.250	6,351	0.055	48	6,399	8.8	127	1,118	7,517	1.619	920	0	0	920	6,597
4	2013	876	7.323	6,415	0.057	50	6,465	8.8	129	1,135	7,600	1.635	929	0	0	929	6,671
5	2014	876	7.396	6,479	0.059	52	6,531	8.8	130	1,144	7,675	1.651	938	0	0	938	6,737
6	2015	876	7.470	6,544	0.061	53	6,597	8.8	131	1,153	7,750	1.668	948	0	0	948	6,802
7	2016	876	7.545	6,609	0.063	55	6,664	8.8	133	1,170	7,834	1.684	957	0	0	957	6,877
8	2017	876	7.620	6,675	0.065	57	6,732	8.8	134	1,179	7,911	1.701	966	0	0	966	6,945
9	2018	876	7.696	6,742	0.067	59	6,801	8.8	135	1,188	7,989	1.718	976	0	0	976	7,013
10	2019	876	7.773	6,809	0.069	60	6,869	8.8	137	1,206	8,075	1.735	986	0	0	986	7,089
11	2020	876	7.851	6,877	0.072	63	6,940	8.8	138	1,214	8,154	1.753	996	0	0	996	7,158
12	2021	876	7.929	6,946	0.074	65	7,011	8.8	139	1,223	8,234	1.770	1,006	0	0	1,006	7,228
13	2022	876	8.009	7,016	0.076	67	7,083	8.8	141	1,241	8,324	1.788	1,016	0	0	1,016	7,308
14	2023	876	8.089	7,086	0.079	69	7,155	8.8	142	1,250	8,405	1.806	1,026	0	0	1,026	7,379
15	2024	876	8.170	7,157	0.081	71	7,228	8.8	144	1,267	8,495	1.824	1,036	0	0	1,036	7,459
16	2025	876	8.251	7,228	0.084	74	7,302	8.8	145	1,276	8,578	1.842	1,046	0	0	1,046	7,532
17	2026	876	8.334	7,301	0.087	76	7,377	8.8	146	1,285	8,662	1.861	1,057	0	0	1,057	7,605
18	2027	876	8.417	7,373	0.090	79	7,452	8.8	148	1,302	8,754	1.879	1,067	0	0	1,067	7,687
19	2028	438	8.501	3,723	0.093	41	3,764	4.4	149	656	4,420	1.898	539	0	0	539	3,881
20	2029	0	8.586	0	0.096	0	0	0.0	151	0	0	1.917	0	0	0	0	0
21	2030	0	8.672	0	0.099	0	0	0.0	152	0	0	1.936	0	0	0	0	0
	Total =	15,768							NPV =		$145,506					$39,711	$105,795
											$75,832					$30,379	$45,453

Total NPV = $45,453
Benefit/Cost Ratio = 2.50

Worksheet Calculations

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

Table 2
Utility Cost Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 90% Furnace**

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$3,136	$550	$3,686	$2,111	$9,000	$11,111	($7,425)
2011	6,334	1,109	7,443	1,829	9,000	10,829	(3,386)
2012	6,399	1,118	7,517	0	0	0	7,517
2013	6,465	1,135	7,600	0	0	0	7,600
2014	6,531	1,144	7,675	0	0	0	7,675
2015	6,597	1,153	7,750	0	0	0	7,750
2016	6,664	1,170	7,834	0	0	0	7,834
2017	6,732	1,179	7,911	0	0	0	7,911
2018	6,801	1,188	7,989	0	0	0	7,989
2019	6,869	1,206	8,075	0	0	0	8,075
2020	6,940	1,214	8,154	0	0	0	8,154
2021	7,011	1,223	8,234	0	0	0	8,234
2022	7,083	1,241	8,324	0	0	0	8,324
2023	7,155	1,250	8,405	0	0	0	8,405
2024	7,228	1,267	8,495	0	0	0	8,495
2025	7,302	1,276	8,578	0	0	0	8,578
2026	7,377	1,285	8,662	0	0	0	8,662
2027	7,452	1,302	8,754	0	0	0	8,754
2028	3,764	656	4,420	0	0	0	4,420
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
Total =			$145,506			$21,940	$123,566
		NPV =	$75,832			$21,113	$54,719

Total NPV = $54,719
Benefit/Cost Ratio = 3.59

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: **SD Space Heating - 90% Furnace**

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$3,136	$550	$0.022	$0	$1.041	$456	$4,142	$11,111	$21,000	$32,111	($27,969)
2011	6,334	1,109	0.023	0	1.065	933	8,376	10,829	21,000	31,829	(23,453)
2012	6,399	1,118	0.023	0	1.090	955	8,472	0	0	0	8,472
2013	6,465	1,135	0.024	0	1.115	977	8,577	0	0	0	8,577
2014	6,531	1,144	0.025	0	1.141	1,000	8,675	0	0	0	8,675
2015	6,597	1,153	0.025	0	1.167	1,022	8,772	0	0	0	8,772
2016	6,664	1,170	0.026	0	1.194	1,046	8,880	0	0	0	8,880
2017	6,732	1,179	0.026	0	1.221	1,070	8,981	0	0	0	8,981
2018	6,801	1,188	0.027	0	1.249	1,094	9,083	0	0	0	9,083
2019	6,869	1,206	0.028	0	1.278	1,120	9,195	0	0	0	9,195
2020	6,940	1,214	0.029	0	1.307	1,145	9,299	0	0	0	9,299
2021	7,011	1,223	0.029	0	1.337	1,171	9,405	0	0	0	9,405
2022	7,083	1,241	0.030	0	1.368	1,198	9,522	0	0	0	9,522
2023	7,155	1,250	0.031	0	1.400	1,226	9,631	0	0	0	9,631
2024	7,228	1,267	0.031	0	1.432	1,254	9,749	0	0	0	9,749
2025	7,302	1,276	0.032	0	1.465	1,283	9,861	0	0	0	9,861
2026	7,377	1,285	0.033	0	1.498	1,312	9,974	0	0	0	9,974
2027	7,452	1,302	0.034	0	1.533	1,343	10,097	0	0	0	10,097
2028	3,764	656	0.035	0	1.568	687	5,107	0	0	0	5,107
2029	0	0	0.036	0	1.604	0	0	0	0	0	0
2030	0	0	0.037	0	1.641	0	0	0	0	0	0
Total =							$165,798			$63,940	$101,858
						NPV =	$114,910			$62,634	$52,276

Total NPV = $52,276
Benefit/Cost Ratio = 1.83

Worksheet Calculations

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

Table 4
Participant Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 90% Furnace**

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$9,000	438	$10.522	$4,609	$0.092	$0	$13,609	$30,000	($16,391)
2011	9,000	876	10.627	9,309	0.095	0	18,309	30,000	(11,691)
2012	0	876	10.734	9,403	0.097	0	9,403	0	9,403
2013	0	876	10.841	9,497	0.099	0	9,497	0	9,497
2014	0	876	10.949	9,591	0.102	0	9,591	0	9,591
2015	0	876	11.059	9,688	0.104	0	9,688	0	9,688
2016	0	876	11.170	9,785	0.107	0	9,785	0	9,785
2017	0	876	11.281	9,882	0.110	0	9,882	0	9,882
2018	0	876	11.394	9,981	0.112	0	9,981	0	9,981
2019	0	876	11.508	10,081	0.115	0	10,081	0	10,081
2020	0	876	11.623	10,182	0.118	0	10,182	0	10,182
2021	0	876	11.739	10,283	0.121	0	10,283	0	10,283
2022	0	876	11.857	10,387	0.124	0	10,387	0	10,387
2023	0	876	11.975	10,490	0.127	0	10,490	0	10,490
2024	0	876	12.095	10,595	0.130	0	10,595	0	10,595
2025	0	876	12.216	10,701	0.134	0	10,701	0	10,701
2026	0	876	12.338	10,808	0.137	0	10,808	0	10,808
2027	0	876	12.461	10,916	0.140	0	10,916	0	10,916
2028	0	438	12.586	5,513	0.144	0	5,513	0	5,513
2029	0	0	12.712	0	0.147	0	0	0	0
2030	0	0	12.839	0	0.151	0	0	0	0
Total =		15,768					$199,701	$60,000	$139,701
						NPV =	$143,806	$58,769	85,037

Total NPV = $85,037
Benefit/Cost Ratio = 2.45

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) = (C) 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)
(I) = (G) - (H)

Space Heating – 94% Furnace Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 94% Furnace**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	2.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	2.00%
4) Demand Cost ($/Unit/Yr) =	$123.68
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
16a) Administrative & Operating Costs =	$1,126	$844
16b) Incentive Costs =	9,000	9,000
16c) Total Utility Project Costs =	$10,126	$9,844
17) Direct Participant Costs ($/Part.) =	$1,120	$1,120
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	1.40%	1.40%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	1.40%	1.40%
20) Project Life (Years) =	18	18
21) Avg. Dk/Part. Saved =	8.60	8.60
22) Avg Non-Gas Fuel Units/Part. Saved =	0	0
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Number of Participants =	30	30
24) Total Annual Dk Saved =	258	258
25) Incentive/Participant =	$300	$300
26) Distribution Delivery Charge		$1.571
27) Effective Fed & State Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$22,753	1.91
Utility Cost Test	$28,674	2.49
Societal Test	$4,756	1.07
Participant Test	$33,239	1.50

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 94% Furnace**

		Benefits										Costs				
t	Year	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)	Annual Benefits Less Costs (P)
1	2010	258	$7.178	$1,852	$0.052	$13	$1,865	2.6	$125	$325	$2,190	$1.602	$268	$1,126	$9,000	$10,394	($8,204)
2	2011	516	7.321	3,778	0.053	27	3,805	5.2	126	655	4,460	1.634	547	844	9,000	10,391	(5,931)
3	2012	516	7.468	3,853	0.055	28	3,881	5.2	127	660	4,541	1.667	558	0	0	558	3,983
4	2013	516	7.617	3,930	0.057	29	3,959	5.2	129	671	4,630	1.701	569	0	0	569	4,061
5	2014	516	7.769	4,009	0.059	30	4,039	5.2	130	676	4,715	1.735	581	0	0	581	4,134
6	2015	516	7.925	4,089	0.061	31	4,120	5.2	131	681	4,801	1.769	592	0	0	592	4,209
7	2016	516	8.083	4,171	0.063	33	4,204	5.2	133	692	4,896	1.805	604	0	0	604	4,292
8	2017	516	8.245	4,254	0.065	34	4,288	5.2	134	697	4,985	1.841	616	0	0	616	4,369
9	2018	516	8.410	4,340	0.067	35	4,375	5.2	135	702	5,077	1.877	628	0	0	628	4,449
10	2019	516	8.578	4,426	0.069	36	4,462	5.2	137	712	5,174	1.915	641	0	0	641	4,533
11	2020	516	8.750	4,515	0.072	37	4,552	5.2	138	718	5,270	1.953	654	0	0	654	4,616
12	2021	516	8.925	4,605	0.074	38	4,643	5.2	139	723	5,366	1.992	667	0	0	667	4,699
13	2022	516	9.103	4,697	0.076	39	4,736	5.2	141	733	5,469	2.032	680	0	0	680	4,789
14	2023	516	9.285	4,791	0.079	41	4,832	5.2	142	738	5,570	2.073	694	0	0	694	4,876
15	2024	516	9.471	4,887	0.081	42	4,929	5.2	144	749	5,678	2.114	707	0	0	707	4,971
16	2025	516	9.660	4,985	0.084	43	5,028	5.2	145	754	5,782	2.157	722	0	0	722	5,060
17	2026	516	9.853	5,084	0.087	45	5,129	5.2	146	759	5,888	2.200	736	0	0	736	5,152
18	2027	516	10.051	5,186	0.090	46	5,232	5.2	148	770	6,002	2.244	751	0	0	751	5,251
19	2028	258	10.252	2,645	0.093	24	2,669	2.6	149	387	3,056	2.289	383	0	0	383	2,673
20	2029	0	10.457	0	0.096	0	0	0.0	151	0	0	2.334	0	0	0	0	0
21	2030	0	10.666	0	0.099	0	0	0.0	152	0	0	2.381	0	0	0	0	0
	Total =	9,288									$93,550					$31,568	$61,982
									NPV =		$47,893					$25,140	$22,753

Total NPV = $22,753
Benefit/Cost Ratio = 1.91

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: **SD Space Heating - 94% Furnace**

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$1,865	$325	$2,190	$1,126	$9,000	$10,126	($7,936)
2011	3,805	655	4,460	844	9,000	9,844	(5,384)
2012	3,881	660	4,541	0	0	0	4,541
2013	3,959	671	4,630	0	0	0	4,630
2014	4,039	676	4,715	0	0	0	4,715
2015	4,120	681	4,801	0	0	0	4,801
2016	4,204	692	4,896	0	0	0	4,896
2017	4,288	697	4,985	0	0	0	4,985
2018	4,375	702	5,077	0	0	0	5,077
2019	4,462	712	5,174	0	0	0	5,174
2020	4,552	718	5,270	0	0	0	5,270
2021	4,643	723	5,366	0	0	0	5,366
2022	4,736	733	5,469	0	0	0	5,469
2023	4,832	738	5,570	0	0	0	5,570
2024	4,929	749	5,678	0	0	0	5,678
2025	5,028	754	5,782	0	0	0	5,782
2026	5,129	759	5,888	0	0	0	5,888
2027	5,232	770	6,002	0	0	0	6,002
2028	2,669	387	3,056	0	0	0	3,056
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
Total =			$93,550			$19,970	$73,580
		NPV =	$47,893			$19,219	$28,674

Total NPV = $28,674
Benefit/Cost Ratio = 2.49

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: **SD Space Heating - 94% Furnace**

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$1,865	$325	$0.022	$0	$1.041	$269	$2,459	$10,126	$24,600	$34,726	($32,267)
2011	3,805	655	0.023	0	1.065	550	5,010	9,844	24,600	34,444	(29,434)
2012	3,881	660	0.023	0	1.090	562	5,103	0	0	0	5,103
2013	3,959	671	0.024	0	1.115	575	5,205	0	0	0	5,205
2014	4,039	676	0.025	0	1.141	589	5,304	0	0	0	5,304
2015	4,120	681	0.025	0	1.167	602	5,403	0	0	0	5,403
2016	4,204	692	0.026	0	1.194	616	5,512	0	0	0	5,512
2017	4,288	697	0.026	0	1.221	630	5,615	0	0	0	5,615
2018	4,375	702	0.027	0	1.249	644	5,721	0	0	0	5,721
2019	4,462	712	0.028	0	1.278	659	5,833	0	0	0	5,833
2020	4,552	718	0.029	0	1.307	674	5,944	0	0	0	5,944
2021	4,643	723	0.029	0	1.337	690	6,056	0	0	0	6,056
2022	4,736	733	0.030	0	1.368	706	6,175	0	0	0	6,175
2023	4,832	738	0.031	0	1.400	722	6,292	0	0	0	6,292
2024	4,929	749	0.031	0	1.432	739	6,417	0	0	0	6,417
2025	5,028	754	0.032	0	1.465	756	6,538	0	0	0	6,538
2026	5,129	759	0.033	0	1.498	773	6,661	0	0	0	6,661
2027	5,232	770	0.034	0	1.533	791	6,793	0	0	0	6,793
2028	2,669	387	0.035	0	1.568	405	3,461	0	0	0	3,461
2029	0	0	0.036	0	1.604	0	0	0	0	0	0
2030	0	0	0.037	0	1.641	0	0	0	0	0	0
Total =							$105,502			$69,170	$36,332
						NPV =	$72,512			$67,756	$4,756

Total NPV = $4,756
Benefit/Cost Ratio = 1.07

Worksheet Calculations

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

(H) = Table 2 (F)
(I) = Direct Part. Costs (17) x No. of Part. (23) - Table 1 (N)
(J) = (H) + (I)
(K) = (G) - (J)

Table 4
Participant Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Space Heating - 94% Furnace**

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$9,000	258	$10.626	$2,742	$0.092	$0	$11,742	$33,600	($21,858)
2011	9,000	516	10.839	5,593	0.095	0	14,593	33,600	(19,007)
2012	0	516	11.056	5,705	0.097	0	5,705	0	5,705
2013	0	516	11.277	5,819	0.099	0	5,819	0	5,819
2014	0	516	11.502	5,935	0.102	0	5,935	0	5,935
2015	0	516	11.732	6,054	0.104	0	6,054	0	6,054
2016	0	516	11.967	6,175	0.107	0	6,175	0	6,175
2017	0	516	12.206	6,298	0.110	0	6,298	0	6,298
2018	0	516	12.450	6,424	0.112	0	6,424	0	6,424
2019	0	516	12.699	6,553	0.115	0	6,553	0	6,553
2020	0	516	12.953	6,684	0.118	0	6,684	0	6,684
2021	0	516	13.213	6,818	0.121	0	6,818	0	6,818
2022	0	516	13.477	6,954	0.124	0	6,954	0	6,954
2023	0	516	13.746	7,093	0.127	0	7,093	0	7,093
2024	0	516	14.021	7,235	0.130	0	7,235	0	7,235
2025	0	516	14.302	7,380	0.134	0	7,380	0	7,380
2026	0	516	14.588	7,527	0.137	0	7,527	0	7,527
2027	0	516	14.879	7,678	0.140	0	7,678	0	7,678
2028	0	258	15.177	3,916	0.144	0	3,916	0	3,916
2029	0	0	15.481	0	0.147	0	0	0	0
2030	0	0	15.790	0	0.151	0	0	0	0
Total		9,288					$136,583	$67,200	$69,383
						NPV =	$99,060	$65,821	33,239

Total NPV = $33,239
Benefit/Cost Ratio = 1.50

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) = (C) 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)
(I) = (G) - (H)

Water Heaters
Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD Water Heaters**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	2.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	2.00%
4) Demand Cost ($/Unit/Yr) =	$123.680
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
16a) Administrative & Operating Costs =	$1,970	$2,533
16b) Incentive Costs =	2,750	8,500
16c) Total Utility Project Costs =	$4,720	$11,033
17) Direct Participant Costs ($/Part.) =	$65	$408
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	1.40%	1.40%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	1.40%	1.40%
20) Project Life (Years) =	15	15
21) Avg. Dk/Part. Saved =	1.90	3.70
22) Avg Non-Gas Fuel Units/Part. Saved =	0	0
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Number of Participants =	55	85
24) Total Annual Dk Saved =	105	315
25) Incentive/Participant =	$50	$100
26) Distribution Delivery Charge		$1.571
27) Effective Fed & State Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$15,268	1.80
Utility Cost Test	$19,521	2.31
Societal Test	$9,135	1.22
Participant Test	$30,608	1.83

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Water Heaters**

		Benefits										Costs				
t	Year	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)	Annual Benefits Less Costs (P)
1	2010	105	$7.178	$754	$0.052	$5	$759	1.1	$125	$138	$897	$1.602	$109	$1,970	$2,750	$4,829	($3,932)
2	2011	419	7.321	3,067	0.053	22	3,089	4.2	126	529	3,618	1.634	444	2,533	8,500	11,477	(7,859)
3	2012	419	7.468	3,129	0.055	23	3,152	4.2	127	533	3,685	1.667	453	0	0	453	3,232
4	2013	419	7.617	3,192	0.057	24	3,216	4.2	129	542	3,758	1.701	462	0	0	462	3,296
5	2014	419	7.769	3,255	0.059	25	3,280	4.2	130	546	3,826	1.735	471	0	0	471	3,355
6	2015	419	7.925	3,321	0.061	26	3,347	4.2	131	550	3,897	1.769	481	0	0	481	3,416
7	2016	419	8.083	3,387	0.063	26	3,413	4.2	133	559	3,972	1.805	490	0	0	490	3,482
8	2017	419	8.245	3,455	0.065	27	3,482	4.2	134	563	4,045	1.841	500	0	0	500	3,545
9	2018	419	8.410	3,524	0.067	28	3,552	4.2	135	567	4,119	1.877	510	0	0	510	3,609
10	2019	419	8.578	3,594	0.069	29	3,623	4.2	137	575	4,198	1.915	520	0	0	520	3,678
11	2020	419	8.750	3,666	0.072	30	3,696	4.2	138	580	4,276	1.953	531	0	0	531	3,745
12	2021	419	8.925	3,740	0.074	31	3,771	4.2	139	584	4,355	1.992	541	0	0	541	3,814
13	2022	419	9.103	3,814	0.076	32	3,846	4.2	141	592	4,438	2.032	552	0	0	552	3,886
14	2023	419	9.285	3,890	0.079	33	3,923	4.2	142	596	4,519	2.073	563	0	0	563	3,956
15	2024	419	9.471	3,968	0.081	34	4,002	4.2	144	605	4,607	2.114	574	0	0	574	4,033
16	2025	315	9.660	3,043	0.084	26	3,069	3.2	145	464	3,533	2.157	441	0	0	441	3,092
17	2026	0	9.853	0	0.087	0	0	0.0	146	0	0	2.200	0	0	0	0	0
18	2027	0	10.051	0	0.090	0	0	0.0	148	0	0	2.244	0	0	0	0	0
19	2028	0	10.252	0	0.093	0	0	0.0	149	0	0	2.289	0	0	0	0	0
20	2029	0	10.457	0	0.096	0	0	0.0	151	0	0	2.334	0	0	0	0	0
21	2030	0	10.666	0	0.099	0	0	0.0	152	0	0	2.381	0	0	0	0	0
	Total =	6,286									$61,743					$23,395	$38,348
									NPV =		$34,432					$19,164	$15,268

Total NPV = $15,268
Benefit/Cost Ratio = 1.80

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: **SD Water Heaters**

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$759	$138	$897	$1,970	$2,750	$4,720	($3,823)
2011	3,089	529	3,618	2,533	8,500	11,033	(7,415)
2012	3,152	533	3,685	0	0	0	3,685
2013	3,216	542	3,758	0	0	0	3,758
2014	3,280	546	3,826	0	0	0	3,826
2015	3,347	550	3,897	0	0	0	3,897
2016	3,413	559	3,972	0	0	0	3,972
2017	3,482	563	4,045	0	0	0	4,045
2018	3,552	567	4,119	0	0	0	4,119
2019	3,623	575	4,198	0	0	0	4,198
2020	3,696	580	4,276	0	0	0	4,276
2021	3,771	584	4,355	0	0	0	4,355
2022	3,846	592	4,438	0	0	0	4,438
2023	3,923	596	4,519	0	0	0	4,519
2024	4,002	605	4,607	0	0	0	4,607
2025	3,069	464	3,533	0	0	0	3,533
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
Total =			$61,743			$15,753	$45,990
		NPV =	$34,432			$14,911	$19,521

Total NPV = $19,521
Benefit/Cost Ratio = 2.31

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: **SD Water Heaters**

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$759	$138	$0.022	$0	$1.041	$109	$1,006	$4,720	$825	$5,545	($4,539)
2011	3,089	529	0.023	0	1.065	446	4,064	11,033	26,180	37,213	(33,149)
2012	3,152	533	0.023	0	1.090	457	4,142	0	0	0	4,142
2013	3,216	542	0.024	0	1.115	467	4,225	0	0	0	4,225
2014	3,280	546	0.025	0	1.141	478	4,304	0	0	0	4,304
2015	3,347	550	0.025	0	1.167	489	4,386	0	0	0	4,386
2016	3,413	559	0.026	0	1.194	500	4,472	0	0	0	4,472
2017	3,482	563	0.026	0	1.221	512	4,557	0	0	0	4,557
2018	3,552	567	0.027	0	1.249	523	4,642	0	0	0	4,642
2019	3,623	575	0.028	0	1.278	535	4,733	0	0	0	4,733
2020	3,696	580	0.029	0	1.307	548	4,824	0	0	0	4,824
2021	3,771	584	0.029	0	1.337	560	4,915	0	0	0	4,915
2022	3,846	592	0.030	0	1.368	573	5,011	0	0	0	5,011
2023	3,923	596	0.031	0	1.400	587	5,106	0	0	0	5,106
2024	4,002	605	0.031	0	1.432	600	5,207	0	0	0	5,207
2025	3,069	464	0.032	0	1.465	461	3,994	0	0	0	3,994
2026	0	0	0.033	0	1.498	0	0	0	0	0	0
2027	0	0	0.034	0	1.533	0	0	0	0	0	0
2028	0	0	0.035	0	1.568	0	0	0	0	0	0
2029	0	0	0.036	0	1.604	0	0	0	0	0	0
2030	0	0	0.037	0	1.641	0	0	0	0	0	0
Total =							$69,588			$42,758	$26,830
						NPV =	$50,366			$41,231	$9,135

Total NPV = $9,135
Benefit/Cost Ratio = 1.22

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: **SD Water Heaters**

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$2,750	105	$10.626	$1,116	$0.092	$0	$3,866	$3,575	$291
2011	8,500	419	10.839	4,542	0.095	0	13,042	34,680	(21,638)
2012	0	419	11.056	4,632	0.097	0	4,632	0	4,632
2013	0	419	11.277	4,725	0.099	0	4,725	0	4,725
2014	0	419	11.502	4,819	0.102	0	4,819	0	4,819
2015	0	419	11.732	4,916	0.104	0	4,916	0	4,916
2016	0	419	11.967	5,014	0.107	0	5,014	0	5,014
2017	0	419	12.206	5,114	0.110	0	5,114	0	5,114
2018	0	419	12.450	5,217	0.112	0	5,217	0	5,217
2019	0	419	12.699	5,321	0.115	0	5,321	0	5,321
2020	0	419	12.953	5,427	0.118	0	5,427	0	5,427
2021	0	419	13.213	5,536	0.121	0	5,536	0	5,536
2022	0	419	13.477	5,647	0.124	0	5,647	0	5,647
2023	0	419	13.746	5,760	0.127	0	5,760	0	5,760
2024	0	419	14.021	5,875	0.130	0	5,875	0	5,875
2025	0	315	14.302	4,505	0.134	0	4,505	0	4,505
2026	0	0	14.588	0	0.137	0	0	0	0
2027	0	0	14.879	0	0.140	0	0	0	0
2028	0	0	15.177	0	0.144	0	0	0	0
2029	0	0	15.481	0	0.147	0	0	0	0
2030	0	0	15.790	0	0.151	0	0	0	0
Total =		6,286					$89,416	$38,255	$51,161
						NPV =	$67,440	$36,832	30,608

Total NPV = $30,608
Benefit/Cost Ratio = 1.83

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) = (C) 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)
(I) = (G) - (H)

Programmable Thermostats Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD Programmable Thermostat**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	2.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	2.00%
4) Demand Cost ($/Unit/Yr) =	$123.680
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
16a) Administrative & Operating Costs =	$3,940	$4,080
16b) Incentive Costs =	2,200	2,700
16c) Total Utility Project Costs =	$6,140	$6,780
17) Direct Participant Costs ($/Part.) =	$60	$60
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	1.40%	1.40%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	1.40%	1.40%
20) Project Life (Years) =	15	15
21) Avg. Dk/Part. Saved =	2.90	2.90
22) Avg Non-Gas Fuel Units/Part. Saved =	216	216
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Number of Participants =	110	135
24) Total Annual Dk Saved =	319	392
25) Incentive/Participant =	$20	$20
26) Distribution Delivery Charge		$1.571
27) Effective Fed & State Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$39,391	3.00
Utility Cost Test	$46,696	4.77
Societal Test	$79,130	4.56
Participant Test	$151,224	11.53

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Programmable Thermostat**

		Benefits										Costs				
t	Year	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)	Annual Benefits Less Costs (P)
1	2010	319	$7.178	$2,290	$0.052	$17	$2,307	3.2	$125	$400	$2,707	$1.602	$331	$3,940	$2,200	$6,471	($3,764)
2	2011	711	7.321	5,205	0.053	38	5,243	7.1	126	895	6,138	1.634	753	4,080	2,700	7,533	(1,395)
3	2012	711	7.468	5,310	0.055	39	5,349	7.1	127	902	6,251	1.667	769	0	0	769	5,482
4	2013	711	7.617	5,416	0.057	41	5,457	7.1	129	916	6,373	1.701	784	0	0	784	5,589
5	2014	711	7.769	5,524	0.059	42	5,566	7.1	130	923	6,489	1.735	800	0	0	800	5,689
6	2015	711	7.925	5,635	0.061	43	5,678	7.1	131	930	6,608	1.769	816	0	0	816	5,792
7	2016	711	8.083	5,747	0.063	45	5,792	7.1	133	944	6,736	1.805	832	0	0	832	5,904
8	2017	711	8.245	5,862	0.065	46	5,908	7.1	134	951	6,859	1.841	849	0	0	849	6,010
9	2018	711	8.410	5,980	0.067	48	6,028	7.1	135	959	6,987	1.877	865	0	0	865	6,122
10	2019	711	8.578	6,099	0.069	49	6,148	7.1	137	973	7,121	1.915	883	0	0	883	6,238
11	2020	711	8.750	6,221	0.072	51	6,272	7.1	138	980	7,252	1.953	900	0	0	900	6,352
12	2021	711	8.925	6,346	0.074	53	6,399	7.1	139	987	7,386	1.992	918	0	0	918	6,468
13	2022	711	9.103	6,472	0.076	54	6,526	7.1	141	1,001	7,527	2.032	937	0	0	937	6,590
14	2023	711	9.285	6,602	0.079	56	6,658	7.1	142	1,008	7,666	2.073	956	0	0	956	6,710
15	2024	711	9.471	6,734	0.081	58	6,792	7.1	144	1,022	7,814	2.114	975	0	0	975	6,839
16	2025	392	9.660	3,787	0.084	33	3,820	3.9	145	566	4,386	2.157	548	0	0	548	3,838
17	2026	0	9.853	0	0.087	0	0	0.0	146	0	0	2.200	0	0	0	0	0
18	2027	0	10.051	0	0.090	0	0	0.0	148	0	0	2.244	0	0	0	0	0
19	2028	0	10.252	0	0.093	0	0	0.0	149	0	0	2.289	0	0	0	0	0
20	2029	0	10.457	0	0.096	0	0	0.0	151	0	0	2.334	0	0	0	0	0
21	2030	0	10.666	0	0.099	0	0	0.0	152	0	0	2.381	0	0	0	0	0
	Total =	10,665									$104,300					$25,836	$78,464
									NPV =		$59,098					$19,707	$39,391

Total NPV = $39,391
Benefit/Cost Ratio = 3.00

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: **SD Programmable Thermostat**

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$2,307	$400	$2,707	$3,940	$2,200	$6,140	($3,433)
2011	5,243	895	6,138	4,080	2,700	6,780	(642)
2012	5,349	902	6,251	0	0	0	6,251
2013	5,457	916	6,373	0	0	0	6,373
2014	5,566	923	6,489	0	0	0	6,489
2015	5,678	930	6,608	0	0	0	6,608
2016	5,792	944	6,736	0	0	0	6,736
2017	5,908	951	6,859	0	0	0	6,859
2018	6,028	959	6,987	0	0	0	6,987
2019	6,148	973	7,121	0	0	0	7,121
2020	6,272	980	7,252	0	0	0	7,252
2021	6,399	987	7,386	0	0	0	7,386
2022	6,526	1,001	7,527	0	0	0	7,527
2023	6,658	1,008	7,666	0	0	0	7,666
2024	6,792	1,022	7,814	0	0	0	7,814
2025	3,820	566	4,386	0	0	0	4,386
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
Total =			$104,300			$12,920	$91,380
		NPV =	$59,098			$12,402	$46,696

Total NPV = $46,696
Benefit/Cost Ratio = 4.77

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: **SD Programmable Thermostat**

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$2,307	$400	$0.022	$523	$1.041	$332	$3,562	$6,140	$4,400	$10,540	($6,978)
2011	5,243	895	0.023	1,217	1.065	757	8,112	6,780	5,400	12,180	(4,068)
2012	5,349	902	0.023	1,217	1.090	775	8,243	0	0	0	8,243
2013	5,457	916	0.024	1,270	1.115	793	8,436	0	0	0	8,436
2014	5,566	923	0.025	1,323	1.141	811	8,623	0	0	0	8,623
2015	5,678	930	0.025	1,323	1.167	830	8,761	0	0	0	8,761
2016	5,792	944	0.026	1,376	1.194	849	8,961	0	0	0	8,961
2017	5,908	951	0.026	1,376	1.221	868	9,103	0	0	0	9,103
2018	6,028	959	0.027	1,429	1.249	888	9,304	0	0	0	9,304
2019	6,148	973	0.028	1,482	1.278	909	9,512	0	0	0	9,512
2020	6,272	980	0.029	1,535	1.307	929	9,716	0	0	0	9,716
2021	6,399	987	0.029	1,535	1.337	951	9,872	0	0	0	9,872
2022	6,526	1,001	0.030	1,588	1.368	973	10,088	0	0	0	10,088
2023	6,658	1,008	0.031	1,641	1.400	995	10,302	0	0	0	10,302
2024	6,792	1,022	0.031	1,641	1.432	1,018	10,473	0	0	0	10,473
2025	3,820	566	0.032	933	1.465	574	5,893	0	0	0	5,893
2026	0	0	0.033	0	1.498	0	0	0	0	0	0
2027	0	0	0.034	0	1.533	0	0	0	0	0	0
2028	0	0	0.035	0	1.568	0	0	0	0	0	0
2029	0	0	0.036	0	1.604	0	0	0	0	0	0
2030	0	0	0.037	0	1.641	0	0	0	0	0	0
Total =							$138,961			$22,720	$116,241
						NPV =	$101,350			$22,220	$79,130

Total NPV = $79,130
Benefit/Cost Ratio = 4.56

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: **SD Programmable Thermostat**

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$2,200	319	$10.626	$3,390	$0.092	$2,186	$7,776	$6,600	$1,176
2011	2,700	711	10.839	7,707	0.095	5,027	15,434	8,100	7,334
2012	0	711	11.056	7,861	0.097	5,133	12,994	0	12,994
2013	0	711	11.277	8,018	0.099	5,239	13,257	0	13,257
2014	0	711	11.502	8,178	0.102	5,398	13,576	0	13,576
2015	0	711	11.732	8,341	0.104	5,504	13,845	0	13,845
2016	0	711	11.967	8,509	0.107	5,662	14,171	0	14,171
2017	0	711	12.206	8,678	0.110	5,821	14,499	0	14,499
2018	0	711	12.450	8,852	0.112	5,927	14,779	0	14,779
2019	0	711	12.699	9,029	0.115	6,086	15,115	0	15,115
2020	0	711	12.953	9,210	0.118	6,245	15,455	0	15,455
2021	0	711	13.213	9,394	0.121	6,403	15,797	0	15,797
2022	0	711	13.477	9,582	0.124	6,562	16,144	0	16,144
2023	0	711	13.746	9,773	0.127	6,721	16,494	0	16,494
2024	0	711	14.021	9,969	0.130	6,880	16,849	0	16,849
2025	0	392	14.302	5,606	0.134	3,907	9,513	0	9,513
2026	0	0	14.588	0	0.137	0	0	0	0
2027	0	0	14.879	0	0.140	0	0	0	0
2028	0	0	15.177	0	0.144	0	0	0	0
2029	0	0	15.481	0	0.147	0	0	0	0
2030	0	0	15.790	0	0.151	0	0	0	0
Total =		10,665					$225,698	$14,700	$210,998
						NPV =	$165,592	$14,368	151,224

Total NPV = $151,224
Benefit/Cost Ratio = 11.53

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) = (C) 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)
(I) = (G) - (H)

Retrofit Attic Insulation Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD Retrofit Attic Insulation**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	2.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	2.00%
4) Demand Cost ($/Unit/Yr) =	$123.680
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
16a) Administrative & Operating Costs =	$1,970	$2,533
16b) Incentive Costs =	16,280	25,160
16c) Total Utility Project Costs =	$18,250	$27,693
17) Direct Participant Costs ($/Part.) =	$767	$767
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	1.40%	1.40%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	1.40%	1.40%
20) Project Life (Years) =	20	20
21) Avg. Dk/Part. Saved =	9.10	9.10
22) Avg Non-Gas Fuel Units/Part. Saved =	193	193
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Number of Participants =	55	85
24) Total Annual Dk Saved =	501	774
25) Incentive/Participant =	$296	$296
26) Distribution Delivery Charge		$1.571
27) Effective Fed & State Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$64,863	2.10
Utility Cost Test	$80,237	2.83
Societal Test	$95,122	1.87
Participant Test	$196,131	2.87

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD Retrofit Attic Insulation**

		Benefits										Costs				
t	Year	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)	Annual Benefits Less Costs (P)
1	2010	501	$7.178	$3,596	$0.052	$26	$3,622	5.0	$125	$625	$4,247	$1.602	$520	$1,970	$16,280	$18,770	($14,523)
2	2011	1,274	7.321	9,327	0.053	68	9,395	12.7	126	1,600	10,995	1.634	1,350	2,533	25,160	29,043	(18,048)
3	2012	1,274	7.468	9,514	0.055	70	9,584	12.7	127	1,613	11,197	1.667	1,377	0	0	1,377	9,820
4	2013	1,274	7.617	9,704	0.057	73	9,777	12.7	129	1,638	11,415	1.701	1,405	0	0	1,405	10,010
5	2014	1,274	7.769	9,898	0.059	75	9,973	12.7	130	1,651	11,624	1.735	1,433	0	0	1,433	10,191
6	2015	1,274	7.925	10,096	0.061	78	10,174	12.7	131	1,664	11,838	1.769	1,462	0	0	1,462	10,376
7	2016	1,274	8.083	10,298	0.063	80	10,378	12.7	133	1,689	12,067	1.805	1,491	0	0	1,491	10,576
8	2017	1,274	8.245	10,504	0.065	83	10,587	12.7	134	1,702	12,289	1.841	1,521	0	0	1,521	10,768
9	2018	1,274	8.410	10,714	0.067	85	10,799	12.7	135	1,715	12,514	1.877	1,551	0	0	1,551	10,963
10	2019	1,274	8.578	10,928	0.069	88	11,016	12.7	137	1,740	12,756	1.915	1,582	0	0	1,582	11,174
11	2020	1,274	8.750	11,148	0.072	92	11,240	12.7	138	1,753	12,993	1.953	1,614	0	0	1,614	11,379
12	2021	1,274	8.925	11,370	0.074	94	11,464	12.7	139	1,765	13,229	1.992	1,646	0	0	1,646	11,583
13	2022	1,274	9.103	11,597	0.076	97	11,694	12.7	141	1,791	13,485	2.032	1,679	0	0	1,679	11,806
14	2023	1,274	9.285	11,829	0.079	101	11,930	12.7	142	1,803	13,733	2.073	1,713	0	0	1,713	12,020
15	2024	1,274	9.471	12,066	0.081	103	12,169	12.7	144	1,829	13,998	2.114	1,747	0	0	1,747	12,251
16	2025	1,274	9.660	12,307	0.084	107	12,414	12.7	145	1,842	14,256	2.157	1,782	0	0	1,782	12,474
17	2026	1,274	9.853	12,553	0.087	111	12,664	12.7	146	1,854	14,518	2.200	1,818	0	0	1,818	12,700
18	2027	1,274	10.051	12,805	0.090	115	12,920	12.7	148	1,880	14,800	2.244	1,854	0	0	1,854	12,946
19	2028	1,274	10.252	13,061	0.093	118	13,179	12.7	149	1,892	15,071	2.289	1,891	0	0	1,891	13,180
20	2029	1,274	10.457	13,322	0.096	122	13,444	12.7	151	1,918	15,362	2.334	1,928	0	0	1,928	13,434
21	2030	774	10.666	8,255	0.099	77	8,332	7.7	152	1,170	9,502	2.381	1,195	0	0	1,195	8,307
	Tota =	25,481									$261,889					$78,502	$183,387
									NPV =		$124,066					$59,202	$64,863

Total NPV = $64,863
Benefit/Cost Ratio = 2.10

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: **SD Retrofit Attic Insulation**

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$3,622	$625	$4,247	$1,970	$16,280	$18,250	($14,003)
2011	9,395	1,600	10,995	2,533	25,160	27,693	(16,698)
2012	9,584	1,613	11,197	0	0	0	11,197
2013	9,777	1,638	11,415	0	0	0	11,415
2014	9,973	1,651	11,624	0	0	0	11,624
2015	10,174	1,664	11,838	0	0	0	11,838
2016	10,378	1,689	12,067	0	0	0	12,067
2017	10,587	1,702	12,289	0	0	0	12,289
2018	10,799	1,715	12,514	0	0	0	12,514
2019	11,016	1,740	12,756	0	0	0	12,756
2020	11,240	1,753	12,993	0	0	0	12,993
2021	11,464	1,765	13,229	0	0	0	13,229
2022	11,694	1,791	13,485	0	0	0	13,485
2023	11,930	1,803	13,733	0	0	0	13,733
2024	12,169	1,829	13,998	0	0	0	13,998
2025	12,414	1,842	14,256	0	0	0	14,256
2026	12,664	1,854	14,518	0	0	0	14,518
2027	12,920	1,880	14,800	0	0	0	14,800
2028	13,179	1,892	15,071	0	0	0	15,071
2029	13,444	1,918	15,362	0	0	0	15,362
2030	8,332	1,170	9,502	0	0	0	9,502
Total =			$261,889			$45,943	$215,946
		NPV =	$124,066			$43,829	$80,237

Total NPV = $80,237
Benefit/Cost Ratio = 2.83

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: **SD Retrofit Attic Insulation**

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$3,622	$625	$0.022	$234	$1.041	$522	$5,003	$18,250	$25,896	$44,146	($39,143)
2011	9,395	1,600	0.023	621	1.065	1,357	12,973	27,693	40,021	67,714	(54,741)
2012	9,584	1,613	0.023	621	1.090	1,389	13,207	0	0	0	13,207
2013	9,777	1,638	0.024	648	1.115	1,421	13,484	0	0	0	13,484
2014	9,973	1,651	0.025	676	1.141	1,454	13,754	0	0	0	13,754
2015	10,174	1,664	0.025	676	1.167	1,487	14,001	0	0	0	14,001
2016	10,378	1,689	0.026	703	1.194	1,521	14,291	0	0	0	14,291
2017	10,587	1,702	0.026	703	1.221	1,556	14,548	0	0	0	14,548
2018	10,799	1,715	0.027	730	1.249	1,591	14,835	0	0	0	14,835
2019	11,016	1,740	0.028	757	1.278	1,628	15,141	0	0	0	15,141
2020	11,240	1,753	0.029	784	1.307	1,665	15,442	0	0	0	15,442
2021	11,464	1,765	0.029	784	1.337	1,703	15,716	0	0	0	15,716
2022	11,694	1,791	0.030	811	1.368	1,743	16,039	0	0	0	16,039
2023	11,930	1,803	0.031	838	1.400	1,784	16,355	0	0	0	16,355
2024	12,169	1,829	0.031	838	1.432	1,824	16,660	0	0	0	16,660
2025	12,414	1,842	0.032	865	1.465	1,866	16,987	0	0	0	16,987
2026	12,664	1,854	0.033	892	1.498	1,908	17,318	0	0	0	17,318
2027	12,920	1,880	0.034	919	1.533	1,953	17,672	0	0	0	17,672
2028	13,179	1,892	0.035	946	1.568	1,998	18,015	0	0	0	18,015
2029	13,444	1,918	0.036	973	1.604	2,043	18,378	0	0	0	18,378
2030	8,332	1,170	0.037	607	1.641	1,270	11,379	0	0	0	11,379
Total =							$311,198			$111,860	$199,338
						NPV =	$204,203			$109,081	$95,122

Total NPV = $95,122
Benefit/Cost Ratio = 1.87

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: **SD Retrofit Attic Insulation**

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$16,280	501	$10.626	$5,324	$0.092	$977	$22,581	$42,176	($19,595)
2011	25,160	1,274	10.839	13,809	0.095	2,567	41,536	65,181	(23,645)
2012	0	1,274	11.056	14,085	0.097	2,621	16,706	0	16,706
2013	0	1,274	11.277	14,367	0.099	2,675	17,042	0	17,042
2014	0	1,274	11.502	14,654	0.102	2,756	17,410	0	17,410
2015	0	1,274	11.732	14,947	0.104	2,810	17,757	0	17,757
2016	0	1,274	11.967	15,246	0.107	2,891	18,137	0	18,137
2017	0	1,274	12.206	15,550	0.110	2,972	18,522	0	18,522
2018	0	1,274	12.450	15,861	0.112	3,026	18,887	0	18,887
2019	0	1,274	12.699	16,179	0.115	3,107	19,286	0	19,286
2020	0	1,274	12.953	16,502	0.118	3,188	19,690	0	19,690
2021	0	1,274	13.213	16,833	0.121	3,269	20,102	0	20,102
2022	0	1,274	13.477	17,170	0.124	3,350	20,520	0	20,520
2023	0	1,274	13.746	17,512	0.127	3,432	20,944	0	20,944
2024	0	1,274	14.021	17,863	0.130	3,513	21,376	0	21,376
2025	0	1,274	14.302	18,221	0.134	3,621	21,842	0	21,842
2026	0	1,274	14.588	18,585	0.137	3,702	22,287	0	22,287
2027	0	1,274	14.879	18,956	0.140	3,783	22,739	0	22,739
2028	0	1,274	15.177	19,335	0.144	3,891	23,226	0	23,226
2029	0	1,274	15.481	19,723	0.147	3,972	23,695	0	23,695
2030	0	774	15.790	12,221	0.151	2,477	14,698	0	14,698
Total =		25,481					$438,983	$107,357	$331,626
						NPV =	$300,813	$104,682	196,131

Total NPV = $196,131
Benefit/Cost Ratio = 2.87

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) = (C) 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)
(I) = (G) - (H)

New Construction Bundle Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD New Construction Bundle**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	2.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	2.00%
4) Demand Cost ($/Unit/Yr) =	$123.680
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
16a) Administrative & Operating Costs =	$2,814	$2,251
16b) Incentive Costs =	27,300	27,300
16c) Total Utility Project Costs =	$30,114	$29,551
17) Direct Participant Costs ($/Part.) =	$1,058	$1,058
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	1.40%	1.40%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	1.40%	1.40%
20) Project Life (Years) =	20	20
21) Avg. Dk/Part. Saved =	7.60	9.40
22) Avg Non-Gas Fuel Units/Part. Saved =	25	25
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Number of Participants =	78	78
24) Total Annual Dk Saved =	593	733
25) Incentive/Participant =	$350	$350
26) Distribution Delivery Charge		$1.571
27) Effective Fed & State Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$56,197	1.76
Utility Cost Test	$72,249	2.26
Societal Test	$37,212	1.22
Participant Test	$125,446	1.78

Table 1
Ratepayer Impact Measure Test

Company: **Montana-Dakota Utilities Co.**
Project: **SD New Construction Bundle**

		Benefits											Costs				
t	Year	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)	Annual Benefits Less Costs (P)
1	2010	593	$7.178	$4,257	$0.052	$31	$4,288	5.9	$125	$738	$5,026	$1.602	$616	$2,814	$27,300	$30,730	($25,704)
2	2011	1,326	7.321	9,708	0.053	70	9,778	13.3	126	1,676	11,454	1.634	1,405	2,251	27,300	30,956	(19,502)
3	2012	1,326	7.468	9,903	0.055	73	9,976	13.3	127	1,689	11,665	1.667	1,433	0	0	1,433	10,232
4	2013	1,326	7.617	10,100	0.057	76	10,176	13.3	129	1,716	11,892	1.701	1,463	0	0	1,463	10,429
5	2014	1,326	7.769	10,302	0.059	78	10,380	13.3	130	1,729	12,109	1.735	1,492	0	0	1,492	10,617
6	2015	1,326	7.925	10,509	0.061	81	10,590	13.3	131	1,742	12,332	1.769	1,521	0	0	1,521	10,811
7	2016	1,326	8.083	10,718	0.063	84	10,802	13.3	133	1,769	12,571	1.805	1,552	0	0	1,552	11,019
8	2017	1,326	8.245	10,933	0.065	86	11,019	13.3	134	1,782	12,801	1.841	1,583	0	0	1,583	11,218
9	2018	1,326	8.410	11,152	0.067	89	11,241	13.3	135	1,796	13,037	1.877	1,614	0	0	1,614	11,423
10	2019	1,326	8.578	11,374	0.069	91	11,465	13.3	137	1,822	13,287	1.915	1,647	0	0	1,647	11,640
11	2020	1,326	8.750	11,603	0.072	95	11,698	13.3	138	1,835	13,533	1.953	1,679	0	0	1,679	11,854
12	2021	1,326	8.925	11,835	0.074	98	11,933	13.3	139	1,849	13,782	1.992	1,713	0	0	1,713	12,069
13	2022	1,326	9.103	12,071	0.076	101	12,172	13.3	141	1,875	14,047	2.032	1,747	0	0	1,747	12,300
14	2023	1,326	9.285	12,312	0.079	105	12,417	13.3	142	1,889	14,306	2.073	1,783	0	0	1,783	12,523
15	2024	1,326	9.471	12,559	0.081	107	12,666	13.3	144	1,915	14,581	2.114	1,818	0	0	1,818	12,763
16	2025	1,326	9.660	12,809	0.084	111	12,920	13.3	145	1,929	14,849	2.157	1,855	0	0	1,855	12,994
17	2026	1,326	9.853	13,065	0.087	115	13,180	13.3	146	1,942	15,122	2.200	1,892	0	0	1,892	13,230
18	2027	1,326	10.051	13,328	0.090	119	13,447	13.3	148	1,968	15,415	2.244	1,930	0	0	1,930	13,485
19	2028	1,326	10.252	13,594	0.093	123	13,717	13.3	149	1,982	15,699	2.289	1,968	0	0	1,968	13,731
20	2029	1,326	10.457	13,866	0.096	127	13,993	13.3	151	2,008	16,001	2.334	2,007	0	0	2,007	13,994
21	2030	733	10.666	7,818	0.099	73	7,891	7.3	152	1,110	9,001	2.381	1,132	0	0	1,132	7,869
	Total =	26,520									$272,510					$93,515	$178,995
									NPV =		$129,658					$73,462	$56,197

Total NPV = $56,197
Benefit/Cost Ratio = 1.76

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: **SD New Construction Bundle**

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$4,288	$738	$5,026	$2,814	$27,300	$30,114	($25,088)
2011	9,778	1,676	11,454	2,251	27,300	29,551	(18,097)
2012	9,976	1,689	11,665	0	0	0	11,665
2013	10,176	1,716	11,892	0	0	0	11,892
2014	10,380	1,729	12,109	0	0	0	12,109
2015	10,590	1,742	12,332	0	0	0	12,332
2016	10,802	1,769	12,571	0	0	0	12,571
2017	11,019	1,782	12,801	0	0	0	12,801
2018	11,241	1,796	13,037	0	0	0	13,037
2019	11,465	1,822	13,287	0	0	0	13,287
2020	11,698	1,835	13,533	0	0	0	13,533
2021	11,933	1,849	13,782	0	0	0	13,782
2022	12,172	1,875	14,047	0	0	0	14,047
2023	12,417	1,889	14,306	0	0	0	14,306
2024	12,666	1,915	14,581	0	0	0	14,581
2025	12,920	1,929	14,849	0	0	0	14,849
2026	13,180	1,942	15,122	0	0	0	15,122
2027	13,447	1,968	15,415	0	0	0	15,415
2028	13,717	1,982	15,699	0	0	0	15,699
2029	13,993	2,008	16,001	0	0	0	16,001
2030	7,891	1,110	9,001	0	0	0	9,001
Total =			$272,510			$59,665	$212,845
		NPV =	$129,658			$57,409	$72,249

Total NPV =	$72,249
Benefit/Cost Ratio =	2.26

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

Compan **Montana-Dakota Utilities Co.**
Project: **SD New Construction Bundle**

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$4,288	$738	$0.022	$43	$1.041	$617	$5,686	$30,114	$55,205	$85,319	($79,633)
2011	9,778	1,676	0.023	90	1.065	1,412	12,956	29,551	55,205	84,756	(71,800)
2012	9,976	1,689	0.023	90	1.090	1,445	13,200	0	0	0	13,200
2013	10,176	1,716	0.024	94	1.115	1,478	13,464	0	0	0	13,464
2014	10,380	1,729	0.025	98	1.141	1,513	13,720	0	0	0	13,720
2015	10,590	1,742	0.025	98	1.167	1,547	13,977	0	0	0	13,977
2016	10,802	1,769	0.026	101	1.194	1,583	14,255	0	0	0	14,255
2017	11,019	1,782	0.026	101	1.221	1,619	14,521	0	0	0	14,521
2018	11,241	1,796	0.027	105	1.249	1,656	14,798	0	0	0	14,798
2019	11,465	1,822	0.028	109	1.278	1,695	15,091	0	0	0	15,091
2020	11,698	1,835	0.029	113	1.307	1,733	15,379	0	0	0	15,379
2021	11,933	1,849	0.029	113	1.337	1,773	15,668	0	0	0	15,668
2022	12,172	1,875	0.030	117	1.368	1,814	15,978	0	0	0	15,978
2023	12,417	1,889	0.031	121	1.400	1,856	16,283	0	0	0	16,283
2024	12,666	1,915	0.031	121	1.432	1,899	16,601	0	0	0	16,601
2025	12,920	1,929	0.032	125	1.465	1,943	16,917	0	0	0	16,917
2026	13,180	1,942	0.033	129	1.498	1,986	17,237	0	0	0	17,237
2027	13,447	1,968	0.034	133	1.533	2,033	17,581	0	0	0	17,581
2028	13,717	1,982	0.035	137	1.568	2,079	17,915	0	0	0	17,915
2029	13,993	2,008	0.036	140	1.604	2,127	18,268	0	0	0	18,268
2030	7,891	1,110	0.037	72	1.641	1,203	10,276	0	0	0	10,276
Total =							$309,771			$170,075	$139,696
						NPV =	$203,808			$166,596	$37,212

Total NPV = $37,212
Benefit/Cost Ratio = 1.22

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: **SD New Construction Bundle**

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$27,300	593	$10.626	$6,301	$0.092	$179	$33,780	$82,505	($48,725)
2011	27,300	1,326	10.839	14,373	0.095	371	42,044	82,505	(40,461)
2012	0	1,326	11.056	14,660	0.097	378	15,038	0	15,038
2013	0	1,326	11.277	14,953	0.099	386	15,339	0	15,339
2014	0	1,326	11.502	15,252	0.102	398	15,650	0	15,650
2015	0	1,326	11.732	15,557	0.104	406	15,963	0	15,963
2016	0	1,326	11.967	15,868	0.107	417	16,285	0	16,285
2017	0	1,326	12.206	16,185	0.110	429	16,614	0	16,614
2018	0	1,326	12.450	16,509	0.112	437	16,946	0	16,946
2019	0	1,326	12.699	16,839	0.115	449	17,288	0	17,288
2020	0	1,326	12.953	17,176	0.118	460	17,636	0	17,636
2021	0	1,326	13.213	17,520	0.121	472	17,992	0	17,992
2022	0	1,326	13.477	17,871	0.124	484	18,355	0	18,355
2023	0	1,326	13.746	18,227	0.127	495	18,722	0	18,722
2024	0	1,326	14.021	18,592	0.130	507	19,099	0	19,099
2025	0	1,326	14.302	18,964	0.134	523	19,487	0	19,487
2026	0	1,326	14.588	19,344	0.137	534	19,878	0	19,878
2027	0	1,326	14.879	19,730	0.140	546	20,276	0	20,276
2028	0	1,326	15.177	20,125	0.144	562	20,687	0	20,687
2029	0	1,326	15.481	20,528	0.147	573	21,101	0	21,101
2030	0	733	15.790	11,574	0.151	294	11,868	0	11,868
Total =		26,520					$410,048	$165,010	$245,038
						NPV =	$287,069	$161,624	125,446

Total NPV = $125,446
Benefit/Cost Ratio = 1.78

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) = (C) 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)
(I) = (G) - (H)

Total Program Benefit/Cost Analysis

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

Company: **Montana-Dakota Utilities Co.**
Project: **SD Total Program**
Program Years: **2010 - 2011**

Input Data	
1) Retail Rate ($/Dk) =	$10.418
Escalation Rate =	2.00%
2) Non-Gas Fuel Retail Rate ($/Fuel Unit) =	$0.090
Escalation Rate =	2.50%
Non-Gas Fuel Units (ie. kWh,Gallons, etc) =	
3) Commodity Cost ($/Dk) =	$7.037
Escalation Rate =	2.00%
4) Demand Cost ($/Unit/Yr) =	$123.68
Escalation Rate =	1.00%
5) Peak Reduction Factor =	1.000%
6) Variable O&M ($/Dk) =	$0.050
Escalation Rate =	3.31%
7) Non-Gas Fuel Cost ($/Fuel Unit) =	$0.020
Escalation Rate =	2.50%
8) Non-Gas Fuel Loss Factor	8.00%
9) Gas Environmental Damage Factor =	$1.018
Escalation Rate =	2.30%
10) Non Gas Fuel Environmental Damage Factor	$0.000
Escalation Rate =	0.00%
11) Participant Discount Rate =	4.28%
12) Utility Discount Rate =	8.265%
13) Societal Discount Rate =	4.28%
14) General Input Data Year =	2009
15) Project Analysis Year 1 =	2010
Project Analysis Year 2 =	2011

	First Year	Second Year
16) Utility Project Costs		
Education & Outreach	$12,500	$12,500
16a) Administrative & Operating Costs =	$13,931	$14,070
16b) Incentive Costs =	$66,530	$81,660
16c) Total Utility Project Costs =	$92,961	$108,230
17) Average Direct Participant Costs ($/Part.) =	$511	$537
18) Participant Non-Energy Costs (Annual $/Part.) =	$0	$0
Escalation Rate =	0.00%	0.00%
19) Participant Non-Energy Savings (Annual $/Part) =	$0	$0
Escalation Rate =	0.00%	0.00%
20) Project Life (Years) =		
21) Avg. Dk/Part. Saved =	5.7	10.8
22) Avg Non-Gas Fuel Units/Part. Saved =	434	434
22a) Avg Additional Non-Gas Fuel Units/ Part. Used =	0	0
23) Total Number of Participants =	388	473
24) Total Annual Dk Saved =	2,214	5,122
25) Incentive/Participant =	$171	$171
26) Distribution Delivery Charge		$1.571
27) Effective Fed & State Income Tax Rate = (Federal & Revenues Taxes)		35.15%

Test Results	NPV	B/C
Ratepayer Impact Measure Test	$219,879	1.88
Utility Cost Test	$278,050	2.44
Societal Test	$277,630	1.59
Participant Test	$621,685	2.41

Table 1
Ratepayer Impact Measure Test

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

		Benefits										Costs				
t	Year	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 & Education Costs (M)	Incentive Costs (N)	Total Program Costs (O)	Annual Benefits Less Costs (P)
1	2010	2,214	$7.178	$15,862	$0.052	$115	$15,977	22.0	$125	2,776	$18,753	$1.602	$2,295	$26,431	$66,530	$95,256	($76,503)
2	2011	5,122	7.321	37,373	0.053	271	37,644	51.0	126	6,464	44,108	1.634	5,410	26,570	81,660	113,640	(69,532)
3	2012	5,122	7.468	38,060	0.055	281	38,341	51.0	127	6,515	44,856	1.667	5,510	0	0	5,510	39,346
4	2013	5,122	7.617	38,757	0.057	293	39,050	51.0	129	6,618	45,668	1.701	5,612	0	0	5,612	40,056
5	2014	5,122	7.769	39,467	0.059	302	39,769	51.0	130	6,669	46,438	1.735	5,715	0	0	5,715	40,723
6	2015	5,122	7.925	40,194	0.061	312	40,506	51.0	131	6,720	47,226	1.769	5,820	0	0	5,820	41,406
7	2016	5,122	8.083	40,930	0.063	323	41,253	51.0	133	6,823	48,076	1.805	5,926	0	0	5,926	42,150
8	2017	5,122	8.245	41,683	0.065	333	42,016	51.0	134	6,874	48,890	1.841	6,035	0	0	6,035	42,855
9	2018	5,122	8.410	42,452	0.067	344	42,796	51.0	135	6,927	49,723	1.877	6,144	0	0	6,144	43,579
10	2019	5,122	8.578	43,230	0.069	353	43,583	51.0	137	7,028	50,611	1.915	6,259	0	0	6,259	44,352
11	2020	5,122	8.750	44,030	0.072	368	44,398	51.0	138	7,080	51,478	1.953	6,374	0	0	6,374	45,104
12	2021	5,122	8.925	44,842	0.074	379	45,221	51.0	139	7,131	52,352	1.992	6,491	0	0	6,491	45,861
13	2022	5,122	9.103	45,667	0.076	390	46,057	51.0	141	7,233	53,290	2.032	6,611	0	0	6,611	46,679
14	2023	5,122	9.285	46,510	0.079	405	46,915	51.0	142	7,284	54,199	2.073	6,735	0	0	6,735	47,464
15	2024	5,122	9.471	47,371	0.081	415	47,786	51.0	144	7,387	55,173	2.114	6,857	0	0	6,857	48,316
16	2025	4,699	9.660	44,159	0.084	394	44,553	47.0	145	6,831	51,384	2.157	6,394	0	0	6,394	44,990
17	2026	3,992	9.853	38,003	0.087	347	38,350	40.0	146	5,840	44,190	2.200	5,503	0	0	5,503	38,687
18	2027	3,992	10.051	38,692	0.090	359	39,051	40.0	148	5,920	44,971	2.244	5,602	0	0	5,602	39,369
19	2028	3,296	10.252	33,023	0.093	306	33,329	33.0	149	4,917	38,246	2.289	4,781	0	0	4,781	33,465
20	2029	2,600	10.457	27,188	0.096	249	27,437	26.0	151	3,926	31,363	2.334	3,935	0	0	3,935	27,428
21	2030	1,507	10.666	16,073	0.099	150	16,223	15.0	152	2,280	18,503	2.381	2,327	0	0	2,327	16,176
	Total =	94,008									$939,498					$317,527	$621,971
									NPV =		$470,979					$251,100	$219,879

Total NPV = $219,879
Benefit/Cost Ratio = 1.88

Worksheet Calculations

(A) = Sum of all programs Table 1 (A).
(B) = Commodity Cost (3) escalated
(C) = Sum of all programs Table 1 (C).
(D) = Variable O&M Cost (6), escalated
(E) = Sum of all programs Table 1 (E).
(F) = (C) + (E)
(G) = Sum of all programs Table 1 (G).
(H) = Demand Cost (4) escalated.
(I) = (G) x (H)
(J) = (F) + (I)
(K) = Distribution Delivery Charge (26) escalated.
(L) = Sum of all programs Table 1 (L)
(M) = Sum of all programs Table 1 (M) + Education and Outreach (16)
(N) = Sum of all programs Table 1 (N)
(O) = (L) + (M) + (N)
(P) = (J) - (O)

Table 2
Utility Cost Test

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

	Benefits			Costs			
Year	Total Energy Savings (A)	Total Demand Savings (B)	Annual Total Savings (C)	Program Admin Costs (D)	Incentive Costs (E)	Utility Program Costs (F)	Annual Benefits Less Costs (G)
2010	$15,977	$2,776	$18,753	$26,431	$66,530	$92,961	($74,208)
2011	37,644	6,464	44,108	26,570	81,660	108,230	(64,122)
2012	38,341	6,515	44,856	0	0	0	44,856
2013	39,050	6,618	45,668	0	0	0	45,668
2014	39,769	6,669	46,438	0	0	0	46,438
2015	40,506	6,720	47,226	0	0	0	47,226
2016	41,253	6,823	48,076	0	0	0	48,076
2017	42,016	6,874	48,890	0	0	0	48,890
2018	42,796	6,927	49,723	0	0	0	49,723
2019	43,583	7,028	50,611	0	0	0	50,611
2020	44,398	7,080	51,478	0	0	0	51,478
2021	45,221	7,131	52,352	0	0	0	52,352
2022	46,057	7,233	53,290	0	0	0	53,290
2023	46,915	7,284	54,199	0	0	0	54,199
2024	47,786	7,387	55,173	0	0	0	55,173
2025	44,553	6,831	51,384	0	0	0	51,384
2026	38,350	5,840	44,190	0	0	0	44,190
2027	39,051	5,920	44,971	0	0	0	44,971
2028	33,329	4,917	38,246	0	0	0	38,246
2029	27,437	3,926	31,363	0	0	0	31,363
2030	16,223	2,280	18,503	0	0	0	18,503
Total =			$939,498			$201,191	$738,307
		NPV =	$470,979			$192,929	$278,050

Total NPV = $278,050
Benefit/Cost Ratio = 2.44

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

Table 3
Societal Test

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

	Benefits							Costs			
Year	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)	Annual Benefits Less Costs (K)
2010	$15,977	$2,776	$0.022	$800	$1.041	$2,305	$21,858	$80,461	$131,926	$212,387	($190,529)
2011	37,644	6,464	0.023	1,928	1.065	5,455	51,491	95,730	172,406	268,136	(216,645)
2012	38,341	6,515	0.023	1,928	1.090	5,583	52,367	0	0	0	52,367
2013	39,050	6,618	0.024	2,012	1.115	5,711	53,391	0	0	0	53,391
2014	39,769	6,669	0.025	2,097	1.141	5,845	54,380	0	0	0	54,380
2015	40,506	6,720	0.025	2,097	1.167	5,977	55,300	0	0	0	55,300
2016	41,253	6,823	0.026	2,180	1.194	6,115	56,371	0	0	0	56,371
2017	42,016	6,874	0.026	2,180	1.221	6,255	57,325	0	0	0	57,325
2018	42,796	6,927	0.027	2,264	1.249	6,396	58,383	0	0	0	58,383
2019	43,583	7,028	0.028	2,348	1.278	6,546	59,505	0	0	0	59,505
2020	44,398	7,080	0.029	2,432	1.307	6,694	60,604	0	0	0	60,604
2021	45,221	7,131	0.029	2,432	1.337	6,848	61,632	0	0	0	61,632
2022	46,057	7,233	0.030	2,516	1.368	7,007	62,813	0	0	0	62,813
2023	46,915	7,284	0.031	2,600	1.400	7,170	63,969	0	0	0	63,969
2024	47,786	7,387	0.031	2,600	1.432	7,334	65,107	0	0	0	65,107
2025	44,553	6,831	0.032	1,923	1.465	6,883	60,190	0	0	0	60,190
2026	38,350	5,840	0.033	1,021	1.498	5,979	51,190	0	0	0	51,190
2027	39,051	5,920	0.034	1,052	1.533	6,120	52,143	0	0	0	52,143
2028	33,329	4,917	0.035	1,083	1.568	5,169	44,498	0	0	0	44,498
2029	27,437	3,926	0.036	1,113	1.604	4,170	36,646	0	0	0	36,646
2030	16,223	2,280	0.037	679	1.641	2,473	21,655	0	0	0	21,655
Total =							$1,100,818			$480,523	$620,295
						NPV =	$747,148			$469,518	$277,630

Total NPV = $277,630
Benefit/Cost Ratio = 1.59

Worksheet Calculations	
(A) = Table 1 (C)	(H) = Sum of all programs Table 3 (H)
(G) = Table 1 (D)	(I) = Sum of all programs Table 3 (H)
(C) = Non-Gas Fuel Cost (7), adjusted for losses (8), escalated..	(J) = (H) + (I)
(D) = Sum of all programs Table 3 (D)	(K) = (G) - (J)
(E) = Gas Environmental Damage Factor (9), escalated	
(F) = Sum of all programs Table 3 (F)	
(G) = (A) + (B) + (D) + (F)	

Table 4
Participant Test

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

	Benefits							Costs	
Year	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)	Annual Benefits Less Costs (I)
2010	$66,530	2,214	$10.626	$23,482	$0.092	$3,342	$93,354	$198,456	($105,102)
2011	81,660	5,122	10.839	55,333	0.095	7,965	144,958	254,066	(109,108)
2012	0	5,122	11.056	56,346	0.097	8,132	64,478	0	64,478
2013	0	5,122	11.277	57,379	0.099	8,300	65,679	0	65,679
2014	0	5,122	11.502	58,429	0.102	8,552	66,981	0	66,981
2015	0	5,122	11.732	59,503	0.104	8,720	68,223	0	68,223
2016	0	5,122	11.967	60,597	0.107	8,970	69,567	0	69,567
2017	0	5,122	12.206	61,707	0.110	9,222	70,929	0	70,929
2018	0	5,122	12.450	62,844	0.112	9,390	72,234	0	72,234
2019	0	5,122	12.699	64,002	0.115	9,642	73,644	0	73,644
2020	0	5,122	12.953	65,181	0.118	9,893	75,074	0	75,074
2021	0	5,122	13.213	66,384	0.121	10,144	76,528	0	76,528
2022	0	5,122	13.477	67,611	0.124	10,396	78,007	0	78,007
2023	0	5,122	13.746	68,855	0.127	10,648	79,503	0	79,503
2024	0	5,122	14.021	70,129	0.130	10,900	81,029	0	81,029
2025	0	4,699	14.302	65,377	0.134	8,051	73,428	0	73,428
2026	0	3,992	14.588	56,264	0.137	4,236	60,500	0	60,500
2027	0	3,992	14.879	57,280	0.140	4,329	61,609	0	61,609
2028	0	3,296	15.177	48,889	0.144	4,453	53,342	0	53,342
2029	0	2,600	15.481	40,251	0.147	4,545	44,796	0	44,796
2030	0	1,507	15.790	23,795	0.151	2,771	26,566	0	26,566
Total =		94,008					$1,500,429	$452,522	$1,047,907
						NPV =	$1,063,779	$442,094	621,685

Total NPV = $621,685
Benefit/Cost Ratio = 2.41

Worksheet Calculations
(A) = Sum of all programs Table 4 (A)
(G) = Table 1 (A)
(C) = Retail Rate (1) escalated.
(D) = Sum of all programs Table 4 (D)
(E) = Non=Gas Fuel Retail Rate (2), escalated.
(F) = Sum of all programs Table 4 (F)
(G) = (A) + (D) + (F)
(H) = Sum of all programs Table 4 (H)
(I) = (G) - (H)

Attachment D

Montana-Dakota Utilities Co.
A Division of MDU Resources Group, Inc.
400 N 4th Street
Bismarck, ND 58501

State of South Dakota
Gas Rate Schedule – SDPUC Volume No. 2

Section No. 1
4th Revised Sheet No. 1
Canceling 3rd Revised Sheet No. 1

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Date Filed: March 2, 2009 **Effective Date:**

Issued By: Donald R. Ball
Vice President-Regulatory Affairs

Docket No.:

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A Division of MDU Resources Group, Inc.
400 N 4th Street
Bismarck, ND 58501

State of South Dakota
Gas Rate Schedule – SDPUC Volume No. 2

Section No. 3
3rd Revised Sheet No. 31
Canceling 2nd Revised Sheet No. 31

CONSERVATION PROGRAM
TRACKING MECHANISM Rate 90

Applicability:
This rate schedule represents a Conservation Program Tracking Mechanism and specifies the procedure to be utilized to recover the costs of a portfolio of conservation programs, as authorized by the Commission, including the recovery of distribution delivery charge revenues reduced as a result of the conservation programs. Service provided under the Company's Residential Service Rates 60 and 66 and Firm General Service Rates 70, 72 and 76 shall be subject to this tracking mechanism. T T T

Conservation Program Tracker:
An adjustment per dk will be determined for each rate schedule subject to the Conservation Program Tracking Mechanism. Monthly bills beginning with the first billing cycle each May 1 will be adjusted by the application of the Conservation Tracking Adjustment rate indicated below. The rate will reflect the amortization of the conservation program costs including the dk savings associated with each measure implemented in the prior 12 month period. The currently authorized Distribution Delivery Charge applicable to qualifying customers that participated in a conservation program will be applied to the dk savings to compute the reduction in Distribution Delivery revenues associated with the conservation programs. The total program costs including the lost distribution revenues will be amortized over projected volumes to be sold over the next 12 month period. Following the initial one-year term, and annually thereafter, the Conservation Program Tracker rate calculation shall include any over or under collection of revenue from the preceding twelve month recovery period. T N

Conservation Tracking Adjustment:

Black Hills	$.004 per dk
East River	$.002 per dk

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Vice President-Regulatory Affairs

Docket No.:

Tariffs Reflecting Proposed Changes

Montana-Dakota Utilities Co.
A Division of MDU Resources Group, Inc.
400 N 4th Street
Bismarck, ND 58501

State of South Dakota
Gas Rate Schedule – SDPUC Volume No. 2

Section No. 1
3rd Revised Sheet No. 1
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Montana-Dakota Utilities Co.
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400 N 4th Street
Bismarck, ND 58501

State of South Dakota
Gas Rate Schedule – SDPUC Volume No. 2

Section No. 3
2nd Revised Sheet No. 31
Canceling 1st Revised Sheet No. 31

~~EXPERIMENTAL~~ CONSERVATION PROGRAM TRACKING MECHANISM Rate 90

Applicability:
This rate schedule represents a~~n Experimental~~ Conservation Program Tracking Mechanism and specifies the procedure to be utilized to recover the costs of a portfolio of conservation programs ~~consisting of a Customer Conservation Starter Kit Program, a High-Efficiency Furnace Program and a Programmable Thermostat Program~~, as authorized by the Commission, including the recovery of distribution delivery charge revenues reduced as a result of the conservation programs. Service provided under the Company's Residential Service Rates 60 and 66 and Firm General Service Rates 70, 72 and 76 shall be subject to this tracking mechanism. ~~This experimental program shall expire on April 30, 2009.~~

Conservation Program Tracker:
An adjustment per dk will be determined for each rate schedule subject to the Conservation Program Tracking Mechanism. Monthly bills beginning with the first billing cycle ~~following May 1, 2006 and~~ each May 1 ~~thereafter,~~ will be adjusted by the application of the Conservation Tracking Adjustment rate indicated below. The rate will reflect the amortization of the conservation program costs including the dk savings associated with each measure implemented in the prior 12 month period. The currently authorized Distribution Delivery Charge applicable to qualifying customers that participated in a conservation program will be applied to the dk savings to compute the reduction in Distribution Delivery revenues associated with the conservation programs. The total program costs including the lost distribution revenues will be amortized over projected volumes to be sold over the next 12 month period. Following the initial one-year term, and annually thereafter, the Conservation Program Tracker rate calculation shall include any over or under collection of revenue from the preceding twelve month recovery period.

Conservation Tracking Adjustment:

Black Hills	$.004 per dk
East River	$.002 per dk