



**Department of Energy**  
Western Area Power Administration  
Desert Southwest Customer Service Region  
P.O. Box 6457  
Phoenix, AZ 85005-6457

**DEC 20 2012**

Via E-mail: [Frank.McRae@mesaaz.gov](mailto:Frank.McRae@mesaaz.gov)

Mr. Frank A. McRae  
Director, Energy Resources Department  
City of Mesa  
P.O. Box 1466  
Mesa, AZ 85211

**Re: City of Mesa 5-year Integrated Resource Plan 2012-2016**

Dear Mr. McRae:

Thank you for submitting your 5-year Integrated Resource Plan to Western Area Power Administration (Western). It covers the reporting period for calendar years 2012-2016. This is your formal notice that this report has been reviewed and approved.

Data from all customers will be consolidated and included in our reports provided to Congress and others.

For annual updates, please use our automated on-line reporting system at <http://www.wapa.gov/FormsAuth/Login.aspx?ReturnUrl=/irpsubmit/irpsubmit.aspx>.

Western has a wide range of information on our Energy Services web site, [www.wapa.gov/es](http://www.wapa.gov/es), which may help you implement your plan. You may also call our PowerLine at (800) 769-3756 for personal assistance. If you do not have access to the web site, have questions on the guidelines, or need assistance in implementing your report action plan, please contact me at (602) 605-2659 or [colletti@wapa.gov](mailto:colletti@wapa.gov).

Please do not hesitate to call if I may be of further assistance in this or any other Energy Services related matter.

Sincerely,

A handwritten signature in black ink that reads "Audrey Lynn Colletti". The signature is fluid and cursive.

Audrey Lynn Colletti  
Public Utilities Specialist

Email cc:

Pedro Serrano, [Pedro.Serrano@mesaaz.gov](mailto:Pedro.Serrano@mesaaz.gov)  
Anthony Cadorin, [Anthony.Cadorin@MesaAZ.gov](mailto:Anthony.Cadorin@MesaAZ.gov)



## Energy Resources Department

Via Electronic Mail

November 27, 2012

Ms. Audrey Colletti  
Energy Services Representative  
Western Area Power Administration  
Desert Southwest Customer Service Region  
P.O. Box 6457  
Phoenix, AZ 85005-6457

Ms. Colletti;

In accordance with Western Area Power Administration ("WAPA") Integrated Resource Planning (IRP) Regulations - 10 CFR Part 905, the City of Mesa Energy Resources Department Electric Utility ("Mesa") previously submitted for WAPA's approval in June 2012, its 2012 IRP report covering the January 2012 through December 2022 time period. After review, WAPA requested that Mesa supplement its 2012 IRP filing with additional information. In response, Mesa hereby supplements and provides the following information as part of its IRP filing for 2012:

### I. Methods Used to Measure Success in Mesa's DSM Programs

Mesa's approach to Demand Side Management ("DSM") Programs will emphasize customer education and be tailored to suit Mesa's customer base which includes many fixed income residential customers, residential customers who rent their living space and customers who may not have adequate financial resources to invest in large, capital intensive energy conservation projects. Programs will include the following:

- **Solar Photovoltaic (PV) Pilot Program:** Mesa has established a limited PV Pilot Program whereby residential and commercial customers who meet specific requirements can install a solar PV system at their premise and receive an incentive of up to \$1.00/Watt-DC of installed capacity. The PV Pilot Program, in total, has a specific limit of \$100,000 for up-front incentives. Eligible participants will also receive a form of "net metering" during the PV Pilot Program.
  - Success in the PV Pilot Program will be measured by the number of successful interconnections to the system, the amount of energy generated by the PV systems per year, the efficiency of the systems in terms of maximizing the kWh produced per kW-DC installed and the number of renewable energy credits accruing to Mesa. Mesa will use the PV Pilot Program to gauge the interest in these types of programs, study how these systems affect the electricity usage of the participants and study the challenges associated with administering this sort of program.
- **Commercial Energy Audit Program for Commercial Customers:** Upon customer request, these audits will provide the customer with a historic energy consumption analysis to note any (positive or negative) trends in energy consumption; infrared camera photos to detect potential anomalies in building construction, insulation, or leaks in the

building shell; and energy modeling to determine what energy conservation improvements may be most effective at reducing energy consumption.

- Success in Mesa's Energy Audit Program will be measured through a follow-up phone call with the customers one year after the audit to determine if they have made any energy-saving improvements to their premise and to determine whether or not they feel that the improvements have reduced their energy consumption in comparison to their historic consumption. Additionally, this will be compared to an energy analysis model (created using "eQuest" energy modeling software) of the customer's premise to validate the customer's assumed energy savings and determine the effectiveness of each audit. At this time Mesa will adhere to a maximum limit of one audit per month per customer.
- **Energy Conservation Seminars:** Mesa will offer Energy Conservation Seminars ("ECS") where Mesa staff will demonstrate easily implemented techniques that will help customers to reduce energy consumption without the need for large capital investments. The ECS program will be customized to fit within the financial and technical capabilities of Mesa's residential customer base to maximize the amount of energy conserved per seminar. Based on the outcome of the ECS program, Mesa may consider a residential energy audit program to dovetail in with the Commercial Energy Audit Program.
  - Success in the ECS program will be measured by the number of participants that take part in the seminars. Mesa is currently creating a scope of work for these seminars so no final details are available at this time, however, Mesa envisions that it will conduct two to six seminars per year with each seminar focusing on a different aspect of energy conservation (e.g. residential conservation, commercial conservation, etc.).
- **Interactive Web-Based Applications:** Mesa is investigating the feasibility of providing interactive, web-based applications that help residential customers learn where energy is being consumed in the dwelling to then evaluate what energy conservation measures would be most beneficial
  - Success in the web-based applications will be determined by the number of participants that utilize the applications during a specific period of time. Mesa has not finalized any details for this type of program; however, it has investigated the capabilities of common vendors' software packages for this type of program and has benchmarked similar programs of the neighboring utilities.

## II. Environmental Considerations of Mesa's Energy Acquisition and DSM Activities

- **Mesa's Energy Acquisition Activities**
  - Mesa foresees the continuation of its current practice of issuing competitive Request for Proposals ("RFP") for firm power, in combination with participation in WAPA's Resource Management Services group for ensuring an economical and reliable source of power. These RFP's do not constrain the suppliers to specific resources and, as such, Mesa expects these suppliers to provide power that is derived from their respective resource pools which have the potential to include solar, wind, hydroelectric or other renewable sourced resources. Because Mesa's current suppliers have a diverse mixture of resources and because these resources are actively traded within the Western power markets and then supplemented with additional resources from WAPA's RMS group, ultimately, Mesa receives a resource mixture that reflects the regional supply mix and therefore mirrors the regional environmental impact. The power prices that Mesa

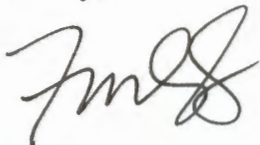
has been receiving through the RFP process and WAPA's RMS group, however, seem to indicate that the purchases can be closely correlated with the marginal market prices of efficient, natural gas based power. Where Mesa differs from a number of the other regional utilities is that its supply of renewable federal hydropower directly provides approximately 20% of its annual energy requirements. Mesa strongly views this as environmentally advantageous in comparison to the regional energy mix. Mesa will continue to pursue additional economical and renewable resources (such as resources from the Boulder Canyon Project's Post-2017 Reallocation) as they become available and Mesa's environmental impact will continue to follow improvements in the regional environmental impact as it becomes more efficient and increasingly reliant on renewable resources due to the Renewable Portfolio Standard that is required of the larger utilities.

- **Mesa's DSM Activities**

- Mesa's DSM activities are planned to be environmentally beneficial by implementing education energy conservation programs emphasizing products and activities easily available to customers that provide ways to reduce their environmental impact through energy conservation. Through these education programs, customers will be able to make the most economical conservation decisions which in turn should provide for the most environmentally beneficial conservation measures.

Upon acceptance of the above provided supplemental information, Mesa hereby completes the requirements of the IRP process for 2012. If you have any questions regarding Mesa's submittal, please contact Mr. Anthony Cadorin at (480) 644-4851 or at [Anthony.Cadorin@mesaaz.gov](mailto:Anthony.Cadorin@mesaaz.gov).

Sincerely,



Frank A. McRae  
Director, Energy Resources Department  
City of Mesa

Cc: Mr. Pedro Serrano  
Mr. Anthony Cadorin



City of Mesa Energy Resources  
Department  
PO Box 1466  
Mesa, AZ 85211-1466

Thursday, July 19, 2012

**To: Ms. Audrey Colletti**  
**Energy Services**  
**Western Area Power Administration**  
**Desert Southwest Customer Service Region**  
**P.O. Box 6457**  
**Phoenix, AZ 85005-6457**

Dear Ms. Colletti:

In accordance with Western Area Power Administration (Western) Integrated Resource Planning (IRP) Regulations – 10 CFR Part 905, the City of Mesa (Mesa) hereby submits for your approval two (2) copies of its 2012 IRP report covering the January 2012 through December 2021 time period. This IRP submittal updates and replaces Mesa's 2007 IRP. Future annual reports will reflect the 2012 IRP.

I hereby confirm that all public participation requirements have been met. Attached is the City Council resolution approving and confirming the IRP.

If you have any questions regarding Mesa's submittal, please contact Anthony Cadorin at (480) 644-4851.

Sincerely,

Frank McRae  
Department Director  
City of Mesa Energy Resources Department

Cc: Mr. Pedro Serrano  
Mr. Anthony Cadorin  
Mr. Wilbert Taebel



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Energy Resources Department  
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Mesa, AZ 85211-1466  
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# 2012 Integrated Resource Plan

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City of Mesa Energy Resources Department  
Maricopa County  
State of Arizona

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## Section 1.0 – Executive Summary

The City of Mesa Energy Resources Department Electric Utility (Mesa) 2012 Integrated Resource Plan (IRP) addresses Mesa’s resource requirements for the 2012 to 2022 planning horizon. Mesa issued wide-reaching competitive solicitations for both conventional and renewable resources which allowed Mesa to compare all available supply options with demand-side options and customer-owned generation options. Mesa’s resource needs for this time frame are identified and plans to acquire the preferred resources are presented. This IRP will serve as a guide for Mesa to continue meeting current and future load requirements in a safe, reliable, economical and customer-responsive manner. Additionally, this Plan also addresses a number of other issues such as demand-side management (DSM) strategies and how to address requests for interconnection of customer-owned distributed generation. Below is a Loads and Resources (L&R) Plan summary, which indicates the current forecasts of customer demand, existing resources and recommended resource acquisitions for the years 2012 – 2017 of the 10 year planning horizon:

Table 1) 2012-2017 Peak Demand, Loads & Resources

<b>2012-2017 Peak Demand, Loads &amp; Resources</b>					
<b>YEAR</b>	<b>2012-2013</b>	<b>2013-2014</b>	<b>2014-2015</b>	<b>2015-2016</b>	<b>2016-2017</b>
Forecasted Peak Demand @ Supply, MW	81.3	81.7	82.1	82.7	82.5
Transmission Losses @ 3%, MW	2.4	2.5	2.5	2.5	2.5
<b>Total Required Supply, MW</b>	<b>83.8</b>	<b>84.2</b>	<b>84.6</b>	<b>85.2</b>	<b>85.0</b>
<b>Existing Contracted Resources, MW</b>	<b>59.7</b>	<b>24.7</b>	<b>14.7</b>	<b>14.7</b>	<b>14.7</b>
<b>Deficiency, MW</b>	<b>24.1</b>	<b>59.5</b>	<b>69.9</b>	<b>70.5</b>	<b>70.3</b>
<b>New DSM Resources, MW</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>New Contracted Resources, MW</b>	<b>15.0</b>	<b>55.0</b>	<b>65.0</b>	<b>65.0</b>	<b>65.0</b>
<b>Ad Hoc Resources, MW</b>	<b>9.1</b>	<b>4.5</b>	<b>4.9</b>	<b>5.5</b>	<b>5.3</b>

### 1.1 Existing Operations and Resources

Mesa has developed a diverse resource portfolio comprised of long-term purchased power agreements, short-term purchased power agreements and “as needed” purchases from the regional energy market. Mesa contracts for power from a variety of entities to meet its customers’ requirements, thus avoiding the issues of relying on a single supplier. Through



participation in the Western Area Power Administration's (Western) Resource Management Services (RMS) group, Mesa is able to gain access to the regional electric energy markets and acquires short-term (i.e., less than 12 months) firm, as-needed, resources to meet the customers' requirements that are not met through the acquisition of long-term agreements. Mesa relies upon a variety of firm transmission service and substation facilities agreements with Western to provide for the reliable import and delivery of Mesa's electric resources. Summarized below are the current power supply resources for Mesa as of 2012:

- **Western**

Long-term, firm capacity and associated energy from the Parker-Davis Project (P-DP) and Colorado River Storage Project (CRSP) hydroelectric generation facilities amounting to a total of 14.85 MW of summer capacity and approximately 73,000 MWh of energy of per year. The P-DP contract terminates in 2024 and the CRSP contract terminates in 2028.

- **Shell Energy North America (SENA)**

Mesa currently receives firm capacity and associated energy from two, separate long-term agreements with SENA. The first agreement has three separate components amounting to 35 MW. Two components for a total of 25 MW expire after the summer peak of 2012. The third component for 10 MW expires May of 2013. One of the components (15 MW, May through September) was again awarded to SENA through the summer peak of 2015.

The second agreement (SENA 2) is for 10 MW of day-ahead firm, dispatchable capacity and associated energy that expires after the summer peak of 2013. All of the SENA agreements are fixed price.

- **Constellation Energy Group (Constellation) Base Contract (formerly through Shell)**

Mesa has procured 15 MW of firm, fixed price, 7 x 24, year-round capacity and associated energy from Constellation beginning April 1, 2012 and set to expire March 31, 2017. Constellation was also awarded the replacement of one of the expiring SENA peak contracts for 10 MW, July through August that will begin delivering energy July 2013 and terminate August 2015. The Constellation agreements are also fixed price.

- **Resource Management Services**

Mesa participates in Western's Resource Management Services program (RMS), which aggregates the loads and supply side resources of its members. Western dispatches and schedules the aggregated resources to minimize the costs to its members. Previously, the amount of excess resources available for sharing amongst participants was diminishing due to load growth in the participants' service areas, however, this trend has slowed and resources have proven adequate to meet Mesa's needs.

## **1.2 Overview of the IRP**

The planning process used by Mesa to develop this IRP is similar to the approaches used by many utilities. Mesa's planning process and the IRP have also been developed and will be administered to fully comply with the applicable federal regulations<sup>1</sup> and exceed prudent utility management practices. Mesa's objective is to develop an IRP that is robust, flexible and economical while complying with Western's requirements.

- The IRP is robust in that a number of scenarios for assumptions that significantly impact the resource choices are analyzed so that Mesa has confidence that the IRP will be a "least cost plan" under a wide variety of actual circumstances.
- The IRP is flexible in that the plan to acquire the selected resources can be accelerated or delayed based upon actual circumstances and conditions.
- The IRP adequately compares the costs of renewable resources to the conventional, long-term contractual resources that Mesa has historically utilized.

1. 10 CFR 905.11.(b)(4)(i) addresses this requirement. Part of WAPA's Energy Planning and Management Program of 1995 which was required by Section 114 of the EPACT of 1992

- The IRP is economical in that DSM resources have been evaluated and compared with alternative supply-side options.

The IRP achieves these objectives and will increase Mesa's opportunities to enhance reliability by further diversifying its resource portfolio through the acquisition of resources from the competitive regional energy markets through competitive solicitation and the implementation of DSM programs that aim to increase customers' understanding of their energy consumption in order to help maximize the customers' return on their investments in conservation. Mesa also retains the ability to pursue the development of its own resources absent the availability of economically advantageous resources from the regional energy markets.

The main principles of Mesa's IRP approach are:

- Customer / community participation
- Resource requirements forecasted, planned & acquired in a timely & efficient manner
- Renewable & supply-side (S/S) options are identified through a competitive RFP process and are compared with DSM on a "level playing field"
- Resource options are selected & acquired based upon defined planning & selection criteria
- Compliance is achieved with requirement of power supply contracts and federal regulations administered by Western Area Power Administration (Western)

Mesa hosted three community meetings on November 10<sup>th</sup>, 2011, December 13<sup>th</sup>, 2011 and February 29<sup>th</sup>, 2012. At the first and second community meetings, Mesa discussed:

- The analytical steps and processes that Mesa will pursue to develop its IRP;
- Supply-side and demand-side options that will be assessed and evaluated for inclusion in IRP;
- Mesa's potential resource selection criteria – to enable Mesa to continue providing safe, reliable and economic electric utility services;

- The use of a 10 year planning horizon to identify resource requirements and to plan for resource acquisitions; and
- The solicitation of public input to assist with development of a “preliminary” IRP including resource alternatives to be evaluated.

At the community meeting on February 29<sup>th</sup>, 2012 Mesa presented its “preliminary” IRP recommendations for comments and input from its customers. Mesa’s recommendations were based upon the input at the community meetings, “iMesa” events, City of Mesa Pancake Breakfasts, and Central Main Plan meetings as well as inquiries that Mesa had received from customers over the course of the years that reflects their concerns about the price of electric utility services and their bills.

The IRP identifies Mesa’s future resource needs and provides a clear indication of the next steps in acquiring the selected resources. The IRP consists of the development and acquisition of supply side resources with an additional focus on education as a DSM program and a strategic approach to the implementation of customer-owned generation.

The IRP’s supply side plan relies heavily upon the issuance and administration of competitive solicitations to acquire the required resource needs for the future. Competitive solicitations with short- to medium-term supply periods ensure a high degree of price stability, high degree of reliability and enjoy the benefit of acquiring the lowest cost resources available on the market. These short- and medium-term supply periods also position Mesa to capitalize on supply side opportunities, such as the 2017 Boulder Canyon Project, Hoover Dam (Hoover Power) reallocation, that become available from time to time that are available to municipal utilities.

Rather than providing customer incentives for efficiency upgrades, Mesa will pursue an aggressive campaign of energy conservation education as a DSM measure. The residential and commercial customers within Mesa’s ESA span a wide range of cultural and economic demographics. DSM programs that focus on specific appliances or technologies may not be applicable to entire classes of customers and those customers would not be able to receive the

benefits of the programs that they are paying for. Through hosting energy conservation seminars, and providing additional information about the customers' energy consumption, customers become greater stewards of their own energy consumption and can invest more effectively in energy conservation measures. Similarly, Mesa will offer energy audits for commercial customers to better help them understand their energy consumption habits and help them find simple ways to conserve.

Mesa will proceed with a Solar Photovoltaic (Solar PV) Pilot Program to evaluate the merits and effects of incentivizing customer-owned solar photovoltaic distributed generation. This pilot program will allow Mesa to investigate any positive or negative effects from the implementation of this type of program prior to encumbering the burden of implementing a large-scale, long-term incentive program.

### **1.3 Three Year Action Plan**

The IRP's Three Year Action Plan identifies the steps and objectives for the next 36 months once Mesa's City Council (Council) approves the IRP. The Three Year Action Plan is separated into DSM, customer-owned generation and supply side components.

Mesa's DSM program will focus on education for both residential and commercial customers. Some example tools that may be used in the program include:

- Energy audits for commercial customers who have concerns of high energy bills
- Energy conservation seminars where Mesa staff demonstrate the use of energy simulation software or demonstrate how to calculate financial payback on energy conservation measures
- Assessment and the potential development of interactive, web-based applications that help the customer learn where energy is being consumed in the house to then evaluate what energy conservation measures would be most beneficial

In addition to the educational DSM program, Mesa will be implementing a twelve month Solar PV Pilot Program whereby eligible customers may be eligible for an up-front incentive of up to

\$1.00 per watt-DC of installed PV generation. The following table details the constraints of the Solar PV Pilot Program:

Table 2) Solar PV Pilot Program Details

<b>Customer Type:</b>	<b><u>Residential</u></b>	<b><u>Commercial</u></b>
<b>Incentive (\$/watt-DC):</b>	\$ 1.00	\$ 1.00
<b>Maximum kW / \$ Incentive:</b>	5 kW / \$ 5,000	10 kW / \$ 10,000
<b>Annual Budget:</b>	\$ 50,000	\$ 50,000

The supply side portion of Three Year Action Plan focuses on the final identification and acquisition of the resource or combination of resources to replace the expiring SENA contracts. The primary effort of this Three Year Action Plan will be the issuance of competitive solicitations and comparisons of any responsive proposals with the development, participation and/or acquisition of any technically and economically feasible electric generation projects that occur within the 2012 to 2015 time frame.

#### **1.4 Five Year Action Plan**

The primary activity in the two years beyond the Three Year Action Plan is to continue to plan for the expiration of short-term contracts. The agreements expiring in the period covered under the Five Year Action Plan account for more than 50 percent of Mesa's resources at the time of system peak demand. There is the possibility for Mesa's participation as an owner in new large-scale facilities that could achieve commercial operation near these time frames. Large-scale facilities such as those currently being considered require significant lead times to develop and construct. Mesa will consider the inclusion of such facilities in its next IRP if these facilities continue development at their current pace and are consistent with Mesa's IRP resource selection criteria. Additionally, Hoover Power may be available through the Arizona Power Authority (APA). Although the outcome of the current debate on the allocation of Hoover Power is yet to be resolved, Mesa, as a municipal entity, may be able to secure

additional reliable, inexpensive, renewable Hoover Power resources. Resources from Hoover Power are expected to become available as of October 1<sup>st</sup>, 2017.

The other area of focus in this time frame will be the ongoing measurement and confirmation of the effectiveness of the proposed DSM programs. Included in these efforts will be the verification of the economics of such programs. Additionally, Mesa will be continually monitoring and evaluating the economics of retaining any incentive-based customer-owned generation programs. The current economics of these types of programs aren't favorable for Mesa or the customer according to Mesa's analysis (which is elaborated upon more in Section 6).

## **Section 2.0 City of Mesa – Electric Service Area Information**

### **2.1 Electric Service Area Description**

The City of Mesa is a full service Arizona municipality initially settled by pioneers in the 1870's and incorporated in 1883. Mesa is the State of Arizona's third largest city and has operated its own electric utility since 1917. The current electric service area (ESA) was established by the Arizona Supreme Court on September 15, 1954 and approximates the incorporated city limits as they were at that time. Mesa's ESA is approximately 5.5 square miles and encompasses the heart of the city, including the original town site. As of March of 2012, service within this area is provided to approximately 15,483 customers of whom 12,748 are residential and 2,735 are commercial. There are no industrial customers in the ESA.

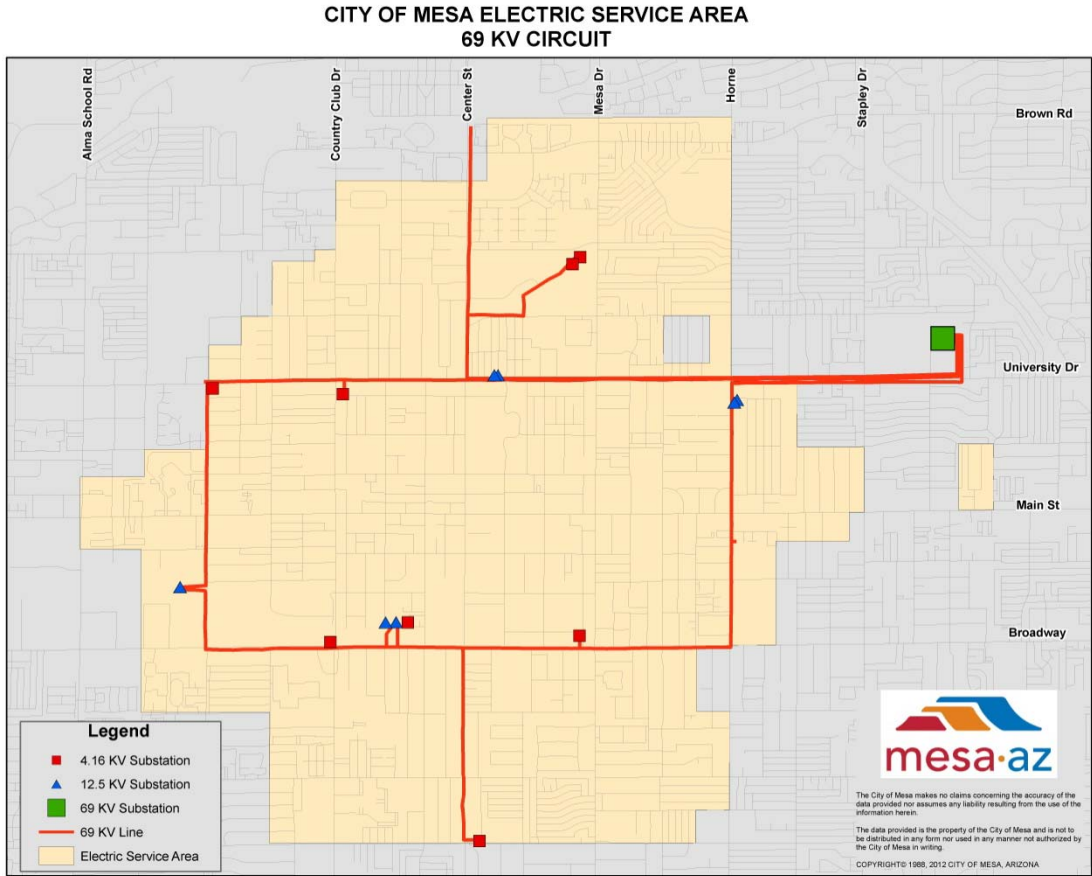


Figure 1) City of Mesa Electric Service Area (ESA)

The Salt River Project Agricultural Improvement and Power District (SRP) serves the areas surrounding Mesa’s ESA. Mesa’s service territory has minimal vacant land for new development and minimal growth in customer loads is forecasted in this IRP. The customer growth that is forecasted is attributed to in-fill residential growth trends and specific commercial and governmental developments and their related electric requirements.

**2.2 Mesa City Council**

The City’s electric rates are established by ordinance and adopted by the City Council. Mesa’s City Council is comprised of six council members and the mayor. Each councilmember is elected from one of six voting districts in Mesa, with the mayor being elected at large. The current City Council members are listed below:



**City Council**

- Scott Smith – Mayor
- Dave Richins –Councilmember, District 1
- Alex Finter – Councilmember, District 2
- Dennis Kavanaugh – Councilmember, District 3
- Christopher Glover – Councilmember, District 4
- Dana Higgins – Councilmember, District 5
- Scott Somers – Vice Mayor / Councilmember, District 6

**2.3 IRP Responsibility**

Mesa’s Energy Resources Department is responsible for planning and acquiring the electric power resources required to meet the electrical service needs of its customers. Under the direction of the Energy Resources Department Director, the Energy Resources Department is specifically charged with this task. Additionally, the Energy Resources Department is charged with monitoring and updating Mesa’s IRP. Mesa personnel responsible for the IRP are listed below.

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 Energy Resources  
 Department Director  
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 Mesa, AZ 85211-1466  
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 Manager  
 P.O. Box 1466  
 Mesa, AZ 85211-1466  
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**Anthony Cadorin**  
 Energy Resources  
 Coordinator  
 P.O. Box 1466  
 Mesa, AZ 85211-1466  
 Ph: 480-644-4851  
 Fax: 480-644-3336

**Section 3.0 City of Mesa Energy Resources Department Electric Utility Integrated Resources Plan Goals and Objectives**

This IRP represents Mesa’s response to Western’s Energy Planning and Management Program rules delineated by 10 CFR Part 905. In addition to complying with federal regulations, the primary objectives of this project are to develop an IRP that is robust, flexible and economical:

- The IRP is robust in that will still be an appropriate plan under a variety of diverse scenarios. Thus, the IRP will be a “least cost plan” under wide variety of actual circumstances.

- The IRP is flexible in that the plan to acquire the selected resources can be accelerated or delayed if actual circumstances and conditions are materially different than those assumed in the development of this plan.
- The IRP provides an economical approach in that the supply side resources will be acquired through a competitive solicitation process ensuring that the least cost source of supply (without compromising reliability) will be acquired. The department will use present worth and system optimization techniques to compare the various options to determine “least cost”.

Other objectives integral to this IRP are:

- Enhance Mesa’s ability to provide electric utility services to its customers in a safe, reliable and least cost manner, consistent with sound utility business principles;
- Contribute to customer financial stability by providing electric power at rates that allow for continued long-term enhancement in property and asset values;
- Identify the need and timing of new resources and develop an optimal planning strategy that responds to the inherent risks in the energy marketplace.
- Provide a resource portfolio that accounts for the desires of Mesa’s customers in terms of renewable resources and DSM programs.

The IRP achieves these objectives and will increase Mesa’s opportunities to enhance reliability by further diversifying Mesa’s resource portfolio through the development of DSM programs that are focused on reduction of summer peak demands and the acquisition of resources from the regional energy markets through competitive solicitation. Mesa also retains the ability to pursue the development of its own resources absent the availability of economically advantageous resources from the regional energy markets.

## **Section 4.0 Existing Resources**

### **4.1 Power Supply Overview**

Mesa’s existing supply side resources portfolio is comprised of long-term and short-term purchased power agreements. Mesa contracts for power from a variety of entities to supply its total load without relying on a single supplier and as a member in Western’s Resource

Management Services program (RMS), has access to the wholesale power supply market and the ability to engage in short-term firm and non-firm transactions. Mesa relies upon a variety of firm transmission service and substation facilities agreements with Western to provide the reliable delivery of the capacity and associated energy Mesa is entitled to in these agreements.

RMS aggregates the loads and supply side resources (electric generation and transmission) of its members and dispatches and schedules the resources to minimize the costs to its members. Additionally, RMS markets any excess resources of the members and acquires most of its members' supplemental and incremental needs. Western's aggregation of RMS members' loads and resources allows Western to meet Mesa's needs by acquiring standard sized market products which are typically lower in cost than non-standard products. Mesa has accrued significant benefits from its membership in RMS.

#### **4.2 Existing Supply Resources Description**

The Department currently purchases firm power from Western Area Power Administration (Western), Shell Energy North America (SENA) and Constellation Energy Group (Constellation) under firm purchased power contracts. Mesa also participates in the Parker-Davis Resources Exchange Program, along with similarly situated utilities, to integrate and exchange federal hydroelectric resources purchased from Western. The power and energy purchased from all of Mesa's resources is transmitted over Western's Parker-Davis and Pacific Intertie transmission systems to Western's 500kV and 230kV Pinnacle Substations and then to the 230/69 kV Rogers Substation, jointly owned by SRP, Western and Mesa. The power and energy are then transmitted via Mesa's two 69 kV lines to the electrical distribution facilities where the power and energy are then distributed to Mesa's ESA customers. Detailed below are the current power supply resources for the City of Mesa Energy Resources Department as of 2012:

- **Western Area Power Administration**

The agreements with Western are for firm capacity and associated energy from the Parker-Davis Project (P-DP) and Colorado River Storage Project (CRSP) hydroelectric generation facilities as detailed below:

- **Parker-Davis Project Generation:** 10.45 MW Capacity (March – September); 8.0 MW Capacity (October – February); 49,582 MWH Annual Energy
  - Expires September 2028.
- **Colorado River Storage Project Generation:** 4.40 MW Capacity (April – September); 3.30 MW Capacity (October – March); 23,000 MWH Annual Energy.
  - Expires September 2024.
- **Constellation Base Contract**

This contract, replacing a previous agreement with SENA, is for firm capacity, associated energy and reserve requirements. The contract is for 15.0 MW of firm capacity and associated energy subject to *force majeure* conditions. The contract began delivering power as of April 1, 2012 and is set to expire at the end of March 2017.
- **Constellation Peak Contract**

This contract, recently put into place, supplies 10 MW on a 7x16 schedule in July and August and will replace the SENA 1C contract that is expiring after the 2012 peak season. Deliveries will begin on July 1, 2013 and the contract is set to expire at the end of August 2015.
- **Shell Energy North America 1A-C, 2 (formerly through Public Service Company of New Mexico (PNM))**

Mesa has two agreements with Shell that were purchased by Shell from PNM. The first agreement was assigned to PNM by American Electric Power (AEP) in December 2003. Mesa had originally contracted a three-part agreement with AEP for a total of 45 MW in January 2002 to replace expiring purchased power contracts. The contract was the result of a competitive bid process in association with ED-2. In December of 2003, Mesa negotiated a 10 MW reduction in Part 1 of its AEP agreement. Subsequently, AEP, also in December 2003, assigned Mesa's

remaining 35 MW power contract to PNM. In June 2004, Mesa executed an additional agreement with PNM for 10 MW as a result of a competitive bid process. These three agreements were sold to SENA in 2007. These agreements are detailed below:

- SENA Agreement No. 1:
  - Part 1A: 10 MW Firm Capacity (January-December); 7x24 Firm Energy (January-December); Expires May 2013.
  - Part 1B: 15 MW (May-August), 20 MW (September) Firm Capacity; 7x16 Firm Energy (May-September); Expires September 2012. The replacement for this contract (15 MW May – September) was again awarded to SENA through a competitive RFP process and will be expiring in September of 2015
  - Part 1C: 10 MW Firm Capacity (July-August); 7x16 Firm Energy (July-August); Expires August 2012.
  
- SENA Agreement No. 2:
  - 10 MW Firm Capacity – Dispatchable Day Ahead; 7x16 Firm Energy (June-October: 0 – 24,480 MWH); Expires October 2013.

- **Resource Management Services**

The resource scheduling and utilization of Mesa's resources is managed through the Department's participation in the Resources Management Services program (RMS) administered by Western. The RMS group consists of the City of Mesa, Electrical District Number Two (ED-2), Town of Fredonia, Aha Macav Power Service, and Cortaro-Marana Irrigation and Drainage District. As part of the RMS group, these entities pool loads and resources to achieve the benefits of diversity and greater economies of scale when performing purchased power transactions. Western has been contracted to provide the necessary scheduling, dispatching and accounting functions to support the group plus purchase supplemental power as needed on a monthly, daily and real-time basis.

## **Section 5.0 Customer Requirements and Resource Needs Forecast**

### **5.1 Overall System Load Forecast**

The Department's 2012-2022 peak demand and energy load forecast was developed based on recent historical load patterns on a total load demand basis as registered at Mesa's Rogers Substation point of delivery for its power resources, time series trend analyses of weather normalized customer sales as billed and by class, and the identification of discrete commercial developments and their projected electrical requirements within the ESA.

The following graph illustrates the historical demand and energy loads and growth trends in peak demand since 2003 and the projected demand and energy loads based on forecasted peak demand growth for 2012-2021.

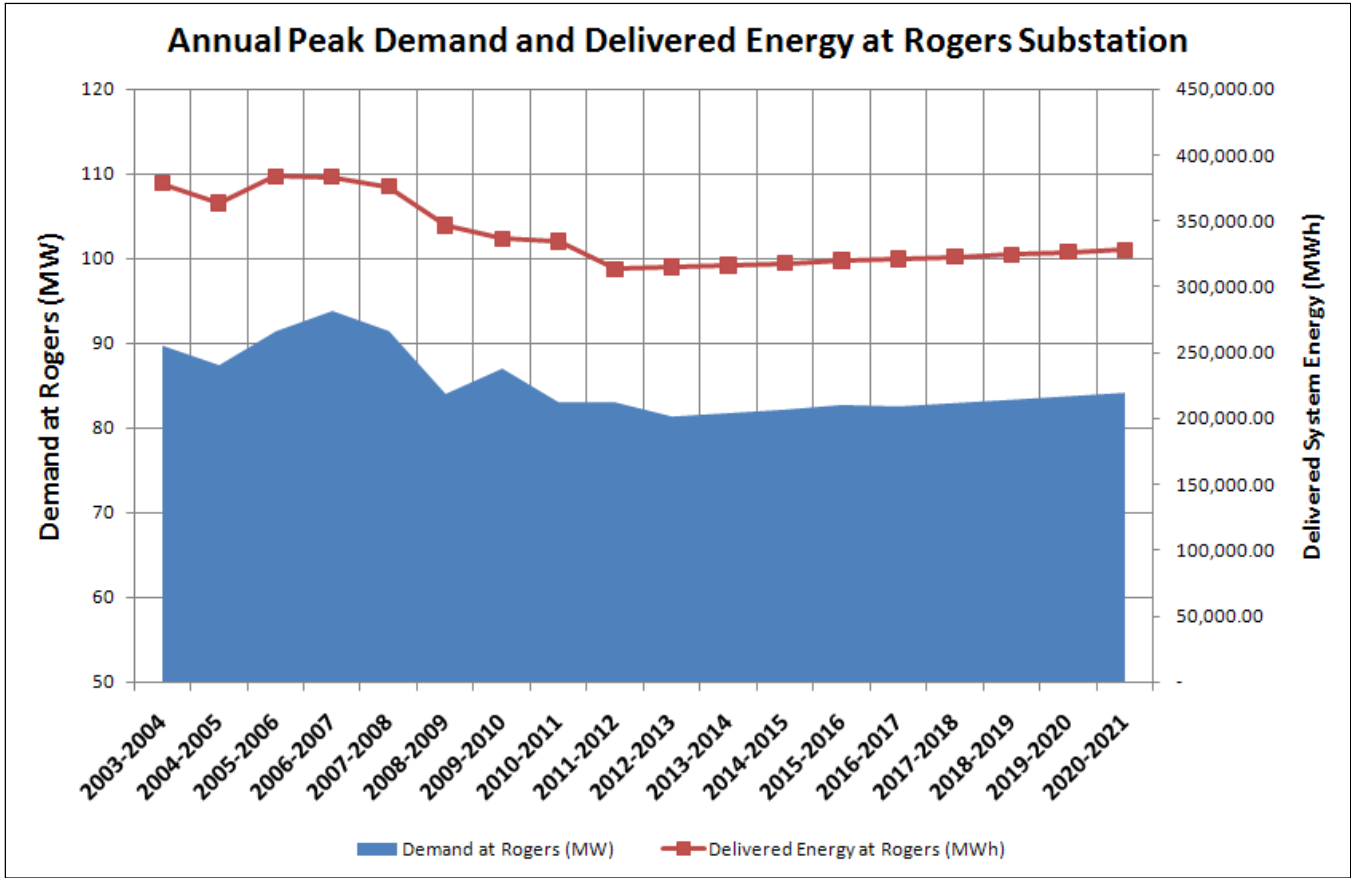


Figure 2) Annual Peak Demand at Rogers (MW) and Delivered Energy (MWh) at Rogers

### 5.2 Customer Profile

Mesa’s ESA is unique when in comparison to SRP’s or APS’s in that Mesa’s ESA is landlocked with no room for outward expansion. As such, any growth in Mesa’s ESA must come from infill of vacant parcels (e.g. re-development or re-use) or expansion of existing facilities. The ESA is beginning to experience some infill growth again, so some growth is forecasted within the ESA provided the continuation of an improving economic climate.

As a whole, Arizona experienced a high level of growth in electricity sales during the period of overall economic prosperity in the early 2000’s, however, from 2007 to 2008, this trend began to reverse and sales dropped through 2009.

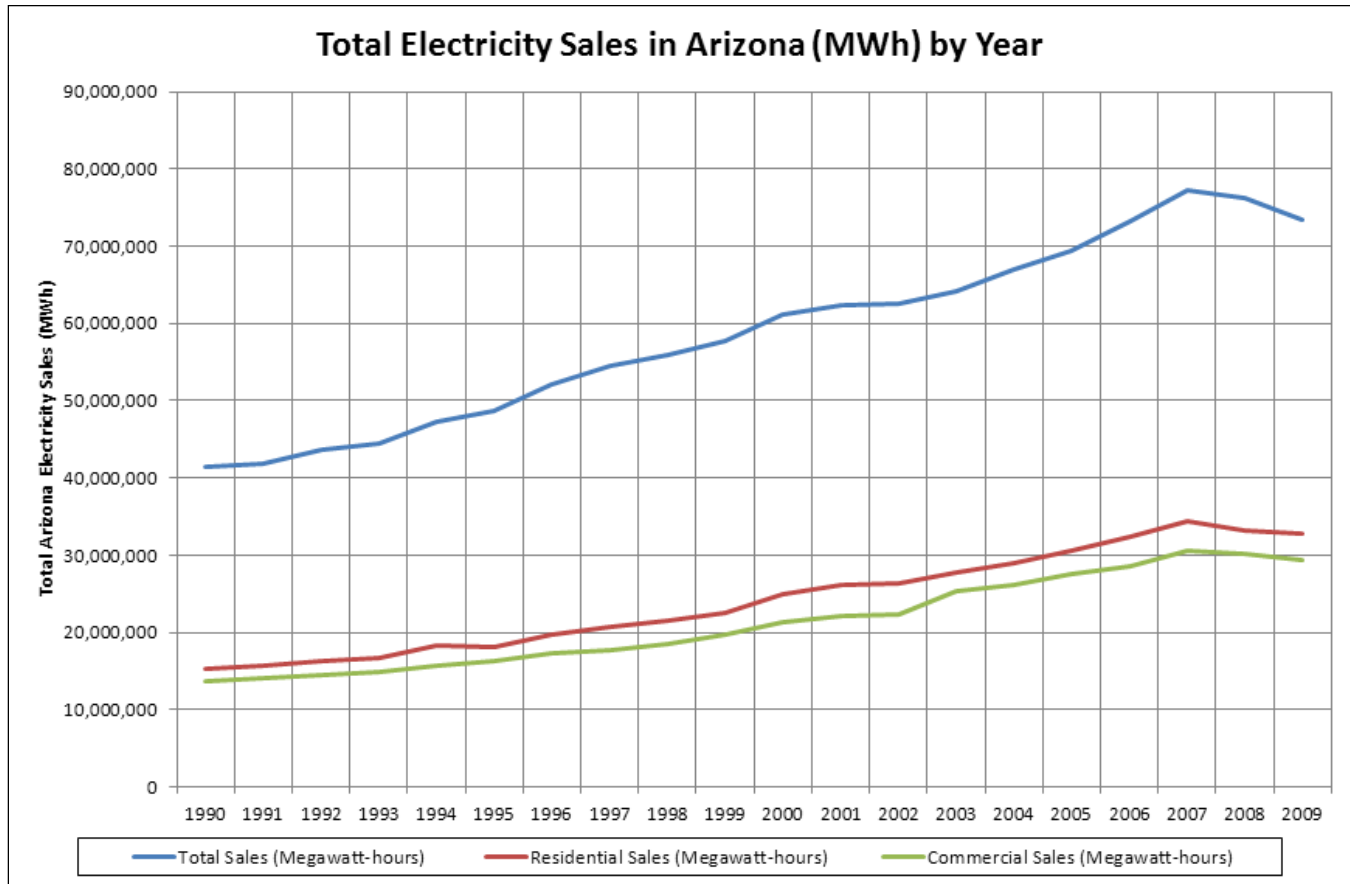


Figure 3) Total Electricity Sales in Arizona (MWh) by Year. Residential Sales and Commercial Sales are also displayed [Energy Information Administration]

In addition, 2007 – 2011 saw a general increase in public interest in energy efficiency and renewable energy generation. The “Energy Independence and Security Act of 2007”<sup>1</sup> required many new energy efficiency improvements including:

- The progressive implementation of increasing energy standards on all new light bulbs (effectively phasing out the use of incandescent light bulbs in certain wattage ranges).
- Efficiency in residential boilers
- Water efficiency standards for dishwashers and clothes washers
- Efficiency in dehumidifiers
- Efficiency in electric motors
- Efficiency in walk-in coolers and freezers

1. <http://www.gpo.gov/fdsys/pkg/PLAW-110publ140/pdf/PLAW-110publ140.pdf>



- Efficiency in external power supplies
- Restrictions in the manufacturing of T12 fixtures for commercial lighting

The increased availability and decreased cost of more efficient lighting could have played a minor role in the reduction of Mesa's peak demand. Since Mesa's last IRP (issued in 2007), Mesa enacted a six month long compact fluorescent light bulb exchange program that resulted in an estimated reduction of over 46 MWh of energy on an annual basis.

As of January 2006<sup>1</sup>, Department of Energy's amended minimum efficiency standards require that all residential air conditioners sold in the United States have a Seasonal Energy Efficiency Ratio (SEER) of 13 or greater. Similarly, as of October of 2008, new packaged commercial air conditioners are also required to have higher Energy Efficiency Ratios (EER), dependent on the units rated size (other regulation is set to take effect in October 2012 that will ensure that all packaged equipment will be required to adhere to the increased efficiency standards). Mesa's peak system demand, occurring in the hot summer months, is mostly driven by residential air conditioning load, so increases in required efficiency will continue to play a significant role in the reduction of Mesa's peak demand as legacy models are replaced with the new, higher efficiency models.

The "American Recovery and Reinvestment Act of 2009"<sup>2</sup> provided additional tax incentives to homeowners of up to 30% of the cost of various home energy efficiency upgrades up to a maximum of \$1,500 if the project was completed in 2009 or 2010.

Arizona HB-2332 of 2009<sup>3</sup> enacted minimum energy efficiency standards and additional public building requirements including:

- Guidelines for Energy Performance Contracting for existing schools
- Property tax exemptions for PV systems, Combined Heat and Power Systems, Energy Efficient Building Components, and Renewable Energy Equipment
- Minimum energy efficiency standards for portable electric spas, residential pool pumps and residential pool pump motors

1. [http://www1.eere.energy.gov/buildings/appliance\\_standards/residential/pdfs/ac\\_factsheet.pdf](http://www1.eere.energy.gov/buildings/appliance_standards/residential/pdfs/ac_factsheet.pdf)

2. <http://www.gpo.gov/fdsys/pkg/PLAW-111publ5/pdf/PLAW-111publ5.pdf>

3. <http://www.azleg.gov/legtext/49leg/1r/bills/hb2332s.pdf>

One other factor that may have contributed to the reduction of peak demand seen at Rogers’ substation is the ongoing upgrading of Mesa’s 4 kV system to 12 kV and the installation of fixed capacitors throughout Mesa’s ESA. Mesa has implemented a program to reduce reactive power requirements and improve system efficiency by systematically adding 10,200 kVAR worth of fixed capacitors. The overall effect of these changes is that with the increased efficiency, less supply is needed at Rogers’ to meet the same amount of tail-end customer demand.

Trend analysis on a customer class level shows a general decline in the number customers in all customer classes, as seen in Figure 4. The number of commercial customers did increase from 2004 through 2007, but this trend reversed in 2007 and has since decreased. Residential and “other” customer classes have decreased since 2004, however, the residential customer class has shown steady growth since the beginning of 2010.

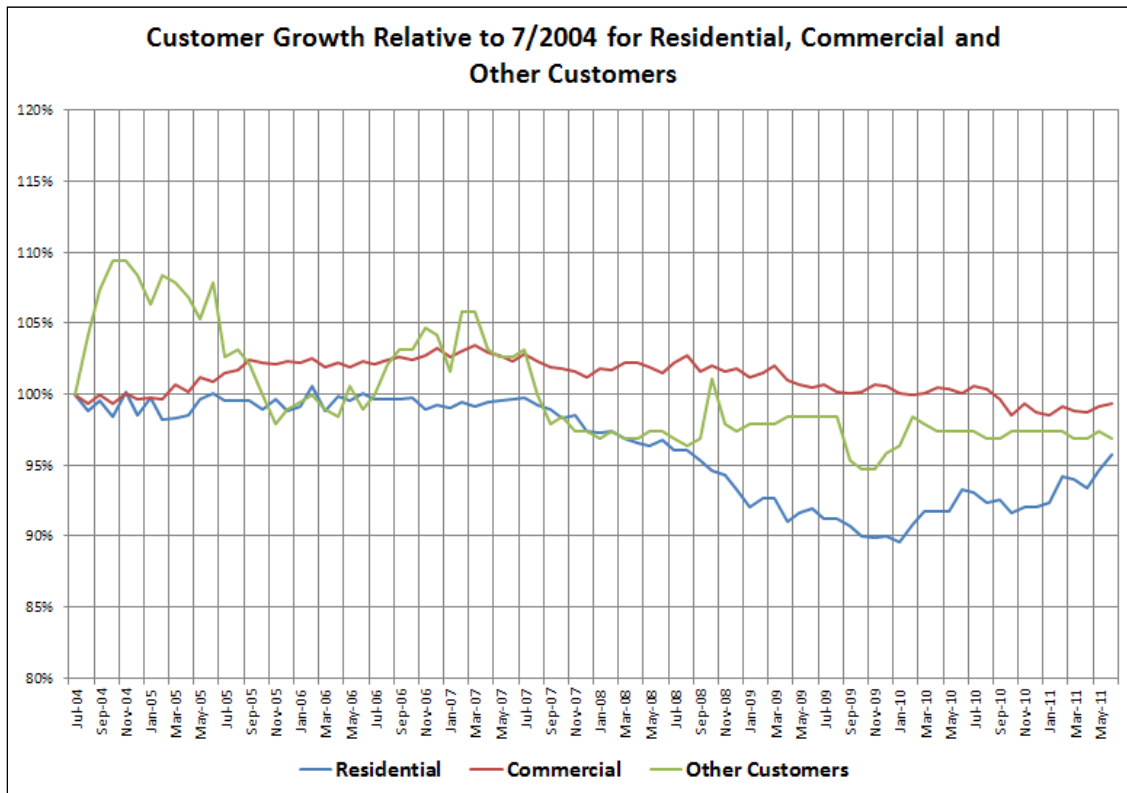


Figure 4) Customer growth relative to 7/2004 for Residential, Commercial and Other Customers

As mentioned previously, a general attitude of conservation and the economic recession are likely responsible for a reduction in overall system energy consumption. This trend can be seen at the customer class level as well. Residential and Commercial annual consumption per customer followed a trend of increasing through fiscal year 2007 (July 2006 - 2007) but began to decrease afterwards. The customers within the “other” category seemed to lag residential and commercial by a year, but since 2008 they also have seen reduced consumption. If this trend continues even given some increase in economic activity, the value of an incentive-based DSM program may be marginal for Mesa given that customers are demonstrating their ability and willingness to change their consumption patterns regardless of incentives.

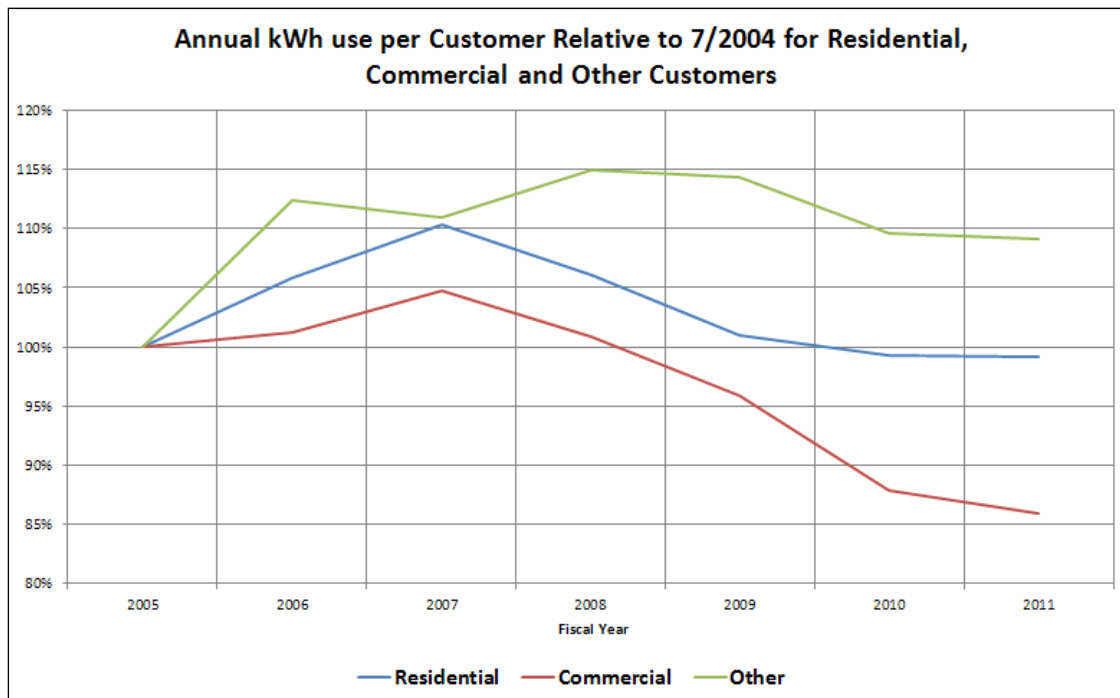


Figure 5) Annual kWh use per customer Relative to 7/2004 for Residential, Commercial and Other customers .

The baseline market conditions within the Department’s ESA were developed to more accurately assess which DSM technologies were most applicable to Mesa’s unique ESA. Mesa’s service territory is not expected to grow significantly in the future due to minimal vacant land for new development and minimal forecasted growth in customer loads. As mentioned previously, the customer growth that is forecasted is attributed to in-fill residential growth

trends and specific commercial and governmental developments and their related electric requirements.

In order to better understand the market, Mesa grouped its customers into distinct customer groups. The relative shares of each end-use customer category by number of customers and by electricity usage are shown in Figure 6 and Figure 7, respectively.

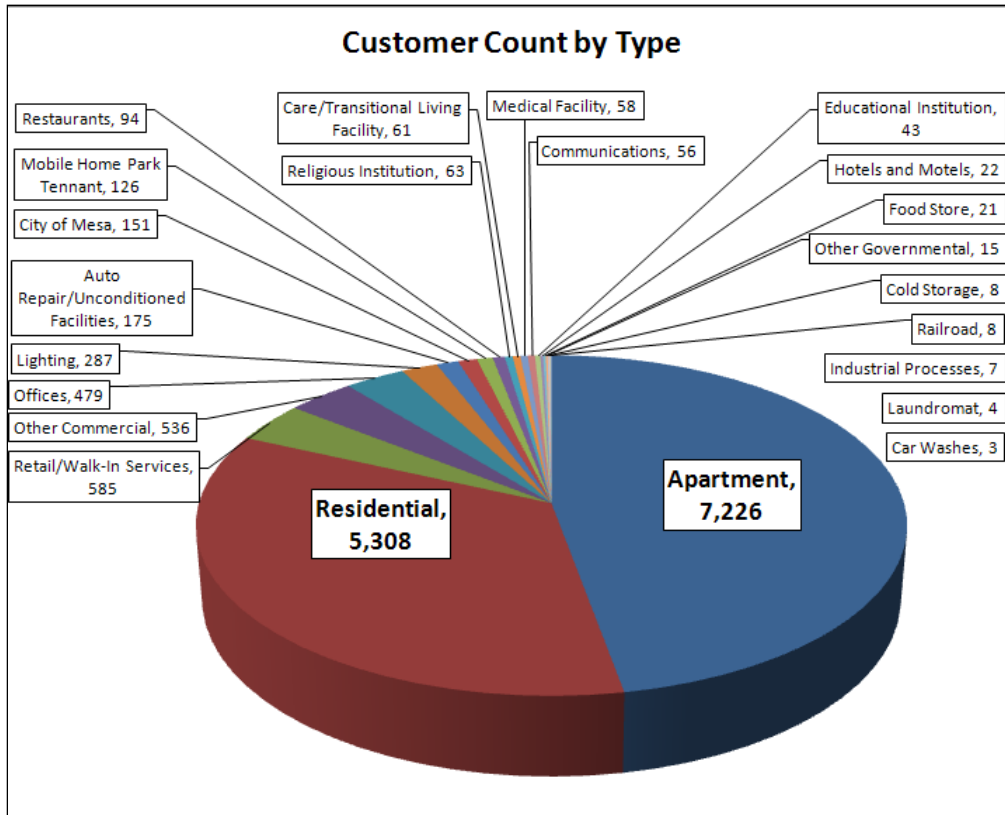


Figure 6) Mesa Utility Market Profile by Number of Customers, 9/2011

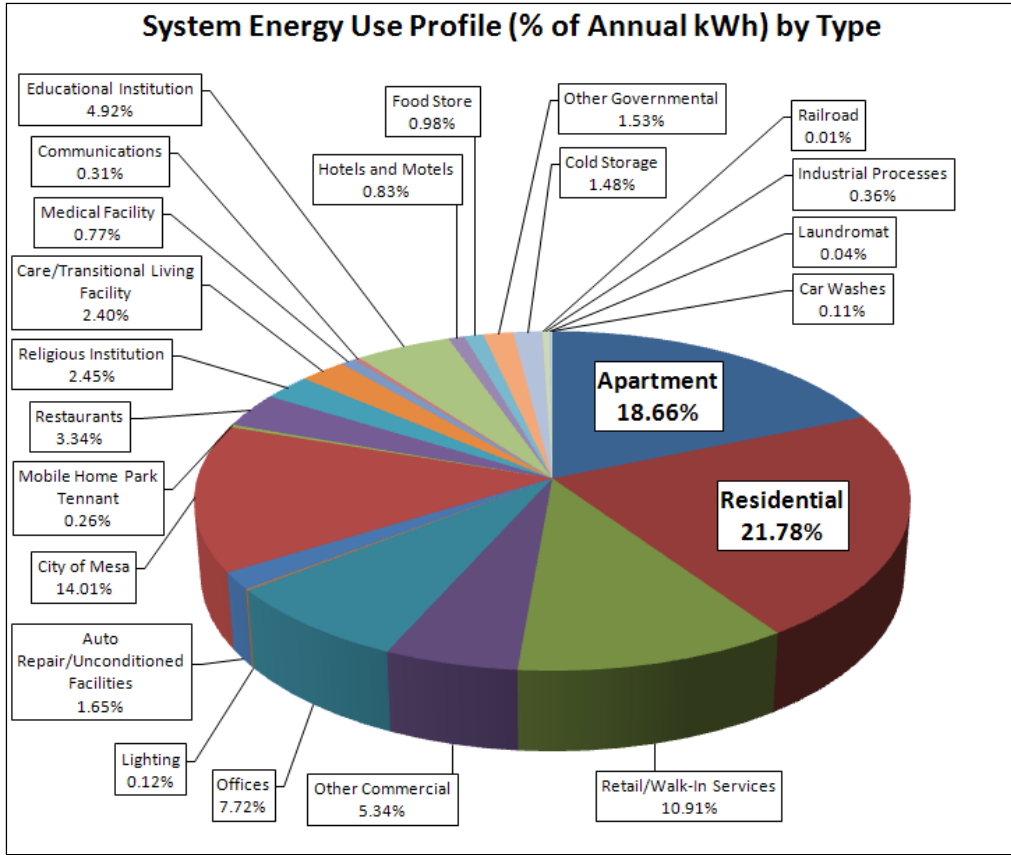


Figure 7) Mesa Utility Market Profile by Energy Billed (kWh), 9/2010 – 9/2011

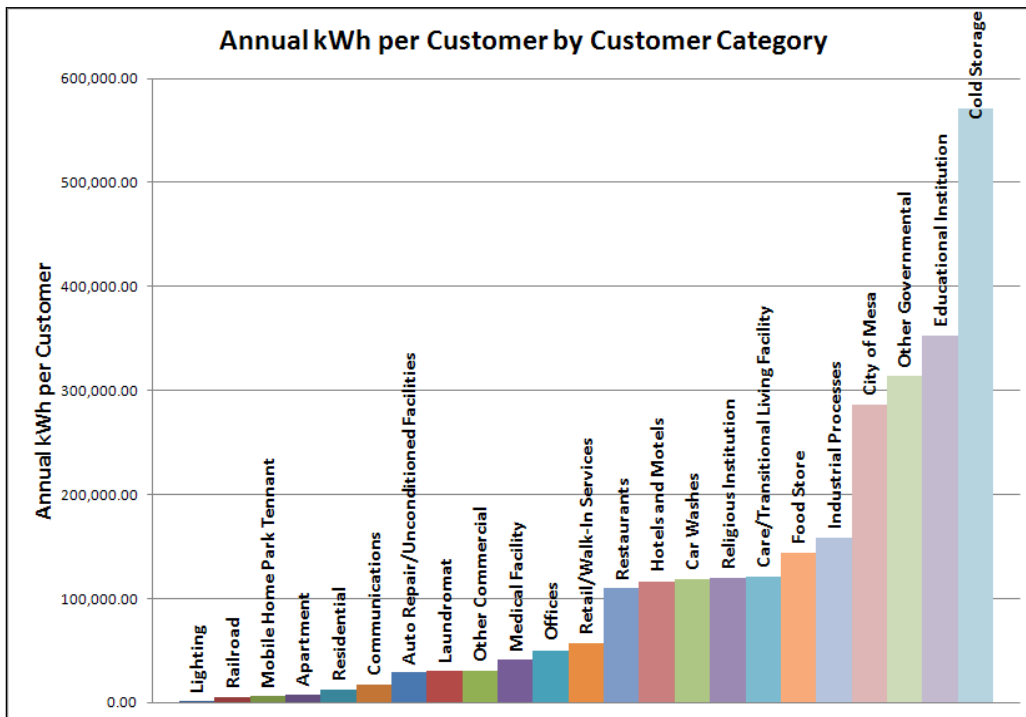


Figure 8) Annual kWh per Customer by Customer Category

As can be seen in Figure 6 and Figure 7, the major end-use customer categories in the ESA are single-family residential, multi-family residential, retail/walk-in services and office space which, in aggregate, comprise 89% of the total market by number of customers and 60% of the total market by billed electric energy use. These results are consistent with findings from previous research efforts conducted for other entities operating in the Arizona marketplace. The future customer base will likely be very similar to the current customer base.

Mesa conducted a survey of 100 randomly chosen single family homes within the ESA. For Mesa, single family residences are generally of the following construction:

- Single story ranch style
- Block wall construction, stucco exterior (78% Block vs. 22% Wood Frame)
- Average construction year 1958 (range 1900 – 2005)
- Average home size 1,510 ft<sup>2</sup> (range 679 – 3,786 ft<sup>2</sup>)
- Refrigeration cooling (air conditioner) (67% A/C vs. 33% Evaporative cooling)
- No pool at the home (88% no pool, 12% pool)

In addition to these findings, the following assumptions were used to generate electric load profiles:

- Water heating and space heating use natural gas
- Air conditioners are rated SEER-9.7

Using these assumptions and the data found in the survey, a building energy analysis model was generated in the Quick Energy Simulation Tool (eQuest) by Energy Design Resources. eQuest is based on the DOE-2 building energy analysis program developed by James J. Hirsch & Associates in collaboration with Lawrence Berkeley National Laboratory. DOE-2 work was performed mostly under funding from the United States Department of Energy. This model was developed for use in the ongoing evaluation of potential DSM programs. Figure 9 shows the modeled estimated average annual electricity consumption by end-use for a

residential single family customer. The model predicted the average single-family residential customer's annual energy consumption to within 2.4% of the actual average.

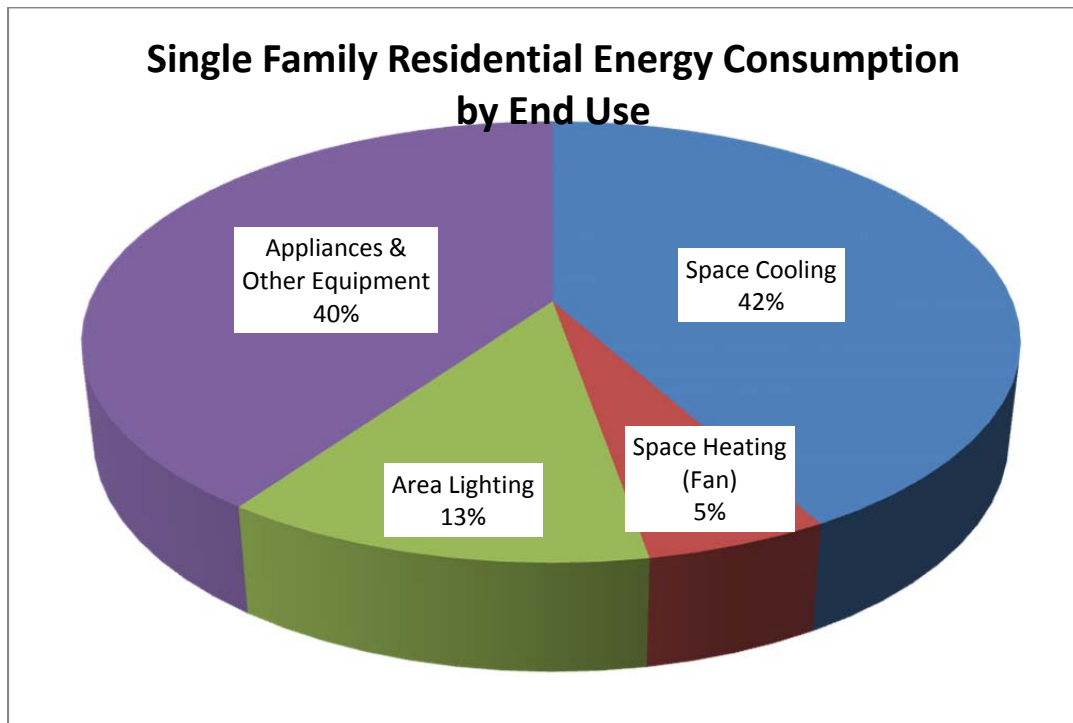


Figure 9) Single Family Residential Energy Consumption by End Use as modeled using eQuest

Mesa conducted a survey of 40 randomly chosen multi-family residences within the ESA. For Mesa, multi-family residences will generally be of the following construction:

- Wood frame construction, stucco exterior (30% Block vs. 70% Wood Frame)
- Average construction year 1978 (range 1960 – 1997)
- Average size 1,115 ft<sup>2</sup> (range 710 – 1,690 ft<sup>2</sup>)
- Refrigeration cooling (air conditioner) (100% A/C vs. 0% Evaporative cooling)

In addition to these findings, the following assumptions were used to generate electric load profiles:

- Water heating and space heating use natural gas
- Air conditioners are rated SEER-9.7

Using these assumptions and the data found in the survey, a building energy analysis model was generated in eQuest for use in the evaluation of DSM programs. Figure 10 shows the

modeled average annual electricity consumption by end-use for a residential multi-family dwelling customer. The model predicted the average multi-family residential customer's annual energy consumption to within 9.6% of the actual average.

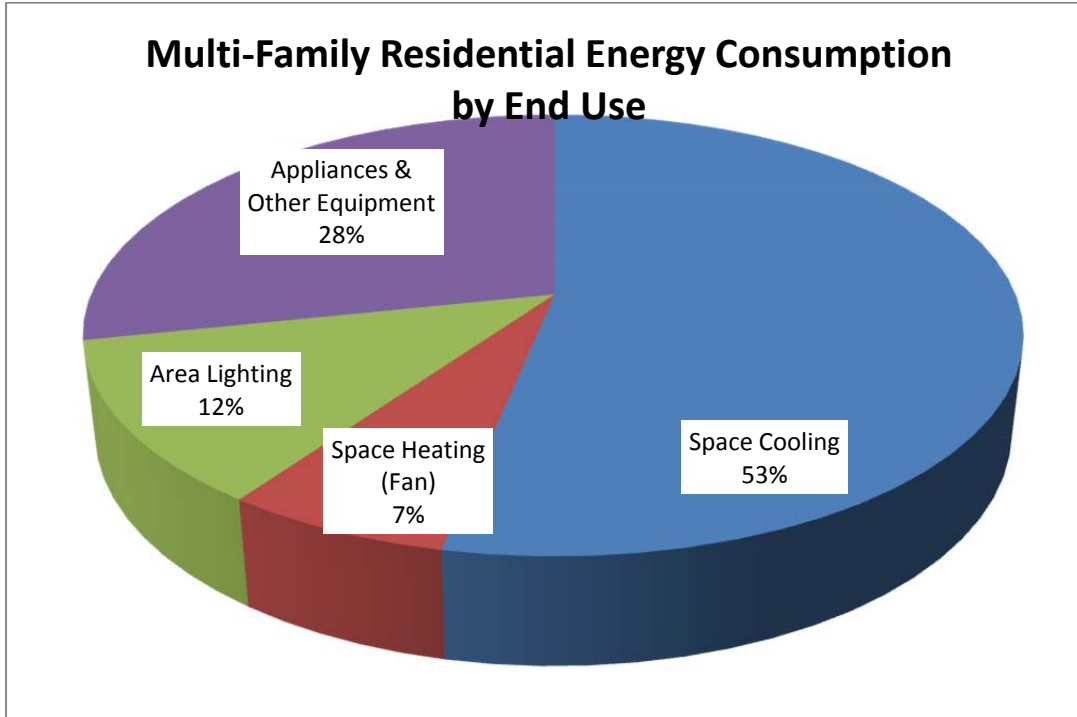


Figure 10) Multi-Family Residential Energy Consumption by End Use as modeled using eQuest.

### **5.3 Forecasted Resource Needs**

Mesa experiences its peak demand during the summer months, specifically in July or August. In July of 2006, Mesa experienced a total system peak demand of 93.8 MW (unadjusted for weather). In August of 2011, Mesa experienced a total system peak demand of 83.0 MW (unadjusted for weather). This reduction in peak demand has meant that the mix of contractual supplies has remained adequate for supporting all peak demand requirements. To determine the 2012-2022 forecasted resource needs, a comparison was made of existing and available resources with the forecast of customer requirements for the same period. Table 3 summarizes Mesa's net resource needs at time of forecasted system peak demand.



Table 3) Load &amp; Resource Table for the Ten Year Outlook

2012-2022 FORECASTED RESOURCE NEEDS								
YEAR	SENA	Constellation	Parker-Davis	CRSP	Losses 3%	TOTAL SUPPLY (MW)	LOAD (MW)	(NEED) (MW)
<b>2012</b>	45	15	10.4	4.3	-2.4	72.3	81.3	<b>-9.1</b>
<b>2013</b>	35	25	10.4	4.3	-2.5	72.2	81.7	<b>-9.5</b>
<b>2014</b>	15	25	10.4	4.3	-2.5	52.2	82.1	<b>-29.9</b>
<b>2015</b>	15	25	10.4	4.3	-2.5	52.2	82.7	<b>-30.5</b>
<b>2016</b>	0	15	10.4	4.3	-2.5	27.2	82.5	<b>-55.3</b>
<b>2017</b>	0	0	10.4	4.3	-2.5	12.2	82.9	<b>-70.7</b>
<b>2018</b>	0	0	10.4	4.3	-2.5	12.2	83.3	<b>-71.1</b>
<b>2019</b>	0	0	10.4	4.3	-2.5	12.2	83.7	<b>-71.5</b>
<b>2020</b>	0	0	10.4	4.3	-2.5	12.2	84.1	<b>-72.0</b>
<b>2021</b>	0	0	10.4	4.3	-2.5	12.2	84.4	<b>-72.2</b>
<b>2022</b>	0	0	10.4	4.3	-2.5	12.2	84.7	<b>-72.5</b>

To meet the forecasted deficiencies, the Department has undertaken a substantive review and analysis of those resource options available to safely, economically and reliably meet its projected resource needs over the planning period. This is more fully discussed in Section 6.0 Resource Options.

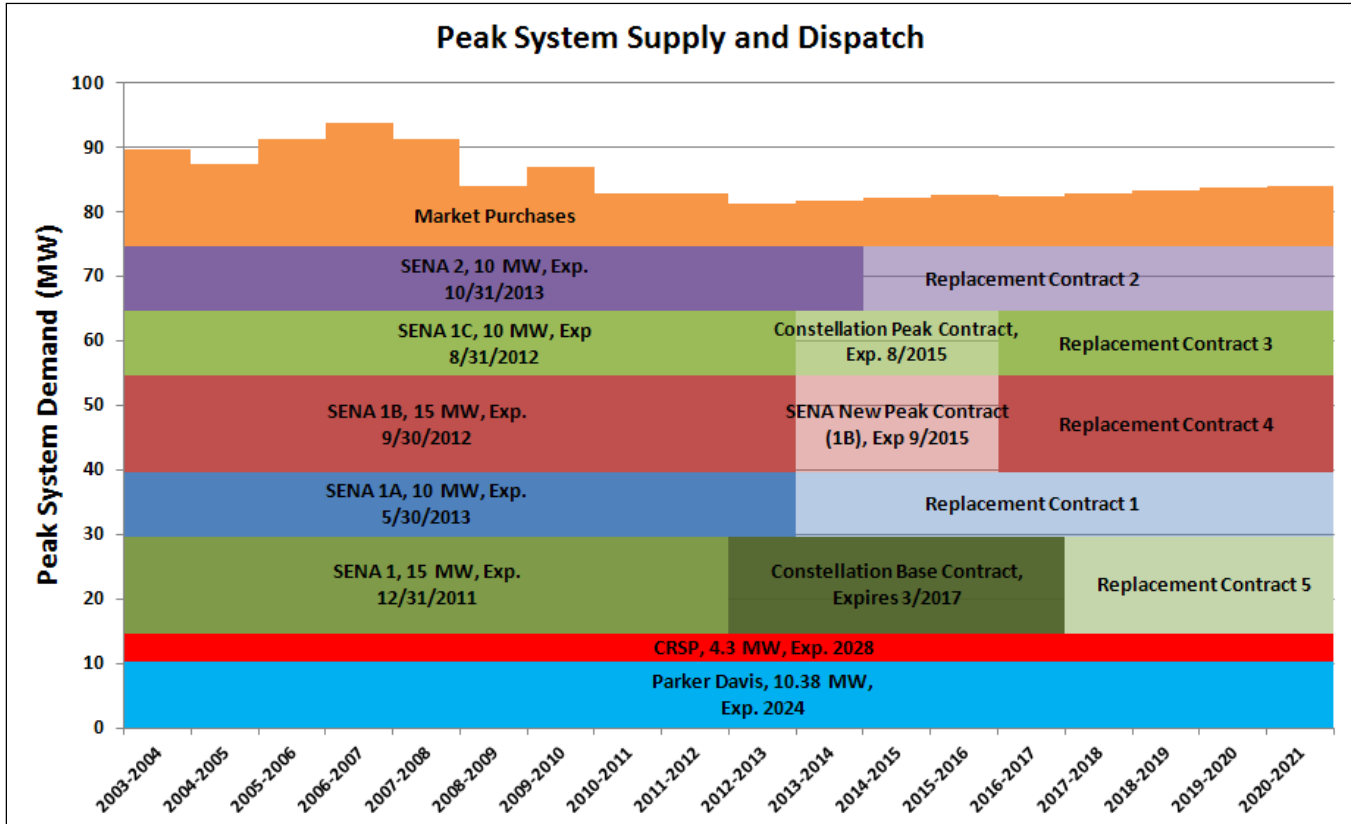


Figure 11) Peak system demand by year, and the associated dispatch strategy

## Section 6.0 Resource Options & Public Participation

In developing a course of action to meet Mesa’s forecasted resource needs, both supply side and demand side management (DSM) resource options were examined.

### 6.1 Demand Side Management Resource Options

In 2007 Mesa contracted a consultant to conduct a DSM potentials study of its residential and commercial class ESA customers. The results of this study indicated a strong, albeit limited potential, to reduce the department’s summer peak demand by implementing certain DSM programs. Mesa’s furthered this analysis for 2012 and concluded that opportunities exist to help both residential and commercial customers save energy during times of peak demand. The following technologies were evaluated due to 1) their use in other Arizona utilities’ DSM programs and 2) their potential to reduce demand during peak consumption hours (certain

DSM measures wouldn't affect peak hour demand and, as such, were discarded from further analysis):

### **Summary of Residential Demand Side Technologies Considered**

#### **Room Heating/Cooling**

- Programmable Thermostats
- Duct Sealing
- High Efficiency Air Conditioning
- HVAC Diagnostics and Tune-Ups
- Quality Installation

#### **Thermal Envelope**

- High Efficiency Windows
- Window Treatments (sunscreens, reflective or spectrally selective film, tinted windows)
- Weatherization and Insulation (ceiling, wall, floor)

#### **Appliances**

- Energy Star Refrigerators
- Refrigerator Recycling

#### **Other**

- Efficient Pool Pumps
- Time Differentiated Rate Pricing

### **Summary of Commercial Demand Side Technologies Considered**

#### **HVAC**

- Programmable and/or Communicating Thermostats
- Quality Installation
- HVAC Diagnostics and Repair
- High Efficiency Packaged Diagnostics
- Duct Sealing

#### **Lighting**

- Compact Fluorescent Lamps
- De-lamping with Reflectors
- Regular or Premium T8 with Electronic Ballasts
- Occupancy Sensors
- Daylighting Controls
- Energy Management System Reduced Unoccupied Lighting Levels

#### **Thermal Envelope**

- High Efficiency Windows

- Window Treatments (sunscreens, reflective or spectrally selective film, tinted windows, high performance glass)
- Cool (light-colored/reflective) Roofing
- Weatherization and Insulation (ceiling, wall, floor)
- Updated Ceiling/Roof Insulation for Older Buildings

**Other**

- High Efficiency Electric Fryer (food preparation customers)
- High Efficiency Office Equipment (copiers)
- Commercial Refrigeration Improvements (high efficiency evaporation for motors, high efficiency ice makers, strip curtains, night covers)
- Time Differentiated Pricing (real time pricing, time of use rates, critical peak pricing)
- Premium Efficiency Motors
- Vending Machine Controllers

Overall, residential customers benefitted the most from HVAC improvement measures (High Efficiency Air Conditioning, Duct Sealing) and envelope measures (Window Treatments). Commercial customers benefitted the most from lighting efficiency improvement measures and HVAC improvement measures, however, this is highly dependent on the nature of the business.

**6.2 Renewable Portfolio Standard**

Renewable Portfolio Standards (RPS) are becoming popular mechanisms for requiring or committing electric utilities to acquire a prescribed amount of electric resources (e.g. 15% of annual energy requirements by 2025) from “renewable” sources (e.g. wind, solar, geothermal, hydro) to meet customer requirements. Mesa is not currently subject to any state or federal regulatory or legislative requirement to set aside a portion of its resource portfolio to renewable resources.

Approximately, 20 percent of Mesa’s total annual energy requirements (18 percent of the system peak demand requirements) are met with energy generated from the hydro-electric generating facilities on the Colorado River. Mesa regards electric energy generated from hydroelectric facilities as a renewable resource.

### **6.3 Customer Owned Distributed Generation Facilities**

Mesa has evaluated options for compensating owners of Distributed Generation facilities. One of the options evaluated was "net metering". Mesa's evaluations indicate that the economics of customer-owned generation options such as roof mounted PV are only slightly improved with net metering and/or utility incentives. The costs of conventional resources are significantly less, including on a net-present-value basis, than the costs of a customer-owned distributed generation (PV) program that includes net-metering and incentives.

### **6.4 Supply Side Options**

Although a strong push for renewable energy was carried through the recent economic recession by programs such as the ARRA and decreasing solar and wind prices, the main focus of recent years has been the vast increase in domestic natural gas supplies due to the shale gas phenomena. As such, the electric distribution industry is in a unique position to pass along savings on extremely low cost resources to its customers; Mesa being no exception to this.

To evaluate least cost options for supply side resources, Mesa issued a competitive RFP to over thirty suppliers for both renewable and conventional electric supplies in the fall of 2011 and received offers from four qualified respondents. Prices to Mesa reflected general trends in the market of extremely low cost power for conventional resources, however, no respondents offered to provide renewable resources. As a result, Mesa issued another RFP to specifically request pricing for supply side renewable resources and received responses from five qualified respondents. Responses showed the general trend of decreasing, but still high, prices for renewable resources (as indicated in Figures 12 through 15).

Analysis was performed to simulate the results of implementing various mixtures of supply side resources. Implementation of renewable resources caused significant increases in supply costs as shown in the following figures:

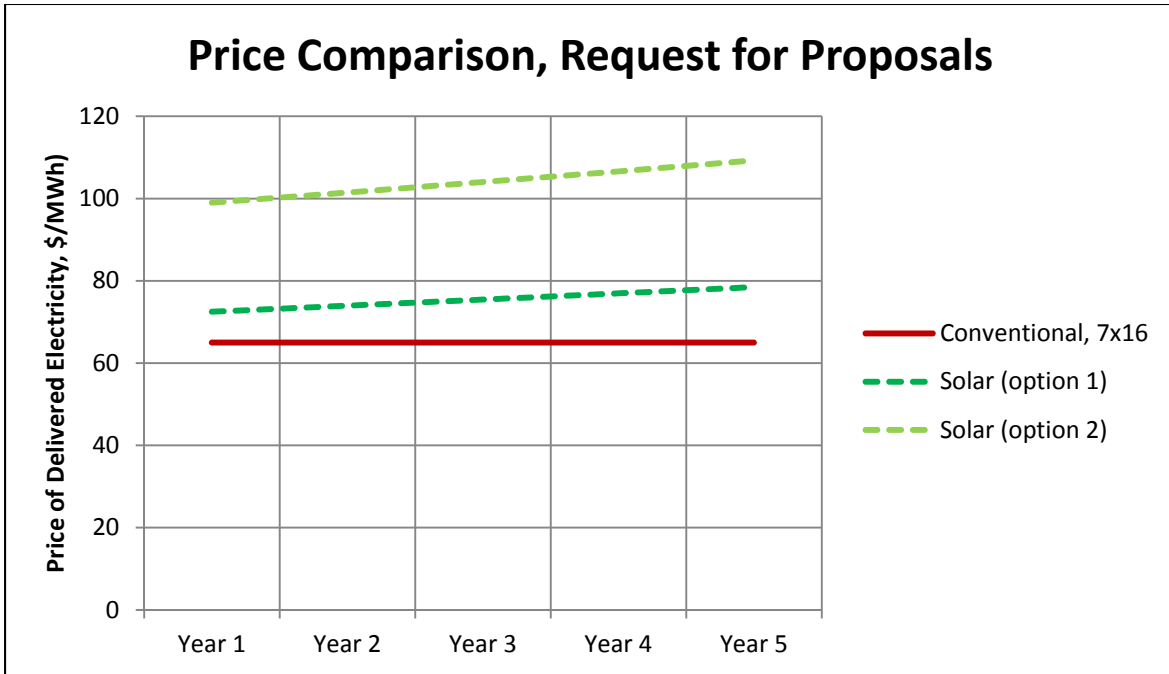


Figure 12) Price comparison from Mesa's requests for proposals comparing 7x16 firm, on-peak power with solar energy

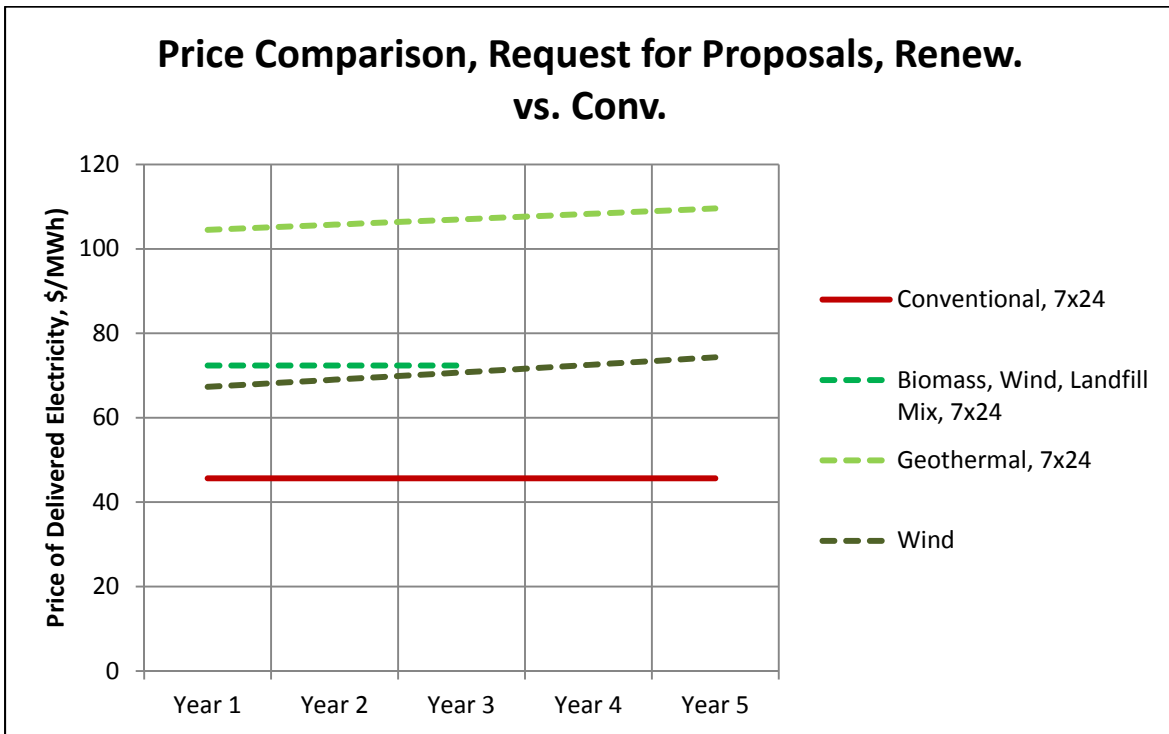


Figure 13) Price comparison from Mesa's request for proposals comparing 7x24 firm power with various renewable power sources

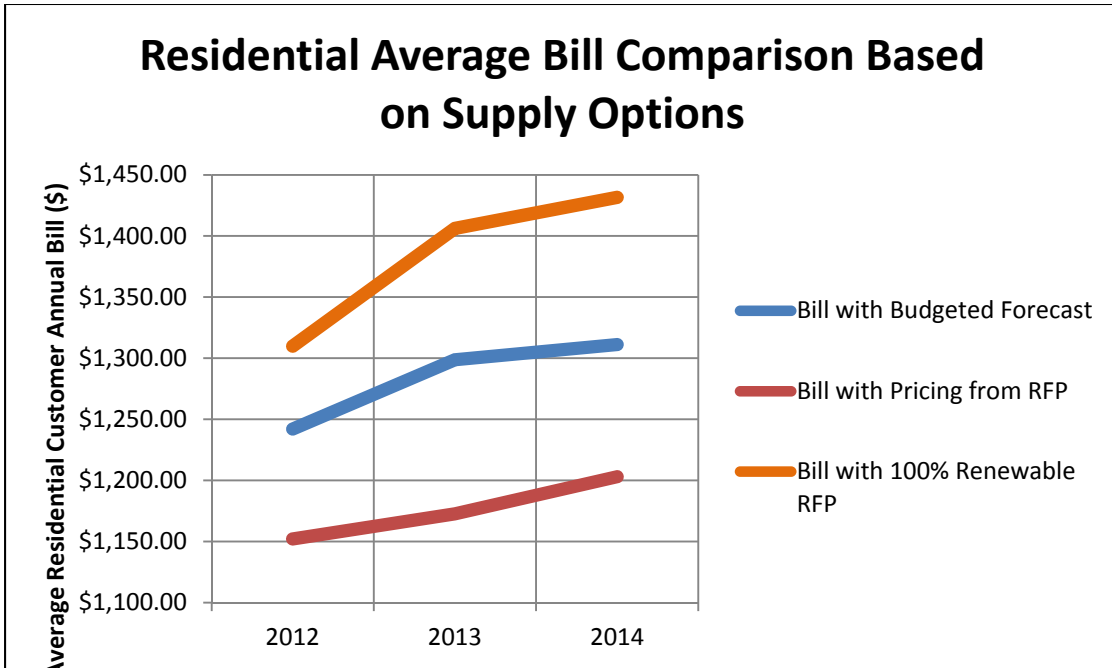


Figure 14) Analysis comparing an average residential customer's bill with budgeted forecast energy costs, average energy costs received through the RFP, and 100% renewable energy costs from the RFP

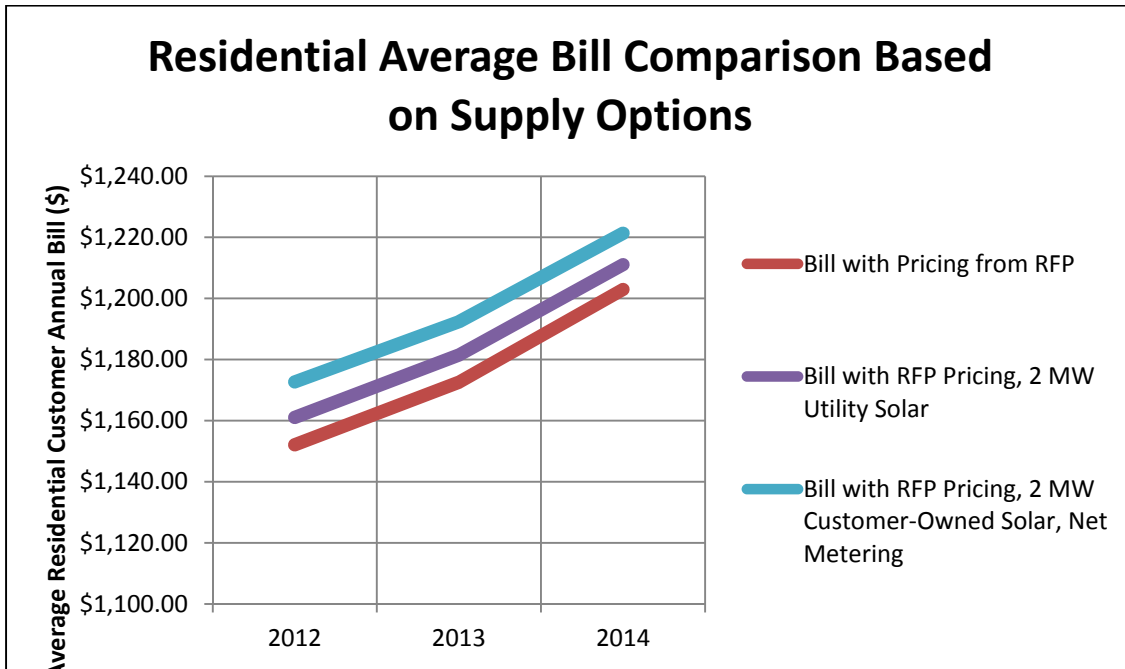


Figure 15) Analysis comparing an average residential customer's bill with 2 MW of customer-owned solar and net metering vs. 2 MW of utility-owned solar

## **6.5 Public Input**

Mesa hosted three community meetings on November 10<sup>th</sup>, 2011, December 13<sup>th</sup>, 2011 and February 29<sup>th</sup>, 2012. At the first and second community meetings, Mesa discussed:

- The analytical steps and processes that Mesa will pursue to develop its IRP;
- The identification of the various alternatives that will be assessed and evaluated for inclusion in IRP;
- Mesa's potential resource selection criteria – to enable Mesa to continue providing safe, reliable and economic electric utility services;
- The use of a 10 year planning horizon to identify resource requirements and to plan for resource acquisitions; and
- The solicitation of public input to assist with development of a “preliminary” IRP including resource alternatives to be evaluated.

These meetings were advertised through a press release, bill message, on Mesa's web site, announcements at “iMesa” meetings, and face-to-face through handing out fliers to Mesa businesses on Main St. At these meetings, three strategies (and corresponding resource costs) for resource acquisition were presented. The first strategy was a continuation of the replacement of expiring contractual resources with similar contractual resources. The second strategy was a replacement of expiring contractual resources with renewable resources. The third strategy was a mixture of the two first strategies. The customers did not comment on the three strategies, however, customers expressed the following concerns:

- Customers suggested time of use pricing as a means to shift peak to better coincide with solar peak production
- Customers suggested that it would be useful to couple pricing options with other Demand Side Management (DSM) programs
- Given the high usage of some of the larger commercial customers, customers suggested that it may be worthwhile to look to those customers for DSM savings (energy audits)
- Customers suggested that Energy Efficiency and Conservation Block Grants would be worthwhile for assisting low income customers
- Customers suggested that some other methods of Demand Side Management to investigate would be
  - Injected foam for block construction housing
  - Duct leak repair



- Customers suggested making sure that sustainability is taken into account when trying to select the “best” energy supply resource through the IRP process in addition to the value of peak reduction, reliability and cost
- Customers suggested that net metering may be more important than an up-front incentive given the falling prices of photovoltaic modules and the recent availability of solar lease programs
- Customers suggested that in light of the current consensus on climate change and the pollution generated from conventional resources, it would be responsible on the City’s part to purchase more energy from clean sources
- Customers suggested that it would be useful to be able to quantify which energy sources (i.e. the percentage of natural gas vs. other sources) are being used to supply Shell’s portion of the energy
- Customers suggested that Energy Resources could look at the Xeriscaping incentive program as a model for any DSM incentive programs that they’re looking to implement

At the community meeting on February 29<sup>th</sup>, 2012 Mesa presented its “preliminary” IRP recommendations for comments and input from its customers. Mesa’s recommendations were based upon the input at the community meetings as well as inquiries that Mesa has received from customers over the course of the years that reflects their concerns about the price of electric utility services and their bills. The recommendation to implement a Solar PV Pilot Program was favorable with the customers that were in attendance at that meeting.

## **Section 7.0 IRP Plan Recommendations**

The Department’s plan will focus on the acquisition of a least-cost combination of resources consistent with its resource needs. In the near term, 2012 to 2013, Mesa’s resource requirements will be met using a combination of short-term and medium-term wholesale purchases that are acquired in close proximity to when they are needed, as has been Mesa’s practice for several years. This approach enables Mesa to take advantage of the competitive wholesale markets and to minimize any risk associated with acquiring excess, uneconomic resources that it will have to bear for an extended period. Mesa may administer its own competitive solicitations when the magnitude of Mesa’s incremental needs are of sufficient size and duration to justify this approach. Examples of opportunities for medium-term competitive solicitation include the replacement of the SENA 1A and SENA 2 contracts in 2013. These

contracts should be replaced for three to five year terms depending on the market pricing at the time of solicitation. Other short-term resource needs (month-ahead and week-ahead) can continue to be met through Mesa's participation in the RMS group.

Coincident with the timing of the expiration of the Constellation Base Contract, hydro-electric resources from the Boulder Canyon Project may become available. These resources are renewable, inexpensive, and reliable and would likely result in energy cost savings for Mesa's customers. Mesa should capitalize on the opportunity to participate in the Boulder Canyon Project should these resources be made available through the Arizona Power Authority in 2017.

Similarly, coincident with the timing of the expiration of the SENA 1B and Constellation peak contracts, resources will be made available for participation in Sempra's Mesquite plant. These resources could prove to be extremely cost effective for replacement of peak-type contracts and the current timing of the expiration of Mesa's peak-type contracts will enable Mesa to participate in this project should the economics of the plant prove favorable.

Rather than incentivizing specific DSM measures, Mesa will utilize energy conservation education as its primary form of DSM. In general, the vintage of the building stock in Mesa's ESA does not lend itself to a high degree of energy efficiency. For example, when modeling residential energy use within the ESA, a SEER 9.7 air conditioner cooling a minimally insulated building accurately modeled the year-round energy consumption for the average residential customer. Given that the minimum SEER of a new air conditioner is now 13, any replacement of the existing stock of HVAC equipment will ensure a reduction in peak demand given equivalent customer behavior. This is why an energy education approach should be utilized by Mesa to promote energy conservation. Changes in the efficiency of the physical equipment are now occurring organically as a result of strict energy efficiency standards at the federal and state level. These improvements, however, can easily be negatively offset by, for example, the customer turning the air conditioning set-point down only a few degrees during the summer which is just one example of why energy conservation education will be crucial within the ESA over the short- and long-term. Additionally, while customers are somewhat uniform throughout

the limited geographic area that comprises the ESA, every customer does possess unique energy consumption habits and so a utility incentive for a specific appliance may not be money well spent when an alternative, simple and inexpensive solution may be available to save even more energy. Educating the customer on how to properly analyze his or her energy consumption for ways to save will maximize the return on investment for both the customer and Mesa in terms of conserving energy.

It is also important to note that there has been a strong trend of negative demand growth within the ESA indicating that customers are already conserving (due to the slowing of the local economy and a general increased interest in energy conservation, possibly due to Mesa's ongoing efforts in energy conservation education). Mesa believes that this negative trend will be stopped and likely reversed and is projecting slight growth going forward, however, until growth in demand resumes that warrants an aggressive DSM program, Mesa should continue with a comprehensive strategy for educating the customer about energy conservation including:

- Commercial energy audits for commercial customers who have concerns of high energy bills. These audits will provide the customer with a historic energy consumption analysis to note any (positive or negative) trends in energy consumption; infrared camera photos to detect anomalies in building construction, insulation, or leaks in the building shell; and energy modeling to determine what energy conservation improvements may provide an adequate return on investment
- Energy conservation seminars where Mesa staff demonstrate the use of energy simulation software or demonstrate how to calculate financial payback on energy conservation measures
- Assessment and the development of interactive, web-based applications that help the customer learn where energy is being consumed in the house to then evaluate what energy conservation measures would be most beneficial

During the IRP period, should positive demand growth resume and accelerate, Mesa's analysis has positioned it to respond by implementing what it has determined to be the most cost effective DSM incentive programs if appropriate.

Because the public input from the November and December IRP meetings, and public input from "iMesa" (an online and in-person forum for suggesting ways to improve operations of the City), Central Main Plan meetings and Pancake Breakfasts showed a very strong desire for net metering and solar PV generation, Mesa will pursue a Solar PV Pilot Program to evaluate the merits and effects of incentivizing customer-owned solar photovoltaic distributed generation. This pilot program will allow Mesa to investigate any positive or negative effects from the implementation of this type of program prior to encumbering the burden of implementing a large-scale, long-term incentive program.

The Solar PV Pilot Program will be implemented for a period of twelve months during which customers will be eligible for an up-front incentive of up to \$1.00 per watt-DC of installed PV generation. The following table details the constraints of the Solar PV Pilot Program:

Table 4) Solar PV Pilot Program Details

<b>Customer Type:</b>	<b><u>Residential</u></b>	<b><u>Commercial</u></b>
<b>Incentive (\$/watt-DC):</b>	\$ 1.00	\$ 1.00
<b>Maximum kW / \$ Incentive:</b>	5 kW / \$ 5,000	10 kW / \$ 10,000
<b>Annual Budget:</b>	\$ 50,000	\$ 50,000

Evaluation of the outcomes following the Solar PV Pilot Program will determine whether or not to continue to incentivize customer-owned PV generation on a long-term basis.

Table 5 details the five-year outlook for the recommended final IRP plan.

Table 5) 5 Year Outlook for the Recommended IRP Plan

Year	2012	2013	2014	2015	2016
<b>FIRM CONTRACT PURCHASES (MW)</b>					
Constellation - 15 MW: 7x24, Jan – Dec	15.0	15.0	15.0	15.0	15.0
SENA 1A - 10 MW: 7x24, Jan - Dec	10.0	0.0	0.0	0.0	0.0
SENA 1B - 15/20 MW: 7x16 May-Sep	15.0	15.0	15.0	15.0	0.0
SENA 1C - 10 MW: 7x16 Jul-Aug	10.0	0.0	0.0	0.0	0.0
Constellation – 10 MW: 7x16 Jul-Aug	0.0	10.0	10.0	10.0	0.0
SENA 2 - 10 MW: Day Ahead (7-22,M-S), Jun-Oct	10.0	10.0	0.0	0.0	0.0
<b>NEW CONTRACTED RESOURCES (MW)</b>	0.0	10.0	20.0	20.0	45.0
Transmission Losses, Non-Federal @ 3%	(2.4)	(2.5)	(2.5)	(2.5)	(2.5)
PARKER-DAVIS (7.95MW; 10.379MW)	10.4	10.4	10.4	10.4	10.4
CRSP (3.407MW; 4.312MW)	4.3	4.3	4.3	4.3	4.3
<b>TOTAL PURCHASES (MW)</b>	72.3	72.2	72.2	72.2	72.2
MESA GENERATION (MW)	0.0	0.0	0.0	0.0	0.0
AD HOC RESOURCES (MW)	9.1	9.5	9.9	10.5	10.3
<b>TOTAL NET FOR LOAD RESOURCES (MW)</b>	81.3	81.7	82.1	82.7	82.5
<b>FIRM SYSTEM LOAD (MW)</b>					
NET FIRM LOAD @ ROGERS (MW)	81.3	81.7	82.1	82.7	82.5
NEW DSM PROGRAMS (MW)	0.0	0.0	0.0	0.0	0.0
<b>TOTAL LOAD, MW</b>	81.3	81.7	82.1	82.7	82.5
<b>(DEFICIENCY) / SURPLUS (MW)</b>	0.0	0.0	0.0	0.0	0.0
<b>CUSTOMER-OWNED GENERATION (MW)</b>					
SOLAR PV PILOT PROGRAM (MW)	0.1	0.1	0.1	0.1	0.1

## Appendix

RESOLUTION NO. 10080

A RESOLUTION OF THE COUNCIL OF THE CITY OF MESA, MARICOPA COUNTY, ARIZONA, APPROVING THE INTEGRATED RESOURCE PLAN AND CONFIRMING THAT ALL REQUIREMENTS OF 10 CFR 905.11 HAVE BEEN MET.

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MESA, MARICOPA COUNTY, AS FOLLOWS:

Section 1. That the Integrated Resource Plan prepared by the City of Mesa Energy Resources Department for submission to the Western Area Power Administration is hereby approved and confirmed.

PASSED AND ADOPTED by the City Council of the City of Mesa, Arizona, this 25<sup>th</sup> day of June, 2012.

APPROVED:



\_\_\_\_\_  
Mayor

ATTEST:

  
\_\_\_\_\_  
City Clerk

