

Integrated Resource Plan Public Advisory Group

Meeting 11 – November 16, 2017

Recap of IRP Process, Assumptions
For Resource Options, Preliminary
Results, Development of
Most Cost-Effective Portfolio



El Paso Electric

Meeting Agenda

- **Welcome and Introduction**
- **Public Advisory Process and Meeting Schedule**
- **Recap of IRP Process**
- **Assumptions for Resource Options**
- **Preliminary Results**
 - Development of the most cost-effective portfolio of resources
- **Discussion**

Welcome and Introduction

Presenters for this Meeting

- Maritza Perez: NM IRP Case Manager
- Omar Gallegos: Director of Resource Planning and Management
- Myra Segal: Facilitator

Safety and Basics

- Please sign in. You will be added to our PAG distribution list
 - Skype participants can email NMIRP@epelectric.com
- Recording of Meetings
- Acronyms on last slide

Safe Harbor Statement

Certain matters discussed in this Integrated Resource Plan ("IRP") public advisory group presentation other than statements of historical information are "forward-looking statements" made pursuant to the safe harbor provisions of the Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. Such statements are subject to a variety of risks, uncertainties and other factors, most of which are beyond El Paso Electric Company's ("EPE" or the "Company") control, and many of which could have a significant impact on the Company's operations, results of operations, and financial condition, and could cause actual results to differ materially from those anticipated. Additional information concerning factors that could cause actual results to differ materially from those expressed in forward-looking statements is contained in EPE's most recently filed periodic reports. Any such forward-looking statement is qualified by reference to these risks and factors. EPE cautions that these risks and factors are not exclusive.

Management cautions against putting undue reliance on forward-looking statements or projecting any future assumptions based on such statements. Forward-looking statements speak only as of the date of this IRP public advisory group presentation, and EPE does not undertake to update any forward-looking statement contained herein, except to the extent the events or circumstances constitute material changes in this IRP that are required to be reported to the New Mexico Public Regulation Commission ("NMPRC" or "Commission") pursuant to its IRP Rule, 17.7.3 New Mexico Administrative Code.

Ground Rules

Meeting Rules and Guidelines

- **Meetings will follow the agenda**
- **Presentations and Discussion**
 - If you have questions or comments, please raise your hand and wait for the microphone.
 - Skype attendees may type in questions in the instant message box
- **Discussion time at end of meeting can relate to any presentation**
 - All public input and requests submitted in writing will be responded to in writing*
- **Keep communications respectful and to the point**

*Joint Stipulation Case No. 15-00241-UT

Public Advisory Group Meeting Schedule

Past Meetings

Meeting	Date	Subject	Location
(1)	5/25/2017 2:00 PM - 4:00 PM	Kick-off and Introduction Explanation of IRP Process and Goals Resource Planning Process and Overview Preliminary Listing of Resource Options to Consider	EPE Office 555 S. Compress Rd. Las Cruces, NM
(2)	6/8/2017 2:00 PM - 3:30 PM	Summary of IRP process and introduction to system	NMPRC Offices 4th Floor Hearing Room P.E.R.A. Building 1120 Paseo de Peralta Santa Fe, NM
(3)	7/6/2017 2:00 PM - 4:30 PM	Operational Considerations/Requirements for Future Resources Assessment of need for additional resources System Operations - Reliability, Import Limits and Balancing Existing Conventional Resources System generation retirement plan and process Transmission & Distribution Systems Overview and Projects	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(4)	8/8/2017 2:00 PM - 4:30 PM	Existing Renewable Resources and Distributed Generation (DG) Demand Response (DR) Programs and Options Energy Efficiency (EE) Load Forecast	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(5)	9/7/2017 2:00 PM - 4:30 PM	Conventional Capacity and Generation Option Considerations Demand Side Resource Options Renewable Energy Options (Solar, Wind, Geothermal, Storage, DG) Operational Considerations for Intermittent Resources and Balancing Renewable Portfolio Standard Impacts L&R Table Strategist Introduction Resource Input Template Renewable & Conventional Power Plant Siting and Environmental Considerations	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(6)	9/22/2017	Presentation by PAG members Merrie Lee Soules and Don Kurtz: "Public Advisory Group Special Session on Analysis for 2018 IRP"	Dona Ana County Conference Room 113 845 N. Motel Blvd, Las Cruces, NM
(7)	10/5/2017 2:00 PM - 4:30 PM	Initial Resource Options Submittal from PAG Due for November Run Rate Considerations and Potential Impacts on Resource Planning Decisions Resource Planning Base Case Assumptions Initial Cost Estimates for Resource Planning Options Modeling and risk assumptions and the cost & general attributes of potential additional resources	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(8)	10/20/2017	Presentation by PAG Members Merrie Lee Soules, Phil Simpson, Allen Downs, and Steve Fischmann: Special Session on Resource Analysis for 2018 IRP	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(9)	10/26/2017 2:00 PM - 4:30 PM	Retirements, Cost Modeling Assumptions, and other topics of interest to PAG	Dona Ana County Conference Room 113 845 N. Motel Blvd. Las Cruces, NM
(10)	11/2/2017	SANTA FE - Overview on Public Advisory Process	Santa Fe

PAG-designed meetings highlighted ➡

Additional Meeting on Retirements
(based on PAG feedback) ➡

17.7.3.9 NMAC

Public Advisory Process Required Topics

Identification of Resource Options

Assessment of Need for Additional Resources

Load Forecast

Evaluation of Supply and Demand Side Resources

Modeling and Risk Assumptions

Cost and general attributes of potential additional resources

Public Advisory Group Meeting Schedule

Future Meetings

Final Review
Meetings*

Meeting	Date	Subject	Location
(11)	11/16/2017	Recap of IRP Process	Dona Ana County
	2:00 PM -	Assumptions For Resource Options	Conference Room 113
	4:30 PM	Preliminary Results	845 N. Motel Blvd.
		Development of the most cost-effective portfolio of resources for utility's IRP	Las Cruces, NM
(12)	1/19/2018	PAG Presentations and Discussions as Requested	Las Cruces
	2/2/2018	Last Resource Input Submittals from PAG Due	
(13)	2/16/2018	PAG Presentations and Discussions as Requested	Las Cruces
(14)	4/30/2018	IRP Draft Presentation	Las Cruces
(15)	5/16/2018	Follow-up meeting to receive and respond to public feedback	Las Cruces
(16)	6/8/2018	Final IRP presentation showing new load forecast	Las Cruces
(17)	6/29/2018	Follow-up meeting to receive and respond to public feedback	Las Cruces
	7/15/2018	IRP Filing Date	

17.7.3.9 NMAC

Public Advisory Process Required Topics

Development of the most cost-effective portfolio of resources for utility's IRP

*Joint Stipulation Case No. 15-00241-UT

Integrated Resource Plan

Public Advisory Process

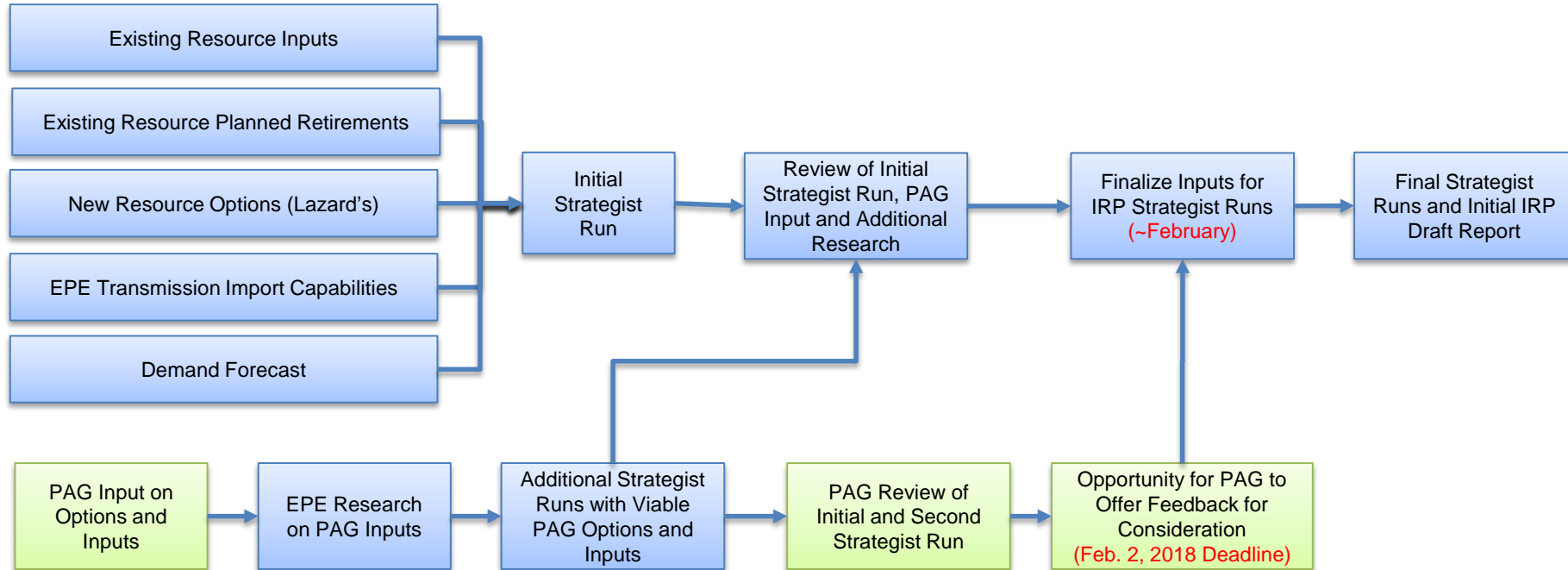
The purposes of the public participation process are for the utility to provide information to, and receive and consider input from, the public regarding the development of its IRP. Topics to be discussed as part of the public participation process include, but are not limited to,

- the utility's load forecast;
 - evaluation of existing supply- and demand-side resources;
 - the assessment of need for additional resources;
 - identification of resource options;
 - modeling and risk assumptions and
 - the cost and general attributes of potential additional resources; and
 - development of the most cost-effective portfolio of resources for the utility's IRP.
- [NM Rule 17.7.3.9 \(H\) 5](#)

Omar Gallegos

Recap of IRP Process, Considerations and Adjustments

Recap of IRP Process



Further Considerations and Adjustments

- **EPE has already stated it plans to consider**
 - Evaluating expected cost declines for solar, wind and storage
 - Introducing a solar with battery storage option
 - Creating a “renewable heavy” portfolio
 - Re-running Strategist without the first selected resource
 - Further analysis and review of demand-side resources
- **EPE will continue to review all PAG input for consideration**
 - PAG has until February 2, 2018 to provide resource options and/or input recommendations with supporting sources
- **The results of this Strategist run is based on the initial Lazard inputs as previously described**

Assumptions for Resource Options

Assumptions for Resource Options

Technology	Capital Costs (\$/kw)	Heat Rate (Btu/kWh)	Fixed O&M (\$/kW-yr.)	Variable O&M (\$/MWh)
Solar* (adjusted down for ITC)	\$1,384	-	\$12.00	-
Wind*	\$1,700	-	\$40.00	-
Biomass*	\$4,000	14,500	\$95.00	\$15.00
Geothermal*	\$6,400	-	-	\$40.00
Gas Fired CC	\$1,000	6,600	\$5.85	\$2.75
Gas Fired CT	\$1,000	9,000	\$25.00	\$7.50
Gas Reciprocating Engine	\$1,100	9,000	\$20.00	\$15.00
Demand Response	\$369	-	-	-

*Renewables to be considered are in addition to and above Renewable Portfolio Standard requirements, as per Joint Stipulation Case No. 15-00241-UT.

EPE Proprietary Material



Assumptions for Storage Option

Technology	Capital Costs (\$/kwh)	O&M (\$/kWh)	Charging Cost (\$/MWh)	Battery Replacement after 10 yrs (\$/kWh)
Storage	\$1,082	\$12.00	\$35.00	\$338

*Renewables to be considered are in addition to and above Renewable Portfolio Standard requirements, as per Joint Stipulation Case No. 15-00241-UT.

EPE Proprietary Material

Resource Capacity Assumptions

Technology	Capacity (MW)	Total available to add**
Solar*	25, 75, 100	2, 3, 2
Wind*	100	2
Biomass*	20	1
Geothermal*	20	1
Gas Fired CC	320	3
Gas Fired CT	100	3
Gas Reciprocating Engine	50, 100	2, 2
Storage	15	3
Demand Response	1	1

*Renewables to be considered are in addition to and above Renewable Portfolio Standard requirements, as per Joint Stipulation Case No. 15-00241-UT

**If options are exhausted, EPE will re-evaluate the total available to add while keeping in mind reliability and operational impacts (Frequency response, load regulation, system balancing, etc.)

EPE Proprietary Material

Resource Options Analyzed in Plan

- EPE began analysis with initially conveyed resource options
- Through the analysis, quantities of resource options were modified to assess optimization and to analyze the resource mix options
- Initial results provided for two resource plan options (one was forced)

Resource Capacity Assumptions for Initial Analysis

Technology	Capacity (MW)	Total available to add**
Solar*	25, 75, 100	2, 3, 4
Wind*	100	2
Biomass*	20	1
Geothermal*	20	1
Gas Fired CC	320	3
Gas Fired CT	100	5
Gas Reciprocating Engine	100	3
Storage	15	3
Demand Response	1	1

*Renewables to be considered are in addition to and above Renewable Portfolio Standard requirements, as per Joint Stipulation Case No. 15-00241-UT

**If options are exhausted, EPE will re-evaluate the total available to add while keeping in mind reliability and operational impacts (Frequency response, load regulation, system balancing, etc.)

EPE Proprietary Material



Preliminary Results

Development of Most Cost Effective Portfolio with Initial Assumptions

Preliminary Results for Initial Assumptions

PROVIEW LEAST COST OPTIMIZATION SYSTEM PLANNING PERIOD PLAN COMPARISON								
PLAN RANK	1	2	3	4	5	6	7	8
2017								
2018								
2019								
2020								
2021								
2022	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)
2023	100S(1)	100S(1)	100S(1)	100S(1)	100S(1)	100S(1)	100S(1)	100S(1)
2024								
2025								
2026	75PV(1)	75PV(1)	100S(1)	75PV(1)	75PV(1)	100S(1)	75PV(1)	75PV(1)
2027	25PV(1)	25PV(1)	CC_M(1)	75PV(1)	75PV(1)	CC_M(1)	25PV(1)	25PV(1)
	CC_M(1)	CC_M(1)		CC_M(1)	CC_M(1)		CC_M(1)	CC_M(1)
2028	25PV(1)	25PV(1)	25PV(1)			25PV(1)	25PV(1)	25PV(1)
2029	75PV(1)	75PV(1)	75PV(1)	75PV(1)	75PV(1)	75PV(1)	75PV(1)	75PV(1)
2030	CT_L(1)	CT_L(1)	CT_L(1)			CT_L(1)	CT_L(1)	CT_L(1)
2031				CT_L(1)	CT_L(1)			
2032								
2033	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CT_L(1)	CT_L(1)
							RECP(1)	RECP(1)
2034							CT_L(1)	CT_L(1)
2035	CT_L(1)	RECP(1)	CT_L(1)			RECP(1)	CT_L(1)	RECP(1)
2036				CT_L(1)	RECP(1)			
2037								
P.V. UTILITY COST:								
PLANNING PERIOD	3918832.0	3919891.0	3919952.5	3920022.2	3920712.8	3921011.5	3921809.5	3922868.5
% DIFFERENCE	0.00%	0.03%	0.03%	0.03%	0.05%	0.06%	0.08%	0.10%
STUDY PERIOD RANK	1	2	3	4	5	6	7	8

Legend

CC_M: 1x1 Combined Cycle (320 MW)
 CT_L: Combustion Turbine LMS(80MW)
 RECP: Reciprocating Engines
 25PV: 25MW Solar
 75PV: 75MW Solar
 100S: 100MW Solar

Modified Scenario to Force Solar Selection

Technology	Capacity (MW)	Total available to add**
Solar*	25, 75, 100	2, 3, 5
Wind*	100	2
Biomass*	20	1
Geothermal*	20	1
Gas Fired CC	320	3
Gas Fired CT	100	5
Gas Reciprocating Engine	100	3
Storage	15	3
Demand Response	1	1

Excluded as an option
for 2022 and 2023.

*Renewables to be considered are in addition to and above Renewable Portfolio Standard requirements, as per Joint Stipulation Case No. 15-00241-UT

**If options are exhausted, EPE will re-evaluate the total available to add while keeping in mind reliability and operational impacts (Frequency response, load regulation, system balancing, etc.)

EPE Proprietary Material

Preliminary Results for Modified Scenario

PROVIEW LEAST COST OPTIMIZATION SYSTEM PLANNING PERIOD PLAN COMPARISON								
PLAN RANK	1	2	3	4	5	6	7	8
2017								
2018								
2019								
2020								
2021								
2022	100S(2)	100S(2)	100S(2)	100S(2)	100S(2)	100S(2)	100S(2)	100S(2)
2023	100S(2)	100S(3)	100S(2)	100S(3)	100S(2)	100S(2)	100S(2)	100S(2)
2024	CT_L(1)		CT_L(1)		CT_L(1)	CT_L(1)	CT_L(1)	CT_L(1)
2025		25PV(1)		25PV(1)				
2026	25PV(1)	75PV(1)	25PV(1)	75PV(1)	25PV(1)	25PV(1)	25PV(1)	25PV(1)
2027	75PV(1)	CC_M(1)	75PV(1)	CC_M(1)	75PV(1)	CC_M(1)	75PV(1)	100S(1)
	CC_M(1)		CC_M(1)		CC_M(1)	CT_L(1)	CC_M(1)	CC_M(1)
2028	75PV(1)	75PV(1)	75PV(1)	75PV(1)	25PV(1)		25PV(1)	
2029		25PV(1)		25PV(1)	75PV(1)	25PV(1)	75PV(1)	75PV(1)
2030	CT_L(1)	CT_L(1)	CT_L(1)	CT_L(1)	CT_L(1)	CT_L(1)	CT_L(1)	CT_L(1)
2031								
2032								
2033	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)	CC_M(1)
2034								
2035	CT_L(1)	CT_L(1)	RECP(1)	RECP(1)		CT_L(1)		
2036					CT_L(1)		RECP(1)	CT_L(1)
2037								
P.V. UTILITY COST:								
PLANNING PERIOD	3958166.5	3958421.2	3959225.5	3959480.2	3959938.8	3960261.5	3960629.0	3961186.5
% DIFFERENCE	0.00%	0.01%	0.03%	0.03%	0.04%	0.05%	0.06%	0.08%
STUDY PERIOD RANK	1	2	3	4	5	6	7	8

Legend

CC_M: 1x1 Combined Cycle (320 MW)
 CT_L: Combustion Turbine LMS(80MW)
 RECP: Reciprocating Engines
 25PV: 25MW Solar
 75PV: 75MW Solar
 100S: 100MW Solar

EPE's Initial Review

- **Need to investigate further the Demand Side options**
 - Including Energy Efficiency options
- **Continue with review of solar, wind and storage pricing**
- **Review of reliability**
 - The first portfolio recommended 300 MW of solar in addition to the 110 MW existing (this creates a new evening peak)
 - Introduces considerations for reserve margin and regulating considerations due to intermittency
- **Consider sensitivity runs and risk analysis (carbon tax, fuel...)**

Discussion

Acronyms

Btu - British Thermal Unit	kWh - kilowatt hour
CC - Combined Cycle	L&R - Loads and Resources
CT - Combustion Turbine	MW - MegaWatts (1,000 kW)
EE - Energy Efficiency	MWh - Megawatt hours
EPE - El paso Electric Company, or "EPEC"	NMAC - New Mexico Administrative Code
IRP - Integrated Resource Plan	NMPRC - New Mexico Public Regulation Commission
ITC - Investment Tax Credit	PAG - Public Advisory Group
KV - Kilovolt (1,000 volts)	PV - Photovoltaic
kW - kilowatt (1,000 watts)	