PUBLIC COMMENT DRAFT

Integrated Resource Plan

Prepared for:

City of Beatrice, Nebraska

November 7, 2022

Prepared by:

JK Energy Consulting, LLC
74408 Road 433
Smithfield, NE 68976
402-440-0227
jk@jkenergyconsulting.com

TABLE OF CONTENTS

Introduction

In 1995, Western Area Power Administration (Western) instituted a program called the Energy Planning and Management Program (EPAMP). The EPAMP includes a provision that requires its customers to prepare and submit an Integrated Resource Plan (IRP) to Western to maintain their current allocations of power and energy it receives from Western. This IRP is intended to meet the requirements of the EPAMP for the City of Beatrice Board of Public Works (Beatrice or BPW).

The BPW is responsible for serving the City of Beatrice, Nebraska, and nearby areas with electricity, water, and wastewater treatment services. There is an assignment agreement between BPW and Beatrice State Development Center (BSDC) that enables BPW to optimize use of the Western agreement to serve the needs of BSDC and BPW. It is the City's understanding from the Nebraska Department of Administrative Services that BSDC was included in their blanket IRP for Nebraska locations under Western; therefore, the BSDC is not part of this IRP. The purpose of this IRP is to develop two and five-year supply-side resource and demand side management (DSM) measures to serve Beatrice's power supply requirements at the lowest reasonable cost consistent with prudent financial and technical principles.

Up until 2021, Beatrice was part of an IRP cooperative with the Nebraska Public Power District (NPPD) and its wholesale customers. In 2019, the BPW began a process where it began phasing out its purchases of its supplemental requirements and developing its own power supply resource portfolio. As of 2022, the BPW is no longer purchasing wholesale power and energy from NPPD and, therefore, is not part of its IRP

cooperative. This will be the first IRP that Beatrice has submitted to Western as an independent entity.

Approach to 2022 IRP

The 2022 IRP was prepared based on the procedures suggested by the EPAMP. The tasks completed to prepare this IRP are summarized below:

- Prepared Beatrice's peak demand and energy requirements forecast.
- Compared forecasted peak demand and energy requirements to existing power supply resources to estimate future resource needs.
- Reviewed power supply resource options, including necessary transmission facilities, to identify economical resources to include in the integration analysis.
- Identified potential DSM measures and assessed their economic and technical feasibility.
- Integrated DSM measures with supply resources to develop preferred plan.
- Considered environmental impacts and costs of each IRP option.
- Solicited public participation and incorporated comments into the IRP.

Goals and Objectives

Beatrice's goals are to provide reliable service to its customers at low rates and ensure there is sufficient capacity for future growth and development. To achieve these goals, Beatrice focused on the following objectives when developing the 2022 IRP:

- Maintain local control of the utilities system.
- Integrate cost-effective renewable energy into the portfolio.
- Focus on continued growth and development.
- Maintain rates that are competitive with neighboring utilities.

- Maintain financial and rate stability.

Overview of Utility Profile

Beatrice is a not-for-profit municipally owned electric utility located in southeastern Nebraska. Retail sales in FY 2021 (October 1, 2020 through September 30, 2021) were approximately 166,000 MWh and the electric customers were segmented into the following customer classes:

Table 1
2021 Retail Customer Data

Customer Class	Number of Customers	Energy Sales (MWh)
Residential	5,807	70,787
General Service	1,003	71,293
Large Power	7	23,535
Municipal	43	399
Total	**6,860**	**166,014**

In 2021, Beatrice had a system peak of 41.9 MW and annual energy usage of 183,000 MWh (including distribution losses), for an annual load factor of 50%. The peak typically occurs during the summer season and is driven largely by air conditioning load. There have been instances where the annual peak demand occurs in the winter season, including in February 2021 during the winter weather event that affected a large portion of the Southwest Power Pool (SPP) region.

Load Forecast

Introduction

Since 2017, annual energy usage has been relatively stable. Fluctuations in energy usage over the last 10 years have been caused by industrial growth and contraction. For example, a bio-diesel plant was constructed and decommissioned, and another manufacturing plant closed in this historical window. There has been residential growth from new subdivisions as the City has experienced an increase in residents who commute to Lincoln, Nebraska, which is located approximately 40 miles north of Beatrice. The forecast is presented in Table 2 (see page 5). Energy usage was projected to remain stable at the usage level for 2021. Energy usage in 2021 was typical of future expectations, based on normal weather and changes in the industrial customer base.

[Intentionally left blank.]

Table 2
Historical and Projected
Demand and Energy Requirements

Year	Net System Peak MW	Percent Change	Net System Energy MWh	Percent Change	Load Factor %
2017	39.4	0.00%	183,763	0.00%	53%
2018	38.9	-1.27%	202,200	10.03%	59%
2019	40.3	3.60%	193,469	-4.32%	55%
2020	35.2	-12.66%	177,507	-8.25%	57%
2021	41.9	18.92%	183,154	3.18%	50%
FORECAST					
2022	40.3	-3.73%	184,710	0.85%	52%
2023	40.3	0.00%	184,710	0.00%	52%
2024	40.3	0.00%	184,710	0.00%	52%
2025	40.3	0.00%	184,710	0.00%	52%
2026	40.3	0.00%	184,710	0.00%	52%
2027	40.3	0.00%	184,710	0.00%	52%
2028	40.3	0.00%	184,710	0.00%	52%
2029	40.3	0.00%	184,710	0.00%	52%
2030	40.3	0.00%	184,710	0.00%	52%
2031	40.3	0.00%	184,710	0.00%	52%

Note: Projected peak demand was rounded to nearest 0.1 MW for this table.

Supply Side Resources

Table 3 (see page 6) shows Beatrice's supply side resources as they were in place in 2021. Each of the capacity and energy resources procured by Beatrice to replace the NPPD supplemental requirements agreement was secured through a competitive selection process to meet the requirement of the Western EPAMP to identify and compare all practicable energy supply resource options.

Table 3
Existing Generating Resources
2021 Actual Capacity and Energy

Source	Capacity (MW)	Energy (MWh)
NPPD	3.3	16,244
Western	3.4	13,501
AEP	0.0	175,922
Cottonwood (1)	2.9	74,690
LES	39.0	0
NextEra	0.0	71,602
Total	**48.6**	**351,959**

Notes:
(1) Cottonwood is offered into SPP Integrated Marketplace as stand-alone resource and is not typically delivered to serve Beatrice load. Beatrice does accredit capacity and has designated Cottonwood as a network resource.

- Western. Western provides Beatrice approximately 3.4 MW of capacity (summer season capacity) and associated energy from its hydro-electric resources on the upper Missouri River. The existing agreement with Western expires in 2050.

- Nebraska Public Power District (NPPD). Beatrice purchased its capacity and energy, in excess of its Western allocation, from NPPD through a long-term, total requirements agreement. In 2019, Beatrice began phasing out its purchases of capacity and energy from NPPD, with that phase-out completed on January 1, 2022. Also in 2019, Beatrice began securing a portfolio of resources to replace energy and capacity that was being supplied by NPPD through the long-term agreement.

- AEP Energy Partners (AEP). Beatrice currently purchases energy from AEP through a Market-Based Rate Partial Requirements Electric Service Agreement. The existing agreement expires December 31, 2030. The energy is supplied based on a

typical monthly energy usage curve, with AEP managing imbalances through the SPP Integrated Marketplace. This energy agreement supplies the vast majority of Beatrice's power supply requirements at a fixed rate.

- Cottonwood Wind Project (Cottonwood). Beatrice purchases 16.1 MW (nameplate) of capacity and associated energy from the Cottonwood project, located near Red Cloud, Nebraska. The typical capacity factor for this resource is approximately 50%. This resource is typically offered into the SPP Integrated Marketplace, though the capacity component of the resource is designated as a network resource under Beatrice's transmission service arrangements.

- Lincoln Electric System (LES). Beatrice currently purchases capacity requirements in excess of its Western allocation from LES through system capacity purchase agreements. The existing agreements are effective through December 2023.

- NextEra Energy Marketing, LLC (NextEra). Beatrice has entered into an agreement to purchase capacity only from NextEra, effective January 1, 2024 through December 31, 2030.

Transmission

Beatrice purchases network integration transmission service from SPP that enables Beatrice to receive delivery for capacity accreditation purposes. Beatrice is located in the NPPD zone and purchases transmission-level transformation from NPPD through SPP. The transmission service arrangement with SPP/NPPD provides for delivery from the various power supply resources across NPPD's 34.5 kV bus at the Beatrice substation and South Beatrice sub substation.

Comparison of Loads and Resources

Peak demand and energy usage is projected to remain stable through 2032, excluding the impact of any large load additions in the local industrial park. Beatrice has been in discussions with various computer server operators, but has not executed any service agreements at this time; therefore, this load has not been included in the load forecast. Table 4 (see page 9) compares Beatrice's existing and committed capacity resources to the projected capacity requirements. Table 4 is based on SPP's resource adequacy policy that requires a reserve margin of 15% for load not served by a firm resource (such as Western). Based on the Projected Capacity Requirements and Resources, Beatrice has sufficient capacity resources through 2030. Upon expiration of the NextEra capacity purchase, Beatrice will have a capacity deficit of approximately 37 MW.

Table 5 (see page 10) compares projected energy requirements to existing energy resources. Through 2030, Beatrice has surplus energy that is sold into the SPP Integrated Marketplace, primarily from the Cottonwood wind project. Beginning in 2031, Beatrice will have a deficit of approximately 95,000 MWh resulting from the expiration of the AEP energy purchase agreement.

While additional capacity and energy will be needed within Beatrice's planning horizon of 10 years, those purchases will not be entered into until after the end of the five-year action plan covered by this IRP. It is likely that the next IRP will include plans to meet the capacity and energy shortfall that is projected before the end of the current 10-year planning horizon.

Table 4
Projected Capacity Requirements and Resources
Base Case Loads
(MW)

Description	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Peak Demand	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3
Losses	-	-	-	-	-	-	-	-	-	-	-
Total System Demand + Losses	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3	38.3
Capacity Sales	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reserves (1)	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2	5.2
Total Capacity Requirements	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5	43.5
Existing Resources											
AEP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WAPA Billings	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Cottonwood	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9
LES	43.0	43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NextEra	0.0	0.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	0.0	0.0
Total Resources	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	49.3	6.3	6.3
Surplus / (Deficit)	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	-37.2	-37.2

Note:
(1) 15% of system demand not served by firm resources (WAPA Billings).
(2) Includes generation that can operate without emergency-only restrictions.

Table 5
Projected Energy Requirements and Resources
Base Case Loads
(MWh)

Description	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Energy Sales	167,148	167,148	167,148	167,148	167,148	167,148	167,148	167,148	167,148	167,148	167,148
Losses	16,006	16,006	16,006	16,006	16,006	16,006	16,006	16,006	16,006	16,006	16,006
Total Energy For Native Load	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154
Off-System Sales	-	-	-	-	-	-	-	-	-	-	-
Total Energy Requirements	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154
Energy Resources											
AEP	175,922	175,922	175,922	175,922	175,922	175,922	175,922	175,922	175,922	-	-
Cottonwood	74,690	74,690	74,690	74,690	74,690	74,690	74,690	74,690	74,690	74,690	74,690
WAPA Billings	13,501	13,501	13,501	13,501	13,501	13,501	13,501	13,501	13,501	13,501	13,501
NextEra	-	-	-	-	-	-	-	-	-	-	-
SPP Market Net Sales	(80,959)	(80,959)	(80,959)	(80,959)	(80,959)	(80,959)	(80,959)	(80,959)	(80,959)	-	-
Total Energy Resources	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	183,154	88,191	88,191
Surplus / (Deficit)	-	-	-	-	-	-	-	-	-	(94,963)	(94,963)

Future Supply Side Resources

Since Beatrice has sufficient capacity and energy resources through the end of the five-year action plan, there was no need to complete an analysis of additional power supply options. Provided there is no significant change in loads through industrial growth, Beatrice should not need to construct or procure additional capacity or energy resources throughout the five-year action plan horizon. It is likely that Beatrice will need to consider replacement resources for the expiring AEP energy purchase and NextEra capacity.

Renewable Resources

Beatrice purchases a 16.1 MW unit participation share of the Cottonwood wind farm in south-central Nebraska. This resource is capable of supplying approximately 40% of Beatrice's energy supply requirements. The purchase of this resource was entered to provide a long-term energy hedge, to provide a low-cost renewable resource in the event a state or Federal renewable portfolio standard were implemented, and diversify Beatrice's energy supply resource portfolio. Generally, revenues from sales of energy from Cottonwood in the SPP Integrated Marketplace have been sufficient to offset the contracted purchase price. By selling this energy in the Integrated Marketplace without renewable attributes, Beatrice has accumulated renewable energy and their attributes (some of which have been sold) without any rate impact to retail ratepayers. Beatrice has developed a net metering rate schedule, as required by Nebraska statute.

Conclusions

Based on the analyses completed, the following conclusions and recommendations were reached:

1. Beatrice has secured sufficient energy to hedge most of Beatrice's energy requirements.

2. Beatrice does not need to pursue additional capacity or energy resources during the next five-year period.

3. More than 40% of Beatrice's energy supply requirements are from renewable energy.

Demand Side Analysis

Existing Programs

Beatrice already implements several DSM measures. These programs include the following:

1. Participation in the Nebraska Municipal Power Pool (NMPP) Electric Distribution Services program. This program helps minimize distribution losses and improve distribution system efficiency.

2. Partnership with Nebraska Energy Office for energy loans and information on energy conservation measures.

3. LED street lighting conversion, which has been completed.

4. HVAC efficiency improvement rebates.

5. Links and energy conservation information on the City of Beatrice's website.

6. Beatrice recently undertook a project to replace a significant portion of the older 4.16 kV distribution system with 13.8 kV distribution lines, consistent with the rest of the distribution system. This project will reduce distribution losses.

Review of Load Shape Objectives

The Electric Power Research Institute (ERPI) developed six industry accepted load shape objectives. In general, these objectives have remained the same over the last 25 years, though two have been alternatively named (shown in parenthesis) in some publications based on changes in energy markets. The six primary load objectives are:

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

2. Peak Clipping – 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.

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

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

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

6. Flexible Load Shape (Dynamic Energy Management) – involves modifying 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.

Based on Beatrice'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 capacity and energy needs.

Changes in DSM Approach

Several of the DSM programs that have typically been analyzed by other utilities in the past have been rendered obsolete by changes in energy efficiency standards at the federal level. Beatrice has already completed the conversion of its entire street lighting inventory from high-pressure sodium to LED fixtures at a cost of more than $100,000.

Implementation of the SPP Integrated Marketplace, decreasing natural gas prices, and increasing development of wind energy resources have decreased energy prices over the last five years.

Screening Analysis

The screening analysis consisted of two steps:

1. Qualitative Screening. This step 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 evaluated.

2. Economic Feasibility. Avoided costs for capacity and energy were calculated in the supply side resource evaluation and used to calculate the costs and benefits of each DSM measure.

Qualitative Screening

The DSM technologies that satisfy Beatrice's load shape objectives were reviewed by qualitative screening. The qualitative screening involved the use of six criteria to identify those technologies most relevant to Beatrice's objectives. The criteria evaluated included:

1. Costs. Costs include start-up, marketing, and equipment.

2. 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.

3. 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 old refrigerator compressors containing CFCs and old ballasts with PCBs.

4. Market Potential. In order for the program to realize its maximum potential, intended markets and end-uses must be identified.

5. Ease of Implementation. The success of a program is 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.

6. Availability. The DSM technology must be commercially available and reliable. Since Beatrice has a relatively small utility staff, it would be difficult to manage a program with high administrative burdens.

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 Beatrice's load shape objectives than those with lower scores. Table 6 and Table 7 (see page 17) show the scores for each technology applicable to a particular customer class.

Table 6
Qualitative Screening
Residential Demand Side Measures

Technology Alternative	Cost	Customer Preference	Environmental Impact	Market Potential	Ease of Implementation	Commercial Availability/Reliability	Total
High Efficiency Air Conditioners	3	2	2	3	2	3	15
Whole-House Audits	2	3	3	3	2	2	15
Air Conditioning Load Cycling	3	1	2	2	2	3	13
Water Heater Load Shedding	3	2	2	2	2	3	14
HVAC Replacement Loans	3	2	3	2	2	2	14
Energy-Efficient New Home	2	2	3	1	2	2	12
Room Air Conditioner Rebates	1	2	2	1	1	2	9

Table 7
Qualitative Screening
Commercial/Industrial Demand Side Measures

Technology Alternative	Cost	Customer Preference	Environmental Impact	Market Potential	Ease of Implementation	Commercial Availability/Reliability	Total
High Efficiency Air Conditioners	2	3	3	3	2	2	15
HVAC Efficiency Improvement	2	3	3	3	2	2	15
Interruptible Rates	3	1	3	2	2	2	13
Customized Rebate Program	1	2	3	2	2	2	12
Process Improvement	1	1	2	1	2	2	9
Compressed Air Efficiency	1	2	2	1	1	2	9

All applicable technologies were ranked from high to low for each customer class. Any measure with a score greater than 10 was deemed to have passed the qualitative screening. Six residential measures and four commercial/industrial measures passed the qualitative screening and were assessed for economic feasibility.

Selected DSM Programs

The following DSM programs were selected through the screening analysis and assessed for economic feasibility.

1. Residential High Efficiency Central Air Conditioners. For customers needing to replace their existing air conditioner, this program would provide rebates or incentives when the BPW selects the size of the customer's new or replacement air conditioner.

2. Residential Energy Audits. Energy efficient improvements, including additional insulation, reduction of infiltration, and full basement insulation, would be assessed by a trained energy audit specialist. Cost-effective energy efficiency measures would be identified for the homeowner.

3. 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.

4. Residential Electric Water Heater Load Shedding. A customer incentive would be given to customers who agree to have an electric water heater cycled off for periods of time during summer peak load hours.

5. Improved Home Loan Program for Furnace and Air Conditioning Replacement. This program would provide a loan subsidy to customers installing properly sized high-efficiency equipment. This would be achieved by Beatrice providing loan funds or by making a payment directly to the bank granting the loan.

6. Energy-Efficient New Home. Customers would receive an incentive in the form of a rebate, rate discount, or a loan subsidy from Beatrice for building a new home to meet certain energy efficiency standards.

7. 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.

8. 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, higher efficiency cooling equipment, and energy management controls are examples of eligible improvements.

9. 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 Beatrice. The customer signs a contract before the summer begins and is obligated to interrupt a certain amount of their load for a set number of hours per year.

10. 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.

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 parameters were used in the economic evaluation:

- The evaluation was done on a system-wide basis, meaning the analysis evaluated system-wide 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, updated information from local vendors was collected.
- Avoided demand and energy costs from Beatrice's existing supply side resources were used. The avoided capacity rate was $30/kW-year and the avoided energy rate was $30/MWh. It was assumed that summer peak demand savings were

used to make excess capacity available for sale, with the summer season being defined as June-September and the winter season as October-May.

- A discount rate of 4.5% was used.
- The Total Resource Cost test was used. This compared the total costs of the measure, including costs incurred by Beatrice or the end-user, to the total cost savings realized by Beatrice.

The economic evaluation considered the installation, operation and maintenance, and administrative and general expenses that would be incurred over the life of the measure. DSM expenses were compared to Beatrice's avoided capacity and energy cost, and the net cost or savings to Beatrice was calculated on an annual basis and discounted to 2022 dollars. Measures with a positive net present value were considered economically feasible.

A summary of the economic evaluations are shown in Tables 8 and 9 (see page 21). The analysis of each individual DSM measure is shown in Appendix A.

Table 8
Impact of Demand Side Measures Alternatives - Residential

Impact of DSM Alternatives	Net Present Value 2022 $		
	5-Year	10-Year	Life
Air Conditioning Load Cycling	$ (154,536.43)	$ (100,363.95)	$ (46,869.73)
Water Heater Load Shedding	$ (65,567.78)	$ (64,945.66)	$ (63,660.38)
High Efficiency Air Conditioners	$ (53,945.65)	$ (23,196.48)	$ 32,018.12
HVAC Replacement Loans	$ (277,458.79)	$ (296,011.02)	$ (317,900.46)
Whole-House Audits	$ (554,362.82)	$ (394,695.49)	$ (246,163.26)

Table 9
Impact of Demand Side Measures Alternatives - Commercial/Industrial

Impact of DSM Alternatives	Net Present Value 2022 $		
	5-Year	10-Year	Life
Interruptible Rates	$ (12,435.05)	$ (14,431.27)	$ (14,431.27)
High Efficiency Air Conditioners	$ (37,714.97)	$ (28,612.34)	$ (12,267.25)
HVAC Efficiency Improvement	$ (41,376.15)	$ (33,353.73)	$ (18,948.30)
Customized Rebate Program	$ (127,616.72)	$ (65,056.11)	$ (5,751.07)

It appears that the only DSM measure that is economically feasible is to continue the existing rebate program for high efficiency HVAC equipment. Power supply costs are very competitive, eliminating many DSM measures that have been implemented by regional utilities. Implementation of distribution system improvements, as needed, reduces distribution system losses. Beatrice should continue low-cost DSM options, such as promoting energy efficiency via the City's website and customer newsletters.

Supply/Demand Side Resource Integration

Development of Integrated Resource Plan

The only DSM measure that was integrated with the resource plan was LED street lighting. The estimated reduction in energy usage was built into the forecast. Because Beatrice peaks in the summer season, the LED street lighting program will have no impact on the forecast peak demand. The preferred plan includes maintaining existing supply-side resources with a plan to explore replacement resources toward the end of the five-year action plan.

Preferred Alternative

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

- Continue the existing HVAC rebate program and existing low-cost DSM measures, including website information and programs offered by the Nebraska Department of Environment and Energy.
- Consider identifying replacement capacity and energy resources for expiring agreements in 2030 toward the end of the five-year action plan period.

Environmental Impact

Beatrice complies with all applicable provisions of the State and Federal environmental regulations at its power plant and substation facilities. Proposed projects would include emissions control technology, as required, to help reduce environmental impacts. Encouraging DSM through no cost or low cost methods would reduce energy usage and emissions. Implementing energy audits would reduce future energy usage.

The Cottonwood project is capable of supplying 40% of Beatrice's energy requirements. When compared to the typical CO_2 emissions profile of electric resources in Nebraska, the Cottonwood project eliminates more than 42,000 metric tons of CO_2 emissions per year, based on emissions data in Nebraska from the Energy Information Administration for 2020.

Action Plans

To the extent that costs for power supply resources, DSM and transmission change, Beatrice should review and modify this action plan accordingly. Based on the assumptions used, analyses completed, and conclusions reached in this study, the

following action plans are recommended. The plans outline near-term and longer-term recommendations.

Two-Year

- Beatrice should continue to promote partnerships with the Nebraska Department of Environment and Energy via a link on its website.
- Continue providing energy efficiency information via the City's website.
- Continue providing high-efficiency HVAC rebates.

Five-Year

- Continue actions from Two-Year action plan.
- Consider replacement resources for expiring capacity and energy resources.

Public Participation

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

[The remainder of this section will be completed after the public process is complete.]

Validation of Predicted Performance

Beatrice compares its load forecasts to actual usage on an annual and monthly basis. Power supply resources are tracked on a monthly basis. On an annual basis, Beatrice completes a resource adequacy workbook that is submitted to SPP to ensure compliance with regional resource adequacy requirements. Beatrice 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 projected 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 cost of purchased power or demand side measures.

Appendix A: Economic Analysis of Demand Side Measures

DSM Program Name: Air Conditioning Load Cycling
Customer Class: Residential

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	0.85	-	
Annual Energy Usage			
Energy Savings (%)			0%
Energy Savings (kWh per unit)			-

Program Costs	Amount
Admin Cost (total $/year)	15,000.00
Capital Cost ($/unit)	150.00
Maintenance Cost ($/year/unit)	12.00
Cost Escalation (%/year)	2.50%

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Annual Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	15
Discount Rate	4.50%

Estimated Applicability	Amount
Estimated Residential Customers	5807
Estimated Application Saturation	60%
Market Eligibility	40%
Feasibility	100%
Estimated Units	1394

Year	Summer Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-mon)	Annual Energy Charge ($/MWh)	Power Cost Savings ($)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	1,185	-	36.00	-	35.00	42,656.40	209,100.00	31,728.00	(198,171.60)	(198,171.60)
2023	1,185	-	37.08	-	36.05	43,936.09	-	32,521.20	11,414.89	10,923.34
2024	1,185	-	38.19	-	37.13	45,254.17	-	33,334.23	11,919.94	10,915.45
2025	1,185	-	39.34	-	38.25	46,611.80	-	34,167.59	12,444.21	10,904.82
2026	1,185	-	40.52	-	39.39	48,010.15	-	35,021.78	12,988.38	10,891.55
2027	1,185	-	41.73	-	40.57	49,450.46	-	35,897.32	13,553.14	10,875.73
2028	1,185	-	42.99	-	41.79	50,933.97	-	36,794.75	14,139.22	10,857.45
2029	1,185	-	44.28	-	43.05	52,461.99	-	37,714.62	14,747.37	10,836.79
2030	1,185	-	45.60	-	44.34	54,035.85	-	38,657.49	15,378.36	10,813.84
2031	1,185	-	46.97	-	45.67	55,656.93	-	39,623.92	16,033.00	10,788.68
2032	1,185	-	48.38	-	47.04	57,326.63	-	40,614.52	16,712.11	10,761.39
2033	1,185	-	49.83	-	48.45	59,046.43	-	41,629.89	17,416.55	10,732.06
2034	1,185	-	51.33	-	49.90	60,817.83	-	42,670.63	18,147.19	10,700.74
2035	1,185	-	52.87	-	51.40	62,642.36	-	43,737.40	18,904.96	10,667.53
2036	1,185	-	54.45	-	52.94	64,521.63	-	44,830.83	19,690.80	10,632.50

NPV in 2022 $		
	Five Year	(154,536.43)
	Ten Year	(100,363.95)
	Life	(46,869.73)

DSM Program Name: Water Heater Load Shedding
Customer Class: Residential

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	0.45	-	
Annual Energy Usage			
Energy Savings (%)			0%
Energy Savings (kWh per unit)			5

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Annual Energy Cost ($/MWh)	30.00
Rate Escalation (%/yr)	3.00%
Measure Life	15
Discount Rate	4.50%

Program Costs	Amount
Admin Cost (total $/year)	2,000.00
Capital Cost ($/unit)	150.00
Maintenance Cost ($/year/unit)	12.00
Cost Escalation (%/year)	2.50%

Estimated Applicability	Amount
Estimated Residential Customers	5807
Estimated Application Saturation	15%
Market Eligibility	50%
Feasibility	100%
Estimated Units	436

Year	Summer Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-mon)	Annual Energy Charge ($/MWh)	Power Cost Savings ($)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	196	2,180	36.00	-	30.00	7,128.60	65,400.00	7,232.00	(65,503.40)	(65,503.40)
2023	196	2,180	37.08	-	30.90	7,342.46	-	7,412.80	(70.34)	(67.31)
2024	196	2,180	38.19	-	31.83	7,562.73	-	7,598.12	(35.39)	(32.41)
2025	196	2,180	39.34	-	32.78	7,789.61	-	7,788.07	1.54	1.35
2026	196	2,180	40.52	-	33.77	8,023.30	-	7,982.77	40.53	33.98
2027	196	2,180	41.73	-	34.78	8,264.00	-	8,182.34	81.66	65.53
2028	196	2,180	42.99	-	35.82	8,511.92	-	8,386.90	125.02	96.00
2029	196	2,180	44.28	-	36.90	8,767.28	-	8,596.58	170.70	125.44
2030	196	2,180	45.60	-	38.00	9,030.30	-	8,811.49	218.81	153.86
2031	196	2,180	46.97	-	39.14	9,301.21	-	9,031.78	269.43	181.30
2032	196	2,180	48.38	-	40.32	9,580.24	-	9,257.57	322.67	207.78
2033	196	2,180	49.83	-	41.53	9,867.65	-	9,489.01	378.64	233.32
2034	196	2,180	51.33	-	42.77	10,163.68	-	9,726.24	437.44	257.94
2035	196	2,180	52.87	-	44.06	10,468.59	-	9,969.39	499.20	281.68
2036	196	2,180	54.45	-	45.38	10,782.65	-	10,218.63	564.02	304.56

NPV in 2022 $		
	Five Year	(65,567.78)
	Ten Year	(64,945.66)
	Life	(63,660.38)

DSM Program Name: High Efficiency Air Conditioners
Customer Class: Residential

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	0.60	-	
Annual Energy Usage			
Energy Savings (%)			0%
Energy Savings (kWh per unit)			500

Program Costs	Amount
Admin Cost (total $/year)	-
Capital Cost ($/unit)	500.00
Maintenance Cost ($/year/unit)	-
Cost Escalation (%/year)	2.50%

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Annual Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	20
Discount Rate	4.50%

Estimated Applicability	Amount
Estimated Residential Customers	5807
Estimated Application Saturation	60%
Market Eligibility	5%
Feasibility	100%
Estimated Units	174

Year	Summer Capacity Savings (kW)	Winter Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-mon)	Annual Energy Charge ($/MWh)	Power Cost Savings ($)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	104	-	87,000	36.00	-	35.00	6,803.40	87,000.00	-	(80,196.60)	(80,196.60)
2023	104	-	87,000	37.08	-	36.05	7,007.50	-	-	7,007.50	6,705.74
2024	104	-	87,000	38.19	-	37.13	7,217.73	-	-	7,217.73	6,609.49
2025	104	-	87,000	39.34	-	38.25	7,434.26	-	-	7,434.26	6,514.62
2026	104	-	87,000	40.52	-	39.39	7,657.29	-	-	7,657.29	6,421.10
2027	104	-	87,000	41.73	-	40.57	7,887.01	-	-	7,887.01	6,328.94
2028	104	-	87,000	42.99	-	41.79	8,123.62	-	-	8,123.62	6,238.09
2029	104	-	87,000	44.28	-	43.05	8,367.32	-	-	8,367.32	6,148.55
2030	104	-	87,000	45.60	-	44.34	8,618.34	-	-	8,618.34	6,060.29
2031	104	-	87,000	46.97	-	45.67	8,876.89	-	-	8,876.89	5,973.30
2032	104	-	87,000	48.38	-	47.04	9,143.20	-	-	9,143.20	5,887.56
2033	104	-	87,000	49.83	-	48.45	9,417.50	-	-	9,417.50	5,803.05
2034	104	-	87,000	51.33	-	49.90	9,700.02	-	-	9,700.02	5,719.75
2035	104	-	87,000	52.87	-	51.40	9,991.02	-	-	9,991.02	5,637.65
2036	104	-	87,000	54.45	-	52.94	10,290.75	-	-	10,290.75	5,556.73
2037	104	-	87,000	56.09	-	54.53	10,599.48	-	-	10,599.48	5,476.97
2038	104	-	87,000	57.77	-	56.16	10,917.46	-	-	10,917.46	5,398.35
2039	104	-	87,000	59.50	-	57.85	11,244.98	-	-	11,244.98	5,320.86
2040	104	-	87,000	61.29	-	59.59	11,582.33	-	-	11,582.33	5,244.48
2041	104	-	87,000	63.13	-	61.37	11,929.80	-	-	11,929.80	5,169.21

NPV in 2022 $	**Five Year**	(53,945.65)
	Ten Year	(23,196.48)
	Life	32,018.12

DSM Program Name: HVAC Replacement Loans
Customer Class: Residential

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	1.00	1.00	
Annual Energy Usage			
Energy Savings (%)			0%
Energy Savings (kWh per unit)			2,000

Program Costs	Amount
Admin Cost (total $/year)	7,500.00
Capital Cost ($/unit)	750.00
Maintenance Cost ($/year/unit)	100.00
Cost Escalation (%/year)	2.50%

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Annual Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	20
Discount Rate	4.50%

Estimated Applicability	Amount
Estimated Residential Customers	5807
Estimated Application Saturation	100%
Market Eligibility	6%
Feasibility	100%
Estimated Units	337

Year	Summer Capacity Savings (kW)	Winter Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-mon)	Annual Energy Charge ($/MWh)	Power Cost Savings ($)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	337	337	674,000	36.00	-	35.00	35,722.00	252,750.00	41,200.00	(258,228.00)	(258,228.00)
2023	337	337	674,000	37.08	-	36.05	36,793.66	-	42,230.00	(5,436.34)	(5,202.24)
2024	337	337	674,000	38.19	-	37.13	37,897.47	-	43,285.75	(5,388.28)	(4,934.21)
2025	337	337	674,000	39.34	-	38.25	39,034.39	-	44,367.89	(5,333.50)	(4,673.73)
2026	337	337	674,000	40.52	-	39.39	40,205.43	-	45,477.09	(5,271.67)	(4,420.61)
2027	337	337	674,000	41.73	-	40.57	41,411.59	-	46,614.02	(5,202.43)	(4,174.70)
2028	337	337	674,000	42.99	-	41.79	42,653.94	-	47,779.37	(5,125.43)	(3,935.80)
2029	337	337	674,000	44.28	-	43.05	43,933.55	-	48,973.85	(5,040.30)	(3,703.76)
2030	337	337	674,000	45.60	-	44.34	45,251.56	-	50,198.20	(4,946.64)	(3,478.40)
2031	337	337	674,000	46.97	-	45.67	46,609.11	-	51,453.15	(4,844.05)	(3,259.58)
2032	337	337	674,000	48.38	-	47.04	48,007.38	-	52,739.48	(4,732.10)	(3,047.13)
2033	337	337	674,000	49.83	-	48.45	49,447.60	-	54,057.97	(4,610.37)	(2,840.90)
2034	337	337	674,000	51.33	-	49.90	50,931.03	-	55,409.42	(4,478.39)	(2,640.74)
2035	337	337	674,000	52.87	-	51.40	52,458.96	-	56,794.66	(4,335.69)	(2,446.51)
2036	337	337	674,000	54.45	-	52.94	54,032.73	-	58,214.52	(4,181.79)	(2,258.05)
2037	337	337	674,000	56.09	-	54.53	55,653.71	-	59,669.88	(4,016.17)	(2,075.24)
2038	337	337	674,000	57.77	-	56.16	57,323.32	-	61,161.63	(3,838.31)	(1,897.93)
2039	337	337	674,000	59.50	-	57.85	59,043.02	-	62,690.67	(3,647.65)	(1,725.98)
2040	337	337	674,000	61.29	-	59.59	60,814.31	-	64,257.94	(3,443.63)	(1,559.27)
2041	337	337	674,000	63.13	-	61.37	62,638.74	-	65,864.39	(3,225.64)	(1,397.68)

NPV in 2022 $		
	Five Year	(277,458.79)
	Ten Year	(296,011.02)
	Life	(317,900.46)

DSM Program Name: Whole-House Audits
Customer Class: Residential

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	0.50	0.50	
Annual Energy Usage			
Energy Savings (%)			0%
Energy Savings (kWh per unit)			876

Program Costs	Amount
Admin Cost (total $/year)	-
Capital Cost ($/unit)	1,000.00
Maintenance Cost ($/year/unit)	-
Cost Escalation (%/year)	2.50%

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Annual Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	15
Discount Rate	4.50%

Estimated Applicability	Amount
Estimated Residential Customers	5807
Estimated Application Saturation	50%
Market Eligibility	25%
Feasibility	100%
Estimated Units	726

Year	Summer Capacity Savings (kW)	Winter Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-mon)	Annual Energy Charge ($/MWh)	Power Cost Savings ($)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	363	363	635,976	36.00	-	35.00	35,327.16	726,000.00	-	(690,672.84)	(690,672.84)
2023	363	363	635,976	37.08	-	36.05	36,386.97	-	-	36,386.97	34,820.07
2024	363	363	635,976	38.19	-	37.13	37,478.58	-	-	37,478.58	34,320.26
2025	363	363	635,976	39.34	-	38.25	38,602.94	-	-	38,602.94	33,827.63
2026	363	363	635,976	40.52	-	39.39	39,761.03	-	-	39,761.03	33,342.06
2027	363	363	635,976	41.73	-	40.57	40,953.86	-	-	40,953.86	32,863.47
2028	363	363	635,976	42.99	-	41.79	42,182.48	-	-	42,182.48	32,391.74
2029	363	363	635,976	44.28	-	43.05	43,447.95	-	-	43,447.95	31,926.79
2030	363	363	635,976	45.60	-	44.34	44,751.39	-	-	44,751.39	31,468.51
2031	363	363	635,976	46.97	-	45.67	46,093.93	-	-	46,093.93	31,016.81
2032	363	363	635,976	48.38	-	47.04	47,476.75	-	-	47,476.75	30,571.59
2033	363	363	635,976	49.83	-	48.45	48,901.05	-	-	48,901.05	30,132.77
2034	363	363	635,976	51.33	-	49.90	50,368.08	-	-	50,368.08	29,700.24
2035	363	363	635,976	52.87	-	51.40	51,879.13	-	-	51,879.13	29,273.92
2036	363	363	635,976	54.45	-	52.94	53,435.50	-	-	53,435.50	28,853.72

NPV in 2022 $		
	Five Year	(554,362.82)
	Ten Year	(394,695.49)
	Life	(246,163.26)

DSM Program Name: Interruptible Rates
Customer Class: Commercial

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	50	50	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			5,000

Program Costs	Amount
Admin Cost (total $/year)	2,500.00
Capital Cost ($/unit)	10,000.00
Maintenance Cost ($/year/unit)	-
Cost Escalation (%/year)	2.50%

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Avoided Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	10
Discount Rate	4.50%

Estimated Applicability	Amount
Estimated Industrial Customers	2
Estimated Application Saturation	100%
Market Eligibility	25%
Feasibility	100%
Estimated Units	1

Year	Summer Capacity Savings (kW)	Winter Capacity Savings (kW)	Annual Energy Savings (kWh)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-yr)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	50	50	5,000	36.00	-	35.00	1,975.00	10,000.00	2,500.00	(10,525.00)	(10,525.00)
2023	50	50	5,000	37.08	-	36.05	2,034.25	-	2,562.50	(528.25)	(505.50)
2024	50	50	5,000	38.19	-	37.13	2,095.28	-	2,626.56	(531.29)	(486.51)
2025	50	50	5,000	39.34	-	38.25	2,158.14	-	2,692.23	(534.09)	(468.02)
2026	50	50	5,000	40.52	-	39.39	2,222.88	-	2,759.53	(536.65)	(450.02)
2027	50	50	5,000	41.73	-	40.57	2,289.57	-	2,828.52	(538.95)	(432.48)
2028	50	50	5,000	42.99	-	41.79	2,358.25	-	2,899.23	(540.98)	(415.42)
2029	50	50	5,000	44.28	-	43.05	2,429.00	-	2,971.71	(542.71)	(398.80)
2030	50	50	5,000	45.60	-	44.34	2,501.87	-	3,046.01	(544.14)	(382.63)
2031	50	50	5,000	46.97	-	45.67	2,576.93	-	3,122.16	(545.23)	(366.89)

NPV in 2022 $		
	Five Year	(12,435.05)
	Ten Year	(14,431.27)
	Life	(14,431.27)

DSM Program Name: High Efficiency Air Conditioners
Customer Class: Commercial/Industrial

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	1	-	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			2,000

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Avoided Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	20
Discount Rate	4.50%

Program Costs	Amount
Admin Cost (total $/year)	-
Capital Cost ($/unit)	2,500.00
Maintenance Cost ($/year/unit)	-
Cost Escalation (%/year)	2.50%

Estimated Applicability	Amount
Estimated Commercial/Industrial Customers	1010
Estimated Appliance Saturation	75%
Market Eligibility	10%
Feasibility	25%
Estimated Units	19

Year	Summer Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-yr)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	19	38,000	36.00	-	35.00	2,014.00	47,500.00	-	(45,486.00)	(45,486.00)
2023	19	38,000	37.08	-	36.05	2,074.42	-	-	2,074.42	1,985.09
2024	19	38,000	38.19	-	37.13	2,136.65	-	-	2,136.65	1,956.60
2025	19	38,000	39.34	-	38.25	2,200.75	-	-	2,200.75	1,928.51
2026	19	38,000	40.52	-	39.39	2,266.77	-	-	2,266.77	1,900.83
2027	19	38,000	41.73	-	40.57	2,334.78	-	-	2,334.78	1,873.55
2028	19	38,000	42.99	-	41.79	2,404.82	-	-	2,404.82	1,846.65
2029	19	38,000	44.28	-	43.05	2,476.97	-	-	2,476.97	1,820.15
2030	19	38,000	45.60	-	44.34	2,551.27	-	-	2,551.27	1,794.02
2031	19	38,000	46.97	-	45.67	2,627.81	-	-	2,627.81	1,768.27
2032	19	38,000	48.38	-	47.04	2,706.65	-	-	2,706.65	1,742.89
2033	19	38,000	49.83	-	48.45	2,787.85	-	-	2,787.85	1,717.87
2034	19	38,000	51.33	-	49.90	2,871.48	-	-	2,871.48	1,693.21
2035	19	38,000	52.87	-	51.40	2,957.63	-	-	2,957.63	1,668.90
2036	19	38,000	54.45	-	52.94	3,046.36	-	-	3,046.36	1,644.95
2037	19	38,000	56.09	-	54.53	3,137.75	-	-	3,137.75	1,621.34
2038	19	38,000	57.77	-	56.16	3,231.88	-	-	3,231.88	1,598.06
2039	19	38,000	59.50	-	57.85	3,328.84	-	-	3,328.84	1,575.13
2040	19	38,000	61.29	-	59.59	3,428.70	-	-	3,428.70	1,552.52
2041	19	38,000	63.13	-	61.37	3,531.56	-	-	3,531.56	1,530.23

NPV in 2022 $		
	Five Year	(37,714.97)
	Ten Year	(28,612.34)
	Life	(12,267.25)

DSM Program Name: HVAC Efficiency Improvement
Customer Class: Commercial/Industrial

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	5	5	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			5,000

Program Costs	Amount
Admin Cost (total $/year)	-
Capital Cost ($/unit)	10,000.00
Maintenance Cost ($/year/unit)	-
Cost Escalation (%/year)	2.50%

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Avoided Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	20
Discount Rate	4.50%

Estimated Applicability	Amount
Estimated Commercial/Industrial Customers	1010
Estimated Appliance Saturation	100%
Market Eligibility	5%
Feasibility	10%
Estimated Units	5

Year	Summer Capacity Savings (kW)	Winter Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-yr)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	25	25	25,000	36.00	-	35.00	1,775.00	50,000.00	-	(48,225.00)	(48,225.00)
2023	25	25	25,000	37.08	-	36.05	1,828.25	-	-	1,828.25	1,749.52
2024	25	25	25,000	38.19	-	37.13	1,883.10	-	-	1,883.10	1,724.41
2025	25	25	25,000	39.34	-	38.25	1,939.59	-	-	1,939.59	1,699.66
2026	25	25	25,000	40.52	-	39.39	1,997.78	-	-	1,997.78	1,675.26
2027	25	25	25,000	41.73	-	40.57	2,057.71	-	-	2,057.71	1,651.21
2028	25	25	25,000	42.99	-	41.79	2,119.44	-	-	2,119.44	1,627.51
2029	25	25	25,000	44.28	-	43.05	2,183.03	-	-	2,183.03	1,604.15
2030	25	25	25,000	45.60	-	44.34	2,248.52	-	-	2,248.52	1,581.12
2031	25	25	25,000	46.97	-	45.67	2,315.97	-	-	2,315.97	1,558.43
2032	25	25	25,000	48.38	-	47.04	2,385.45	-	-	2,385.45	1,536.06
2033	25	25	25,000	49.83	-	48.45	2,457.02	-	-	2,457.02	1,514.01
2034	25	25	25,000	51.33	-	49.90	2,530.73	-	-	2,530.73	1,492.28
2035	25	25	25,000	52.87	-	51.40	2,606.65	-	-	2,606.65	1,470.86
2036	25	25	25,000	54.45	-	52.94	2,684.85	-	-	2,684.85	1,449.74
2037	25	25	25,000	56.09	-	54.53	2,765.39	-	-	2,765.39	1,428.93
2038	25	25	25,000	57.77	-	56.16	2,848.35	-	-	2,848.35	1,408.42
2039	25	25	25,000	59.50	-	57.85	2,933.80	-	-	2,933.80	1,388.21
2040	25	25	25,000	61.29	-	59.59	3,021.82	-	-	3,021.82	1,368.28
2041	25	25	25,000	63.13	-	61.37	3,112.47	-	-	3,112.47	1,348.64

NPV in 2022 $		
	Five Year	(41,376.15)
	Ten Year	(33,353.73)
	Life	(18,948.30)

DSM Program Name: Customized Rebate Program
Customer Class: Commercial/Industrial

DSM Measure Effectiveness	Summer Demand	Winter Demand	Annual Energy
Load Reduction (kW per Unit)	5	5	
Annual Energy Usage			
Energy Savings (%)			
Energy Savings (kWh per unit)			8,750

Power Cost and Economic Parameters	
Summer Capacity ($/kW-season)	36.00
Winter Capacity ($/kW-season)	-
Avoided Energy Cost ($/MWh)	35.00
Rate Escalation (%/yr)	3.00%
Measure Life	15
Discount Rate	4.50%

Program Costs	Amount
Admin Cost (total $/year)	5,000.00
Capital Cost ($/unit)	3,795.22
Maintenance Cost ($/year/unit)	124.21
Cost Escalation (%/year)	2.50%

Estimated Applicability	Amount
Estimated Commercial/Industrial Customers	1010
Estimated Appliance Saturation	100%
Market Eligibility	5%
Feasibility	100%
Estimated Units	51

Year	Summer Capacity Savings (kW)	Winter Capacity Savings (kW)	Annual Energy Savings (kWh/unit)	Summer Capacity Charge ($/kW-yr)	Winter Capacity Charge ($/kW-yr)	Annual Energy Charge ($/MWh)	Power Cost Savings ($/unit)	Capital Costs ($)	O&M Costs ($)	Annual Savings / (Costs) ($)	Present Value ($)
2022	255	255	446,250	36.00	-	35.00	24,798.75	193,556.22	11,334.71	(180,092.18)	(180,092.18)
2023	255	255	446,250	37.08	-	36.05	25,542.71	-	11,618.08	13,924.63	13,325.01
2024	255	255	446,250	38.19	-	37.13	26,308.99	-	11,908.53	14,400.46	13,186.94
2025	255	255	446,250	39.34	-	38.25	27,098.26	-	12,206.24	14,892.02	13,049.83
2026	255	255	446,250	40.52	-	39.39	27,911.21	-	12,511.40	15,399.81	12,913.69
2027	255	255	446,250	41.73	-	40.57	28,748.55	-	12,824.18	15,924.36	12,778.52
2028	255	255	446,250	42.99	-	41.79	29,611.00	-	13,144.79	16,466.22	12,644.34
2029	255	255	446,250	44.28	-	43.05	30,499.33	-	13,473.41	17,025.93	12,511.14
2030	255	255	446,250	45.60	-	44.34	31,414.31	-	13,810.24	17,604.07	12,378.92
2031	255	255	446,250	46.97	-	45.67	32,356.74	-	14,155.50	18,201.24	12,247.70
2032	255	255	446,250	48.38	-	47.04	33,327.45	-	14,509.39	18,818.06	12,117.47
2033	255	255	446,250	49.83	-	48.45	34,327.27	-	14,872.12	19,455.15	11,988.24
2034	255	255	446,250	51.33	-	49.90	35,357.09	-	15,243.92	20,113.16	11,860.01
2035	255	255	446,250	52.87	-	51.40	36,417.80	-	15,625.02	20,792.78	11,732.77
2036	255	255	446,250	54.45	-	52.94	37,510.33	-	16,015.65	21,494.69	11,606.55

NPV in 2022 $		
	Five Year	(127,616.72)
	Ten Year	(65,056.11)
	Life	(5,751.07)

Appendix B: Public Notice and Meeting Agenda