Integrated Resource Plan

Prepared for

Falls City Utilities
Falls City, Nebraska

June 2007

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Section I. Introduction

This is the Integrated Resource Plan (IRP) for Falls City Utilities (Falls City). The IRP was developed to identify Falls City's resource requirements for the 10-year period beginning fiscal year 2007 through fiscal year 2016.

Purpose

Falls City is responsible for serving the City of Falls City with electricity, gas, water, and sanitary sewer and water services. Western Area Power Administration (WAPA) instituted a program called the Energy Planning and Management Program (EPAMP). EPAMP became effective on November 20, 1995. EPAMP includes a provision that requires its customers to prepare and submit an IRP to WAPA to maintain their current allocations of power and energy from WAPA. This IRP is also intended to meet WAPA's requirements.

As part of Falls City's ongoing obligation under EPAMP, it periodically prepares and updates its IRP. The purpose of this IRP is to develop two and five-year implementation plans to serve Falls City's power supply requirements at the lowest reasonable cost consistent with prudent financial and technical principles.

Discussion of Past IRP Studies

Falls City submitted an IRP to Western in 2002. The 2002 IRP recommended that Falls City monitor baseload projects for feasibility, extend the Omaha Public Power District (OPPD) contract until a new baseload purchase/participation could be made, and construct or purchase additional peaking capacity to replace generating units that will be retired in the future. Falls City implemented the IRP recommendations for a new baseload purchase/participation by participating in the OPPD Nebraska City Unit #2 (NC-2) Project. The 2002 IRP also recommended that Falls City continue to investigate partnerships with the Nebraska Energy

Office (NEO), implement low cost Demand Side Management (DSM) programs and consider purchases of renewable energy based on customer interest. As part of the initial step in the implementation of the recommendation, Falls City participates in the Nebraska Municipal Power Pool (NMPP)'s Electric Distribution Services (EDS) including infrared scanning and meter verification audits. Falls City submits progress reports on the IRP annually to Western.

Methodology

This IRP was prepared consistent with EPAMP's suggested methodology and is consistent with prior Falls City IRPs. The methodology used to prepare this IRP is summarized by the following list of tasks:

- Prepared Falls City's peak demand and energy requirements forecast.
- Compared forecasted peak demand and energy requirements to existing Falls City power supply resources to estimate future resource needs.
- Screened power supply resource options to identify economical resources to include in the integration analysis.
- Screened DSM measures to identify economical and technically feasible measures that could be included in the integration analysis.
- Integrated DSM measures with supply resources to develop IRP options.
- Considered environmental impacts and costs of each IRP option.
- Developed recommendation based on economic and non-economic considerations.
- Solicited public participation and incorporated comments in the IRP.

General Objectives

Falls City's goal is to provide reliable service at low rates. Falls City also focuses on ensuring ample capacity for future growth and development. To achieve this stated goal, Falls City focused on the following objectives in developing the IRP:

- Maintain local control of the utilities system.
- Focus on continued growth and development.
- Maintain low rates.
- Maintain financial and rate stability.

Utility Profile

Falls City is a not-for-profit municipally owned electric utility located in southeastern Nebraska. In 2006, the electric customers were segmented in the following customer classes:

- Residential 2,213
- Commercial 547
- Industrial 21
- Total Electric Customers: 2,781

Falls City had a system peak of 15,080 kW in 2006. Falls City's annual energy usage was 53,511 MWh in 2006, for an annual load factor of 40.51%.

Section II. Load Forecast

Introduction

Based on trending analysis and identification of known new loads, an annual peak growth rate of 0.0% - 0.7% appears reasonable. Since 1998, annual energy growth has averaged -0.35% per year. The forecast is presented in Table 1. Load projections were based on historical data through the year 2006, with system peak load growth projected at 0.0% - 0.7% per year thereafter. Energy calculations are based on projected demand, hours in the year, and a load factor of 46% - 48%.

Table 1
Falls City Utilities
Historical and Projected
Peak Demand and Energy Requirements

Year	Net System Peak MW	Percent Change	Net System Energy MWh	Percent Change	Load Factor %
1997	15.10		53,923		41%
1998	14.70	-2.65%	55,030	2.05%	43%
1999	15.40	4.76%	50,869	-7.56%	38%
2000	14.56	-5.45%	54,930	7.98%	43%
2001	14.06	-3.43%	54,519	-0.75%	44%
2002	13.92	-1.00%	53,931	-1.08%	44%
2003	14.44	3.74%	52,136	-3.33%	41%
2004	13.60	-5.82%	51,535	-1.15%	43%
2005	13.54	-0.44%	54,737	6.21%	46%
2006	15.08	11.37%	53,511	-2.24%	41%
2007	14.10	-6.50%	56,258	5.13%	46%
2008	14.20	0.71%	56,892	1.13%	46%
2009	14.20	0.00%	57,218	0.57%	46%
2010	14.30	0.70%	57,702	0.85%	46%
2011	14.30	0.00%	58,189	0.84%	46%
2012	14.30	0.00%	58,851	1.14%	47%
2013	14.40	0.70%	59,194	0.58%	47%
2014	14.40	0.00%	59,700	0.85%	47%
2015	14.50	0.69%	60,208	0.85%	47%
2016	14.50	0.00%	60,886	1.13%	48%

Section III. Supply Side Resource Analysis

Current Power Supply Arrangements

The Falls City system includes owned and purchased power supply resources, DSM programs and transmission system arrangements.

Existing Supply Side Resources

Falls City's system generates 20.4 MW capacity and energy, purchases 3 MW of capacity and energy from WAPA, and has ownership rights for 5.5 MW of baseload that is currently under construction. Table 2 summarizes Falls City's existing supply side resources.

Table 2
Falls City Utilities
Existing Generating Resources - 2006

Source	Capacity (MW)	Energy (MWh)
Generation	20.40	927
WAPA	3.05	14,751
Municipal Energy Agency of Nebraska (MEAN)	0.00	37,833
Omaha Public Power District (OPPD) (1)	0.00	0
Total	**23.45**	**53,511**

(1) MEAN provides scheduling services for the MAPP Service Schedule C, Falls City

Owned Generation. Falls City owns and operates two diesel engine generators and six dual fueled (diesel/natural gas) engine generators.

WAPA. WAPA delivers firm electric service to Falls City. This agreement terminates in 2024.

Municipal Energy Agency of Nebraska (MEAN). MEAN provides scheduling services for the MAPP Service Schedule C, non-firm energy from OPPD to Falls City. This contract expires April 30, 2010.

Omaha Public Power District (OPPD). Falls City has a contract with OPPD that provides MAPP Schedule C non-firm energy that may be interrupted up to a maximum of 750 hours per year. The existing contract expires April 30, 2010.

OPPD Nebraska City Unit #2 (NC-2). Falls City has a contract with OPPD for 0.83% of 663 MW (or 5.5 MW) of NC-2 which is projected to come online in May 2009. This contract has an initial term of 40 years with optional renewals that could extend to the life of the unit.

Transmission. Falls City is interconnected at 69 kV with OPPD at Falls City. OPPD provides transmission service for WAPA and OPPD purchases under firm and non-firm point-to-point transmission arrangements. MEAN serves as the scheduling agent for the OPPD transmission service.

Comparison of Loads and Resources

Forecasted peak demand and energy requirements were summarized and compared to existing capacity and energy resources. Table 3 (page 7) summarizes the Comparison of Peak Demand and Energy Requirements to Resources. Figure 1 (page 8) is the graphical presentation of the comparison of loads and resources.

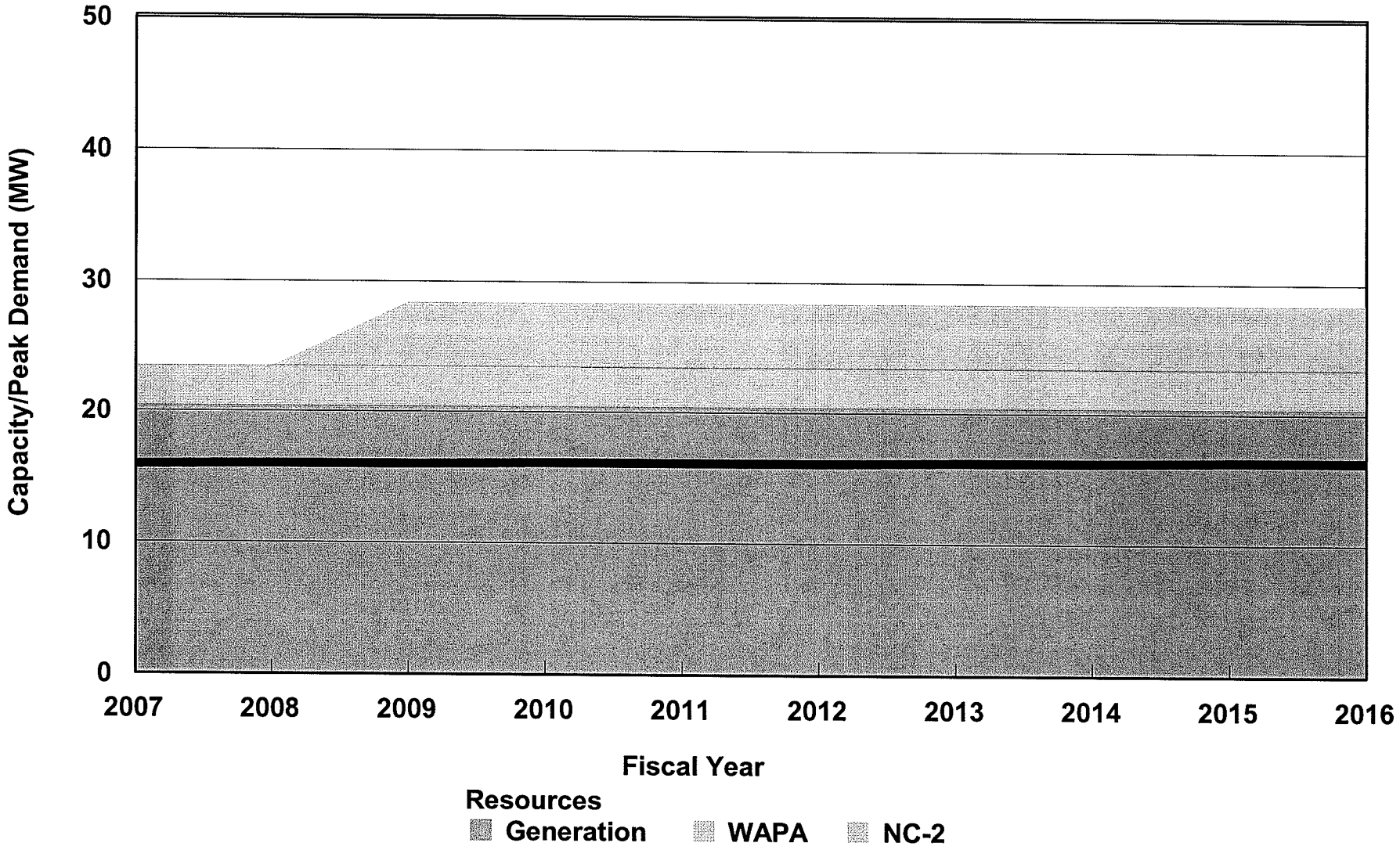
Table 3
Comparison of Peak Demand and Enegy Requirements to Resources

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Demand										
Peak Demand Obligation (1) (2)	15.8	15.9	15.9	16.0	16.0	16.0	16.1	16.1	16.2	16.2
Capacity Resources (3)	23.4	23.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4	28.4
Surplus/(Deficit)	7.6	7.5	12.5	12.4	12.4	12.4	12.3	12.3	12.2	12.2

Notes:
(1) Included forecast demand and 15% required reserves.
(2) Peak Demand is the summer peak, as Falls City Utilities is a summer peaking system.
(3) Included 1% reduction in WAPA in 2011.

Figure 1

Falls City, Nebraska
Comparison of Load vs. Resources



Falls City's Peak Demand Obligation includes peak demand and capacity reserves. Capacity reserves were calculated using the Mid-Continent Area Power Pool (MAPP) Generation Reserve Sharing Pool (GRSP) reserve requirement of 15% of peak demand.

Based on the Comparison of Peak Demand and Energy Requirements to Resources, the following was concluded:

- Falls City has sufficient capacity throughout the study period.
- Falls City may need outage replacement energy during scheduled outages of NC-2 after expiration of the OPPD contract.
- Falls City has sufficient energy available from peaking capacity to supply energy needs during high load hours; however, it may be advantageous to purchase non-firm energy if it is less expensive than the operating costs of peaking generation.

The owned resources typically are not used to generate energy because the cost of energy from these resources is greater than the cost of energy in the economy market.

Future Supply Side Resources

Falls City participates in a statewide joint planning effort through the Nebraska Power Association (NPA). Utilities in NPA jointly coordinate long-term power supply plans to meet the electric power needs of the state of Nebraska. Falls City participates in NPA's resource planning process.

Identification of Resource Options

The following is a description of the supply options that were reviewed.

Renewable Resources. Falls City, through its membership in MEAN, is involved in the wind project in Kimball, Nebraska although it does not specifically purchase wind energy from

MEAN. OPPD also includes renewable resources in its portfolio, including wind energy and landfill methane.

Unit Participation and Energy Purchases. Unit participation purchases in generating facilities of other utilities is an option for long-term resources. Falls City is involved in the following:

- OPPD Nebraska City 2.

Evaluation Criteria

Evaluation criteria were established for the power supply resources. The criteria included:

- Ability to meet Falls City's resource needs.
- Reliability and availability of the resources.
- Operational flexibility of the resource.
- Environmental impacts and compliance costs.
- Total delivered cost of the resource.

Supply Side Resources Selected for Screening

Several power supply resources were screened and evaluated for inclusion in the Falls City IRP. Due to the fact that Falls City has sufficient capacity resources throughout the study period, supply-side resource alternatives focused on Falls City's energy needs.

The supply-side resource alternatives are listed as follows:

- Continued non-firm purchase with OPPD or other supplier.
- Additional baseload capacity and energy to offset peaking energy.

Section IV. Demand Side Analysis

Review of Load Shape Objectives

The Electric Power Research Industry (ERPI) developed six industry accepted load shape objectives. These objectives are as follows:

Strategic Load Growth

Strategic Load Growth involves promoting increased loads in all hours for utilities with surplus capacity for all periods of the year.

Peak Clipping

Peak Clipping is the reduction of system peak loads in order to reduce the reliance on peaking units with high fuel costs. Air conditioning load cycling is an example of a peak clipping program.

Strategic Conservation

Strategic conservation is directed at reducing end-use consumption through the conservation of energy and environmental resources. Strategic conservation has a levelized effect on end-use consumption, and thus has a minimal effect on peak load. An example of strategic conservation is an appliance efficiency program.

Valley Filling

Valley filling is a load management program that involves increasing off-peak loads. Street lighting is an example of a program that may build evening loads which are normally off-peak.

Load Shifting

Load shifting involves shifting load from peak to off-peak periods. Irrigation load control and thermal energy storage systems are examples of load shifting.

Flexible Load Shape

Flexible load shape programs modify the load shape on short notice to meet demand requirements without modifying load during periods when it is not needed. Interruptible rates are an example of flexible load shape.

DSM Program Evaluations

Demand Side Management (DSM) measures were considered as a means of deferring capacity acquisitions. DSM measures modify the customer or end use load shape. Fourteen types of DSM programs were evaluated using screening analysis and economic feasibility.

Residential Central Air Conditioning Load Cycling

This DSM program requires the installation of a load-control device that will cycle off the air conditioner during summer peak-load periods. The customer incentive is estimated to be $20 per year with an average load reduction of .85 kW.

Residential Electric Water Heater Load Shedding

A customer incentive of $20 per year would be given to customers already participating in the air conditioner load cycling program and who also have their electric water heater cycled off for periods of time during summer peak-load hours.

Residential High Efficiency Central Air Conditioners

For customers needing to replace their existing air conditioner, this program would provide rebates or incentives when FCU selects the size of the customer's new or replacement air conditioner. The requirements include that the unit's size will not be more than 125% of design heat gain according to Manual J standards, and a minimum SEER of 12. Local contractors market high efficiency equipment, although no rebates or incentives are provided.

Residential Room and Window Air Conditioner Rebates

This program is for customers needing to replace their existing room or window air conditioner. Rebates of $50-55 would be available to customers selecting a unit with a SEER of 10 or more.

High Efficiency Refrigerator Rebate Program

Customers purchasing a refrigerator 15% or more efficient than the minimum 1993 standard would be eligible for a $50 rebate. The customer would be required to give the old refrigerator to the dealer who would dispose of it.

Old Refrigerator Pick-up Program

This purpose of this program is to remove refrigerators that are used as second units from homes and the refrigerator market. The program educates customers about the costs of the second refrigerator, and would provide a $25 incentive to customers for turning in old frost-free refrigerators that are still operable. Coordination must occur with local dealers who will dispose of the old refrigerators.

Improved Home Loan Program for Furnace & AC Replacement

This program would provide a loan subsidy to customers installing properly sized high-efficiency equipment. This would be achieved by Falls City providing loan funds or by making a payment directly to the bank granting the loan.

Energy-Efficient New Home

Customers would receive an incentive in the form of a rebate, rate discount or a loan subsidy from Falls City for building a new home to meet certain energy efficiency standards. This program requires a central air conditioner and furnace that are high efficiency and not

oversized. This program also requires additional insulation, reduction of infiltration, and reduction of heat gain or loss.

Energy-Efficient Existing Home

Energy efficient improvements including additional insulation, reduction of infiltration, and full basement insulation would be eligible for a customer incentive. Additional requirements are that the central air conditioner and furnace be high efficiency and not oversized.

Commercial High-Efficiency Lighting

This program would provide incentives, rebates or loans for commercial and industrial customers who increase the efficiency of their lighting. It was assumed that equipment being replaced was replaced with similar or higher efficiency equipment, and only permanent improvements or replacements qualify. Examples include T8 lights with electronic ballasts and adding day-lighting controls.

Commercial High-Efficiency Air Conditioners

Small commercial customers would receive incentives for installing high-efficiency air conditioners when replacing their existing units. Examples of qualifying equipment are room air conditioners, packaged terminal units, rooftop units, and split systems.

Commercial HVAC Efficiency Improvement Program

Commercial and Industrial customers with large cooling systems would be eligible for incentives, rebates or loans when they reduce their electrical energy consumption of their HVAC systems. Adding cooling towers, and energy management controls are examples of eligible improvements.

Large Customer Customized Rebate Program

This program would provide incentives to commercial and industrial customers who save energy in ways that are not covered by other DSM programs. Examples of eligible energy-efficiency improvements include energy-efficient motors and energy management systems as long as the energy savings would be lasting.

Interruptible Rates

Large Industrial customers would receive a credit for interrupting all or part of their load during summer peak periods when asked to do so by Falls City. The customer signs a contact before the summer starts, and is obligated to interrupt a certain amount of their load up to 10 times during a year for periods of eight hours or less.

Based on Falls City's resources and load profile, the types of DSM most suitable are:

- Strategic conservation (summer season) to reduce end-use consumption during peak periods.
- Strategic load building (winter season) to build loads during periods of surplus capacity.
- Peak clipping (summer season) to reduce peaking energy needs.

Screening Analysis

The screening analysis consisted of two steps. The first step, Qualitative Screening, ranked the potential DSM measures according to subjective criteria, such as customer preference, market potential, and ease of implementation. A score was assigned to each DSM measure and the measures were ranked. This narrowed the list of measures to be economically further evaluated.

The DSM measures were then evaluated for economic feasibility. The avoided costs for capacity and energy calculated in the supply side resource evaluation were used to calculate the costs and benefits of each DSM measure.

Much of the DSM screening utilized information from the WAPA Resource Planning Guide (RPG). The RPG provided a process for evaluating DSM measures and provided reference data for use in the economic evaluation of DSM measures.

Qualitative Screening

The DSM technologies which satisfy Falls City's load shape objectives were subjected to qualitative screening. The qualitative screening involved the use of six criteria, called "second tier criteria," to identify those technologies most relevant to Falls City's objectives. According to the RPG, the second tier criteria are:

- Costs: This includes start-up, marketing and equipment costs.
- Customer Preferences: A customer's acceptance of a technology is determined by such factors as the customer's cost perspective, comfort level with the technology, and willingness to use the measure.
- Environmental Impacts: DSM technologies can postpone the need to add supply-side resources that emit pollutants into the environment, but some DSM measures also have environmental impacts. For example, hazardous waste disposal will be an issue when disposing of old refrigerator compressors containing CFCs and old ballasts with PCBs.
- Market Potential: In order for the program to realize its maximum potential, intended markets and end-uses must be identified.

- Ease of Implementation: A program's success will be heavily dependent on the relative ease of implementation. Some programs may require the simple replacement of lights or appliances, while others require major changes in the building structure.
- Availability: The DSM technology must be commercially available and reliable.

All technologies were scored from 0 to 3 according to their ability to satisfy each of the preceding criteria. Those technologies with higher total scores were considered to be more successful in achieving Falls City's load shape objectives than those with lower scores. Tables 4 and 5 (page 18) show the scores for each technology applicable to a particular customer class.

All applicable technologies were ranked from high to low for each customer class. Falls City then selected 14 technologies for further evaluation. The measures that passed the qualitative screening included nine residential measures, and five commercial/industrial measures. This pre-screening only used qualitative factors to narrow the list of technologies that would be further evaluated. The 14 measures were then subjected to an economic evaluation.

Table 4
Qualitative Screening
Residential Demand Side Measures

Technology Alternative	Cost	Customer Preference	Environmental Impact	Market Potential	Ease of Implementation	Commercial Availability/ Reliability	Total
Central Air Conditioning Load Cycling	2	2	2	3	2	3	14
Electric Water Heater Load Shedding	2	3	3	1	3	3	15
High Efficiency Central Air Conditioners	2	3	3	3	2	3	16
Room and Window Air Conditioner Rebates	3	3	3	3	3	3	18
High Efficiency Refrigerator Rebate Program	3	3	3	3	3	3	18
Old Refrigerator Pick-up Program	3	2	3	3	3	3	17
Improved Home Loan Program for Furnace & AC Replacement	2	3	3	3	3	3	17
Energy-Efficient New Home	1	2	3	2	2	2	12
Energy-Efficient Existing Home	1	2	3	2	2	2	12

Table 5
Qualitative Screening
Commercial/Industrial Demand Side Measures

Technology Alternative	Cost	Customer Preference	Environmental Impact	Market Potential	Ease of Implementation	Commercial Availability/ Reliability	Total
Commercial High-Efficiency Lighting	3	3	2	2	3	3	16
Commercial High-Efficiency Air Conditioners	1	3	3	2	3	3	15
Commercial HVAC Efficiency Improvement Program	2	3	3	2	3	3	16
Large Customer Customized Rebate Program	2	3	3	2	2	3	15
Interruptible Rates	3	3	3	1	1	3	14

Economic Evaluation

Once the technical data for each DSM measure was collected, an economic evaluation was completed. The projected annual cost for each measure was compared to the projected power cost savings to calculate the net present value of the cost or savings of each measure.

The following assumptions were used in the economic evaluation:

- The evaluation was done on a "per-unit' basis, meaning the analysis evaluated one installation of the given measure.
- Technical information for the measures was based on past experience, when possible. When information from past experience was not available, the RPG Reference Data for the Southern Region was used.
- Avoided demand and energy costs from the Supply Side Resource Evaluation were used. It was assumed that peak demand savings were used to reduce seasonal capacity purchases, with the summer season being defined as June-September, and the winter season as October-May.
- A discount rate of 5.0% was used.
- The Total Resource Cost (TRC) test was used. This compared the total costs of the measure, including costs incurred by Falls City or the end user, to the total cost savings realized by Falls City.

Using these assumptions, the 14 DSM measures were evaluated over a ten-year study period. The evaluation considered all of the installation, operational and maintenance, and administrative and general expenses that would be incurred over the ten-year period. The expenses were compared to Falls City's avoided capacity and energy cost. The net cost or savings to Falls City was calculated on an annual basis and discounted to 2007 Dollars. Measures with a positive net present value were considered economically feasible.

A summary of the economic evaluations is shown in Table 6. The analysis of each individual DSM measure is shown in Appendix A.

It appears the only DSM measure that is economically feasible is interruptible rates, primarily because Falls City's power supply costs are very competitive. The next cost of service study should consider interruptible rates if there are customers that may qualify and benefit from interruptible rates. Falls City should also consider low-cost DSM options, such as promoting energy efficiency via the Falls City website and customer flyers.

Table 6
Summary of DSM Measures
Projected Costs and Savings
(2007 $)

DSM Measure	Present Value of Annual Savings (Costs) per unit (1)
Residential	
Central Air Conditioning Load Cycling	($256.96)
Electric Water Heater Load Shedding	($287.42)
High Efficiency Central Air Conditioners	($36.30)
Room and Window Air Conditioner Rebates	($91.41)
High Efficiency Refrigerator Rebate Program	($124.23)
Old Refrigerator Pick-up Program	($36.45)
Improved Home Loan Program for Furnace & AC replacement	($810.65)
Energy-Efficient New Home	($846.64)
Energy-Efficient Existing Home	($1,277.33)
Commercial/Industrial	
Commercial High-Efficiency Lighting	($147.11)
Commercial High-Efficiency Air Conditioners	($117.86)
Commercial HVAC Efficiency Improvement Program	($999.18)
Large Customer Customized Rebate Program	($697.43)
Interruptible Rates	$4,489.90

Section V: Supply/Demand Side Resource Integration

Development of Integrated Resource Plan

Least cost supply resources were combined to develop four cases. These cases and associated costs were developed by the Nebraska Municipal Power Pool (NMPP). Each of the cases includes the projected base load growth rate for demand, which averages less than 1% per year. Table 7 summarizes the Present Value Costs Analysis (in 2009 dollars) through the period 2018.

Table 7
Present Value Cost Analysis

Case	Case Description	Total Present Value 2009 through 2018 in 2009 dollars ($000)
Base Case	Existing resources and non-firm energy purchases through 2010	$19,217
Case 1	Existing resources plus extension of OPPD contract through 2019	$19,116
Case 2	Existing resources plus 1 MW new baseload in 2012	$19,305
Case 3	Existing resources plus 2 MW new baseload in 2012	$19,660

- **Base Case**

The Base Case involved existing resources and non-firm energy purchases through 2010. The present value for the Base Case was calculated as $19,217,000 and ranked second among the four cases.

- **Case 1**

Case 1 involved existing resources plus the extension of the OPPD contract through 2019. The present value for Case 1 was calculated as $19,116,000 and ranked first among the four cases.

- **Case 2**

Case 2 involved existing resources plus one (1) MW of new baseload capacity and energy in 2012. The present value for Case 2 was calculated as $19,305,000 and ranked third among the four cases.

- **Case 3**

Case 3 involved existing resources plus an additional two (2) MW of new baseload capacity and energy in 2012. The present value for Case 3 was calculated as $19,660,000 and ranked fourth among the four cases.

Preferred Alternative

Based on the analyses prepared, it appears Falls City should take the following steps:

- Work to extend the OPPD contract at least through 2011. If possible, Falls City should work to extend the contract even longer, depending on terms and conditions.
- Based on load growth, Falls City may have a need for baseload resources toward the end of the study period, around the 2020-2022 timeframe.

Environmental Impact

- The city complies with applicable provisions of the Clean Air Act and Clean Water Act at its power plant and substation facilities.
- Proposed projects will include Best Available Control Technology (BACT) to help reduce environmental impacts.
- Encouraging DSM through no cost or low cost methods will reduce energy usage and emissions.

Section VI: Action Plans

Based on the assumptions used, analyses completed and conclusions reached, the following action plans are recommended.

Two Year Action Plan

Based on the assumptions used, analyses completed and conclusions reached in this study, the following Two Year Action Plan is recommended. To the extent that resources, DSM and transmission costs change, Falls City should review and modify this action plan accordingly.

- FCU signed a Participation Agreement with OPPD for approximately 5 MW of participation in the 663 MW coal-fired generation unit to be built in Nebraska City, Nebraska. This unit is scheduled to come on line in 2009.
- The OPPD contract was extended until April 30, 2010. Falls City should pursue extension to 2011 and beyond.
- Continue to investigate partnerships with the Nebraska Energy Office (NEO) for viable programs such as energy audits. Falls City should promote partnerships with the NEO via a link on its website.
- Implement low cost DSM programs such as promotion of energy efficiency via the Falls City website.
- Continue participation in EDS through NMPP
- Consider purchases of renewable energy based on customer interest.

Five Year Action Plan

Based on the assumptions used, analyses completed and conclusions reached in this study, the following Five Year Action Plan is recommended. To the extent that resources, DSM and transmission costs change, FCU should review and modify this action plan accordingly.

- Continuation of Two Year Action Plan.
- Review other options as they become available.

Public Participation

Part of the IRP implementation process involves public participation. Falls City has involved the public in developing the IRP, and will continue to solicit public participation as it implements the IRP.

The Integrated Resource Plan was presented in a public hearing to the Falls City Utilities Board of Public Works on June 7, 2007. The purpose of this hearing was to provide information to and gather input from groups and individuals with an interest in Falls City's Integrated Resource Plan. A Notice of the public hearing appeared in Falls City's local newspaper and was posted at the Falls City Utilities office. Attendees of the public hearing included several members of the Board of Public Works. There were no members of the general public present.

Items of discussion involved power supply options and issues. At the conclusion of the public hearing, the IRP was approved by the Board of Public Works on June 7, 2007.

Validation of Predicted Performance

Falls City compares its load forecasts to actual usage on an annual and monthly basis. This comparison will be continually updated in the future. In addition, Falls City will continue to verify the effectiveness of demand-side measures in its annual progress reports to this IRP.

Annual Progress Reports

Annual progress reports to this IRP will be prepared. The annual reports will provide comparisons of actual and predicted power supply costs, comparisons of actual and projected demand-side management activity and planned changes in power supply resources or demand-side management measures. The annual reports will also identify changes to the IRP. Changes to the IRP may be caused by load changes or changes in the costs of purchased power or demand-side measures.

Appendix A: Economic Analysis of Demand Side Measures

Appendix A
Impact of DSM Alternatives
Residential Central Air Conditioning Load Cycling

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.85**	**0.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**10**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	59.00%	59.00%	59.00%
Market Eligibility	40.00%	40.00%	40.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	522	522	522
Total Demand or Energy Savings (kW or kWh)	**444**	**0**	**5,220**

Estimated Installation Cost per Unit	$284.04
Estimated Annual Maintenance Cost per Unit	$13.38
Measure Life	25 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.85	0.00	10	$4.50	$0.00	$45.00	$15.75
2003	0.85	0.00	10	$4.55	$0.00	$46.35	$15.92
2004	0.85	0.00	10	$4.59	$0.00	$47.74	$16.08
2005	0.85	0.00	10	$4.64	$0.00	$49.17	$16.26
2006	0.85	0.00	10	$4.68	$0.00	$50.65	$16.43
2007	0.85	0.00	10	$4.73	$0.00	$52.17	$16.60
2008	0.85	0.00	10	$4.78	$0.00	$53.74	$16.78
2009	0.85	0.00	10	$4.82	$0.00	$55.35	$16.96
2010	0.85	0.00	10	$4.87	$0.00	$57.01	$17.14
2011	0.85	0.00	10	$4.92	$0.00	$58.72	$17.32

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$284.04	$15.75	($268.29)	($268.29)
	2003	$13.38	$15.92	$2.54	$2.42
	2004	$13.78	$16.08	$2.30	$2.09
	2005	$14.19	$16.26	$2.07	$1.79
	2006	$14.62	$16.43	$1.81	$1.49
	2007	$15.06	$16.60	$1.54	$1.21
	2008	$15.51	$16.78	$1.27	$0.95
	2009	$15.98	$16.96	$0.98	$0.70
	2010	$16.46	$17.14	$0.68	$0.46
	2011	$16.95	$17.32	$0.37	$0.24
Total		$419.97	$165.24	($254.73)	($256.96)

Appendix A
Impact of DSM Alternatives
Residential Electric Water Heater Load Shedding

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.45**	**0.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**5**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	15.00%	15.00%	15.00%
Market Eligibility	50.00%	50.00%	50.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	166	166	166
Total Demand or Energy Savings (kW or kWh)	**75**	**0**	**830**

Estimated Installation Cost per Unit	$225.43	
Estimated Annual Maintenance Cost per Unit	$16.55	
Measure Life	25	Years
Discount Rate	5.00%	

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.45	0.00	5	$4.50	$0.00	$24.15	$8.22
2003	0.45	0.00	5	$4.55	$0.00	$24.96	$8.31
2004	0.45	0.00	5	$4.59	$0.00	$24.96	$8.39
2005	0.45	0.00	5	$4.64	$0.00	$27.00	$8.48
2006	0.45	0.00	5	$4.68	$0.00	$27.68	$8.57
2007	0.45	0.00	5	$4.73	$0.00	$28.37	$8.66
2008	0.45	0.00	5	$4.78	$0.00	$29.08	$8.74
2009	0.45	0.00	5	$4.82	$0.00	$29.81	$8.83
2010	0.45	0.00	5	$4.87	$0.00	$30.56	$8.92
2011	0.45	0.00	5	$4.92	$0.00	$31.32	$9.02

Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
2002	$225.43	$8.22	($217.21)	($217.21)
2003	$16.55	$8.31	($8.24)	($7.85)
2004	$17.05	$8.39	($8.66)	($7.85)
2005	$17.56	$8.48	($9.08)	($7.84)
2006	$18.09	$8.57	($9.52)	($7.83)
2007	$18.63	$8.66	($9.97)	($7.81)
2008	$19.19	$8.74	($10.45)	($7.80)
2009	$19.77	$8.83	($10.94)	($7.77)
2010	$20.36	$8.92	($11.44)	($7.74)
2011	$20.97	$9.02	($11.95)	($7.70)
Total	$393.60	$86.14	($307.46)	($287.42)

Appendix A
Impact of DSM Alternatives
Residential High Efficiency Central Air Conditioners

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.90**	**0.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**500**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	59.00%	59.00%	59.00%
Market Eligibility	50.00%	50.00%	50.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	653	653	653
Total Demand or Energy Savings (kW or kWh)	**588**	**0**	**326,500**

Estimated Installation Cost per Unit	$338.31
Estimated Annual Maintenance Cost per Unit	$3.55
Measure Life	20 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.9	0.00	500	$4.50	$0.00	$45.00	$39.38
2003	0.9	0.00	500	$4.55	$0.00	$46.35	$40.23
2004	0.9	0.00	500	$4.59	$0.00	$47.74	$41.11
2005	0.9	0.00	500	$4.64	$0.00	$49.17	$42.01
2006	0.9	0.00	500	$4.68	$0.00	$50.65	$42.94
2007	0.9	0.00	500	$4.73	$0.00	$52.17	$43.89
2008	0.9	0.00	500	$4.78	$0.00	$53.73	$44.87
2009	0.9	0.00	500	$4.82	$0.00	$55.34	$45.87
2010	0.9	0.00	500	$4.87	$0.00	$57.00	$46.90
2011	0.9	0.00	500	$4.92	$0.00	$58.71	$17.72

Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
2002	$338.31	$39.38	($298.93)	($298.93)
2003	$3.55	$40.23	$36.68	$34.93
2004	$3.66	$41.11	$37.45	$33.97
2005	$3.77	$42.01	$38.24	$33.03
2006	$3.88	$42.94	$39.06	$32.13
2007	$4.00	$43.89	$39.89	$31.25
2008	$4.12	$44.87	$40.75	$30.41
2009	$4.24	$45.87	$41.63	$29.59
2010	$4.37	$46.90	$42.53	$28.79
2011	$4.50	$17.72	$13.22	$8.52
Total	$374.40	$404.92	$30.52	($36.30)

Appendix A
Impact of DSM Alternatives
Residential Room and Window Air Conditioner Rebates

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.138**	**0.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**103**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	33.00%	33.00%	33.00%
Market Eligibility	15.00%	15.00%	15.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	110	110	110
Total Demand or Energy Savings (kW or kWh)	**15**	**0**	**11,330**

Estimated Installation Cost per Unit	$113.08	
Estimated Annual Maintenance Cost per Unit	$5.27	
Measure Life	13	Years
Discount Rate	5.00%	

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.138	0.00	103	$4.50	$0.00	$45.00	$7.12
2003	0.138	0.00	103	$4.55	$0.00	$46.35	$7.28
2004	0.138	0.00	103	$4.59	$0.00	$47.74	$7.45
2005	0.138	0.00	103	$4.64	$0.00	$49.17	$7.62
2006	0.138	0.00	103	$4.68	$0.00	$50.65	$7.80
2007	0.138	0.00	103	$4.73	$0.00	$52.17	$7.98
2008	0.138	0.00	103	$4.78	$0.00	$53.73	$8.17
2009	0.138	0.00	103	$4.82	$0.00	$55.34	$8.36
2010	0.138	0.00	103	$4.87	$0.00	$57.00	$8.56
2011	0.138	0.00	103	$4.92	$0.00	$58.71	$8.76

Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
2002	$113.08	$7.12	($105.96)	($105.96)
2003	$5.27	$7.28	$2.01	$1.91
2004	$5.43	$7.45	$2.02	$1.83
2005	$5.59	$7.62	$2.03	$1.75
2006	$5.76	$7.80	$2.04	$1.68
2007	$5.93	$7.98	$2.05	$1.61
2008	$6.11	$8.17	$2.06	$1.54
2009	$6.29	$8.36	$2.07	$1.47
2010	$6.48	$8.56	$2.08	$1.41
2011	$6.67	$8.76	$2.09	$1.35
Total	$166.61	$79.10	($87.51)	($91.41)

Appendix A
Impact of DSM Alternatives
High Efficiency Refrigerator Rebate Program

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.082**	**0.082**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**519**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	15.00%	15.00%	15.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	332	332	332
Total Demand or Energy Savings (kW or kWh)	**27**	**27**	**172,308**

Estimated Installation Cost per Unit	$198.16
Estimated Annual Maintenance Cost per Unit	$6.81
Measure Life	10 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.082	0.08	519	$4.50	$0.00	$24.15	$14.01
2003	0.082	0.08	519	$4.55	$0.00	$24.96	$14.45
2004	0.082	0.08	519	$4.59	$0.00	$24.96	$14.46
2005	0.082	0.08	519	$4.64	$0.00	$27.00	$15.53
2006	0.082	0.08	519	$4.68	$0.00	$27.68	$15.90
2007	0.082	0.08	519	$4.73	$0.00	$28.37	$16.28
2008	0.082	0.08	519	$4.78	$0.00	$29.08	$16.66
2009	0.082	0.08	519	$4.82	$0.00	$29.81	$17.05
2010	0.082	0.08	519	$4.87	$0.00	$30.56	$17.46
2011	0.082	0.08	519	$4.92	$0.00	$31.32	$17.87

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$198.16	$14.01	($184.15)	($184.15)
	2003	$6.81	$14.45	$7.64	$7.28
	2004	$7.01	$14.46	$7.45	$6.76
	2005	$7.22	$15.53	$8.31	$7.18
	2006	$7.44	$15.90	$8.46	$6.96
	2007	$7.66	$16.28	$8.62	$6.75
	2008	$7.89	$16.66	$8.77	$6.54
	2009	$8.13	$17.05	$8.92	$6.34
	2010	$8.37	$17.46	$9.09	$6.15
	2011	$8.62	$17.87	$9.25	$5.96
Total		$267.31	$159.67	($107.64)	($124.23)

Appendix A
Impact of DSM Alternatives
Old Refrigerator Pick-up Program

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.065**	**0.065**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**410**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	15.00%	15.00%	15.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	332	332	332
Total Demand or Energy Savings (kW or kWh)	**22**	**22**	**136,120**

Estimated Installation Cost per Unit	$160.46
Estimated Annual Maintenance Cost per Unit	$5.24
Measure Life	10 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.065	0.07	410	$4.50	$0.00	$24.15	$11.07
2003	0.065	0.07	410	$4.55	$0.00	$24.96	$11.42
2004	0.065	0.07	410	$4.59	$0.00	$24.96	$11.43
2005	0.065	0.07	410	$4.64	$0.00	$54.16	$23.41
2006	0.065	0.07	410	$4.68	$0.00	$55.79	$24.09
2007	0.065	0.07	410	$4.73	$0.00	$57.46	$24.79
2008	0.065	0.07	410	$4.78	$0.00	$59.18	$25.51
2009	0.065	0.07	410	$4.82	$0.00	$60.96	$26.25
2010	0.065	0.07	410	$4.87	$0.00	$62.79	$27.01
2011	0.065	0.07	410	$4.92	$0.00	$64.67	$27.79

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$160.46	$11.07	($149.39)	($149.39)
	2003	$5.24	$11.42	$6.18	$5.89
	2004	$5.40	$11.43	$6.03	$5.47
	2005	$5.56	$23.41	$17.85	$15.42
	2006	$5.73	$24.09	$18.36	$15.10
	2007	$5.90	$24.79	$18.89	$14.80
	2008	$6.08	$25.51	$19.43	$14.50
	2009	$6.26	$26.25	$19.99	$14.21
	2010	$6.45	$27.01	$20.56	$13.92
	2011	$6.64	$27.79	$21.15	$13.63
Total		$213.72	$212.77	($0.95)	($36.45)

Appendix A
Impact of DSM Alternatives
Improved Home Loan Program for Furnace & AC Replacement

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**1.00**	**1.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**500**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	5.80%	5.80%	5.80%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	128	128	128
Total Demand or Energy Savings (kW or kWh)	**128**	**128**	**64,000**

Estimated Installation Cost per Unit	$1,008.82
Estimated Annual Maintenance Cost per Unit	$18.11
Measure Life	20 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	1	1.00	500	$4.50	$0.00	$24.15	$30.08
2003	1	1.00	500	$4.55	$0.00	$24.96	$30.66
2004	1	1.00	500	$4.59	$0.00	$24.96	$30.84
2005	1	1.00	500	$4.64	$0.00	$54.16	$45.63
2006	1	1.00	500	$4.68	$0.00	$55.79	$46.63
2007	1	1.00	500	$4.73	$0.00	$57.46	$47.65
2008	1	1.00	500	$4.78	$0.00	$59.18	$48.70
2009	1	1.00	500	$4.82	$0.00	$60.96	$49.78
2010	1	1.00	500	$4.87	$0.00	$62.79	$50.89
2011	1	1.00	500	$4.92	$0.00	$64.67	$52.02

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$1,008.82	$30.08	($978.74)	($978.74)
	2003	$18.11	$30.66	$12.55	$11.95
	2004	$18.65	$30.84	$12.19	$11.06
	2005	$19.21	$45.63	$26.42	$22.82
	2006	$19.79	$46.63	$26.84	$22.08
	2007	$20.38	$47.65	$27.27	$21.37
	2008	$20.99	$48.70	$27.71	$20.68
	2009	$21.62	$49.78	$28.16	$20.01
	2010	$22.27	$50.89	$28.62	$19.37
	2011	$22.94	$52.02	$29.08	$18.75
Total		$1,192.78	$432.88	($759.90)	($810.65)

Appendix A
Impact of DSM Alternatives
Energy-Efficient New Home

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**0.80**	**0.80**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**600**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	3.00%	3.00%	3.00%
Market Eligibility	100.00%	100.00%	100.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	66	66	66
Total Demand or Energy Savings (kW or kWh)	**53**	**53**	**39,600**

Estimated Installation Cost per Unit	$917.08
Estimated Annual Maintenance Cost per Unit	$35.13
Measure Life	25 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	0.8	0.80	600	$4.50	$0.00	$24.15	$28.89
2003	0.8	0.80	600	$4.55	$0.00	$24.96	$29.52
2004	0.8	0.80	600	$4.59	$0.00	$24.96	$29.67
2005	0.8	0.80	600	$4.64	$0.00	$54.16	$47.33
2006	0.8	0.80	600	$4.68	$0.00	$55.79	$48.46
2007	0.8	0.80	600	$4.73	$0.00	$57.46	$49.61
2008	0.8	0.80	600	$4.78	$0.00	$59.18	$50.79
2009	0.8	0.80	600	$4.82	$0.00	$60.96	$52.01
2010	0.8	0.80	600	$4.87	$0.00	$62.79	$53.27
2011	0.8	0.80	600	$4.92	$0.00	$64.67	$54.55

Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
2002	$917.08	$28.89	($888.19)	($888.19)
2003	$35.13	$29.52	($5.61)	($5.34)
2004	$36.18	$29.67	($6.51)	($5.90)
2005	$37.27	$47.33	$10.06	$8.69
2006	$38.39	$48.46	$10.07	$8.28
2007	$39.54	$49.61	$10.07	$7.89
2008	$40.73	$50.79	$10.06	$7.51
2009	$41.95	$52.01	$10.06	$7.15
2010	$43.21	$53.27	$10.06	$6.81
2011	$44.51	$54.55	$10.04	$6.47
Total	$1,273.99	$444.10	($829.89)	($846.64)

Appendix A
Impact of DSM Alternatives
Energy-Efficient Existing Home

DSM Technology Residential	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**1.00**	**1.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**800**
Estimated Residential Customers	2,213	2,213	2,213
Estimated Appliance Saturation	50.00%	50.00%	50.00%
Market Eligibility	8.00%	8.00%	8.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	89	89	89
Total Demand or Energy Savings (kW or kWh)	**89**	**89**	**71,200**

Estimated Installation Cost per Unit	$1,578.08
Estimated Annual Maintenance Cost per Unit	$19.54
Measure Life	20 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	1	1.00	800	$4.50	$0.00	$24.15	$37.32
2003	1	1.00	800	$4.55	$0.00	$24.96	$38.15
2004	1	1.00	800	$4.59	$0.00	$24.96	$38.33
2005	1	1.00	800	$4.64	$0.00	$54.16	$61.87
2006	1	1.00	800	$4.68	$0.00	$55.79	$63.36
2007	1	1.00	800	$4.73	$0.00	$57.46	$64.89
2008	1	1.00	800	$4.78	$0.00	$59.18	$66.45
2009	1	1.00	800	$4.82	$0.00	$60.96	$68.07
2010	1	1.00	800	$4.87	$0.00	$62.79	$69.72
2011	1	1.00	800	$4.92	$0.00	$64.67	$71.42

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$1,578.08	$37.32	($1,540.76)	($1,540.76)
	2003	$19.54	$38.15	$18.61	$17.72
	2004	$20.13	$38.33	$18.20	$16.51
	2005	$20.73	$61.87	$41.14	$35.54
	2006	$21.35	$63.36	$42.01	$34.56
	2007	$21.99	$64.89	$42.90	$33.61
	2008	$22.65	$66.45	$43.80	$32.68
	2009	$23.33	$68.07	$44.74	$31.80
	2010	$24.03	$69.72	$45.69	$30.92
	2011	$24.75	$71.42	$46.67	$30.08
Total		$1,776.58	$579.58	($1,197.00)	($1,277.33)

Appendix A
Impact of DSM Alternatives
Commercial High-Efficiency Lighting

DSM Technology Commercial	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**4.00**	**4.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**13,000**
Estimated Commercial Customers	568	568	568
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	20.00%	20.00%	20.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	114	114	114
Total Demand or Energy Savings (kW or kWh)	**456**	**456**	**1,482,000**

Estimated Installation Cost per Unit	$3,337.85	
Estimated Annual Maintenance Cost per Unit	$39.25	
Measure Life	15	Years
Discount Rate	5.00%	

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	4.00	4.00	13000	$4.50	$0.00	$24.15	$385.95
2003	4.00	4.00	13000	$4.55	$0.00	$24.96	$397.20
2004	4.00	4.00	13000	$4.59	$0.00	$24.96	$397.93
2005	4.00	4.00	13000	$4.64	$0.00	$27.00	$425.18
2006	4.00	4.00	13000	$4.68	$0.00	$27.68	$434.76
2007	4.00	4.00	13000	$4.73	$0.00	$28.37	$444.48
2008	4.00	4.00	13000	$4.78	$0.00	$29.08	$454.47
2009	4.00	4.00	13000	$4.82	$0.00	$29.81	$464.72
2010	4.00	4.00	13000	$4.87	$0.00	$30.56	$475.25
2011	4.00	4.00	13000	$4.92	$0.00	$31.32	$485.91

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$3,337.85	$385.95	($2,951.90)	($2,951.90)
	2003	$39.25	$397.20	$357.95	$340.90
	2004	$40.43	$397.93	$357.50	$324.26
	2005	$41.64	$425.18	$383.54	$331.32
	2006	$42.89	$434.76	$391.87	$322.39
	2007	$44.18	$444.48	$400.30	$313.65
	2008	$45.51	$454.47	$408.96	$305.17
	2009	$46.88	$464.72	$417.84	$296.95
	2010	$48.29	$475.25	$426.96	$288.98
	2011	$49.74	$485.91	$436.17	$281.16
Total		$3,736.66	$4,365.85	$629.19	($147.11)

Appendix A
Impact of DSM Alternatives
Commercial High-Efficiency Air Conditioners

DSM Technology Commercial	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**2.00**	**0.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**2,500**
Estimated Commercial Customers	547	547	547
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	25.00%	25.00%	25.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	137	137	137
Total Demand or Energy Savings (kW or kWh)	**274**	**0**	**342,500**

Estimated Installation Cost per Unit	$1,258.85
Estimated Annual Maintenance Cost per Unit	$14.22
Measure Life	20 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	2	0.00	2500	$4.50	$0.00	$24.15	$96.38
2003	2	0.00	2500	$4.55	$0.00	$24.96	$98.76
2004	2	0.00	2500	$4.59	$0.00	$24.96	$99.12
2005	2	0.00	2500	$4.64	$0.00	$54.16	$172.49
2006	2	0.00	2500	$4.68	$0.00	$55.79	$176.94
2007	2	0.00	2500	$4.73	$0.00	$57.46	$181.49
2008	2	0.00	2500	$4.78	$0.00	$59.18	$186.16
2009	2	0.00	2500	$4.82	$0.00	$60.96	$191.00
2010	2	0.00	2500	$4.87	$0.00	$62.79	$195.96
2011	2	0.00	2500	$4.92	$0.00	$64.67	$201.05

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$1,258.85	$96.38	($1,162.47)	($1,162.47)
	2003	$14.22	$98.76	$84.54	$80.51
	2004	$14.65	$99.12	$84.47	$76.62
	2005	$15.09	$172.49	$157.40	$135.97
	2006	$15.54	$176.94	$161.40	$132.78
	2007	$16.01	$181.49	$165.48	$129.66
	2008	$16.49	$186.16	$169.67	$126.61
	2009	$16.98	$191.00	$174.02	$123.67
	2010	$17.49	$195.96	$178.47	$120.80
	2011	$18.01	$201.05	$183.04	$117.99
Total		$1,403.33	$1,599.35	$196.02	($117.86)

Appendix A
Impact of DSM Alternatives
Commercial HVAC Efficiency Improvement Program

DSM Technology Commercial	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**5.00**	**5.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**8,750**
Estimated Commercial Customers	21	21	21
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	33.00%	33.00%	33.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	7	7	7
Total Demand or Energy Savings (kW or kWh)	**35**	**35**	**61,250**

Estimated Installation Cost per Unit	$2,744.24	
Estimated Annual Maintenance Cost per Unit	$331.22	
Measure Life	20	Years
Discount Rate	5.00%	

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	5	5.00	8750	$4.50	$0.00	$45.00	$483.75
2003	5	5.00	8750	$4.55	$0.00	$46.35	$496.46
2004	5	5.00	8750	$4.59	$0.00	$47.74	$509.53
2005	5	5.00	8750	$4.64	$0.00	$49.17	$522.96
2006	5	5.00	8750	$4.68	$0.00	$50.65	$536.84
2007	5	5.00	8750	$4.73	$0.00	$52.17	$551.08
2008	5	5.00	8750	$4.78	$0.00	$53.74	$565.76
2009	5	5.00	8750	$4.82	$0.00	$55.35	$580.80
2010	5	5.00	8750	$4.87	$0.00	$57.01	$596.29
2011	5	5.00	8750	$4.92	$0.00	$58.72	$612.23

	Annual Cash Flows ($/per Unit)	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$2,744.24	$483.75	($2,260.49)	($2,260.49)
	2003	$331.22	$496.46	$165.24	$157.37
	2004	$341.16	$509.53	$168.37	$152.72
	2005	$351.39	$522.96	$171.57	$148.21
	2006	$361.93	$536.84	$174.91	$143.90
	2007	$372.79	$551.08	$178.29	$139.69
	2008	$383.97	$565.76	$181.79	$135.65
	2009	$395.49	$580.80	$185.31	$131.70
	2010	$407.35	$596.29	$188.94	$127.88
	2011	$419.57	$612.23	$192.66	$124.19
Total		$6,109.11	$5,455.70	-$653.41	($999.18)

Appendix A
Impact of DSM Alternatives
Large Customer Customized Rebate Program

DSM Technology Commercial	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**5.00**	**5.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**8,750**
Estimated Commercial Customers	568	568	568
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	5.00%	5.00%	5.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	28	28	28
Total Demand or Energy Savings (kW or kWh)	**140**	**140**	**245,000**

Estimated Installation Cost per Unit	$3,795.22
Estimated Annual Maintenance Cost per Unit	$124.21
Measure Life	15 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	5	5.00	8750	$4.50	$0.00	$24.15	$301.31
2003	5	5.00	8750	$4.55	$0.00	$24.96	$309.30
2004	5	5.00	8750	$4.59	$0.00	$24.96	$310.21
2005	5	5.00	8750	$4.64	$0.00	$54.16	$566.63
2006	5	5.00	8750	$4.68	$0.00	$55.79	$581.82
2007	5	5.00	8750	$4.73	$0.00	$57.46	$597.37
2008	5	5.00	8750	$4.78	$0.00	$59.18	$613.36
2009	5	5.00	8750	$4.82	$0.00	$60.96	$629.89
2010	5	5.00	8750	$4.87	$0.00	$62.79	$646.87
2011	5	5.00	8750	$4.92	$0.00	$64.67	$664.29

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$3,795.22	$301.31	($3,493.91)	($3,493.91)
	2003	$124.21	$309.30	$185.09	$176.28
	2004	$127.94	$310.21	$182.27	$165.32
	2005	$131.78	$566.63	$434.85	$375.64
	2006	$135.73	$581.82	$446.09	$367.00
	2007	$139.80	$597.37	$457.57	$358.52
	2008	$143.99	$613.36	$469.37	$350.25
	2009	$148.31	$629.89	$481.58	$342.25
	2010	$152.76	$646.87	$494.11	$334.43
	2011	$157.34	$664.29	$506.95	$326.78
Total		$5,057.08	$5,221.05	$163.97	($697.43)

Appendix A
Impact of DSM Alternatives
Interruptible Rates

DSM Technology Commercial	Summer Demand	Winter Demand	Annual Energy
Rated Load (kW per Unit)			
Coincident Factor (%)			
Contribution to Peak kW			
Demand Savings (%)			
Controllable Load (kW per unit)	**75.00**	**75.00**	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			**1,500**
Estimated Commercial Customers	21	21	21
Estimated Appliance Saturation	100.00%	100.00%	100.00%
Market Eligibility	10.00%	10.00%	10.00%
Feasibility	100.00%	100.00%	100.00%
Estimated Controllable Units	2	2	2
Total Demand or Energy Savings (kW or kWh)	**150**	**150**	**3,000**

Estimated Installation Cost per Unit	$2,468.91
Estimated Annual Maintenance Cost per Unit	$637.64
Measure Life	25 Years
Discount Rate	5.00%

Avoided Cost	Summer Capacity Savings (kW/unit)	Winter Capacity Savings (kW/unit)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-mon.)	Winter Capacity Charge ($/kW-mon.)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)
2002	75	75.00	1500	$4.50	$0.00	$45.00	$1,417.50
2003	75	75.00	1500	$4.55	$0.00	$46.35	$1,433.03
2004	75	75.00	1500	$4.59	$0.00	$47.74	$1,448.75
2005	75	75.00	1500	$4.64	$0.00	$49.17	$1,464.67
2006	75	75.00	1500	$4.68	$0.00	$50.65	$1,480.79
2007	75	75.00	1500	$4.73	$0.00	$52.17	$1,497.11
2008	75	75.00	1500	$4.78	$0.00	$53.73	$1,513.65
2009	75	75.00	1500	$4.82	$0.00	$55.34	$1,530.40
2010	75	75.00	1500	$4.87	$0.00	$57.00	$1,547.36
2011	75	75.00	1500	$4.92	$0.00	$58.71	$1,564.55

	Annual Cash Flows	Program Costs ($/per Unit)	Power Cost Savings ($/per Unit)	Annual Savings/ (Costs) ($/per Unit)	Present Value ($/per Unit)
	2002	$2,468.91	$1,417.50	($1,051.41)	($1,051.41)
	2003	$637.64	$1,433.03	$795.39	$757.51
	2004	$656.77	$1,448.75	$791.98	$718.35
	2005	$676.47	$1,464.67	$788.20	$680.88
	2006	$696.76	$1,480.79	$784.03	$645.02
	2007	$717.66	$1,497.11	$779.45	$610.72
	2008	$739.19	$1,513.65	$774.46	$577.91
	2009	$761.37	$1,530.40	$769.03	$546.54
	2010	$784.21	$1,547.36	$763.15	$516.53
	2011	$807.74	$1,564.55	$756.81	$487.85
Total		$8,946.72	$14,897.81	$5,951.09	$4,489.90