

Public Advisory Group  
Special Session  
on Analysis for 2018 IRP

# Outstanding Unresolved Issues as of January 11, 2018

# New Issues

# Weighted Average Cost of Capital (WACC) should be 6.5514%

- EPE plans to utilize a WACC of 7.747%
  - Need explanation of how this was determined
  - Is this after tax WACC?
  - In its 2016 Energy Efficiency Plan filing, 16-00185-UT, EPE claimed that 6.5514% was its PRC-approved after tax WACC from its most recent rate case

# Facility Life Assumption Discrepancies

Resource	Lazard's	EPE
Combined Cycle	20 years	45 years
Reciprocating Engine	20 years	40 years
Solar	30 years	25 years
Wind	20 years	25 years

# Xcel Energy 2016 ERP All Source Solicitation New Information

- Wind @ \$18.10/MWh
- Wind and Solar @ \$19.90/MWh
- Wind with Battery Storage @ \$21.00/MWh
- Solar (PV) @ \$29.50/MWh
- Wind and Solar with Battery Storage @ \$30.60/MWh
- Solar (PV) with Battery Storage @ \$36.60/MWh

How Does this compare with EPE's 2017 All Source RFP?

# Baseline Assumptions

# Retirements

- Rio Grande Unit 6
  - RG6 has served load every year, but is “considered retired for planning purposes” by EPE
  - EPE refuses to analyze RG6 per the Joint Stipulation provision that EPE agreed to review continued operation of units slated for retirement within five years and conduct quantitative modeling for cost effectiveness of the continued operation of these units
  - This topic is now the subject of a Petition for Declaratory Order, Case No 17-00317-UT at the PRC
- Rio Grand Unit 7, Newman 1, and Newman 2
  - EPE has contracted Burns &McDonnel to evaluate continued operation for an additional 20 years. Results won't be available until late March or April and will only be used for an alternative scenario
  - EPE has declined to commit to evaluate shorter increments proposed by the PAG members
  - The topic of shorter increments is now the subject of formal dispute #3

# Demand Forecast

- The demand forecast in the L&R Table is not reasonable
  - Line 5.0, Total System Demand, is pre-determined regardless of changes in assumptions in the elements of Distributed Generation and Energy Efficiency
  - Growth in Distributed Generation is under represented
  - Interruptible Sales were not triggered and should reduce the Total System Demand Forecast



# Energy Storage

- Energy Storage is now required to be on the Loads & Resources Table and EPE has declined to modify the Table

# Resource Analysis

# Gas Combined Cycle

- EPE agreed to use Lazard's 11.0 values for input to Strategist
  - Lazard's identifies a 20 year life
  - EPE used a 45 year life

# Gas Reciprocating Engine

- EPE agreed to use Lazard's 11.0 values for input to Strategist
  - EPE used a 40 year life
  - Lazard's identifies a 20 year life

# Solar

- EPE agreed to use Lazard's 11.0 values for input to Strategist
  - Lazard's identifies a 30 year life
  - EPE used a 25 year life
- EPE references the availability of solar
  - Does EPE use the values in the "Generic Hourly Solar Profile" exactly as represented on pg 51 of the October 5 presentation material?
- Will EPE model @ Xcel Energy benchmark of \$0.0295/kWh?
- What exactly will EPE model?

# Wind

- EPE agreed to use Lazard's 11.0 values for input to Strategist
  - EPE used a 25 year life
  - Lazard's identifies a 20 year life
- EPE references the availability of wind
  - Does EPE use the values in the "Generic Hourly Wind Profile" exactly as represented on pg 52 of the October 5 presentation material?
- Will EPE model @ Xcel Energy benchmark of \$0.0181/kWh?
- What exactly will EPE model?

# Storage

- Needs to be included in the Loads & Resources Table
- Needs to be analyzed with some amount as a “must use” resource
- EPE 11/16/17 slides on storage included power but not energy, which is needed to reduce peak demand by shifting load. How much energy will be modeled?
- Will EPE analyze @ Xcel Energy benchmark of \$11.30/kw-mo?
- How will the analysis of a “least cost portfolio” evaluate avoided costs from Transmission and Distribution capital investments due to the use of storage as a resource?

# Wind with Storage

- Will the very low costs for wind plus storage in recent Xcel Colorado documents be reviewed or included in future modeling?
- How much storage capacity will be included with wind?
- What exactly will EPE model?



# Solar with Storage

- EPE will model @ \$0.039/kWh with modifications.
  - What modifications?
  - What levels of storage power (MW)
  - What levels of energy (MWh) will be modeled?
- Will EPE model @ Xcel Energy benchmark of \$0.0366/kWh?

# Energy Efficiency

- How will EPE model Energy Efficiency as a resource so that it is consistent with national reports that:
  - agree with Molina (2014) “on a legalized cost basis, new energy efficiency programs cost about one-half to one-third as much as new electricity generation resources”
  - indicate that EE can supply over 80% of capacity needs for large power systems (NWPCC, 2016)
- How will EPE model Energy Efficiency as a resource so that it is consonant with extensive modeling conducted by the NWPCC that indicated a cost of \$18 megawatt/hour (if impact on the need to expand T&D systems is included) to \$30 per megawatt-hour (if those benefits are not included), compared to Gas Fired CC at a cost of \$71 per megawatt hour (NWPCC. 2016), or the cost of \$21/kWh found in a Lawrence Berkeley National Laboratory (2014) study of 31 states from 2009 to 2011
- Is EPE willing to contract with an appropriate consultant to develop accurate EE modeling assumptions for Strategist, at a cost and capacity consistent with national findings?

# Time of Use (TOU)

- EPE says "TOU rates ... will not be modeled as a resource in the Strategist model."
  - EPE claims that they will model high and low demand sensitivities as if that is equivalent to treating TOU as a resource
- TOU rates are a feasible resource to help meet peak demand and should be modeled on a comparable basis with other resources.
- EPE's unwillingness to model TOU as a resource will likely be the subject of a dispute

# Purchase Power Spot Buys (PPSB)

- In EPE's response to the PAG presentation of 9/22/17, EPE dismisses the PAG suggestion that PPA's be used at times of peak demand to meet load needs for a few hours at a time, as an alternative to building new power plants that serve ratepayer capacity needs only a few hours a year.
- Is it EPE's contention that fixed PPA's are not available during peak hours in our region?
- If firm peak time PPA's are in fact available – even at a premium price – will EPE model them at that premium price?
- EPE's unwillingness to model PPSBs as a resource will likely be the subject of a dispute

# Demand Response – Enhanced e Smart

- This type of DR is by far the lowest cost option in EPE's 11/16/17 Resource Options, at \$369/kW, but was not chosen by Strategist.
- EPE's response to 11/16/17 Q27 states their contribution is limited, but doesn't answer question why lowest cost option wasn't chosen. Why not?
- How much capacity will be modeled?
  - EPE's stated they will model 5 to 16.9 MW. Does that mean **both** 5 MW and 16.9MW
- Even small amounts of DR can be effective during peak periods, which is the whole point of DR — it moves energy use from peak to other periods without necessarily decreasing the amount of energy used, thus lowering the need for capacity that would be provided by expensive new generating facilities. How will Strategist take into account this kind of *strategic* use of DR in its modeling?
- EPE has stated it will investigate further viable programs for consideration in the IRP. What additional programs are being modeled, at what costs and capacities?
- Is EPE willing to contract with consultants who have developed extensive and effective DR programs in order to inform its DR strategy and assumptions?

# Demand Response - Interruptible Rates

- Interruptible rate pricing can reduce coincident peak demand with no capital costs to EPE
- Interruptible rates can be revenue-neutral when rates are properly designed.
- EPE's response to 11/16/17 Q20 & Q21 gave a price of \$100/kW – yr but did not clarify how the analysis will be structured
- How exactly will EPE model this resource?

# Distributed Generation (DG)

- EPE does not agree that DG is a viable option to model
  - The DG template recommends subsidizing of DG Solar
  - EPE says it does not make sense for customers to subsidize solar when contribution at peak is below 50% versus utility scale that is at 70%
  - EPE says the template recommends \$80/MWh which is greater than utility scale PPA prices
- DG is a feasible demand side resource that uses different capital sources than the utility's capital and should be modeled
- The proposed resource template suggested other values at \$20/MWh and \$40/MWh
- The topic of DG as a resource is now the subject of formal dispute #4

# Nuclear

- Palo Verde Nuclear Generating Station (PVNGS) Unit 3 is officially “decertified and abandoned”
- PVNGS 3 provides customers with use of capacity and energy, when available, under a purchased power agreement and a “proxy” market price
- How does Strategist treat PVNGS 3 211MW capacity?



# Scenario Requests

# All Fossil Fuel Plants Out of Service by 2038

- Fossil fuel power plants may be obsolete by 2038 due to
  - Greenhouse gas emissions regulations due to climate change
  - Air pollution and water use regulations
  - Availability of more cost effective renewables and storage
- A request that EPE model this scenario has been submitted
- EPE has not yet replied to this request

# Scenario Request: Use Prices from Xcel Energy ERP

Request EPE make Strategist runs using data summarized below from “2017 All Source Solicitation 30-day Report (Public Version)(CPUC Proceeding No. 16A-0396E), December 28, 2017. Costs are the most current available known to the PAG, and are the most appropriate given rapidly decreasing costs, especially for storage.

Technology	Dispatchable Costs (\$/ kW-yr)	Combined Generation and Storage Costs (\$/MWh)	Average Capacity (MW)
Stand-alone Battery Storage	\$135.60		77
Wind		\$18.10	414
Wind and Solar		\$19.90	541
Wind with Battery Storage		\$21.00	637
Solar (PV)		\$29.50	179
Wind and Solar and Battery Storage		\$30.60	578
Solar (PV) with Battery Storage		\$36.00	183

# Other Unresolved Issues

# Other Unresolved Issues

1. How can a resource portfolio that includes hundreds of millions of dollars of capacity that is only used to meet load a few hours a year be considered a “most cost effective portfolio”?
2. How will EPE model the true cost of peak power to native ratepayers for new generating facilities that only provide ratepayer-required power a few hours a year?
3. How will EPE model a strategic sourcing focus on demand-side resources (energy efficiency, demand response and Time of Use rates) that lower peak demand to evaluate, within a “most cost effective portfolio” their cost effectiveness vis a vis the construction of new generating facilities?
4. In EPE’s response to the PAG presentation of 9/22/17 re: peak demand projections, why is Colorado, a state with a fast-growing population, able to keep its increase of projected peak demand at 12% over the same 18 year period that New Mexico’s peak demand is expected to grow by 30%? How will resources similar to those used by Colorado be modeled by EPE in the 2018 IRP as resources that lower peak demand, reducing required capacity and thus producing a “most cost effective portfolio”?

# Other Unresolved Issues (cont.)

1. For most businesses, it is prudent to delay large, long-term investments when technologies are rapidly changing. Extending the life of plants currently scheduled for retirement plus shifting demand away from peak is a strategy that would allow this kind of delay as a way to avoid imprudent investments. How does EPE plan to model this kind of strategic alternative via Strategist or otherwise as a means of identifying a “most cost effective portfolio”?
2. PNM is currently seeking to recover \$353 million in stranded assets from ratepayers for its investment in the San Juan Generating Station even though San Juan GS has been closed because it is no longer the most cost effective resource among feasible alternatives. How is EPE modeling the potential cost to ratepayers of stranded assets represented by expensive, long-term investments in new fossil fuel plants, especially when rapidly emerging technologies may very plausibly soon be more cost effective resources for EPE ratepayers?

# Other Unresolved Issues (cont.)

1. In its response to the PAG presentation of 9/22/17, EPE dismisses the PAG suggestion that EPE delay the closing of older plants scheduled for retirement because “the units in question are past their useful lives (from an engineering and safety perspective)...” What evidence does EPE have that Rio Grande 6, Rio Grande 7, Newman 1 and Newman 2 are past their useful lives from an engineering and safety perspective?
2. In its response to the PAG presentation of 9/22/17, EPE also dismisses the suggestion that EPE delay the closing of plants currently scheduled for closing because “(the plants in question) are much less efficient and more carbon intensive than newer units.” This may be the case, but any rational actor will evaluate the cost of keeping an existing asset that is slightly less efficient or slightly more carbon intensive instead of investing in a new asset with brand new capital costs and a long payback period. How will EPE model the cost curve of that tradeoff in seeking a “most cost effective portfolio” via the 2018 IRP process?

# Other Unresolved Issues (cont.)

1. On January 10, 2018 SDG&E solicited "offers from resources to defer distribution projects that otherwise would have been completed to maintain system safety and reliability (that is, traditional distribution upgrades or build out). Product types eligible for this solicitation are: energy efficiency, demand response, renewables, energy storage and distributed generation." Similarly, how will EPE ensure the IRP contains the lowest-cost portfolio by accounting for the reduced investments in T&D (relative to traditional supply-side resources) that are enabled by these demand-side resources?
2. Will the PAG have access to the identification of all parameters and assumptions used in Strategist modeling runs?



# Dispute Status

1. Dispute requesting that RFP bids be used for Strategist inputs
  1. EPE agreed to use the final bid prices to validate publicly available prices utilized in Strategist and affirmatively verify and communicate with the PAG that the final bids are consistent with the public source data
  2. Status – not yet resolved. Waiting until late March or April for results
2. Dispute requesting that Transmission and Distribution savings be included in the analysis
  1. EPE agreed to evaluate how avoided T&D costs may be attributed to locational resources modeled in Strategist. EPE will identify any publicly available data on distribution capital investment projects
  2. Status – not yet resolved
3. Dispute requesting that generation units scheduled for retirement in the next five years be analyzed for continuing operation on an incremental basis (not just for 20 year extensions of operation)
  1. EPE has agreed to consider shorter intervals
  2. Status – dispute initiated
4. Dispute requesting that Distributed Generation be analyzed as a demand side resource
  1. EPE has proposed using Lazard's values for Distributed Generation
  2. Status – dispute initiated

Other Disputes probable, including:

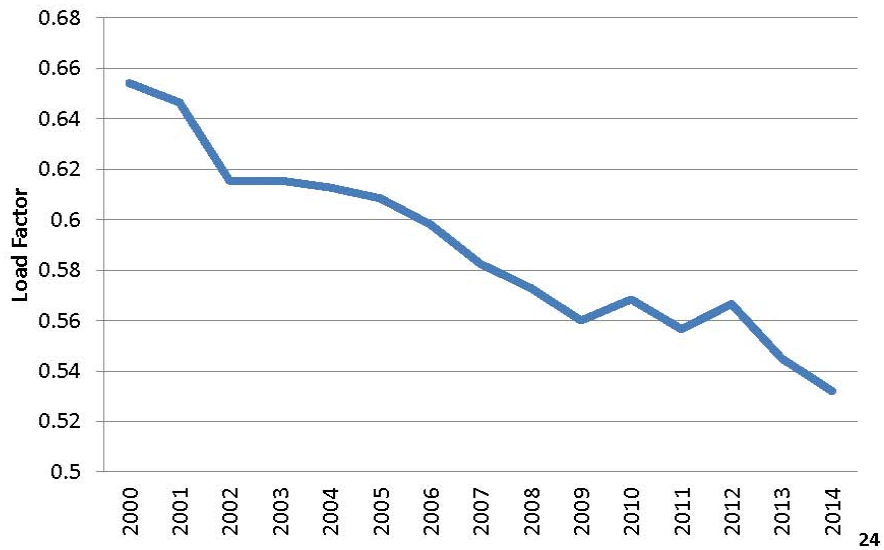
- Purchased Power Spot Buys as a resource
- Robust Energy Efficiency
- Time of Use as a resource

# Rocky Bacchus Analysis

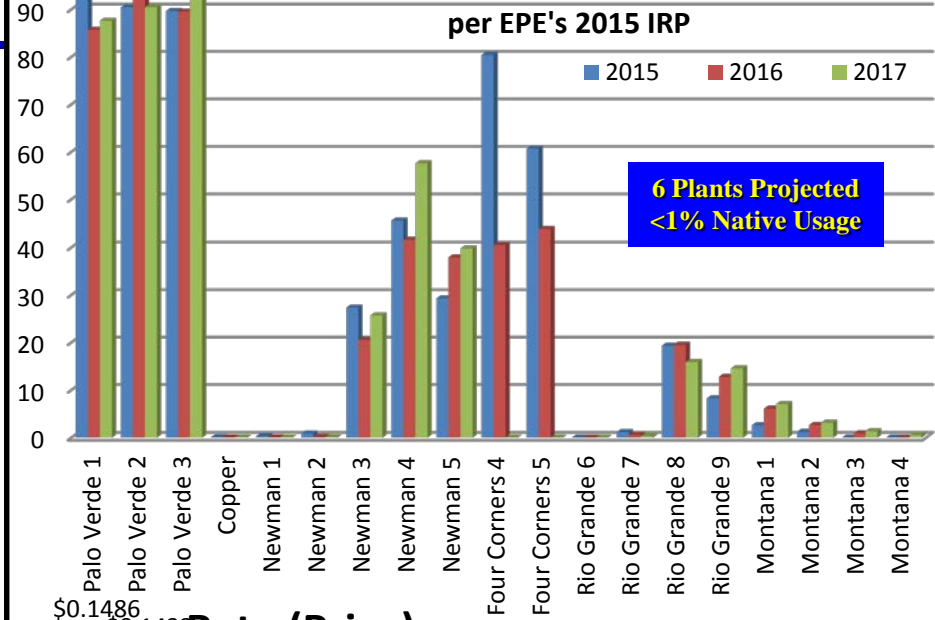
# EPE Should Detail Major Assumptions

Assumptions for Resource Options									Output
Technology	Capital Costs (\$/kw)	Heat rate (Btu/kWh)	Fixed O&M (\$/kW-yr)	Variable O&M (\$/MWh)	Coincident Capacity (MW)	Total Available to Add	Fuel Cost \$/KWh	Capacity Factor (annual)	Levelized Cost
Efficiency					1-1,000				UCT 1.01
Customer DG					1-1,000				1% < Build
Demand Response					1-1,000				1% < Build
Solar PPA					1-1,000				\$0.017
Storage					1-1,000				
Solar					1-1,000				
Wind									
Biomass									
Geothermal									
Gas Fired CC				30%	same as solar				
Gas Fired CT									
Gas Reciprocating Engine									

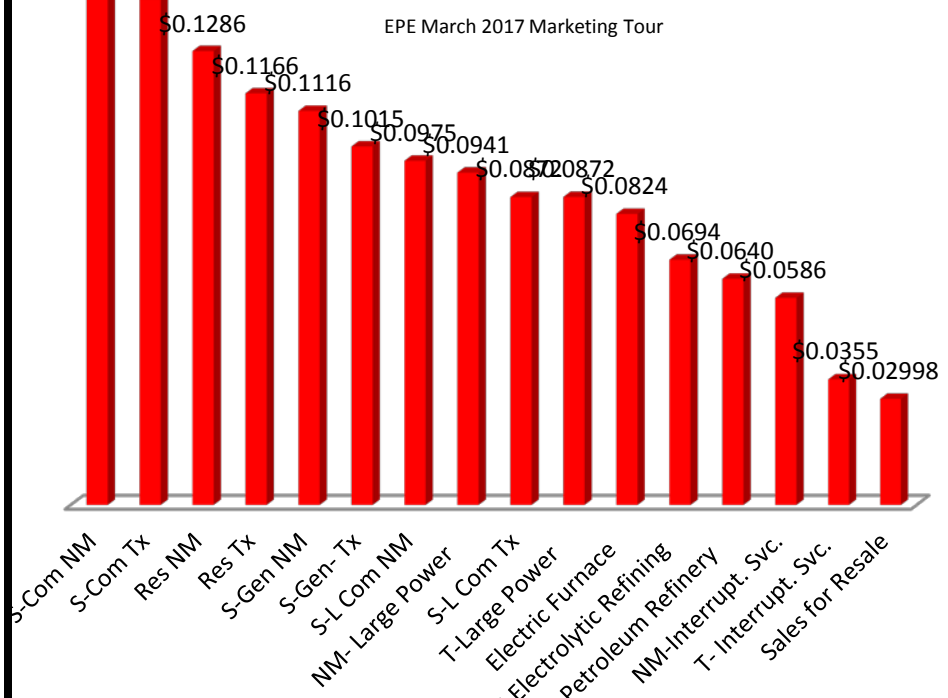
### System Load Factor



### El Paso Electric - Plant Usage

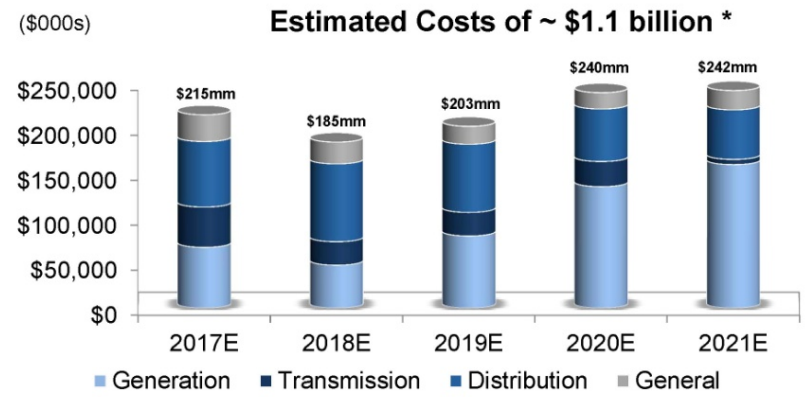


### Rate (Price) - per FERC Page 304

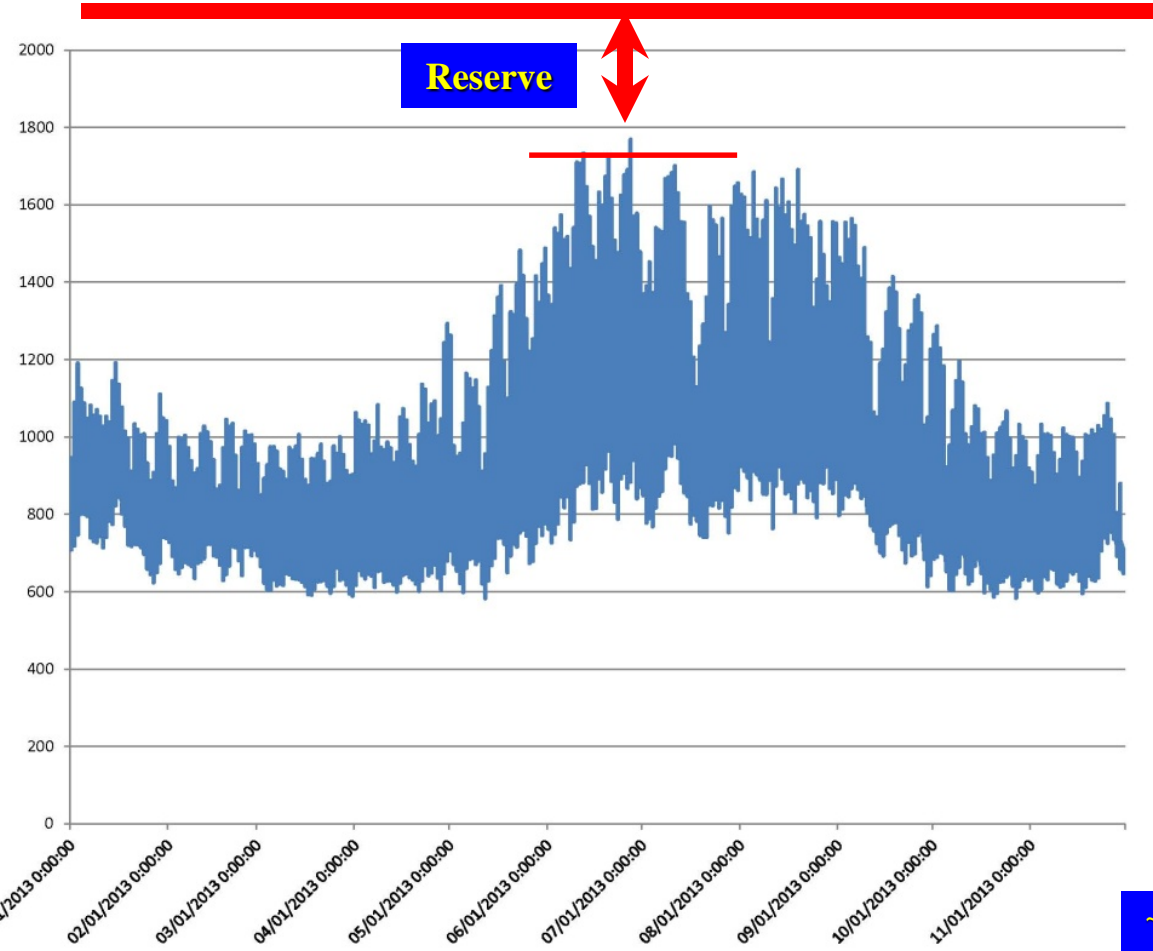


EPE March 2017 Marketing Tour

### Five Year Cash Capital Expenditures



\* Anticipate issuing an all-source RFP for generation resources in 2017; therefore, estimates are subject to change including the acceleration and/or postponement of projects. As a placeholder, the current estimate includes early construction costs for a 320 MW generating resource, to be placed in service in 2023, although the results of the RFP will not be known for some time. Includes approximately \$20mm of large scale solar (5 MW for HAFB and 3 MW for TX community).



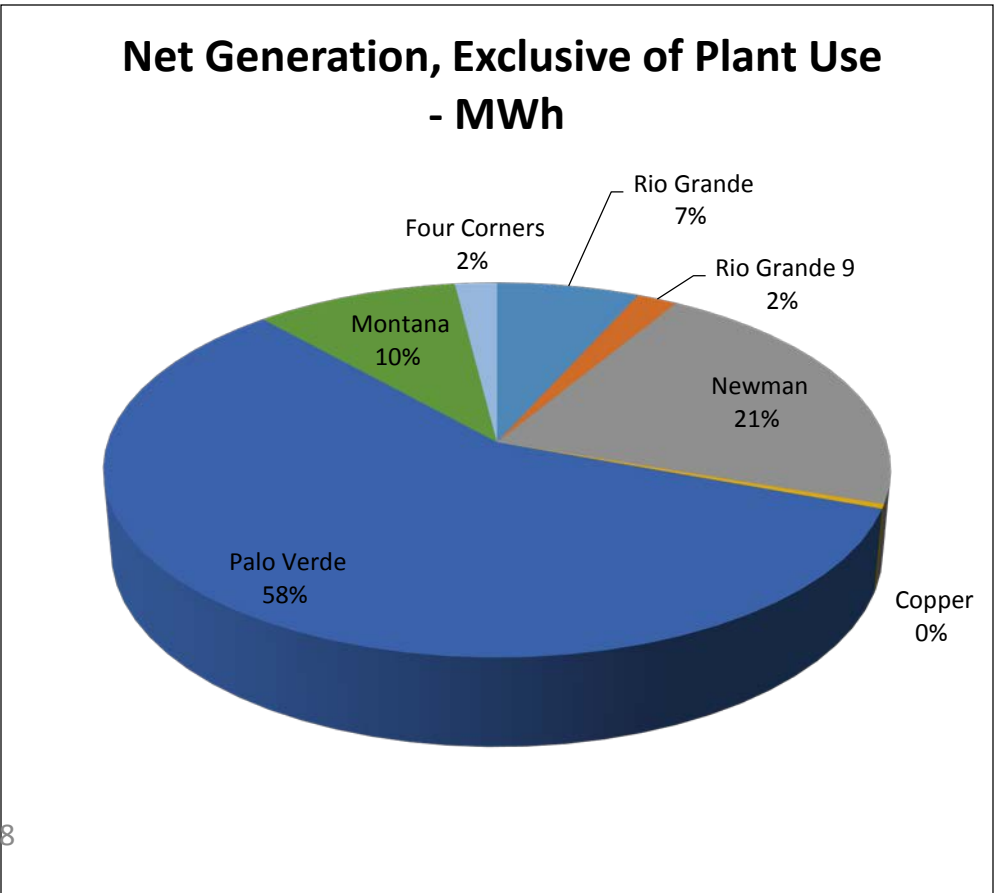
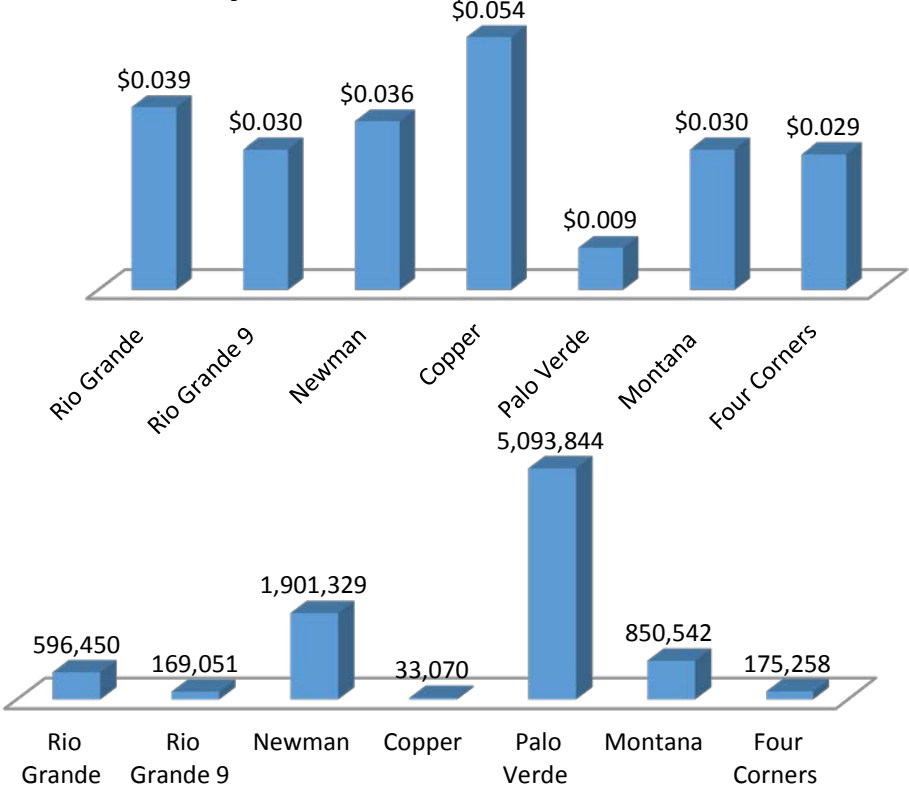
**EPE Builds Based on 1 hour of Peak +15% for Reserve**

**~65% of EPE's Cost is allocated based on 4 hours/ year**

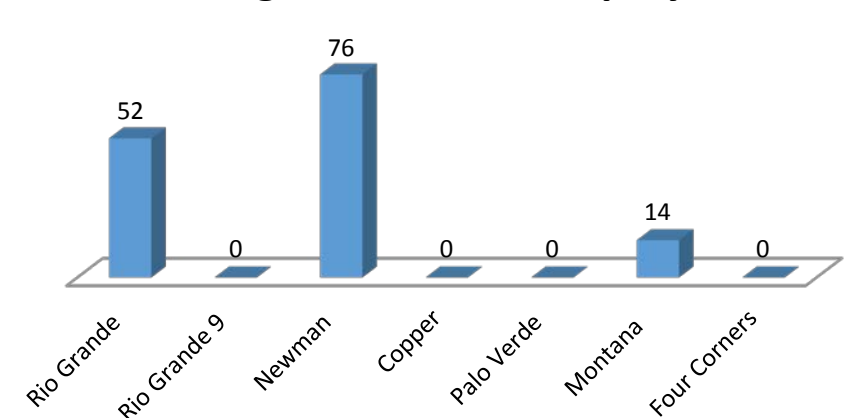
	Hours / Year Peak Above 95%	Hours / Year Peak Above 90%	Shoulder Hours 1:30-3+4-4:30	Peak Hours	Combined Hours	Curtailment Hours outside Range	EPE Premium Billing Hours	Billing Hrs Above 90% Hrs	Premium Billing Hour %
2011	9.3	111.0	51.0	28.0	79.0	32.0	197.1	86.1	43.7%
2012	29.0	147.0	64.5	34.3	98.8	48.3	197.1	50.1	25.4%
2013	16.0	97.8	44.0	23.3	67.3	30.5	197.1	99.4	50.4%
2014	21.3	98.5	44.8	24.0	68.8	29.8	197.1	98.6	50.0%
4 year Average	<b>18.9</b>	<b>113.6</b>	<b>51.1</b>	<b>27.4</b>	<b>78.4</b>	<b>35.1</b>	<b>197.1</b>	<b>83.6</b>	<b>42.4%</b>

Ancillary value for operating hours must be limited to available need, and alternate price, including Purchased Power (per FERC 2016 \$.026)

### FERC 2016 Average Cost of Fuel Burned per KWh Net Gen



### Average Number of Employees



# Requested Next Steps

- Good faith commitment to try to resolve areas of dispute and outstanding issues
- Communicate clearly and timely with PAG
- Establish clear set of inputs to Strategist
- February meeting devote to in-depth discussion of Strategist analysis
  - Inputs
  - What it actually does with the inputs
  - What do the outputs mean
- Schedule a March meeting
  - Address continuing questions and disputes raised by PAG members
  - Achieve additional clarity on analysis process and outputs