

May 31, 2017

Mr. Robert Langenberger  
Western Area Power Administration  
555 E. Crossroads  
Loveland, CO 80538

RE: Arkansas River Power Authority 2017 IRP

Dear Mr. Langenberger:

Enclosed is a copy of the 2017 Integrated Resource Plan for the Arkansas River Power Authority (ARPA), as prepared by JK Energy Consulting, LLC. An electronic version of the IRP was submitted to you on May 31, 2017.

If you have any questions regarding ARPA's 2017 IRP, please feel free to contact Rick Rigel at 719-336-3496 or John Krajewski at 402-440-0227.

Thank you.

Sincerely yours,



Kris Mussman  
Administrative Manager

Enclosure

# **Integrated Resource Plan 2017**

Prepared for

**Arkansas River Power Authority**

Prepared by

JK Energy Consulting, LLC  
650 J Street, Suite 108  
Lincoln, Nebraska 68508  
402-440-0227  
[jk@jkenergyconsulting.com](mailto:jk@jkenergyconsulting.com)

**Table of Contents**

Section I. Summary ..... 1

Section II. ARPA Member Systems ..... 4

Section III. Load Forecast..... 7

Section IV. Supply Side Resources ..... 11

Section V. Future Supply Side Resources..... 16

Section VI. Supply–Side Resource Evaluation ..... 20

Section VII. Demand Side Management Analysis ..... 22

Section VIII. Supply/Demand Side Resource Integration..... 32

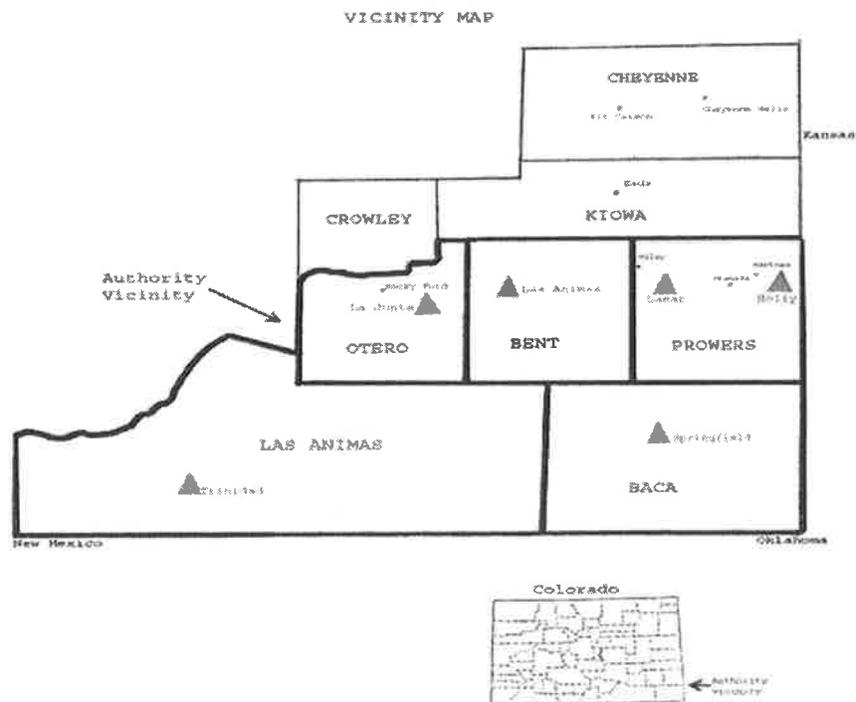
Section IX. Action Plans..... 34

Appendix A - Demand Side Management Measures

Appendix B - Public Notices, Agendas, Resolution

## Section I. Summary

The Arkansas River Power Authority (ARPA) is a wholesale electric service provider in southeastern Colorado that supplies power to the communities of Holly, La Junta, Lamar, Las Animas, Springfield, and Trinidad. Unlike larger, investor-owned utilities, ARPA was formed and is owned by the communities it serves. Each of ARPA's municipal members own and operate an electric system that distributes electricity to residential, commercial, and industrial customers. As a public power entity, ARPA is governed by a 12-person board with two board representatives appointed by each member community.



## **Purpose**

In 1995, Western Area Power Administration (Western) established a program called the Energy Planning and Management Program (EPAMP), which was developed to meet the objectives of Section 114 of the Energy Policy Act of 1992, and enables its customers to maintain their current allocations of capacity and energy from Western. EPAMP requires its customers to prepare and submit an IRP to Western every five years. This IRP is intended to meet the requirements of the EPAMP as well as be used as a planning document for ARPA.

ARPA and one of its members (City of Lamar) have allocations of federal hydropower supplied by Western. ARPA submits a single IRP on behalf of all its members. This is referred to under the EPAMP as a “cooperative” IRP. The purpose of this IRP is to review new generating resources and demand side measures that will reliably serve ARPA’s members, and to complete this review in a manner consistent with the EPAMP.

## **Overview of Past IRPs**

ARPA has completed four IRPs since the EPAMP became effective. ARPA submitted its first IRP in 1996, followed by three additional IRPs in 2003, 2007 and 2012. In general, ARPA has implemented the recommendations of its previous IRPs.

## **Approach to 2017 IRP**

This IRP was prepared based on the procedures suggested by the EPAMP and is consistent with prior IRPs submitted by ARPA. The tasks completed to prepare this IRP are summarized below:

- Prepared ARPA peak demand and energy requirements forecast.

- Compared forecasted peak demand and energy requirements to existing ARPA power supply resources to estimate future resource needs.
- Reviewed power supply resource options to identify economical resources to include in the integration analysis.
- Identified potential demand side management (DSM) measures and assessed their economic and technical feasibility.
- Integrated DSM options 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**

ARPA's mission is to promote the long-term economic well-being of its municipal members and their consumers by providing a dependable and competitively priced supply of wholesale electric power in an environmentally sound manner.

To achieve this stated mission, ARPA focused on the following objectives in developing the IRP:

- Providing reliable wholesale electric power at competitive and affordable rates.
- Preserving its allocation of low cost federal hydropower.
- Ensuring adequate transmission rights are available to economically deliver wholesale power to the members.
- Maintaining the viability of member-owned and controlled electric systems through integration of existing member-owned generation facilities with ARPA-owned local generating resources and supplemental purchase power; thus, preserving local generation and associated jobs.

- Optimizing the operation of generation owned by ARPA and its members, based on current market conditions and the operating costs associated with this generation.
- Furnishing and coordinating support services for the members in order to encourage energy efficiency programs and achieve economic and operational efficiencies.

## **Section II. ARPA Member Systems**

As stated earlier, ARPA has six member systems located in southeast Colorado. Each of the members has exclusive rights to serve retail loads within their respective service territories under existing Colorado law, including the portion of the service territories located outside the corporate limits. There have been no legislative attempts to change provisions related to the exclusive rights of utilities to serve customers within the service territory of electric providers since 1998.

Holly, Colorado: The Town of Holly purchased its municipal utility in 1949. The utility serves an area of approximately 24 square miles with 31 miles of distribution facilities. Approximately 24% of Holly's revenues are derived from customers outside municipal boundaries.

La Junta, Colorado: The La Junta municipal electric utility was created in 1939 and serves an area of approximately 10 square miles. La Junta operates approximately 55 miles of distribution line and 6.3 miles of transmission line. Approximately 14% of the power sold by La Junta is delivered to customers outside municipal boundaries.

Lamar, Colorado: The Lamar municipal electric utility has been in existence since 1920 and serves approximately 170 square miles, comprised of areas both within and

outside the municipal boundaries. Lamar's facilities include approximately 345 miles of distribution line and 36 miles of transmission line. The Lamar Utilities Board (LUB), which operates and oversees the electric utility, was established in 1962 pursuant to the Lamar Home Rule Charter.

Las Animas, Colorado: The Las Animas municipal electric utility was established in 1941 and serves an area of approximately 22 square miles. Approximately 43% of its sales occur outside the municipality. Las Animas' facilities include about 50 miles of distribution line and 13 miles of transmission line.

Springfield, Colorado: The Springfield municipal electric utility was established in 1947 and serves an area of approximately two square miles. Less than 2% of Springfield's sales are attributable to customers outside municipal boundaries. Springfield has approximately 26 miles of distribution line, which includes four miles of distribution line to the ARPA wind turbine in Springfield.

Trinidad, Colorado: The Trinidad municipal electric utility was established in 1949 and serves an area of approximately 9 square miles. Less than 1% of Trinidad's total sales are comprised of sales to customers outside municipal boundaries. Trinidad's facilities include approximately 72 miles of distribution line.

### **Demographics**

Over the past 50 years, the population in ARPA member communities has steadily declined, with the exception of the City of Lamar, whose population has remained steady. Between 1970 and 2015, Las Animas' population has declined by 30% while Holly has seen its population decline 23%. Springfield has experienced a 17% reduction in population, La Junta has decreased 14%, and Trinidad's population has declined 18%.

The causes of the population decline in ARPA member communities are numerous and well documented. There have been a number of key employers that have reduced or eliminated operations in recent years. Water that was previously used for irrigation has been sold to communities in the Front Range, reducing agricultural activity in the area between La Junta and Lamar. These factors, along with aging of the local population and reduced birth rates, have caused the population to steadily decline as shown in Table 1. These population declines have contributed to flat retail energy sales over the last few years.

**Table 1  
Population (1)**

| <b>Member</b> | <b>1970</b>   | <b>1980</b>   | <b>1990</b>   | <b>2000</b>   | <b>2010</b>   | <b>2015 (2)</b> |
|---------------|---------------|---------------|---------------|---------------|---------------|-----------------|
| Holly         | 993           | 969           | 877           | 1,048         | 802           | 765             |
| La Junta      | 7,938         | 8,338         | 7,637         | 7,568         | 7,077         | 6,866           |
| Lamar         | 7,797         | 7,713         | 8,343         | 8,869         | 7,804         | 7,391           |
| Las Animas    | 3,148         | 2,818         | 2,481         | 2,758         | 2,410         | 2,210           |
| Springfield   | 1,660         | 1,657         | 1,475         | 1,562         | 1,451         | 1,383           |
| Trinidad      | 9,901         | 9,663         | 8,580         | 9,078         | 9,096         | 8,103           |
| <b>TOTAL</b>  | <b>31,437</b> | <b>31,158</b> | <b>29,393</b> | <b>30,883</b> | <b>28,640</b> | <b>26,718</b>   |

(1) Sources: State of Colorado, Department of Local Affairs, Historical Census Population

(2) Sources: State of Colorado, Department of Local Affairs, Population Estimate 2015

**Load Profile**

Table 2 (see page 7) shows the peak demand and energy profile for the six member communities as well as the entire ARPA system. The six members have a demand and energy usage profile typical of small municipal systems. Peak demands are driven by weather patterns in the summer and winter season. Load factors for each of the member communities are typical of a predominately residential and small commercial

customer base. All of the members, except Trinidad, are summer peaking systems, with peak demand driven by air conditioning demand. The City of Trinidad has a significant amount of electric heating load and tends to have colder winters than the other ARPA members.

**Table 2  
2016 Peak Demand and Energy Profile**

| <b>Member</b>          | <b>Winter Peak (kW)</b> | <b>Summer Peak (kW)</b> | <b>Energy Purchases (MWh) (1)</b> | <b>Load Factor (%)</b> |
|------------------------|-------------------------|-------------------------|-----------------------------------|------------------------|
| Holly                  | 1,434                   | 2,966                   | 8,973                             | 34.5%                  |
| La Junta               | 13,910                  | 19,303                  | 83,249                            | 49.2%                  |
| Lamar                  | 14,394                  | 23,791                  | 86,599                            | 41.6%                  |
| Las Animas             | 4,741                   | 6,544                   | 26,468                            | 46.2%                  |
| Springfield            | 2,031                   | 3,562                   | 11,875                            | 38.1%                  |
| Trinidad               | 9,296                   | 9,138                   | 51,920                            | 63.8%                  |
| <b>ARPA TOTALS (2)</b> | <b>45,806</b>           | <b>65,304</b>           | <b>269,084</b>                    | <b>47.0%</b>           |

(1) Member energy purchases from ARPA. Does not match data on Table 3 because this figure includes distribution losses but does not include transmission losses.

(2) ARPA summer peak and winter peak is the Coincident Peak rounded to nearest MW, not the sum of the individual Member peaks.

### **Section III. Load Forecast**

#### **Introduction**

A load forecast was prepared to project ARPA's peak demand and energy requirements for the period of 2017 through 2026. The forecast incorporated econometric forecasting methods to attempt to relate historical energy consumption to economic and population growth, employment, real per capita income, number of customers, heating and cooling degree days, and the real wholesale and retail price of electricity. Subsequently, the relationships were applied to projected econometric variables to project future energy consumption.

## **Forecast Methodology**

Annual energy sales forecasts were developed using weather data and attempted to correlate future energy use with historical econometric data. A model was developed by selecting factors that may have influenced energy requirements in the past and may likely influence each member's future energy use. The data that was evaluated is available to the public upon request.

Rather than forecasting each City's use individually, the forecast treated ARPA as a single entity. Weather data for the City of Lamar was used for purposes of the weather normalization process, based on the availability of data and central location relative to all of the members.

- Econometrics. The study considered econometric data to explain historical energy consumption. Historical and projected economic factors that influence the members load include population, employment, number of customers, real per capita income, and the real wholesale and retail price of electricity. The factors that influenced energy usage varied by member. The influencing factors for each member were used to estimate future energy requirements. To the extent that actual trends deviate from projections used in this forecast, actual peak demands and energy usage should deviate from these projections.
- Weather. The effect of weather on energy usage was also considered. Heating and cooling degree days for 2002 through 2016 were collected from the City of Lamar and compared to historical averages. A regression analysis was used to assess the relationship between degree days and annual energy requirements.

### **2017-2026 Load Forecast**

The load forecast is summarized in Table 3 (see page 10). The correlation with econometric data, including population data and economic activity, was relatively low. The three variables shown to have reasonable correlation with the historical energy use data were the previous year's energy sales, heating degree days and cooling degree days.

[Intentionally left blank.]

**Table 3  
Summary of Load Forecast**

| <b>Year</b>     | <b>Retail Energy Sales (1)<br/>(MWh)</b> | <b>Energy Resources (2)<br/>(MWh)</b> | <b>Summer Coincident Peak (MW) (2)</b> | <b>Winter Coincident Peak (MW)</b> |
|-----------------|--|---------------------------------------|--|------------------------------------|
| <b>ACTUAL</b>   |  |                                       |  |                                    |
| 2002            | 261,990                                  | 288,189                               | 64                                     | 45                                 |
| 2003            | 253,895                                  | 279,285                               | 64                                     | 48                                 |
| 2004            | 252,094                                  | 277,303                               | 62                                     | 46                                 |
| 2005            | 260,275                                  | 286,303                               | 70                                     | 48                                 |
| 2006            | 254,831                                  | 280,314                               | 64                                     | 47                                 |
| 2007            | 262,780                                  | 289,058                               | 64                                     | 44                                 |
| 2008            | 256,817                                  | 282,499                               | 65                                     | 46                                 |
| 2009            | 251,675                                  | 276,843                               | 61                                     | 48                                 |
| 2010            | 261,471                                  | 287,618                               | 67                                     | 48                                 |
| 2011            | 254,896                                  | 280,386                               | 70                                     | 45                                 |
| 2012            | 257,838                                  | 283,622                               | 64                                     | 41                                 |
| 2013            | 257,942                                  | 283,737                               | 61                                     | 41                                 |
| 2014            | 258,047                                  | 283,851                               | 61                                     | 41                                 |
| 2015            | 258,151                                  | 283,966                               | 61                                     | 39                                 |
| 2016            | 258,256                                  | 284,081                               | 65                                     | 42                                 |
| <b>FORECAST</b> |  |                                       |  |                                    |
| 2017            | 256,955                                  | 282,650                               | 65                                     | 42                                 |
| 2018            | 257,528                                  | 283,281                               | 65                                     | 42                                 |
| 2019            | 257,276                                  | 283,003                               | 65                                     | 42                                 |
| 2020            | 257,387                                  | 283,126                               | 65                                     | 42                                 |
| 2021            | 257,338                                  | 283,072                               | 65                                     | 42                                 |
| 2022            | 256,955                                  | 282,650                               | 65                                     | 42                                 |
| 2023            | 257,528                                  | 283,281                               | 65                                     | 42                                 |
| 2024            | 257,276                                  | 283,003                               | 65                                     | 42                                 |
| 2025            | 257,387                                  | 283,126                               | 65                                     | 42                                 |
| 2026            | 257,338                                  | 283,072                               | 65                                     | 42                                 |

(1) The energy requirement shown in this column is based on retail sales of members.

(2) Projected energy resource needs, based on generation resources required to supply member's retail energy sales requirements, plus distribution losses and transmission losses for applicable resources (primarily ARPA generation transmitted between members).

The historical data showed no energy sales growth over the previous 15 years, with energy sales in future years projected to decline slightly. This is not unexpected given area population trends, economic activity and improved energy efficiency standards for appliances, heating and air conditioning equipment, lighting, and practically every other electricity-consuming device manufactured today. Summer peak demand usage of 65 MW was forecasted in 2026, which is essentially the same as the 2016 actual peak demand. Energy requirements were projected to be essentially flat for the period 2017 through 2026.

#### **Section IV. Supply Side Resources**

When ARPA was established in 1979, each ARPA member owned local generation. ARPA members are responsible for the continued upkeep, operation, and maintenance of this existing member-owned generation so long as these activities do not become economically detrimental to the member. ARPA coordinates with its members when member-owned generation is needed to assist with power supply. Members are reimbursed for the usage of their member-owned generation in accordance with ARPA's current tariff and reimbursement schedules as approved at least annually by the Board of Directors.

While members are responsible for their existing generation, ARPA is responsible for acquiring power supplies and to construct, operate and maintain new generation, transmission, and related facilities for the purpose of delivering wholesale electric power to its members. ARPA and its members own approximately 43 MW of generating resources. These resources include peaking generation, emergency-only generation, and wind turbines that provide renewable energy.

Table 4 lists ARPA’s existing supply side capacity resources, including installation date, capacity, primary fuel, location, and operational type. ARPA and member-owned generation is primarily peaking generation fueled by diesel or natural gas. There is also 7.5 MW of wind generation that supplies intermittent renewable energy without firm capacity.

**Table 4  
Summary of ARPA and Member-Owned Generation**

| <b>Location</b> | <b>Year Installed</b> | <b>Owned By</b> | <b>Capacity (MW)</b> | <b>Fuel</b> | <b>Type</b>        |
|-----------------|-----------------------|-----------------|----------------------|-------------|--------------------|
| Holly           | 1991-1997             | Member          | 1.0                  | Diesel      | Emergency Only (1) |
|                 | 2008                  | ARPA            | 1.8                  | Diesel      | Peaking            |
| La Junta        | 1939-1971             | Member          | 15.0                 | Diesel      | Emergency Only (1) |
| Lamar           | 2004                  | Member          | 4.5                  | Wind        | Intermittent       |
|                 | 2004                  | ARPA            | 1.5                  | Wind        | Intermittent       |
| Las Animas      | 1941-1967             | Member          | 6.0                  | Diesel      | Emergency Only (1) |
| Springfield     | 1950-1962             | Member          | 2.8                  | Diesel/Dual | Emergency Only (1) |
|                 | 2004                  | ARPA            | 1.5                  | Wind        | Intermittent       |
| Trinidad        | 1965                  | Member          | 3.5                  | Diesel/Dual | Emergency Only (1) |
|                 | 1999                  | ARPA            | 5.6                  | Diesel      | Peaking            |

Notes:

(1) These units are only operable during emergencies and other limited uses permitted under the Reciprocating Internal Combustion Engine (RICE) emissions rules.

**ARPA-Owned Generation**

- Holly Generation Project: In 2000, ARPA and the Town of Holly jointly financed the installation of a used 2 MW diesel-fired internal combustion engine generating set to provide backup power for the Town. This used unit proved to be unreliable for backup purposes. As a result, in 2007 ARPA replaced the unit with a used, but significantly newer diesel-fired generating set with a Tier I emission rating, meaning it did not need retrofits to comply with the

Reciprocating Internal Combustion Engine (RICE) rule issued by Environmental Protection Agency (EPA) in 2010.

- Trinidad Generation Project: ARPA constructed 5.6 MW of peaking generation in Trinidad in the late 1990s. This project is RICE compliant. This generation is available during transmission outages and can be used to supply energy during periods of high market prices.
- Wind Turbines: In 2004, ARPA installed two 1.5 MW wind turbines – one in Lamar and one in Springfield. Although ARPA is responsible for all future generation, the ARPA Board executed an agreement with Lamar Light and Power that allowed them to own and install an additional three 1.5 MW wind turbines at the site in Lamar. The energy from the LUB owned turbines is sold to ARPA at cost. All five turbines are maintained via an agreement with the LUB and are monitored remotely from the Lamar Power Plant. This 7.5 MW of ARPA/member wind typically provides over 6% of ARPA's annual energy requirements. When possible, ARPA and Lamar sell the energy attributes of the wind generation in order to help offset the energy cost associated with the turbines.
- Member-Owned Peaking Generation: The majority of member-owned generation is reaching the end of its life cycle, ranging in age from 30-60 years. This member-owned generation has been and will continue to be vital to ARPA, particularly during transmission outages. ARPA recognized that unit reliability, availability of spare parts, and environmental compliance costs will become

greater issues as these units continue to age and has reduced its reliance on these older generating units in the last 10-15 years.

There are no additional ARPA or member-owned units slated for retirement, replacement, or additions in the near term.

### **Purchased Power Arrangements**

Western - Colorado River Storage Project (CRSP): Western provides an allocation of firm capacity and energy to ARPA and LUB. ARPA acts as the agent for the LUB Western-CRSP allocation. This agreement terminates on September 30, 2024. Twin Eagle Resource Management (TERM) provides scheduling and transmission of all monthly and support energy that ARPA members are entitled to under its agreement with Western.

Western - Loveland Area Projects: ARPA has a capacity and energy allocation from Western associated with the Loveland Area Projects. This agreement terminates on September 30, 2054. TERM provides scheduling and transmission of all monthly energy, support, and pumped storage energy that ARPA members are entitled to under its agreement with Western.

Tri-State Generation and Transmission Association: Through the terms of the Services Agreement between ARPA and Tri-State, ARPA purchased its supplemental power supply needs exclusively from Tri-State. Under the agreement, Tri-State provided all power supply needs not supplied from the existing Western allocations and owned generation facilities. This agreement provided service to ARPA through January 31, 2015.

Twin Eagle Resource Management (TERM): Beginning February 1, 2015, ARPA began purchasing its supplemental energy requirements from TERM. This purchase was the result of a competitive solicitation for requirements power supply resources. This agreement provides all energy in excess of Western allocations and wind energy generation. The agreement runs through January 31, 2025.

**Energy Resource Mix**

Table 5 summarizes the historical energy supply mix for ARPA for 2012 through 2016. There have been significant changes during this time with the termination of the Tri-State agreement, the commencement of a new energy purchase agreement with TERM, and the decommissioning of the Lamar Repowering Project (LRP) based on environmental compliance issues and market conditions.

**Table 5  
Energy Provided by ARPA's Historical  
Supply Side Resources (MWh)**

| <b>Source</b>               | <b>2012 (1)</b> | <b>2013 (1)</b> | <b>2014</b>    | <b>2015</b>    | <b>2016</b>    |
|-----------------------------|-----------------|-----------------|----------------|----------------|----------------|
| Conventional Generation (2) | 36              | 13              | 29             | 41             | 29             |
| Wind Generation (3)         | 23,490          | 21,931          | 20,459         | 18,881         | 18,628         |
| Western                     | 88,265          | 83,067          | 82,517         | 82,142         | 82,183         |
| Tri-State G&T               | 198,882         | 170,695         | 180,152        | 15,832         |                |
| MEAN                        | 20,142          | 0               | 0              | 0              | 0              |
| TERM                        | 0               | 0               | 0              | 168,683        | 184,825        |
| Energy Imbalance            |                 | 10,758          | -9,458         | -103           | 0              |
| <b>TOTAL</b>                | <b>330,815</b>  | <b>275,705</b>  | <b>283,156</b> | <b>285,579</b> | <b>285,665</b> |

(1) ARPA served the City of Raton, NM through January 2013, which is the cause of the decrease in energy resources beginning in 2013.

(2) Includes ARPA-owned and member-owned generation resources. Excludes wind.

(3) Includes ARPA-owned and member-owned wind generation resources.

## **Transmission**

ARPA and its members do not own any transmission (115 kV and higher) and is dependent upon wheeling over the transmission facilities of other utilities in order to supply power to the ARPA member systems. ARPA is a network integration transmission service customer of Tri-State and of Black Hills Colorado Electric Utility Company, LP (BHEC). Tri-State provides network service to Holly, La Junta, Lamar, Trinidad, and Springfield. Las Animas receives transmission service from BHEC. These agreements allow ARPA to serve its member needs from multiple points of receipt, much like a vertically integrated utility does, without reserving redundant capacity since charges for service are based on the measured load of the members.

## **Section V. Future Supply Side Resources**

### **Changes Since 2012 IRP**

Since the last IRP was completed, two key changes have occurred to the ARPA power supply situation. Those changes were consistent with the findings of the previous IRP.

The first key change was entering into a purchased power agreement with TERM, beginning in February 2015. The 2012 IRP recommended soliciting capacity and energy purchase proposals. TERM was selected based on an RFP process that included several major Colorado power supply entities. This purchased power agreement was consistent with the findings of the 2012 IRP.

The second key change was the decisions to retire and decommission the Lamar Repowering Project (LRP). The 2012 IRP recommended placing the LRP in cold standby. A subsequent analysis reviewed the salvage value, ongoing O&M related to keeping LRP

in cold standby, and the market value of capacity and energy. The analysis also evaluated potential risk and capital costs associated with environmental compliance costs. The ARPA Board of Directors voted to permanently retire the LRP in 2014.

**Comparison of Loads and Resources**

Table 6 (see page 18) compares ARPA's existing and committed capacity resources to the projected capacity requirements. Based on the Projected Capacity Requirements and Resources, ARPA has sufficient capacity resources through January 2025 when the TERM agreement expires. Additional capacity resources will need to be secured when the existing TERM agreement expires.

Table 7 (see page 19) shows the comparison of energy requirements to energy resources. The TERM agreement will supply all of ARPA's supplemental energy requirements through 2024. When the TERM agreement expires, ARPA will need to secure additional resources.

[Intentionally left blank.]

**Table 6  
Projected Capacity Requirements and Resources**

| Description                        | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|------------------------------------|------|------|------|------|------|------|------|------|------|------|
| <b>Peak Demand</b>                 | 65   | 65   | 65   | 65   | 65   | 65   | 65   | 65   | 65   | 65   |
| Reserves (1)                       | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    |
| <b>Total Capacity Requirements</b> | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   |
| <b>Existing Resources</b>          |      |      |      |      |      |      |      |      |      |      |
| Western (2)                        | 30   | 30   | 30   | 30   | 30   | 30   | 30   | 30   | 30   | 30   |
| TERM                               | 32   | 32   | 32   | 32   | 32   | 32   | 32   | 32   | -    | -    |
| Local Generation (3)               | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    | 7    |
| Wind (4)                           | -    | -    | -    | -    | -    | -    | -    | -    | -    | -    |
| <b>Total Resources</b>             | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 70   | 38   | 38   |
| <b>Surplus / (Deficit)</b>         | -    | -    | -    | -    | -    | -    | -    | -    | (32) | (32) |

**Notes:**

- (1) Includes 15% reserves for capacity resources that do not include reserves.
- (2) Based on July Contract Rate of Delivery.
- (3) Includes generation available for peaking operation.
- (4) Assumes that wind is not available to supply capacity during peak conditions.

**Table 7  
Projected Energy Requirements and Resources**

| Description                      | 2017    | 2018    | 2019    | 2020    | 2021    | 2022    | 2023    | 2024    | 2025      | 2026      |
|----------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|-----------|-----------|
| <b>Retail Energy Sales</b>       | 256,955 | 257,528 | 257,276 | 257,387 | 257,338 | 256,955 | 257,528 | 257,276 | 257,387   | 257,338   |
| <b>Losses (1)</b>                | 25,695  | 25,753  | 25,728  | 25,739  | 25,734  | 25,695  | 25,753  | 25,728  | 25,739    | 25,734    |
| <b>Total Energy Requirements</b> | 282,650 | 283,281 | 283,003 | 283,126 | 283,072 | 282,650 | 283,281 | 283,003 | 283,126   | 283,072   |
| <b>Existing Resources</b>        |         |         |         |         |         |         |         |         |           |           |
| Western                          | 82,349  | 82,349  | 82,349  | 82,349  | 82,349  | 82,349  | 82,349  | 82,349  | 82,349    | 82,349    |
| TERM (2)                         | 179,593 | 180,224 | 179,946 | 180,069 | 180,015 | 179,593 | 180,224 | 179,946 | -         | -         |
| Local Generation (3)             | 30      | 30      | 30      | 30      | 30      | 30      | 30      | 30      | 30        | 30        |
| Wind (4)                         | 20,678  | 20,678  | 20,678  | 20,678  | 20,678  | 20,678  | 20,678  | 20,678  | 20,678    | 20,678    |
| <b>Total Energy Resources</b>    | 282,650 | 283,281 | 283,003 | 283,126 | 283,072 | 282,650 | 283,281 | 283,003 | 103,057   | 103,057   |
| <b>Surplus / (Deficit)</b>       | -       | -       | -       | -       | -       | -       | -       | -       | (180,069) | (180,015) |

(1) Includes transmission losses for ARPA generation delivered between members and distribution losses.

(2) All requirements not supplied by other resources.

(3) Based on annual capacity factor of 1%.

(4) Based on average wind energy production from 2012 through 2016.

The need date for additional resources is beyond the end of the five-year action plan included in this IRP. It will be necessary to start the capacity and energy procurement process approximately two to three years prior to the expiration of the TERM agreement. Prior to the start of the procurement process, a comprehensive review of available capacity and energy options and an assessment of market conditions should be completed.

One factor that may affect market conditions beyond 2022 is the recent announcement that a group of transmission owners, the Mountain West Transmission Group (MWTG), is considering development of a regional transmission organization (RTO) that would operate some form of an organized energy market. In other regions, changes in pricing and availability of resources occurred and evolved after the implementation of the organized energy market. As market operations become more predictable, utilities and energy marketing entities tend to become more comfortable with the risks associated with making future sales. In addition, over time there tends to be an increase in the number of active market participants.

## **Section VI. Supply–Side Resource Evaluation**

### **Introduction**

The EPAMP indicates the IRP should consider all practicable energy supply resource options. Since ARPA has sufficient capacity and energy resources throughout the study period, there was no need to consider additional capacity and energy resources at this time. The existing agreement with TERM restricts the ability of ARPA to procure energy from alternate resources.

ARPA reviewed a 50% participation share in a hydro-electric project located at Pueblo Reservoir. This 7.5 MW project would be online in 2019 and provide a total of 28,000 MWh per year. The 50% share would have provided approximately 14,000 MWh per year, which is approximately 5% of ARPA's annual energy requirements. An economic assessment of the project was completed and found the capacity and energy rates would be competitive with other similar projects that provide renewable energy.

Although the existing TERM agreement includes restrictions on purchasing energy from other resources, ARPA engaged in negotiations with TERM to integrate the Pueblo hydro project. Negotiations with a third party to take the energy from the project through 2025 were also held. Neither of these negotiations were able to yield an agreement that was acceptable from a cost or risk management perspective. ARPA notified the project developer in March 2017 that it would not participate in the project.

The existing wind turbines have been in service for nearly 15 years. It is becoming more difficult to procure spare parts and the efficiency of these turbines is less than newer turbines. Other entities with similar projects have considered repowering of turbines. For example, the Municipal Energy Agency of Nebraska (MEAN) announced a partnership with NextEra whereby they would repower the existing turbines, construct additional turbines, and enter into a purchased power agreement with MEAN. ARPA has been approached by one entity with some interest in pursuing a similar arrangement.

### **Conclusions**

1. The existing agreement with TERM greatly limits resource options that can be pursued before 2025.

2. ARPA will need to consider power supply resource options available at the conclusion of the TERM agreement. This process should begin in 2021 or 2022.

3. Repowering of the existing wind turbines may provide additional efficiency, lower costs and longer project life.

## **Section VII. Demand Side Management Analysis**

### **Introduction**

DSM options were considered as a method of deferring capacity resource acquisitions. DSM options modify the customer or end-use load shape. New DSM options were considered, as were broadening of existing DSM programs offered through ARPA member communities.

### **Current DSM Activities**

Table 8 (see page 23) lists recent DSM expenditures by the ARPA membership. While ARPA can encourage its members to participate in various DSM activities, it is ultimately the decision of the member whether or not to implement a given measure. Expenditures in 2016 were much greater than those reported in the 2011 IRP. The largest factor in the increased expenditures was the implementation of LED street lighting in three member communities.

[Intentionally left blank.]

**Table 8  
DSM Expenditures - 2016**

| <b>Member</b>  | <b>Service</b>                             | <b>Expenditures</b> |
|----------------|--|---------------------|
| Holly          | Distribution tree trimming                 | \$ 7,150            |
| La Junta       | Tree trimming                              | 9,200               |
| Lamar          | Conservation / Promo                       | 3,059               |
|                | Energy audits                              | 3,500               |
|                | LED lighting                               | 3,790               |
|                | SCADA                                      | 35,000              |
|                | Transformers                               | 35,238              |
|                | Tree trimming                              | 14,228              |
| Las Animas     | LED street lights                          | 10,588              |
|                | Tree trimming                              | 7,727               |
| Springfield    | Tree trimming                              | 2,620               |
| Trinidad       | Tree trimming                              | 8,000               |
|                | LED lighting                               | 106,000             |
| All / ARPA (1) | Customer Education<br>Technical Assistance |                     |
| <b>TOTAL</b>   |  | <b>\$ 246,100</b>   |

**Notes:**

(1) ARPA and its members provide customer education and technical assistance as needed. This includes answering customer questions, providing websites and brochures to customers, and assisting with technical questions from customers.

**Review of Load Shape Objectives**

The Electric Power Research Institute (ERPI) developed six industry accepted load shape objectives:

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 – 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 – 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 ARPA'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 energy.
- Peak clipping (summer season) to reduce peaking energy needs.

### **Changes in DSM Approach**

Several of the DSM programs that were evaluated in 2002, 2007 and 2012 have been rendered obsolete by changes in energy efficiency standards at the federal level. This reduces the number of DSM measures that are evaluated and eliminates several measures that may have passed the screening because they are now mandated by law.

One measure that was evaluated in the 2012 IRP, installation of LED street lighting, was not evaluated in this study since a majority of ARPA's members have already converted to LED street lighting for replacement fixtures and new construction.

Another issue that has arisen in the past is the difficulty in finding contractors to provide services in rural areas of Colorado. For example, the 2012 IRP identified old refrigerator recycling as a potential measure. When it was selected, the cost was based on the typical fee for national providers used by large utilities. In further discussions, the economics were less favorable because of the distance from ARPA communities to their primary service centers in cities like Denver and Colorado Springs. There is also difficulty finding contractors to perform energy audits and similar services. The DSM measures that were reviewed were limited to those that could be implemented with existing utility staff or via contractors that are readily available locally.

### **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 ARPA members' load shape objectives were reviewed by qualitative screening. The qualitative screening involved the use of six criteria to identify those technologies most relevant to ARPA'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 ARPA member communities have 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 more likely to be successful in achieving ARPA's load shape goals than those with lower scores. Tables 9 and 10 show the scores for each technology applicable to a particular customer class.

**Table 9  
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                   | 3                    | 2                | 2                      | 3                                   | 15    |
| Air Conditioning Load Cycling    | 3    | 1                   | 2                    | 3                | 2                      | 3                                   | 14    |
| Water Heater Load Shedding       | 3    | 2                   | 2                    | 2                | 2                      | 3                                   | 14    |
| HVAC Replacement Loans           | 3    | 1                   | 3                    | 2                | 2                      | 2                                   | 13    |
| Energy-Efficient New Home        | 2    | 2                   | 3                    | 1                | 2                      | 2                                   | 12    |
| Room Air Conditioner Rebates     | 1    | 2                   | 2                    | 1                | 1                      | 2                                   | 9     |

**Table 10  
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. ARPA then selected 12 technologies for further evaluation. Any measure with a score greater than 10 was deemed to have passed the qualitative screening. The measures that passed the qualitative screening included five residential measures and four commercial/industrial measures. This pre-screening only used qualitative factors to narrow the list of technologies that would be further evaluated. The nine measures were then subjected to an economic evaluation.

### **Selected DSM Programs**

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

1. 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. ARPA does not have a large proportion of homes with central air conditioning, but there would be enough homes to achieve reasonable demand reduction. The customer incentive is estimated to be \$20/year with an average load reduction of .85 kW.

2. Residential Electric Water Heater Load Shedding. A customer incentive of \$20/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.

3. Residential High Efficiency Central Air Conditioners. For customers needing to replace their existing air conditioner, this program would provide rebates or incentives when ARPA members' utilities select 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 16, which is more efficient than current DOE established standards. Local contractors market high efficiency equipment, although no rebates or incentives are provided.

4. 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 ARPA's members providing loan funds or by making a payment directly to the bank granting the loan.

5. Energy-Efficient New Home (ENERGY STAR®). Customers would receive an incentive in the form of a rebate, rate discount or a loan subsidy from the ARPA member community 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.

6. 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.

7. 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.

8. 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.

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 an ARPA member. The customer would sign up before the summer begins and be obligated to interrupt a certain amount of their load up to 10 times during a year for periods of eight hours or less.

### **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 of DSM measures:

- The evaluation was done on a system-wide basis, meaning the analysis evaluated ARPA-wide installation of the given measure.
- Technical information for the measures was based on experience, when possible. When information from past experience was not available, updated information from local vendors and public data sources was collected.

- Avoided demand and energy costs from ARPA's existing supply side resources were used. Summer peak demand savings were related to reduced transmission costs since the TERM does not include a demand rate component. 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 ARPA or the end-user, to the total cost savings realized by ARPA.

The economic evaluation considered the installation, O&M, and administrative and general expenses that would be incurred over the life of the measure. DSM expenses were compared to ARPA's avoided capacity and energy cost, and the net cost or savings to ARPA was calculated on an annual basis and discounted to 2018 dollars. Measures with a positive net present value were considered economically feasible.

A summary of the economic evaluations are shown in Tables 11 and 12 (see page 32). The analysis of each individual DSM measure is shown in Appendix A.

[Intentionally left blank.]

**Table 11**  
**Impact of Demand Side Measures Alternatives - Residential**

| Impact of DSM Alternatives       | Net Present Value 2018 \$ |              |              |
|----------------------------------|---------------------------|--------------|--------------|
|                                  | 5-Year                    | 10-Year      | Life         |
| Air Conditioning Load Cycling    | \$ (369,679)              | \$ (405,629) | \$ (481,897) |
| Water Heater Load Shedding       | \$ (365,705)              | \$ (406,974) | \$ (506,763) |
| High Efficiency Air Conditioners | \$ (356,497)              | \$ (313,310) | \$ (245,445) |
| HVAC Replacement Loans           | \$ (419,758)              | \$ (379,166) | \$ (321,439) |
| Whole-House Audits               | \$ (598,834)              | \$ (427,821) | \$ (294,792) |

**Table 12**  
**Impact of Demand Side Measures Alternatives - Commercial/Industrial**

| Impact of DSM Alternatives       | Net Present Value 2018 \$ |              |             |
|----------------------------------|---------------------------|--------------|-------------|
|                                  | 5-Year                    | 10-Year      | Life        |
| Interruptible Rates              | \$ (68,113)               | \$ (73,522)  | \$ (85,624) |
| High Efficiency Air Conditioners | \$ (175,553)              | \$ (134,535) | \$ (71,628) |
| HVAC Efficiency Improvement      | \$ (151,688)              | \$ (128,964) | \$ (93,474) |
| Customized Rebate Program        | \$ (418,319)              | \$ (190,785) | \$ (24,754) |

None of the evaluated DSM measures were economically feasible. ARPA's marginal power supply costs are relatively low, based on low natural gas prices and a surplus of capacity and energy in the region. These low marginal costs eliminate many DSM measures that have been implemented by other utilities. ARPA member communities should continue low-cost DSM options, such as promoting energy efficiency via the ARPA and local member community website and customer newsletters.

## **Section VIII. Supply/Demand Side Resource Integration**

### **Preferred Alternative**

Based on the analyses prepared, it appears ARPA and its members should take the following steps:

1. Begin process of evaluating new power supply arrangements in 2021 or 2022, when the TERM agreement is nearing its expiration.
2. Consider repowering of the five existing wind turbines based on economic feasibility.
3. Monitor developments related to the MWTG and its organized energy market.
4. Encourage ARPA members to continue low-cost energy efficiency measures.

### **Environmental Impacts**

ARPA and its members comply with all applicable provisions of state and federal environmental regulations at its power plants and substation facilities. Any new projects would include emissions control technology as required to help reduce environmental impacts. Conversion of street lighting from high-pressure sodium fixtures to LED reduces energy usage, thus reducing environmental impacts. Retiring the LRP eliminated potential emissions related to coal-fired generation. Encouraging DSM through no cost or low cost methods would reduce energy usage and emissions.

One other key component of ARPA's efforts to minimize environmental impact has been its wind energy purchase program. More than 7% of ARPA's energy comes from wind energy. These purchases were undertaken voluntarily without a renewable portfolio standard requirement at the state or local level.

ARPA's allocation of capacity and energy from WAPA is a clean, renewable resource. Steps are continually taken to ensure that this resource is available and that the contract provisions (including compliance with EPAMP) are followed.

## **Section IX. Action Plans**

To the extent that costs for power supply resources, DSM and transmission change, ARPA 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**

- Consider repowering of the existing wind turbines.
- Monitor developments related to MWTG and its organized energy market.
- Continue low-cost energy efficiency measures.
- Continue trend toward replacing street lighting with LED fixtures.

### **Five Year**

- Continue actions from Two Year action plan.
- Begin process of securing replacement power supply resources at the end of the existing TERM agreement.

### **Public Participation**

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

ARPA's monthly Board of Directors meetings are open to the public and notice of the meetings are published in advance along with the agenda. The monthly agenda solicited public comments on the ARPA IRP process at its March meeting, prior to the publication of the draft IRP (see Appendix B – March 2017 Public Notice, March 2017

Agenda). ARPA also solicited comments via their monthly newsletter (see Appendix B – March 2017 Newsletter) and on ARPA’s website (www.arpapower.org). No public comments were received.

A draft of the IRP was presented at a public hearing held in Lamar, Colorado, and via webcast on April 27, 2017, as part of the regular monthly ARPA Board meeting (see Appendix B – April 2017 Agenda). A notice of the public hearing appeared along with the publication of the meeting notice (see Appendix B – April 2017 Public Notice) as well as through ARPA’s monthly newsletter (see Appendix B – April 2017 Newsletter) and website. The purpose of the meeting was to provide information to and gather input from groups and individuals with an interest in ARPA’s Integrated Resource Plan. Public comments were solicited immediately after the presentation and for 10 working days after the hearing. Despite the encouragement for public participation, no members of the general public attended the hearing nor was there any comments received from the general public. The final version of the IRP was provided to member municipalities via copies to their ARPA Board representatives. On May 25, 2017, the ARPA Board adopted a Resolution approving this 2017 IRP (see Appendix B – May 2017 Public Notice, May 2017 Agenda, May 2017 Resolution).

### **Measurement Strategies and Annual Updates**

ARPA compares its load forecasts to actual usage on an annual and monthly basis. This comparison will be continually updated in the future. In addition, ARPA will continue to verify the effectiveness of DSM programs in its annual updates to this IRP. Annual information submittals to Western will continue to be submitted as they have been historically. The format of these submittals will be similar to past submittals.

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           |               |               | 0%            |
| Energy Savings (kWh per unit) |               |               | 10            |

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | 2,000.00 |
| Capital Cost (\$/unit)          | 125.00   |
| Maintenance Cost (\$/year/unit) | 13.38    |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Annual Energy Cost (\$/MWh)        | 39.00 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 25    |
| Discount Rate                      | 4.50% |

| Estimated Applicability          | Amount |
|----------------------------------|--------|
| Estimated Residential Customers  | 13,115 |
| Estimated Application Saturation | 50%    |
| Market Eligibility               | 40%    |
| Feasibility                      | 100%   |
| Estimated Units                  | 2,623  |

| Year                  | Summer Capacity Savings (kW) | Winter Capacity Savings (kW) | Annual Energy Savings (kWh) | 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 (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 2,230                        | -                            | 26,230                      | 12.00                             | -                                  | 52.30                         | 28,126.43               | 327,875.00         | 37,095.74      | (336,844.31)                  | (336,844.31)       |
| 2019                  | 2,230                        | -                            | 26,230                      | 12.36                             | -                                  | 54.20                         | 28,978.90               | -                  | 38,023.13      | (9,044.23)                    | (8,654.77)         |
| 2020                  | 2,230                        | -                            | 26,230                      | 12.73                             | -                                  | 55.70                         | 29,844.97               | -                  | 38,973.71      | (9,128.75)                    | (8,359.47)         |
| 2021                  | 2,230                        | -                            | 26,230                      | 13.11                             | -                                  | 57.00                         | 30,730.58               | -                  | 39,948.05      | (9,217.47)                    | (8,077.24)         |
| 2022                  | 2,230                        | -                            | 26,230                      | 13.51                             | -                                  | 61.00                         | 31,712.57               | -                  | 40,946.76      | (9,234.19)                    | (7,743.43)         |
| 2023                  | 2,230                        | -                            | 26,230                      | 13.91                             | -                                  | 63.00                         | 32,668.40               | -                  | 41,970.42      | (9,302.02)                    | (7,464.42)         |
| 2024                  | 2,230                        | -                            | 26,230                      | 14.33                             | -                                  | 65.00                         | 33,651.34               | -                  | 43,019.69      | (9,368.34)                    | (7,193.91)         |
| 2025                  | 2,230                        | -                            | 26,230                      | 14.76                             | -                                  | 45.00                         | 34,085.13               | -                  | 44,095.18      | (10,010.04)                   | (7,355.67)         |
| 2026                  | 2,230                        | -                            | 26,230                      | 15.20                             | -                                  | 46.35                         | 35,107.69               | -                  | 45,197.56      | (10,089.87)                   | (7,095.05)         |
| 2027                  | 2,230                        | -                            | 26,230                      | 15.66                             | -                                  | 47.74                         | 36,160.92               | -                  | 46,327.50      | (10,166.58)                   | (6,841.14)         |
| 2028                  | 2,230                        | -                            | 26,230                      | 16.13                             | -                                  | 49.17                         | 37,245.75               | -                  | 47,485.68      | (10,239.94)                   | (6,593.78)         |
| 2029                  | 2,230                        | -                            | 26,230                      | 16.61                             | -                                  | 50.65                         | 38,363.12               | -                  | 48,672.83      | (10,309.71)                   | (6,352.83)         |
| 2030                  | 2,230                        | -                            | 26,230                      | 17.11                             | -                                  | 52.17                         | 39,514.01               | -                  | 49,889.65      | (10,375.63)                   | (6,118.14)         |
| 2031                  | 2,230                        | -                            | 26,230                      | 17.62                             | -                                  | 53.73                         | 40,699.43               | -                  | 51,136.89      | (10,437.46)                   | (5,889.56)         |
| 2032                  | 2,230                        | -                            | 26,230                      | 18.15                             | -                                  | 55.34                         | 41,920.41               | -                  | 52,415.31      | (10,494.89)                   | (5,666.96)         |
| 2033                  | 2,230                        | -                            | 26,230                      | 18.70                             | -                                  | 57.00                         | 43,178.03               | -                  | 53,725.69      | (10,547.67)                   | (5,450.19)         |
| 2034                  | 2,230                        | -                            | 26,230                      | 19.26                             | -                                  | 58.71                         | 44,473.37               | -                  | 55,068.83      | (10,595.47)                   | (5,239.13)         |
| 2035                  | 2,230                        | -                            | 26,230                      | 19.83                             | -                                  | 60.48                         | 45,807.57               | -                  | 56,445.56      | (10,637.99)                   | (5,033.64)         |
| 2036                  | 2,230                        | -                            | 26,230                      | 20.43                             | -                                  | 62.29                         | 47,181.80               | -                  | 57,856.69      | (10,674.90)                   | (4,833.60)         |
| 2037                  | 2,230                        | -                            | 26,230                      | 21.04                             | -                                  | 64.16                         | 48,597.25               | -                  | 59,303.11      | (10,705.86)                   | (4,638.87)         |
| 2038                  | 2,230                        | -                            | 26,230                      | 21.67                             | -                                  | 66.08                         | 50,055.17               | -                  | 60,785.69      | (10,730.52)                   | (4,449.33)         |
| 2039                  | 2,230                        | -                            | 26,230                      | 22.32                             | -                                  | 68.07                         | 51,556.82               | -                  | 62,305.33      | (10,748.51)                   | (4,264.87)         |
| 2040                  | 2,230                        | -                            | 26,230                      | 22.99                             | -                                  | 70.11                         | 53,103.53               | -                  | 63,862.96      | (10,759.44)                   | (4,085.37)         |
| 2041                  | 2,230                        | -                            | 26,230                      | 23.68                             | -                                  | 72.21                         | 54,696.63               | -                  | 65,459.54      | (10,762.91)                   | (3,910.70)         |
| 2042                  | 2,230                        | -                            | 26,230                      | 24.39                             | -                                  | 74.38                         | 56,337.53               | -                  | 67,096.03      | (10,758.50)                   | (3,740.77)         |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Five Year</b>              | (369,679.21)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Ten Year</b>               | (405,629.39)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Life</b>                   | (481,897.14)       |

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             |

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | 2,000.00 |
| Capital Cost (\$/unit)          | 325.00   |
| Maintenance Cost (\$/year/unit) | 13.38    |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Annual Energy Cost (\$/MWh)        | 37.25 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 25    |
| Discount Rate                      | 4.50% |

| Estimated Applicability          | Amount |
|----------------------------------|--------|
| Estimated Residential Customers  | 13,115 |
| Estimated Application Saturation | 15%    |
| Market Eligibility               | 50%    |
| Feasibility                      | 100%   |
| Estimated Units                  | 984    |

| Year                  | Summer Capacity Savings (kW) | Winter Capacity Savings (kW) | Annual Energy Savings (kWh) | 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 (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 443                          | -                            | 4,920                       | 12.00                             | -                                  | 52.30                         | 5,570.92                | 319,800.00         | 15,165.92      | (329,395.00)                  | (329,395.00)       |
| 2019                  | 443                          | -                            | 4,920                       | 12.36                             | -                                  | 54.20                         | 5,739.67                | -                  | 15,545.07      | (9,805.40)                    | (9,383.15)         |
| 2020                  | 443                          | -                            | 4,920                       | 12.73                             | -                                  | 55.70                         | 5,911.24                | -                  | 15,933.69      | (10,022.45)                   | (9,177.86)         |
| 2021                  | 443                          | -                            | 4,920                       | 13.11                             | -                                  | 57.00                         | 6,086.75                | -                  | 16,332.04      | (10,245.28)                   | (8,977.91)         |
| 2022                  | 443                          | -                            | 4,920                       | 13.51                             | -                                  | 61.00                         | 6,280.62                | -                  | 16,740.34      | (10,459.71)                   | (8,771.11)         |
| 2023                  | 443                          | -                            | 4,920                       | 13.91                             | -                                  | 63.00                         | 6,469.88                | -                  | 17,158.85      | (10,688.97)                   | (8,577.37)         |
| 2024                  | 443                          | -                            | 4,920                       | 14.33                             | -                                  | 65.00                         | 6,664.52                | -                  | 17,587.82      | (10,923.30)                   | (8,387.96)         |
| 2025                  | 443                          | -                            | 4,920                       | 14.76                             | -                                  | 45.00                         | 6,756.46                | -                  | 18,027.51      | (11,271.06)                   | (8,282.29)         |
| 2026                  | 443                          | -                            | 4,920                       | 15.20                             | -                                  | 46.35                         | 6,959.15                | -                  | 18,478.20      | (11,519.05)                   | (8,100.02)         |
| 2027                  | 443                          | -                            | 4,920                       | 15.66                             | -                                  | 47.74                         | 7,167.93                | -                  | 18,940.16      | (11,772.23)                   | (7,921.59)         |
| 2028                  | 443                          | -                            | 4,920                       | 16.13                             | -                                  | 49.17                         | 7,382.96                | -                  | 19,413.66      | (12,030.70)                   | (7,746.90)         |
| 2029                  | 443                          | -                            | 4,920                       | 16.61                             | -                                  | 50.65                         | 7,604.45                | -                  | 19,899.00      | (12,294.55)                   | (7,575.89)         |
| 2030                  | 443                          | -                            | 4,920                       | 17.11                             | -                                  | 52.17                         | 7,832.59                | -                  | 20,396.48      | (12,563.89)                   | (7,408.47)         |
| 2031                  | 443                          | -                            | 4,920                       | 17.62                             | -                                  | 53.73                         | 8,067.56                | -                  | 20,906.39      | (12,838.82)                   | (7,244.58)         |
| 2032                  | 443                          | -                            | 4,920                       | 18.15                             | -                                  | 55.34                         | 8,309.59                | -                  | 21,429.05      | (13,119.46)                   | (7,084.15)         |
| 2033                  | 443                          | -                            | 4,920                       | 18.70                             | -                                  | 57.00                         | 8,558.88                | -                  | 21,964.77      | (13,405.90)                   | (6,927.10)         |
| 2034                  | 443                          | -                            | 4,920                       | 19.26                             | -                                  | 58.71                         | 8,815.64                | -                  | 22,513.89      | (13,698.25)                   | (6,773.36)         |
| 2035                  | 443                          | -                            | 4,920                       | 19.83                             | -                                  | 60.48                         | 9,080.11                | -                  | 23,076.74      | (13,996.63)                   | (6,622.87)         |
| 2036                  | 443                          | -                            | 4,920                       | 20.43                             | -                                  | 62.29                         | 9,352.52                | -                  | 23,653.66      | (14,301.14)                   | (6,475.56)         |
| 2037                  | 443                          | -                            | 4,920                       | 21.04                             | -                                  | 64.16                         | 9,633.09                | -                  | 24,245.00      | (14,611.91)                   | (6,331.37)         |
| 2038                  | 443                          | -                            | 4,920                       | 21.67                             | -                                  | 66.08                         | 9,922.09                | -                  | 24,851.13      | (14,929.04)                   | (6,190.22)         |
| 2039                  | 443                          | -                            | 4,920                       | 22.32                             | -                                  | 68.07                         | 10,219.75               | -                  | 25,472.40      | (15,252.66)                   | (6,052.06)         |
| 2040                  | 443                          | -                            | 4,920                       | 22.99                             | -                                  | 70.11                         | 10,526.34               | -                  | 26,109.21      | (15,582.87)                   | (5,916.83)         |
| 2041                  | 443                          | -                            | 4,920                       | 23.68                             | -                                  | 72.21                         | 10,842.13               | -                  | 26,761.94      | (15,919.81)                   | (5,784.47)         |
| 2042                  | 443                          | -                            | 4,920                       | 24.39                             | -                                  | 74.38                         | 11,167.40               | -                  | 27,430.99      | (16,263.60)                   | (5,654.91)         |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Five Year</b>              | (365,705.04)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Ten Year</b>               | (406,974.27)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Life</b>                   | (506,763.01)       |

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           |               |               | 0%            |
| Energy Savings (kWh per unit) |               |               | 500           |

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | -        |
| Capital Cost (\$/unit)          | 1,250.00 |
| Maintenance Cost (\$/year/unit) | -        |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Annual Energy Cost (\$/MWh)        | 39.00 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 20    |
| Discount Rate                      | 4.50% |

| Estimated Applicability          | Amount |
|----------------------------------|--------|
| Estimated Residential Customers  | 13,115 |
| Estimated Application Saturation | 50%    |
| Market Eligibility               | 5%     |
| Feasibility                      | 100%   |
| Estimated Units                  | 328    |

| Year                  | Summer Capacity Savings (kW) | Winter Capacity Savings (kW) | Annual Energy Savings (kWh) | 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 (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 197                          | -                            | 164,000                     | 12.00                             | -                                  | 52.30                         | 10,938.80               | 410,000.00         | -              | (399,061.20)                  | (399,061.20)       |
| 2019                  | 197                          | -                            | 164,000                     | 12.36                             | -                                  | 54.20                         | 11,321.25               | -                  | -              | 11,321.25                     | 10,833.73          |
| 2020                  | 197                          | -                            | 164,000                     | 12.73                             | -                                  | 55.70                         | 11,640.22               | -                  | -              | 11,640.22                     | 10,659.30          |
| 2021                  | 197                          | -                            | 164,000                     | 13.11                             | -                                  | 57.00                         | 11,928.58               | -                  | -              | 11,928.58                     | 10,452.98          |
| 2022                  | 197                          | -                            | 164,000                     | 13.51                             | -                                  | 61.00                         | 12,662.00               | -                  | -              | 12,662.00                     | 10,617.87          |
| 2023                  | 197                          | -                            | 164,000                     | 13.91                             | -                                  | 63.00                         | 13,069.74               | -                  | -              | 13,069.74                     | 10,487.83          |
| 2024                  | 197                          | -                            | 164,000                     | 14.33                             | -                                  | 65.00                         | 13,479.87               | -                  | -              | 13,479.87                     | 10,351.14          |
| 2025                  | 197                          | -                            | 164,000                     | 14.76                             | -                                  | 45.00                         | 10,284.47               | -                  | -              | 10,284.47                     | 7,557.32           |
| 2026                  | 197                          | -                            | 164,000                     | 15.20                             | -                                  | 46.35                         | 10,593.00               | -                  | -              | 10,593.00                     | 7,448.84           |
| 2027                  | 197                          | -                            | 164,000                     | 15.66                             | -                                  | 47.74                         | 10,910.79               | -                  | -              | 10,910.79                     | 7,341.92           |
| 2028                  | 197                          | -                            | 164,000                     | 16.13                             | -                                  | 49.17                         | 11,238.12               | -                  | -              | 11,238.12                     | 7,236.54           |
| 2029                  | 197                          | -                            | 164,000                     | 16.61                             | -                                  | 50.65                         | 11,575.26               | -                  | -              | 11,575.26                     | 7,132.66           |
| 2030                  | 197                          | -                            | 164,000                     | 17.11                             | -                                  | 52.17                         | 11,922.52               | -                  | -              | 11,922.52                     | 7,030.28           |
| 2031                  | 197                          | -                            | 164,000                     | 17.62                             | -                                  | 53.73                         | 12,280.20               | -                  | -              | 12,280.20                     | 6,929.37           |
| 2032                  | 197                          | -                            | 164,000                     | 18.15                             | -                                  | 55.34                         | 12,648.60               | -                  | -              | 12,648.60                     | 6,829.90           |
| 2033                  | 197                          | -                            | 164,000                     | 18.70                             | -                                  | 57.00                         | 13,028.06               | -                  | -              | 13,028.06                     | 6,731.86           |
| 2034                  | 197                          | -                            | 164,000                     | 19.26                             | -                                  | 58.71                         | 13,418.90               | -                  | -              | 13,418.90                     | 6,635.23           |
| 2035                  | 197                          | -                            | 164,000                     | 19.83                             | -                                  | 60.48                         | 13,821.47               | -                  | -              | 13,821.47                     | 6,539.99           |
| 2036                  | 197                          | -                            | 164,000                     | 20.43                             | -                                  | 62.29                         | 14,236.11               | -                  | -              | 14,236.11                     | 6,446.12           |
| 2037                  | 197                          | -                            | 164,000                     | 21.04                             | -                                  | 64.16                         | 14,663.20               | -                  | -              | 14,663.20                     | 6,353.59           |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Five Year</b>              | (356,497.33)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Ten Year</b>               | (313,310.28)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Life</b>                   | (245,444.74)       |

DSM Program Name: HVAC Replacement Loans  
 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) |               |               | 750           |

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | 6,000.00 |
| Capital Cost (\$/unit)          | 1,250.00 |
| Maintenance Cost (\$/year/unit) | -        |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Annual Energy Cost (\$/MWh)        | 37.25 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 20    |
| Discount Rate                      | 4.50% |

| Estimated Applicability          | Amount |
|----------------------------------|--------|
| Estimated Residential Customers  | 13,115 |
| Estimated Application Saturation | 50%    |
| Market Eligibility               | 6%     |
| Feasibility                      | 100%   |
| Estimated Units                  | 380    |

| Year                  | Summer Capacity Savings (kW) | Winter Capacity Savings (kW) | Annual Energy Savings (kWh) | 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 (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 190                          | 190                          | 285,000                     | 12.00                             | -                                  | 52.30                         | 17,185.50               | 475,000.00         | 6,000.00       | (463,814.50)                  | (463,814.50)       |
| 2019                  | 190                          | 190                          | 285,000                     | 12.36                             | -                                  | 54.20                         | 17,795.40               | -                  | 6,150.00       | 11,645.40                     | 11,143.92          |
| 2020                  | 190                          | 190                          | 285,000                     | 12.73                             | -                                  | 55.70                         | 18,293.35               | -                  | 6,303.75       | 11,989.60                     | 10,979.24          |
| 2021                  | 190                          | 190                          | 285,000                     | 13.11                             | -                                  | 57.00                         | 18,736.42               | -                  | 6,461.34       | 12,275.07                     | 10,756.61          |
| 2022                  | 190                          | 190                          | 285,000                     | 13.51                             | -                                  | 61.00                         | 19,951.16               | -                  | 6,622.88       | 13,328.28                     | 11,176.58          |
| 2023                  | 190                          | 190                          | 285,000                     | 13.91                             | -                                  | 63.00                         | 20,598.14               | -                  | 6,788.45       | 13,809.70                     | 11,081.60          |
| 2024                  | 190                          | 190                          | 285,000                     | 14.33                             | -                                  | 65.00                         | 21,247.44               | -                  | 6,958.16       | 14,289.28                     | 10,972.68          |
| 2025                  | 190                          | 190                          | 285,000                     | 14.76                             | -                                  | 45.00                         | 15,629.11               | -                  | 7,132.11       | 8,497.00                      | 6,243.84           |
| 2026                  | 190                          | 190                          | 285,000                     | 15.20                             | -                                  | 46.35                         | 16,097.99               | -                  | 7,310.42       | 8,787.57                      | 6,179.29           |
| 2027                  | 190                          | 190                          | 285,000                     | 15.66                             | -                                  | 47.74                         | 16,580.93               | -                  | 7,493.18       | 9,087.75                      | 6,115.19           |
| 2028                  | 190                          | 190                          | 285,000                     | 16.13                             | -                                  | 49.17                         | 17,078.35               | -                  | 7,680.51       | 9,397.85                      | 6,051.53           |
| 2029                  | 190                          | 190                          | 285,000                     | 16.61                             | -                                  | 50.65                         | 17,590.70               | -                  | 7,872.52       | 9,718.18                      | 5,988.33           |
| 2030                  | 190                          | 190                          | 285,000                     | 17.11                             | -                                  | 52.17                         | 18,118.42               | -                  | 8,069.33       | 10,049.09                     | 5,925.59           |
| 2031                  | 190                          | 190                          | 285,000                     | 17.62                             | -                                  | 53.73                         | 18,661.98               | -                  | 8,271.07       | 10,390.91                     | 5,863.30           |
| 2032                  | 190                          | 190                          | 285,000                     | 18.15                             | -                                  | 55.34                         | 19,221.84               | -                  | 8,477.84       | 10,743.99                     | 5,801.47           |
| 2033                  | 190                          | 190                          | 285,000                     | 18.70                             | -                                  | 57.00                         | 19,798.49               | -                  | 8,689.79       | 11,108.70                     | 5,740.09           |
| 2034                  | 190                          | 190                          | 285,000                     | 19.26                             | -                                  | 58.71                         | 20,392.45               | -                  | 8,907.03       | 11,485.41                     | 5,679.18           |
| 2035                  | 190                          | 190                          | 285,000                     | 19.83                             | -                                  | 60.48                         | 21,004.22               | -                  | 9,129.71       | 11,874.51                     | 5,618.74           |
| 2036                  | 190                          | 190                          | 285,000                     | 20.43                             | -                                  | 62.29                         | 21,634.35               | -                  | 9,357.95       | 12,276.39                     | 5,558.76           |
| 2037                  | 190                          | 190                          | 285,000                     | 21.04                             | -                                  | 64.16                         | 22,283.38               | -                  | 9,591.90       | 12,691.48                     | 5,499.24           |
| 2038                  | -                            | -                            | -                           | 21.67                             | -                                  | 66.08                         | -                       | -                  | -              | -                             | -                  |
| 2039                  | -                            | -                            | -                           | 22.32                             | -                                  | 68.07                         | -                       | -                  | -              | -                             | -                  |
| 2040                  | -                            | -                            | -                           | 22.99                             | -                                  | 70.11                         | -                       | -                  | -              | -                             | -                  |
| 2041                  | -                            | -                            | -                           | 23.68                             | -                                  | 72.21                         | -                       | -                  | -              | -                             | -                  |
| 2042                  | -                            | -                            | -                           | 24.39                             | -                                  | 74.38                         | -                       | -                  | -              | -                             | -                  |
| 2043                  | -                            | -                            | -                           | 25.13                             | -                                  | 76.61                         | -                       | -                  | -              | -                             | -                  |
| 2044                  | -                            | -                            | -                           | 25.88                             | -                                  | 78.91                         | -                       | -                  | -              | -                             | -                  |
| 2045                  | -                            | -                            | -                           | 26.66                             | -                                  | 81.28                         | -                       | -                  | -              | -                             | -                  |
| 2046                  | -                            | -                            | -                           | 27.46                             | -                                  | 83.71                         | -                       | -                  | -              | -                             | -                  |
| 2047                  | -                            | -                            | -                           | 28.28                             | -                                  | 86.22                         | -                       | -                  | -              | -                             | -                  |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Five Year</b>              | (419,758.15)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Ten Year</b>               | (379,165.56)       |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Life</b>                   | (321,439.34)       |

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

| DSM Measure Effectiveness     | Summer Demand | Winter Demand | Annual Energy |
|-------------------------------|---------------|---------------|---------------|
| Load Reduction (kW per Unit)  | 0.15          | 0.15          |               |
| Annual Energy Usage           |               |               |               |
| Energy Savings (%)            |               |               | 0%            |
| Energy Savings (kWh per unit) |               |               | 526           |

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | 3,000.00 |
| Capital Cost (\$/unit)          | 500.00   |
| Maintenance Cost (\$/year/unit) | -        |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Annual Energy Cost (\$/MWh)        | 37.25 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 15    |
| Discount Rate                      | 4.50% |

| Estimated Applicability          | Amount |
|----------------------------------|--------|
| Estimated Residential Customers  | 13,115 |
| Estimated Application Saturation | 50%    |
| Market Eligibility               | 25%    |
| Feasibility                      | 100%   |
| Estimated Units                  | 1639   |

| Year                  | Summer Capacity Savings (kW) | Winter Capacity Savings (kW) | Annual Energy Savings (kWh) | 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 (\$)  |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|------------------------------------|-------------------------------|-------------------------|--------------------|----------------|-------------------------------|---------------------|
| 2018                  | 246                          | 246                          | 861,458                     | 12.00                             | -                                  | 52.30                         | 48,004.47               | 819,500.00         | 3,000.00       | (774,495.53)                  | (774,495.53)        |
| 2019                  | 246                          | 246                          | 861,458                     | 12.36                             | -                                  | 54.20                         | 49,729.75               | -                  | 3,075.00       | 46,654.75                     | 44,645.70           |
| 2020                  | 246                          | 246                          | 861,458                     | 12.73                             | -                                  | 55.70                         | 51,113.10               | -                  | 3,151.88       | 47,961.23                     | 43,919.53           |
| 2021                  | 246                          | 246                          | 861,458                     | 13.11                             | -                                  | 57.00                         | 52,326.89               | -                  | 3,230.67       | 49,096.22                     | 43,022.85           |
| 2022                  | 246                          | 246                          | 861,458                     | 13.51                             | -                                  | 61.00                         | 55,868.44               | -                  | 3,311.44       | 52,558.00                     | 44,073.11           |
| 2023                  | 246                          | 246                          | 861,458                     | 13.91                             | -                                  | 63.00                         | 57,691.97               | -                  | 3,394.22       | 54,297.74                     | 43,571.28           |
| 2024                  | 246                          | 246                          | 861,458                     | 14.33                             | -                                  | 65.00                         | 59,517.49               | -                  | 3,479.08       | 56,038.41                     | 43,031.66           |
| 2025                  | 246                          | 246                          | 861,458                     | 14.76                             | -                                  | 45.00                         | 42,394.00               | -                  | 3,566.06       | 38,827.94                     | 28,531.88           |
| 2026                  | 246                          | 246                          | 861,458                     | 15.20                             | -                                  | 46.35                         | 43,665.82               | -                  | 3,655.21       | 40,010.61                     | 28,134.87           |
| 2027                  | 246                          | 246                          | 861,458                     | 15.66                             | -                                  | 47.74                         | 44,975.80               | -                  | 3,746.59       | 41,229.21                     | 27,743.32           |
| 2028                  | 246                          | 246                          | 861,458                     | 16.13                             | -                                  | 49.17                         | 46,325.07               | -                  | 3,840.25       | 42,484.82                     | 27,357.15           |
| 2029                  | 246                          | 246                          | 861,458                     | 16.61                             | -                                  | 50.65                         | 47,714.82               | -                  | 3,936.26       | 43,778.56                     | 26,976.30           |
| 2030                  | 246                          | 246                          | 861,458                     | 17.11                             | -                                  | 52.17                         | 49,146.27               | -                  | 4,034.67       | 45,111.60                     | 26,600.88           |
| 2031                  | 246                          | 246                          | 861,458                     | 17.62                             | -                                  | 53.73                         | 50,620.66               | -                  | 4,135.53       | 46,485.12                     | 26,230.24           |
| 2032                  | 246                          | 246                          | 861,458                     | 18.15                             | -                                  | 55.34                         | 52,139.27               | -                  | 4,238.92       | 47,900.35                     | 25,864.89           |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Five Year</b>              | <b>(598,834.34)</b> |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Ten Year</b>               | <b>(427,821.34)</b> |
|                       |                              |                              |                             |                                   |                                    |                               |                         |                    |                | <b>Life</b>                   | <b>(294,792.09)</b> |

**DSM Program Name:** Interruptible Rates  
**Customer Class:** Commercial

| DSM Measure Effectiveness            | Summer Demand | Winter Demand | Annual Energy |
|--------------------------------------|---------------|---------------|---------------|
| <b>Load Reduction (kW per Unit)</b>  | 30            | 30            |               |
| Annual Energy Usage                  |               |               |               |
| Energy Savings (%)                   |               |               |               |
| <b>Energy Savings (kWh per unit)</b> |               |               | 1,500         |

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | 6,000.00 |
| Capital Cost (\$/unit)          | 2,500.00 |
| Maintenance Cost (\$/year/unit) | 250.00   |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Avoided Energy Cost (\$/MWh)       | 48.00 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 30    |
| Discount Rate                      | 4.50% |

| Estimated Applicability        | Amount    |
|--------------------------------|-----------|
| Estimated Industrial Customers | 99        |
| Estimated Appliance Saturation | 100%      |
| Market Eligibility             | 25%       |
| Feasibility                    | 100%      |
| <b>Estimated Units</b>         | <b>25</b> |

| 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 (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|-----------------------------------|-------------------------------|------------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 750                          | 750                          | 37,500                      | 12.00                             | -                                 | 52.30                         | 10,961.25                    | 62,500.00          | 12,250.00      | (63,788.75)                   | (63,788.75)        |
| 2019                  | 750                          | 750                          | 37,500                      | 12.36                             | -                                 | 54.20                         | 11,302.50                    | -                  | 12,556.25      | (1,253.75)                    | (1,199.76)         |
| 2020                  | 750                          | 750                          | 37,500                      | 12.73                             | -                                 | 55.70                         | 11,636.85                    | -                  | 12,870.16      | (1,233.31)                    | (1,129.38)         |
| 2021                  | 750                          | 750                          | 37,500                      | 13.11                             | -                                 | 57.00                         | 11,972.04                    | -                  | 13,191.91      | (1,219.87)                    | (1,068.97)         |
| 2022                  | 750                          | 750                          | 37,500                      | 13.51                             | -                                 | 61.00                         | 12,417.08                    | -                  | 13,521.71      | (1,104.63)                    | (926.30)           |
| 2023                  | 750                          | 750                          | 37,500                      | 13.91                             | -                                 | 63.00                         | 12,795.97                    | -                  | 13,859.75      | (1,063.78)                    | (853.63)           |
| 2024                  | 750                          | 750                          | 37,500                      | 14.33                             | -                                 | 65.00                         | 13,183.97                    | -                  | 14,206.24      | (1,022.27)                    | (785.00)           |
| 2025                  | 750                          | 750                          | 37,500                      | 14.76                             | -                                 | 45.00                         | 12,756.36                    | -                  | 14,561.40      | (1,805.04)                    | (1,326.39)         |
| 2026                  | 750                          | 750                          | 37,500                      | 15.20                             | -                                 | 46.35                         | 13,139.06                    | -                  | 14,925.44      | (1,786.38)                    | (1,256.16)         |
| 2027                  | 750                          | 750                          | 37,500                      | 15.66                             | -                                 | 47.74                         | 13,533.23                    | -                  | 15,298.57      | (1,765.34)                    | (1,187.91)         |
| 2028                  | 750                          | 750                          | 37,500                      | 16.13                             | -                                 | 49.17                         | 13,939.22                    | -                  | 15,681.04      | (1,741.81)                    | (1,121.60)         |
| 2029                  | 750                          | 750                          | 37,500                      | 16.61                             | -                                 | 50.65                         | 14,357.40                    | -                  | 16,073.06      | (1,715.66)                    | (1,057.19)         |
| 2030                  | 750                          | 750                          | 37,500                      | 17.11                             | -                                 | 52.17                         | 14,788.12                    | -                  | 16,474.89      | (1,686.77)                    | (994.62)           |
| 2031                  | 750                          | 750                          | 37,500                      | 17.62                             | -                                 | 53.73                         | 15,231.77                    | -                  | 16,886.76      | (1,654.99)                    | (933.87)           |
| 2032                  | 750                          | 750                          | 37,500                      | 18.15                             | -                                 | 55.34                         | 15,686.72                    | -                  | 17,308.93      | (1,620.21)                    | (874.87)           |
| 2033                  | 750                          | 750                          | 37,500                      | 18.70                             | -                                 | 57.00                         | 16,159.38                    | -                  | 17,741.65      | (1,582.27)                    | (817.59)           |
| 2034                  | 750                          | 750                          | 37,500                      | 19.26                             | -                                 | 58.71                         | 16,644.16                    | -                  | 18,185.19      | (1,541.03)                    | (761.99)           |
| 2035                  | 750                          | 750                          | 37,500                      | 19.83                             | -                                 | 60.48                         | 17,143.49                    | -                  | 18,639.82      | (1,496.34)                    | (708.03)           |
| 2036                  | 750                          | 750                          | 37,500                      | 20.43                             | -                                 | 62.29                         | 17,657.79                    | -                  | 19,105.82      | (1,448.03)                    | (655.67)           |
| 2037                  | 750                          | 750                          | 37,500                      | 21.04                             | -                                 | 64.16                         | 18,187.53                    | -                  | 19,583.46      | (1,395.94)                    | (604.86)           |
| 2038                  | 750                          | 750                          | 37,500                      | 21.67                             | -                                 | 66.08                         | 18,733.15                    | -                  | 20,073.05      | (1,339.90)                    | (555.58)           |
| 2039                  | 750                          | 750                          | 37,500                      | 22.32                             | -                                 | 68.07                         | 19,295.15                    | -                  | 20,574.88      | (1,279.73)                    | (507.78)           |
| 2040                  | 750                          | 750                          | 37,500                      | 22.99                             | -                                 | 70.11                         | 19,874.00                    | -                  | 21,089.25      | (1,215.25)                    | (461.43)           |
| 2041                  | 750                          | 750                          | 37,500                      | 23.68                             | -                                 | 72.21                         | 20,470.22                    | -                  | 21,616.48      | (1,146.26)                    | (416.49)           |
| 2042                  | 750                          | 750                          | 37,500                      | 24.39                             | -                                 | 74.38                         | 21,084.33                    | -                  | 22,156.89      | (1,072.57)                    | (372.93)           |
| 2043                  | 750                          | 750                          | 37,500                      | 25.13                             | -                                 | 76.61                         | 21,716.86                    | -                  | 22,710.82      | (993.96)                      | (330.72)           |
| 2044                  | 750                          | 750                          | 37,500                      | 25.88                             | -                                 | 78.91                         | 22,368.36                    | -                  | 23,278.59      | (910.22)                      | (289.82)           |
| 2045                  | 750                          | 750                          | 37,500                      | 26.66                             | -                                 | 81.28                         | 23,039.41                    | -                  | 23,860.55      | (821.14)                      | (250.19)           |
| 2046                  | 750                          | 750                          | 37,500                      | 27.46                             | -                                 | 83.71                         | 23,730.60                    | -                  | 24,457.06      | (726.47)                      | (211.82)           |
| 2047                  | 750                          | 750                          | 37,500                      | 28.28                             | -                                 | 86.22                         | 24,442.51                    | -                  | 25,068.49      | (625.98)                      | (174.66)           |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Five Year</b>              | (68,113.15)        |
|                       |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Ten Year</b>               | (73,522.24)        |
|                       |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Life</b>                   | (85,623.96)        |

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         |

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

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Avoided Energy Cost (\$/MWh)       | 39.00 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 20    |
| Discount Rate                      | 4.50% |

| Estimated Applicability                   | Amount |
|---|--------|
| Estimated Commercial/Industrial Customers | 3,647  |
| Estimated Appliance Saturation            | 100%   |
| Market Eligibility                        | 10%    |
| Feasibility                               | 25%    |
| Estimated Units                           | 91     |

| 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 (\$) |
|----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|-----------------------------------|-------------------------------|------------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                 | 91                           | -                            | 182,000                     | 12.00                             | -                                 | 52.30                         | 10,610.60                    | 227,500.00         | -              | (216,889.40)                  | (216,889.40)       |
| 2019                 | 91                           | -                            | 182,000                     | 12.36                             | -                                 | 54.20                         | 10,989.16                    | -                  | -              | 10,989.16                     | 10,515.94          |
| 2020                 | 91                           | -                            | 182,000                     | 12.73                             | -                                 | 55.70                         | 11,295.90                    | -                  | -              | 11,295.90                     | 10,344.00          |
| 2021                 | 91                           | -                            | 182,000                     | 13.11                             | -                                 | 57.00                         | 11,567.26                    | -                  | -              | 11,567.26                     | 10,136.35          |
| 2022                 | 91                           | -                            | 182,000                     | 13.51                             | -                                 | 61.00                         | 12,331.06                    | -                  | -              | 12,331.06                     | 10,340.35          |
| 2023                 | 91                           | -                            | 182,000                     | 13.91                             | -                                 | 63.00                         | 12,731.93                    | -                  | -              | 12,731.93                     | 10,216.75          |
| 2024                 | 91                           | -                            | 182,000                     | 14.33                             | -                                 | 65.00                         | 13,133.91                    | -                  | -              | 13,133.91                     | 10,085.47          |
| 2025                 | 91                           | -                            | 182,000                     | 14.76                             | -                                 | 45.00                         | 9,533.02                     | -                  | -              | 9,533.02                      | 7,005.14           |
| 2026                 | 91                           | -                            | 182,000                     | 15.20                             | -                                 | 46.35                         | 9,819.01                     | -                  | -              | 9,819.01                      | 6,904.58           |
| 2027                 | 91                           | -                            | 182,000                     | 15.66                             | -                                 | 47.74                         | 10,113.58                    | -                  | -              | 10,113.58                     | 6,805.47           |
| 2028                 | 91                           | -                            | 182,000                     | 16.13                             | -                                 | 49.17                         | 10,416.99                    | -                  | -              | 10,416.99                     | 6,707.79           |
| 2029                 | 91                           | -                            | 182,000                     | 16.61                             | -                                 | 50.65                         | 10,729.50                    | -                  | -              | 10,729.50                     | 6,611.50           |
| 2030                 | 91                           | -                            | 182,000                     | 17.11                             | -                                 | 52.17                         | 11,051.39                    | -                  | -              | 11,051.39                     | 6,516.60           |
| 2031                 | 91                           | -                            | 182,000                     | 17.62                             | -                                 | 53.73                         | 11,382.93                    | -                  | -              | 11,382.93                     | 6,423.06           |
| 2032                 | 91                           | -                            | 182,000                     | 18.15                             | -                                 | 55.34                         | 11,724.41                    | -                  | -              | 11,724.41                     | 6,330.87           |
| 2033                 | 91                           | -                            | 182,000                     | 18.70                             | -                                 | 57.00                         | 12,076.15                    | -                  | -              | 12,076.15                     | 6,239.99           |
| 2034                 | 91                           | -                            | 182,000                     | 19.26                             | -                                 | 58.71                         | 12,438.43                    | -                  | -              | 12,438.43                     | 6,150.42           |
| 2035                 | 91                           | -                            | 182,000                     | 19.83                             | -                                 | 60.48                         | 12,811.58                    | -                  | -              | 12,811.58                     | 6,062.14           |
| 2036                 | 91                           | -                            | 182,000                     | 20.43                             | -                                 | 62.29                         | 13,195.93                    | -                  | -              | 13,195.93                     | 5,975.12           |
| 2037                 | 91                           | -                            | 182,000                     | 21.04                             | -                                 | 64.16                         | 13,591.81                    | -                  | -              | 13,591.81                     | 5,889.36           |
| <b>NPV in 2018 :</b> |                              |                              |                             |                                   |                                   |                               |                              |                    |                |                               |                    |
| <b>Five Year</b>     |                              |                              |                             |                                   |                                   |                               |                              |                    |                |                               | (175,552.77)       |
| <b>Ten Year</b>      |                              |                              |                             |                                   |                                   |                               |                              |                    |                |                               | (134,535.35)       |
| <b>Life</b>          |                              |                              |                             |                                   |                                   |                               |                              |                    |                |                               | (71,628.49)        |

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)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Avoided Energy Cost (\$/MWh)       | 37.25 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 20    |
| Discount Rate                      | 4.50% |

| Estimated Applicability                   | Amount |
|---|--------|
| Estimated Commercial/Industrial Customers | 3,647  |
| Estimated Appliance Saturation            | 100%   |
| Market Eligibility                        | 5%     |
| Feasibility                               | 10%    |
| Estimated Units                           | 18     |

| 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 (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|-----------------------------------|-------------------------------|------------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 90                           | 90                           | 90,000                      | 12.00                             | -                                 | 52.30                         | 5,787.00                     | 180,000.00         | -              | (174,213.00)                  | (174,213.00)       |
| 2019                  | 90                           | 90                           | 90,000                      | 12.36                             | -                                 | 54.20                         | 5,990.40                     | -                  | -              | 5,990.40                      | 5,732.44           |
| 2020                  | 90                           | 90                           | 90,000                      | 12.73                             | -                                 | 55.70                         | 6,158.77                     | -                  | -              | 6,158.77                      | 5,639.77           |
| 2021                  | 90                           | 90                           | 90,000                      | 13.11                             | -                                 | 57.00                         | 6,310.15                     | -                  | -              | 6,310.15                      | 5,529.56           |
| 2022                  | 90                           | 90                           | 90,000                      | 13.51                             | -                                 | 61.00                         | 6,705.55                     | -                  | -              | 6,705.55                      | 5,623.01           |
| 2023                  | 90                           | 90                           | 90,000                      | 13.91                             | -                                 | 63.00                         | 6,922.02                     | -                  | -              | 6,922.02                      | 5,554.58           |
| 2024                  | 90                           | 90                           | 90,000                      | 14.33                             | -                                 | 65.00                         | 7,139.58                     | -                  | -              | 7,139.58                      | 5,482.45           |
| 2025                  | 90                           | 90                           | 90,000                      | 14.76                             | -                                 | 45.00                         | 5,378.26                     | -                  | -              | 5,378.26                      | 3,952.10           |
| 2026                  | 90                           | 90                           | 90,000                      | 15.20                             | -                                 | 46.35                         | 5,539.61                     | -                  | -              | 5,539.61                      | 3,895.37           |
| 2027                  | 90                           | 90                           | 90,000                      | 15.66                             | -                                 | 47.74                         | 5,705.80                     | -                  | -              | 5,705.80                      | 3,839.46           |
| 2028                  | 90                           | 90                           | 90,000                      | 16.13                             | -                                 | 49.17                         | 5,876.97                     | -                  | -              | 5,876.97                      | 3,784.35           |
| 2029                  | 90                           | 90                           | 90,000                      | 16.61                             | -                                 | 50.65                         | 6,053.28                     | -                  | -              | 6,053.28                      | 3,730.03           |
| 2030                  | 90                           | 90                           | 90,000                      | 17.11                             | -                                 | 52.17                         | 6,234.88                     | -                  | -              | 6,234.88                      | 3,676.48           |
| 2031                  | 90                           | 90                           | 90,000                      | 17.62                             | -                                 | 53.73                         | 6,421.93                     | -                  | -              | 6,421.93                      | 3,623.71           |
| 2032                  | 90                           | 90                           | 90,000                      | 18.15                             | -                                 | 55.34                         | 6,614.59                     | -                  | -              | 6,614.59                      | 3,571.70           |
| 2033                  | 90                           | 90                           | 90,000                      | 18.70                             | -                                 | 57.00                         | 6,813.02                     | -                  | -              | 6,813.02                      | 3,520.43           |
| 2034                  | 90                           | 90                           | 90,000                      | 19.26                             | -                                 | 58.71                         | 7,017.41                     | -                  | -              | 7,017.41                      | 3,469.90           |
| 2035                  | 90                           | 90                           | 90,000                      | 19.83                             | -                                 | 60.48                         | 7,227.94                     | -                  | -              | 7,227.94                      | 3,420.09           |
| 2036                  | 90                           | 90                           | 90,000                      | 20.43                             | -                                 | 62.29                         | 7,444.77                     | -                  | -              | 7,444.77                      | 3,371.00           |
| 2037                  | 90                           | 90                           | 90,000                      | 21.04                             | -                                 | 64.16                         | 7,668.12                     | -                  | -              | 7,668.12                      | 3,322.61           |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Five Year</b>              | (151,688.21)       |
|                       |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Ten Year</b>               | (128,964.25)       |
|                       |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Life</b>                   | (93,473.97)        |

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

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

| Program Costs                   | Amount   |
|---------------------------------|----------|
| Admin Cost (total \$/year)      | 6,000.00 |
| Capital Cost (\$/unit)          | 4,000.00 |
| Maintenance Cost (\$/year/unit) | 140.00   |
| Cost Escalation (%/year)        | 2.50%    |

| Power Cost and Economic Parameters |       |
|------------------------------------|-------|
| Summer Capacity (\$/kW-season)     | 12.00 |
| Winter Capacity (\$/kW-season)     | -     |
| Avoided Energy Cost (\$/MWh)       | 37.25 |
| Rate Escalation (%/yr)             | 3.00% |
| Measure Life                       | 15    |
| Discount Rate                      | 4.50% |

| Estimated Applicability                   | Amount     |
|---|------------|
| Estimated Commercial/Industrial Customers | 3,647      |
| Estimated Appliance Saturation            | 100%       |
| Market Eligibility                        | 5%         |
| Feasibility                               | 100%       |
| <b>Estimated Units</b>                    | <b>182</b> |

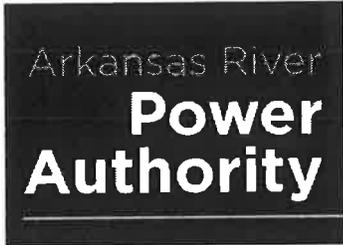
| Year                  | Summer Capacity Savings (kW) | Winter Capacity Savings (kW) | Annual Energy Savings (kWh) | Summer Capacity Charge (\$/kW-yr) | Winter Capacity Charge (\$/kW-yr) | Annual Energy Charge (\$/MWh) | Power Cost Savings (\$/unit) | Capital Costs (\$) | O&M Costs (\$) | Annual Savings / (Costs) (\$) | Present Value (\$) |
|-----------------------|------------------------------|------------------------------|-----------------------------|-----------------------------------|-----------------------------------|-------------------------------|------------------------------|--------------------|----------------|-------------------------------|--------------------|
| 2018                  | 910                          | 910                          | 1,592,500                   | 12.00                             | -                                 | 52.30                         | 94,207.75                    | 728,000.00         | 31,480.00      | (665,272.25)                  | (665,272.25)       |
| 2019                  | 910                          | 910                          | 1,592,500                   | 12.36                             | -                                 | 54.20                         | 97,561.10                    | -                  | 32,267.00      | 65,294.10                     | 62,482.39          |
| 2020                  | 910                          | 910                          | 1,592,500                   | 12.73                             | -                                 | 55.70                         | 100,287.28                   | -                  | 33,073.68      | 67,213.60                     | 61,549.51          |
| 2021                  | 910                          | 910                          | 1,592,500                   | 13.11                             | -                                 | 57.00                         | 102,705.08                   | -                  | 33,900.52      | 68,804.56                     | 60,293.20          |
| 2022                  | 910                          | 910                          | 1,592,500                   | 13.51                             | -                                 | 61.00                         | 109,433.06                   | -                  | 34,748.03      | 74,685.03                     | 62,627.98          |
| 2023                  | 910                          | 910                          | 1,592,500                   | 13.91                             | -                                 | 63.00                         | 112,986.77                   | -                  | 35,616.73      | 77,370.04                     | 62,085.67          |
| 2024                  | 910                          | 910                          | 1,592,500                   | 14.33                             | -                                 | 65.00                         | 116,551.55                   | -                  | 36,507.15      | 80,044.40                     | 61,465.76          |
| 2025                  | 910                          | 910                          | 1,592,500                   | 14.76                             | -                                 | 45.00                         | 85,092.72                    | -                  | 37,419.83      | 47,672.90                     | 35,031.40          |
| 2026                  | 910                          | 910                          | 1,592,500                   | 15.20                             | -                                 | 46.35                         | 87,645.50                    | -                  | 38,355.32      | 49,290.18                     | 34,660.12          |
| 2027                  | 910                          | 910                          | 1,592,500                   | 15.66                             | -                                 | 47.74                         | 90,274.87                    | -                  | 39,314.21      | 50,960.66                     | 34,291.66          |
| 2028                  | 910                          | 910                          | 1,592,500                   | 16.13                             | -                                 | 49.17                         | 92,983.12                    | -                  | 40,297.06      | 52,686.05                     | 33,926.01          |
| 2029                  | 910                          | 910                          | 1,592,500                   | 16.61                             | -                                 | 50.65                         | 95,772.61                    | -                  | 41,304.49      | 54,468.12                     | 33,563.19          |
| 2030                  | 910                          | 910                          | 1,592,500                   | 17.11                             | -                                 | 52.17                         | 98,645.79                    | -                  | 42,337.10      | 56,308.69                     | 33,203.20          |
| 2031                  | 910                          | 910                          | 1,592,500                   | 17.62                             | -                                 | 53.73                         | 101,605.16                   | -                  | 43,395.53      | 58,209.63                     | 32,846.05          |
| 2032                  | 910                          | 910                          | 1,592,500                   | 18.15                             | -                                 | 55.34                         | 104,653.32                   | -                  | 44,480.42      | 60,172.90                     | 32,491.73          |
| <b>NPV in 2018 \$</b> |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Five Year</b>              | (418,319.17)       |
|                       |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Ten Year</b>               | (190,784.56)       |
|                       |                              |                              |                             |                                   |                                   |                               |                              |                    |                | <b>Life</b>                   | (24,754.39)        |

## **Appendix B – Public Notices, Agendas, Resolution**

## **PUBLIC NOTICE**

A meeting of the Arkansas River Power Authority (ARPA) Board of Directors will be held on Thursday, March 30, 2017, at 10:00 a.m. at the Las Animas Bent County Fire Department, 435 W. 5<sup>th</sup> Street, Las Animas, CO. The agenda will include a scheduled hearing at 11:50 to provide an opportunity for any member of the public to submit comments regarding the Authority's Integrated Resource Plan (IRP). The IRP outlines plans for meeting the future electric power needs of ARPA and its member communities. The Arkansas River Power Authority is a political subdivision of the state of Colorado, supplying wholesale electric power to its municipal members of Holly, La Junta, Lamar, Las Animas, Springfield and Trinidad, Colorado. ARPA Board meetings are open to the public.

A proposed agenda for the meeting will be posted at a designated location in each of the member cities at least 24 hours in advance of the meeting. If any member of the public desires a copy of the agenda prior to the meeting you may request one by calling the ARPA office at 719-336-3496.



## BUSINESS OPERATIONS – MARCH 14, 2017

**Integrated Resource Plan (IRP).** The Arkansas River Power Authority is in the process of preparing an Integrated Resource Plan (IRP), as required by the Western Area Power Administration (WAPA) under its Energy Planning and Management Program (EPAMP). The IRP will consider all practicable energy efficiency and energy supply resource options to meet future needs. The IRP must adhere to several criteria, which are listed on the WAPA website under the IRP section. ARPA is working with an outside consultant to complete the IRP and submit it to WAPA by June 1, 2017.

One of the requirements of EPAMP is to “provide ample opportunity for full public participation.” ARPA will be accepting written and verbal comments from affected retail customers of the six ARPA communities at the March 30, and April 27, 2017 meetings and for a ten working day period following the April meeting. At the end of the comment period, all comments received from the public will be reviewed and, if necessary, changes will be incorporated into the IRP. The final IRP will be approved at a public meeting of the ARPA Board of Directors in May 2017.

Interested parties may provide written comments directly to ARPA outside of the listed public meetings by sending them electronically or via US Mail to the following address: Rick Rigel, General Manager, Arkansas River Power Authority, P O Box 70, Lamar, CO 81052, [rrigel@arpapower.org](mailto:rrigel@arpapower.org)

**Summary of January 2017 Financial and Operating Statements.** During the month of January, total operating revenues were better than budget by \$100,122. Total cost of goods sold were over budget 7.5%, and A & G expenses for the month were over budget by \$133,822. There were net revenues of \$92,942 for the month. Member sales for January were 3.8% better than January of 2016 and better than budget by 5.3%.

**Wind Generation Report.** The wind turbine generator near Springfield is currently down due to a bearing failure. It is expected the generator will be repaired by mid to late March.

**ARPA Scholarship Program.** In 2000 the Arkansas River Power Authority Board of Directors established a College Scholarship Program. The Program is administered through our member municipalities of Holly, La Junta, Lamar, Las Animas, Springfield and Trinidad, Colorado. The scholarship is awarded to one high school senior in *each member municipality*. The total scholarship award is \$1,000 funded equally between ARPA and the member municipality. Application forms, scholarship requirements, and eligibility criteria are available either through the counseling offices of the member high schools or at the local office of the electric utility. To be eligible, a student must reside with a family that receives electric service from one of the ARPA member municipalities.

**Next ARPA Meeting.** The next regularly scheduled ARPA board meeting is Thursday, March 30, 2017 at the Las Animas Bent County Fire Department, 435 W 5<sup>th</sup> Street, Las Animas. ARPA board meetings are open to the public.



*Board of Directors Meeting Agenda*  
 Thursday, March 30, 2017  
 10:00 a.m.  
 Las Animas Bent County Fire Department  
 435 West 5th  
 Las Animas, CO 81054

|                       |   |  |
|-----------------------|---|--|
| <b>Board Members:</b> |   |  |
| <i>Holly:</i>         | David Willhite, Pres.*<br>Johnnie Lyons   | <i>Springfield:</i> Darwin Hansen*<br>Vacant             |
| <i>La Junta:</i>      | Gary Cranson<br>Lorenz Sutherland*        | <i>Trinidad:</i> Michelle Miles, Treas.*<br>Robert Fabec |
| <i>Lamar:</i>         | Houssin Hourieh<br>John Sutherland*       |  |
| <i>Las Animas:</i>    | Ron Clodfelter*<br>Richard Stwalley, V.P. | *Executive Committee Members<br>Arvenia Morris, Sec.     |

All agenda items are for discussion and action will be taken as noted or as deemed appropriate.

1. Roll Call
2. Approval of Agenda
3. Executive Session: CRS § 24-6-402(4)(a)(b) and (e)
  - a. Receive Legal Advice Regarding Lamar Repowering Project Litigation
    - i. City of Lamar Litigation/Rate Payers
    - ii. B&W Litigation
  - b. Lamar Repowering Project Contract Negotiations
  - c. Power Supply Contract Negotiations
4. Integrated Resource Plan (IRP) – Public Comments-11:50 a.m.
5. Approval of Minutes of the February 23 Regular Meeting
6. Public Comment – Members of the general public must limit their comments to three (3) minutes each, unless otherwise authorized by the ARPA Board President, or presiding officer.
7. Financial Report and Approval of Outstanding Bills - Aarin Ritter
  - a. Review Quarterly Financials - Rick Rigel
8. Operating Report - Rick Rigel
  - a. Wind Generation Report - Arvenia Morris
9. Operating Committee Report – Ron Clodfelter
10. General Manager Report – Rick Rigel
  - a. Monthly Report
    - i. Pueblo Hydro Dam Project
  - b. Lamar Repowering Project Update
11. Planning and Communication

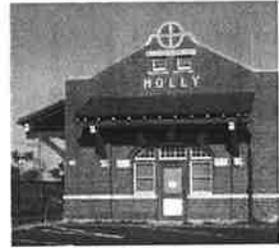
- a. ARPA Awards
  - b. ARPA Scholarship Program
  - c. APPA National Conference
12. Member Cities' Reports
13. New Business
- a. Discussion of Board Officer Positions for April Elections
  - b. Discussion on Contract Power Rate
14. Unfinished Business
- a. Discussion on Distributed Generation Policy
15. Next Meeting Date and Location – April 27 by Webcast
16. Adjourn

**ARPA Member Municipalities: Holly ♦ La Junta ♦ Lamar ♦ Las Animas ♦ Springfield ♦ Trinidad**

## **PUBLIC NOTICE**

A regular meeting of the Arkansas River Power Authority (ARPA) Board of Directors will be held on Thursday, April 27, 2017, at 9:00 a.m. by Webcast. The agenda will include a comment period to provide an opportunity for any member of the public to submit comments regarding the Authority's Integrated Resource Plan (IRP). The IRP outlines plans for meeting the future electric power needs of ARPA and its member communities. The Arkansas River Power Authority is a political subdivision of the state of Colorado, supplying wholesale electric power to its municipal members of Holly, La Junta, Lamar, Las Animas, Springfield and Trinidad, Colorado. ARPA Board meetings are open to the public. If any member of the public desires to attend the meeting, please call the ARPA office at 719-336-3496 for further instruction.

A proposed agenda for the meeting will be posted at a designated location in each of the member cities at least 24 hours in advance of the meeting. If any member of the public desires a copy of the agenda prior to the meeting, please call 336-3496.



## **BUSINESS OPERATIONS – APRIL 12, 2017**

**Integrated Resource Plan (IRP).** The Arkansas River Power Authority is in the process of preparing an Integrated Resource Plan (IRP), as required by the Western Area Power Administration (WAPA) under its Energy Planning and Management Program. ARPA will be accepting written and verbal comments from affected retail customers of the six ARPA communities at the April 27, 2017 meeting and for a ten working day period following the April meeting. At the end of the comment period, all comments received from the public will be reviewed and, if necessary, changes will be incorporated into the IRP. The final IRP will be approved at a public meeting of the ARPA Board of Directors on May 25, 2017. Interested parties may provide written comments directly to ARPA outside of the April 27 public meeting by sending them electronically or via US Mail to the following address: Rick Rigel, General Manager, Arkansas River Power Authority, P O Box 70, Lamar, CO 81052, [rrigel@arpapower.org](mailto:rrigel@arpapower.org)

**ARPA Board Discusses Distributed Generation (DG) Policy.** With utilities facing an increased interest from its customers and developers to install distributed generation such as wind and solar, it's only natural that ARPA and its members would experience continued marketing efforts by solar companies. There are many facets to solar developments that must be considered, especially when considering large solar gardens. For instance, what impact would a mid to large solar installation have on power supply contracts, rate structures, and reliability?

The ARPA Board directed staff to continue its efforts on developing a policy for the development of renewable power generating installations including solar developments, and to ensure the policy addresses the following issues:

- Review of rate modifications that will not increase rates, but would alter how fixed costs are recovered. ARPA's fixed costs include debt service, administration expenses, and capacity related costs. These fixed costs differ from variable costs such as purchased power and transmission costs associated with energy sales and usage.
- Evaluate the potential for ARPA to enter into power purchase agreements (PPA) with solar developers above a certain sized installation. For example, ARPA could consider the possibility of contracting with its member community directly for the generated output of solar installation, or contract with the solar developer directly.
- The Board also discussed whether to place a cap or upper limit on the amount of solar installations it could support in each member community, and as a whole. There are contractual implications related to the sizing of renewable resource developments that will need to be addressed in a policy.
- Ensure member utility operations are aware of the metering requirements for renewable installations. It is imperative that the utilities be able to capture all renewable generated energy for cost recovery and transmission capacity and scheduling purposes.

**Southeastern Colorado Water Conservancy District's (SECWCD) Pueblo Hydro Project.** After an extensive review of the pricing, contract terms and compatibility with existing power purchase agreements, the ARPA Board decided to not pursue a long-term contract for hydro power with the SECWCD. The Board liked many of the attributes the project provided, but ultimately determined that the time and circumstances were not right for the long-term commitment.

**Contract Power Rate.** ARPA has been working with certain of its members on an economic development effort. After evaluating the potential for an economic development opportunity, and ARPA's existing tariff structure, the Board directed staff to continue its efforts to evaluate the development of an economic development rate.

**Summary of February 2017 Financial and Operating Statements.** During the month of February, total operating revenues were less than budget by \$44,520. Total cost of goods sold were just over budget 0.9%, and A & G expenses for the month were over budget by \$51,585. There were net losses of \$220,690 for the month. Total Revenues YTD are better than budget by \$55,602. Member sales for February were 3.2% lower than February of 2016 and lower than budget by 2.2%. Member Sales YTD are about 1.8% better than budget.

**Next ARPA Meeting.** The next regularly scheduled ARPA board meeting is Thursday, April 27, 2017 by WebCast beginning at 9:00 a.m. ARPA board meetings are open to the public. If anyone wishes to attend, please contact the ARPA office (719) 336-3496 for additional details.

**Board of Directors Meeting Agenda**

Thursday, April 27, 2017

9:00 a.m.

By WEBCAST

**Board Members:**

|                    |   |                                     |   |
|--------------------|---|-------------------------------------|---|
| <i>Holly:</i>      | David Willhite, Pres.*<br>Johnnie Lyons   | <i>Springfield:</i>                 | Darwin Hansen*<br>Vacant                |
| <i>La Junta:</i>   | Gary Cranson<br>Lorenz Sutherland*        | <i>Trinidad:</i>                    | Michelle Miles, Treas.*<br>Robert Fabec |
| <i>Lamar:</i>      | Houssin Hourieh<br>John Sutherland*       |                                     |   |
| <i>Las Animas:</i> | Ron Clodfelter*<br>Richard Stwalley, V.P. | <i>*Executive Committee Members</i> | Arvenia Morris, Sec.                    |

All agenda items are for discussion and action will be taken as noted or as deemed appropriate.

1. Roll Call
2. Approval of Agenda
3. Executive Session: CRS § 24-6-402(4)(a)(b) and (e)
  - a. Receive Legal Advice Regarding Lamar Repowering Project Litigation
    - i. City of Lamar Litigation/Rate Payers
    - ii. B&W Litigation
  - b. Lamar Repowering Project Contract Negotiations
  - c. Power Supply Contract Negotiations
4. Election of Officers
5. Presentation of the 2017 Integrated Resource Plan (IRP) – John Krajewski
6. Public Comment (IRP)
7. Approval of Minutes of the March 30 Regular Meeting
8. Public Comment – Members of the general public must limit their comments to three (3) minutes each, unless otherwise authorized by the ARPA Board President, or presiding officer.
9. Financial Report and Approval of Outstanding Bills - Aarin Ritter
10. Operating Report - Rick Rigel
  - a. Wind Generation Report - Arvenia Morris
11. General Manager Report – Rick Rigel
  - a. Monthly Report
  - b. Lamar Repowering Project Update
  - c. 2016 Year in Review - Rick Rigel

12. Planning and Communication
  - a. ARPA Awards
  - b. ARPA Scholarship Program
  - c. APPA National Conference
13. Member Cities' Reports
14. New Business
  - a. Consider Approval of Lamar Settlement
15. Unfinished Business
  - a. Discussion on Contract Power Rate
  - b. Discussion on Distributed Generation Policy
16. Next Meeting Date and Location – May 25 in Holly
17. Adjourn

**ARPA Member Municipalities: Holly ♦ La Junta ♦ Lamar ♦ Las Animas ♦ Springfield ♦ Trinidad**



**Board of Directors Meeting Agenda-REVISED**  
 Thursday, May 25, 2017, 10:00 a.m.  
 Holly Senior and Community Center  
 129 South Main Street  
 Holly, CO 81047

**Board Members:**

|                    |   |                              |   |
|--------------------|---|------------------------------|---|
| <i>Holly:</i>      | David Willhite, Pres.*<br>Johnnie Lyons   | <i>Springfield:</i>          | Darwin Hansen*<br>Roman Horn            |
| <i>La Junta:</i>   | Gary Cranson<br>Lorenz Sutherland*        | <i>Trinidad:</i>             | Michelle Miles, Treas.*<br>Robert Fabec |
| <i>Lamar:</i>      | Houssin Hourieh<br>John Sutherland*       | *Executive Committee Members |   |
| <i>Las Animas:</i> | Ron Clodfelter*<br>Richard Stwalley, V.P. | Arvenia Morris, Sec.         |   |

All agenda items are for discussion and action will be taken as noted or as deemed appropriate.

1. Roll Call
2. Approval of Agenda
3. Executive Session: CRS § 24-6-402(4)(a)(b) and (e)
  - a. Receive Legal Advice Regarding Lamar Repowering Project Litigation
    - i. City of Lamar Litigation/Rate Payers
    - ii. B&W Litigation
  - b. Lamar Repowering Project Contract Negotiations
  - c. Discuss Bond Refinancing Contract Negotiations
  - d. Power Supply Contract Negotiations
4. Approval of Minutes of the April 27 Regular Meeting
5. Public Comment – Members of the general public must limit their comments to three (3) minutes each, unless otherwise authorized by the ARPA Board President, or presiding officer.
6. 2017 Integrated Resource Plan – Action Item
7. Review of Fixed Cost Recovery Model
8. Financial Report and Approval of Outstanding Bills - Aarin Ritter
  - a. Review of Quarterly Financials-Aarin Ritter
9. 2016 Audit Presentation (rfarmer llc) and Associated Resolution
10. Operating Report - Rick Rigel
  - a. Wind Generation Report - Arvenia Morris

11. General Manager Report – Rick Rigel
  - a. Monthly Report
  - b. Lamar Repowering Project Update
12. Planning and Communication
  - a. ARPA Awards
  - b. ARPA Scholarship Program
13. Member Cities' Reports
14. New Business
  - a. Consider Approval of Lamar Settlement
15. Unfinished Business
  - a. Discussion on Contract Power Rate
  - b. Discussion on Distributed Generation Policy
16. Next Meeting Date and Location – July 27 by WebCast
17. Adjourn

RESOLUTION NO. 02-17

**A RESOLUTION OF THE BOARD OF DIRECTORS OF THE ARKANSAS RIVER POWER AUTHORITY  
APPROVING AN INTEGRATED RESOURCE PLAN AND DIRECTING ITS SUBMITTAL TO THE  
WESTERN AREA POWER ADMINISTRATION**

---

**WHEREAS**, the chief purpose of the Arkansas River Power Authority (ARPA or "Authority"), an intergovernmental entity and political subdivision of the State of Colorado, is to provide the wholesale electric requirements of its member municipalities, each of whom furnish retail electric service in their local communities. ARPA's members are the Colorado municipalities of Holly, Lamar, La Junta, Las Animas, Springfield and Trinidad.

**WHEREAS**, the Authority obtains a portion of its wholesale power requirements from the Western Area Power Administration ("Western") under long term, firm power contracts. ARPA receives federal hydropower from Western produced at both the Loveland Area Projects and the Salt Lake City Integrated Projects. Under provisions of the 1992 Energy Policy Act ("EPAAct"), firm power customers of Western are obligated to periodically prepare an Integrated Resource Plan ("IRP"), taking into account certain criteria set forth in this statutory enactment. Western has issued certain rules implementing this EPAAct requirement. These rules require the Authority to submit an IRP to Western every five years, with progress reports submitted annually.

**WHEREAS**, ARPA has prepared its fifth IRP ("2017 IRP") since the enactment of the EPAAct in compliance with Western's implementing rules.

**WHEREAS**, the 2017 IRP incorporates a public participation plan, the purpose of which is to provide information to the public in the ARPA member communities on the IRP and seek public input.

**WHEREAS**, ARPA was advised by Western in written correspondence dated July 17, 2006 that approval of the IRP is required by the ARPA Board of Directors but is not required by each of ARPA's individual member governing bodies.

**WHEREAS**, ARPA entered into a contract with a consulting firm to draft the 2017 IRP which was presented to the public and the Authority's Board of Directors at their meeting on April 27, 2017.

**WHEREAS**, A final draft of the 2017 IRP was provided to the Authority's Board of Directors at their meeting on May 25, 2017 for review, final comment and approval.

**WHEREAS**, the Board of Directors of the Authority, now being fully briefed on the proposed 2017 IRP and being fully advised, hereby takes the following action:

