Integrated Resource Plan Public Advisory Group

Meeting 7 – October 5, 2017

Rate Considerations, Resource Planning Base Case Assumptions, Initial Cost Estimates for Resource Planning Options

The Electric Company
El Paso Electric

Meeting Agenda

- Welcome and Introduction
- Public Advisory Process and Meeting Schedule
- PAG Written Input and Requests
- 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
- Discussion

Welcome and Introduction

Presenters for this Meeting

- Maritza Perez: NM IRP Case Manager
- Jim Schichtl: Vice President of Regulatory Affairs
- Daniel Holguin: Resource Planning Engineer

Safety and Basics

- **Fire Escape Routes**
- **Please sign in. You will be added to our PAG distribution list**
  - Skype participants can email NMIRP@epelectric.com
- **Facilities**
- **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**
  - Each presentation will be followed by a discussion period that relates to that presentation
  - Please reserve your questions and comments for designated discussion periods
  - 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

2017-2018 New Mexico IRP Public Advisory Group Schedule

Meeting	Date	Subject	Location
(1)	5/25/2017	Kick-off and Introduction	EPE Office
	2:00 PM -	Explanation of IRP Process and Goals	555 S. Compress Rd.
	4:00 PM	Resource Planning Process and Overview	Las Cruces, NM
		Preliminary Listing of Resource Options to Consider	
(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	Operational Considerations/Requirements for Future Resources	Dona Ana County
	2:00 PM -	Assessment of need for additional resources	Conference Room 113
	4:30 PM	System Operations - Reliability, Import Limits and Balancing	845 N. Motel Blvd.
		Existing Conventional Resources	Las Cruces, NM
		System generation retirement plan and process	
		Transmission & Distribution Systems Overview and Projects	
(4)	8/8/2017	Existing Renewable Resources and Distributed Generation (DG)	Dona Ana County
	2:00 PM -	Demand Response (DR) Programs and Options	Conference Room 113
	4:30 PM	Energy Efficiency (EE)	845 N. Motel Blvd.
		Load Forecast	Las Cruces, NM
(5)	9/7/2017	Conventional Capacity and Generation Option Considerations	Dona Ana County
	2:00 PM -	Demand Side Resource Options	Conference Room 113
	4:30 PM	Renewable Energy Options (Solar, Wind, Geothermal, Storage, DG)	845 N. Motel Blvd.
		Operational Considerations for Intermittent Resources and Balancing	Las Cruces, NM
		Renewable Portfolio Standard Impacts	
		L&R Table	
		Strategist Introduction	
		Resource Input Template	
		Renewable & Conventional Power Plant Siting and Environmental Considerations	
(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	Initial Resource Options Submittal from PAG Due for November Run	Dona Ana County
	2:00 PM -	Rate Considerations and Potential Impacts on Resource Planning Decisions	Conference Room 113
	4:30 PM	Resource Planning Base Case Assumptions	845 N. Motel Blvd.
		Initial Cost Estimates for Resource Planning Options	Las Cruces, NM
		Modeling and risk assumptions and the cost & general attributes of potential additional resources	
(8)	10/20/2017	Presentation by PAG Members	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 - Resource Planning Overview and Modeling for Cost of Potential Additional Resources	Santa Fe
(11)	11/16/2017	Preliminary Results with 2017 Load Forecast	Dona Ana County
	2:00 PM -	Presentation of Resulting 20-year Expansion Plan	Conference Room 113
	4:30 PM	Development of the most cost-effective portfolio of resources for utility's IRP	845 N. Motel Blvd.
			Las Cruces, NM
(12)	1/19/2018	PAG Presentations and Discussions as Requested	LC/Santa Fe
	2/2/2018	Last Resource Input Submittals from PAG Due	
(13)	2/16/2018	PAG Presentations and Discussions as Requested	LC/Santa Fe
(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**	

New Meeting

New Meeting

El Paso Electric

Integrated Resource Plan

Public Advisory Process

- **The purpose of the public advisory process is to receive public input and solicit public commentary concerning resource planning and related resource acquisition issues**
  - - NM Rule 17.7.3.9 (H)
- **Meeting Schedules and Agendas**
  - Participants may add their own presentations to the agendas for the **January and February** meetings

PAG Written Input and Requests

Follow up Discussion

Integrated Resource Plan

Rate Considerations and Potential Impacts on Resource Planning Decisions

Jim Schichtl

Vice President of Regulatory Affairs

IRP Rule 17.7.3.9(F)(3)

Integrated Resource Plans – Identification of Resource Options

- **“The utility shall describe its existing rates and tariffs that incorporate load management or load shifting concepts. The utility shall also describe how changes in rate design might assist in meeting, delaying or avoiding the need for new capacity.”**

Load Management and Load Shifting

- Load management refers to changes in customer usage that impact the magnitude and timing of instantaneous demand the customer places on the system
- Load shifting refers to changes in customer usage which move the time of consumption while not necessarily changing the customers total consumption
- Load management and load shifting can be affected by through rates or programs which communicate utility costs and may compensate customers for changes in consumption
- Changes in the system load shape, which drives cost of service, result from aggregate changes in customer consumption over time

Mandatory Rate Structure Transitions

	Current	3-Year	5-Year	10-Year	20-Year
Res	Volumetric	Volumetric	Volumetric / CPP & PTR	Volumetric / CPP & PTR	TOU Energy CPP & PTR
Small Commercial	Demand / Energy	Demand / Energy	Demand / Energy CPP & PTR	Demand / TOU Energy CPP & PTR	Demand / TOU Energy CPP & PTR
Medium Commercial	Demand / Energy	Demand / TOU Energy	Demand / TOU Energy CPP & PTR	TOU Demand / TOU Energy CPP & PTR	TOU Demand / TOU Energy CPP & PTR
Industrial	Demand / TOU Energy	Demand / TOU Energy	TOU Demand / TOU Energy	TOU Demand / TOU Energy Cap Bidding	TOU Demand / TOU Energy Cap Bidding
Irrigation / Pumping	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy

Attributes of a Sound Rate Structure

James Bonbright – The Principles of Public Utility Rates

- **Capital attraction / revenue requirement - sound rates are those which are effective in "yielding total revenue requirements under the fair return standard" while avoiding socially undesirable levels of rate base, product quality, and safety.**
- **Consumer rationing objective - rates and structures designed to "discourage the wasteful use of public utility services while promoting all use that is economically justified in view of the relationships between the private and social costs incurred and benefits received."**
- **Fairness to ratepayers - the principle "that the burden of meeting total revenue requirements must be distributed fairly and without arbitrariness, capriciousness, and inequities" in order to avoid "undue discrimination." Characterized by rates which are subsidy free and with "equals treated equally."**

Ratemaking Process – Simplified

Generally In the Context of Rate Case

- **Establish total Company test year revenue requirement**
- **Allocate to Jurisdictions based on cost drivers and direct assignment**
- **Allocate to Rate Classes based on cost drivers and direct assignment**
- **Design rates to recover class revenues based on test year billing determinants**

Current Mandatory Rate Structures

- **General Rate Classes and Rate Structures**
  - Residential – Volumetric rate, seasonal variations
  - Small Commercial – Volumetric and demand charges
  - Medium Commercial - Volumetric and demand charges
  - Industrial - Volumetric TOU and demand charges
  - Irrigation/ Water Pumping - Volumetric TOU and demand charges
  - Lighting – Volumetric rate
- **Most tariffs include optional (voluntary) rates**

Mandatory Rate Structure Transitions

	Current	3-Year	5-Year	10-Year	20-Year
Res	Volumetric	Volumetric	Volumetric / CPP & PTR	Volumetric / CPP & PTR	TOU Energy CPP & PTR
Small Commercial	Demand / Energy	Demand / Energy	Demand / Energy CPP & PTR	Demand / TOU Energy CPP & PTR	Demand / TOU Energy CPP & PTR
Medium Commercial	Demand / Energy	Demand / TOU Energy	Demand / TOU Energy CPP & PTR	TOU Demand / TOU Energy CPP & PTR	TOU Demand / TOU Energy CPP & PTR
Industrial	Demand / TOU Energy	Demand / TOU Energy	TOU Demand / TOU Energy	TOU Demand / TOU Energy Cap Bidding	TOU Demand / TOU Energy Cap Bidding
Irrigation / Pumping	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy	Demand / TOU Energy

AMI

Impact of Load Management and Load Shifting on resource Planning

- Continue to provide optional TOU pricing and price response programs for all customers
- Expand mandatory TOU pricing across rate classes
- Critical Peak Pricing and Peak Time Rebate can be combined as options with standard tariffs
- Estimate customer participation and price response to determine impact on load curve over time, based on estimated participation and price elasticity of demand
- Develop model adjustments for long-term load and sales forecast for IRP modeling and report

Impact on Demand and Energy Forecast

EL PASO ELECTRIC COMPANY
2017-2026 DEMAND AND ENERGY FORECAST

Summary

ENERGY (GWH)	2016 (1)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	10-YR (6) CAGR
Native System Forecast (NFL) (2)												
Upper Bound		9,506	9,646	9,778	9,927	10,065	10,223	10,388	10,563	10,738	10,914	
Expected:	8,432	8,595	8,713	8,822	8,947	9,059	9,190	9,328	9,472	9,615	9,757	**1.5**
Lower Bound		7,684	7,780	7,866	7,967	8,053	8,158	8,267	8,380	8,492	8,599	
Less: DG (3)		11	22	32	43	54	64	75	85	95	106	
Less: EE (4)		35	70	105	141	176	211	246	281	316	351	
Native System Energy												
Upper Bound		9,461	9,551	9,632	9,728	9,812	9,914	10,022	10,138	10,255	10,371	
Expected:	**8,432**	**8,549**	**8,621**	**8,684**	**8,763**	**8,830**	**8,915**	**9,007**	**9,105**	**9,203**	**9,299**	**1.0**
Lower Bound		7,638	7,691	7,736	7,798	7,848	7,917	7,992	8,072	8,152	8,228	
Total System Net Energy (5)												
Upper Bound		9,430	9,521	9,603	9,699	9,783	9,885	9,994	10,111	10,228	10,344	
Expected:	**8,364**	**8,532**	**8,604**	**8,667**	**8,746**	**8,813**	**8,898**	**8,990**	**9,088**	**9,186**	**9,282**	**1.0**
Lower Bound		7,634	7,687	7,731	7,793	7,842	7,911	7,986	8,066	8,145	8,221	
DEMAND (MW)												
Native System Forecast (NFL)												
Upper Bound		2,207	2,248	2,287	2,322	2,364	2,404	2,445	2,482	2,530	2,571	
Expected:	1,892	1,934	1,960	1,985	2,008	2,038	2,068	2,099	2,125	2,163	2,195	**1.5**
Lower Bound		1,661	1,673	1,683	1,693	1,713	1,732	1,752	1,769	1,797	1,819	
Less: DG		3	5	8	10	12	15	17	20	22	25	
Less: EE		5	10	14	19	24	29	34	39	43	48	
Native System Demand:												
Upper Bound		2,199	2,233	2,263	2,290	2,323	2,354	2,386	2,414	2,452	2,484	
Expected:	**1,892**	**1,927**	**1,946**	**1,963**	**1,978**	**2,002**	**2,024**	**2,048**	**2,067**	**2,098**	**2,122**	**1.2**
Lower Bound		1,654	1,658	1,663	1,667	1,681	1,694	1,709	1,720	1,744	1,761	
Total System Demand												
Upper Bound		2,194	2,228	2,258	2,284	2,317	2,348	2,381	2,408	2,446	2,478	
Expected:	**1,877**	**1,923**	**1,942**	**1,959**	**1,974**	**1,998**	**2,020**	**2,044**	**2,063**	**2,094**	**2,119**	**1.2**
Lower Bound		1,652	1,656	1,661	1,665	1,679	1,692	1,707	1,718	1,742	1,759	
Interruptible Load		53	53	53	53	53	53	53	53	53	53	
Upper Bound		2,141	2,171	2,198	2,222	2,253	2,282	2,313	2,339	2,376	2,407	
Expected:	**1,877**	**1,870**	**1,889**	**1,906**	**1,922**	**1,945**	**1,968**	**1,991**	**2,010**	**2,041**	**2,066**	**1.0**
Lower Bound		1,599	1,608	1,615	1,622	1,638	1,653	1,670	1,682	1,707	1,725	

Footnotes:
(1) 2016 are Actual data, Native System Peak occurred on July 14tl
(2) Net For Load is forecasted load before the removal of DG and E
(3) Impact from Distributed Generation.
(4) Impact from Energy Efficiency.
(5) Total System includes transmission wheeling Losses To Others
(6) 10-Year Compounded Average Growth Rate.

Discussion

Integrated Resource Plan

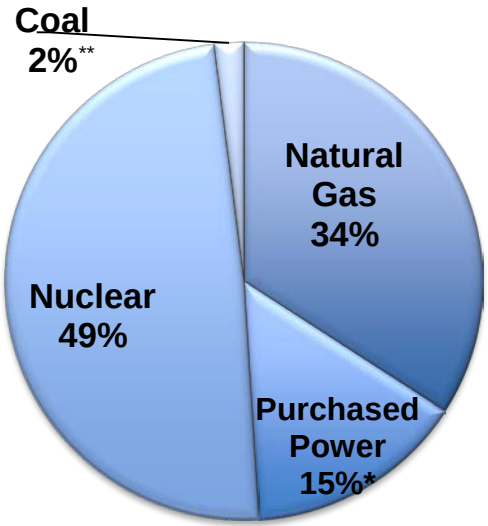
Renewable Portfolio Standard Impacts (“RPS”)
Operational Considerations for Intermittent Resources and Balancing
Capacity Expansion Plan Model Assumptions

Daniel Holguin

Resource Planning Engineer

Diversified Energy Portfolio and Low Carbon Footprint

2016 Energy Sources (by MWh's)



* Renewable energy purchases represent 19% of total purchased power

** Coal is zero in 2017 due to the sale of EPE's interest in the Four Corners Plant in July 2016

EPE vs. U.S. Avg. Carbon Footprint

(Short tons CO_2 equivalent emissions/MWH)

2015 National Average 0.55

2015 EPE 0.33

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Well Positioned to Meet New Environmental Regulations

- EPE's current generating portfolio provides for minimal exposure to the Environmental Protection Agency's guidelines to reduce carbon dioxide emissions
- EPE became a coal-free utility on July 6, 2016, which will reduce one billion pounds of carbon dioxide from our annual emissions
- Costs associated with future retrofits required by environmental regulation will be avoided
- Addition of large-scale solar resources has prevented another one billion pounds of carbon dioxide from being emitted into the atmosphere

Large Scale Solar Projects

- EPE's Texas Community Solar Facility (3MW) became operational during Q2 2017 and is the largest utility-owned community solar project in Texas
- The Holloman Air Force Base (HAFB) Solar Project (5MW) is anticipated to be completed in the first half of 2018
- Currently exploring additional projects

2017 Year End Projected Load and Resources

2017 YE Company Owned Generation 2,088 MW

Solar Purchased Power 74 MW

Palo Verde	Newman	Montana	Rio Grande	Copper	Four Corners	Renewables	Solar
Nuclear	Natural Gas				Coal	Solar	Solar Power
633 MW	752 MW	354 MW (1)	276 MW	64 MW	0 MW (2)	9 MW (3)	107 MW (4)

2017 YE Total Net Resources 2,195 MW

(1) Montana Power Station ("MPS") includes Units 1 & 2 (88 MW per unit), Units 3 & 4 (89 MW per unit).
(2) In July 2016, EE became coal free following the sale of its 7% minority ownership interest in Four Corners Units 4 & 5 and common facilities
(3) Upon completion in 2018, Texas Community Solar Project and Holloman Air Force Base will represent 8 MW of output at full nameplate capacity
(4) Solar purchased power represents approximately 70% of capacity during the summer peak period

Renewable Portfolio Standard

Existing RPS Resources

- **Existing RPS resources are included as existing resources in the IRP analysis**
  - 20 MW Roadrunner Solar (NRG)
  - 5 MW Hatch Solar
  - 10 MW El Chaparral Solar (Sun Edison)
  - 12 MW Las Cruces Centennial Solar (Sun Edison)

Renewable Portfolio Standard

Current RPS Status

- **EPE's 2017 RPS plan has been filed and pending a Commission order**
  - EPE's 2016 RPS plan was approved as compliant with the RPS rule
- **EPE's RPS plan is compliant with the rule in consideration of having exceeded Reasonable Cost Threshold**
  - EPE is not forecasted to attain the 15% renewable energy target in 2017-2019 due to its current RCT standing
  - However, EPE has proposed approval of a Wind REC purchase that will allow EPE to meet the targets through 2022 if approved

Renewable Portfolio Standard

Renewable Energy Resources in the IRP

- **While EPE is not required to add more renewable energy resources for purposes of RPS, additional renewable energy options are introduced in the IRP and the Strategist analysis***
- **EPE is not forcing the selection of renewable energy resources, they will be selected only if they result in the most cost effective portfolio**
- **If renewable energy resources are selected in the IRP plan, they would have the potential to provide additional renewable energy output**
  - If renewables were to be added in the future as system resources, the New Mexico allocated portion could be applied towards the New Mexico RPS

*Joint Stipulation Case No. 15-00241-UT.

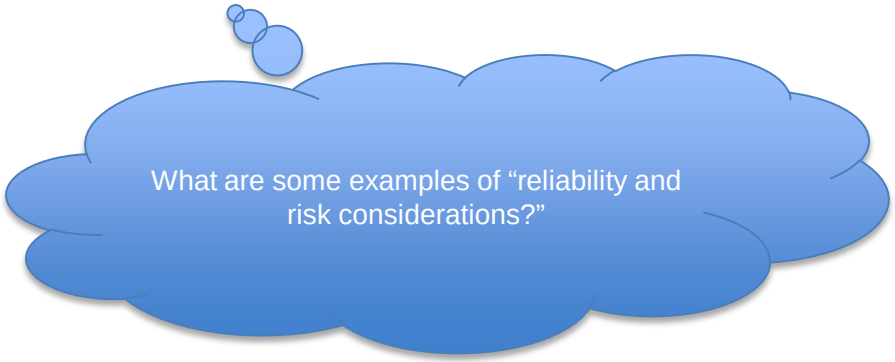
Integrated Resource Plan

Modeling and Risk Assumptions and the Cost & General Attributes of Potential Additional Resources

Operational Considerations for Intermittent Resources and Balancing

Resource Planning

"…minimize the net present value of revenue requirements proposed by a utility to meet electric system demand during the planning period consistent with reliability and risk considerations"

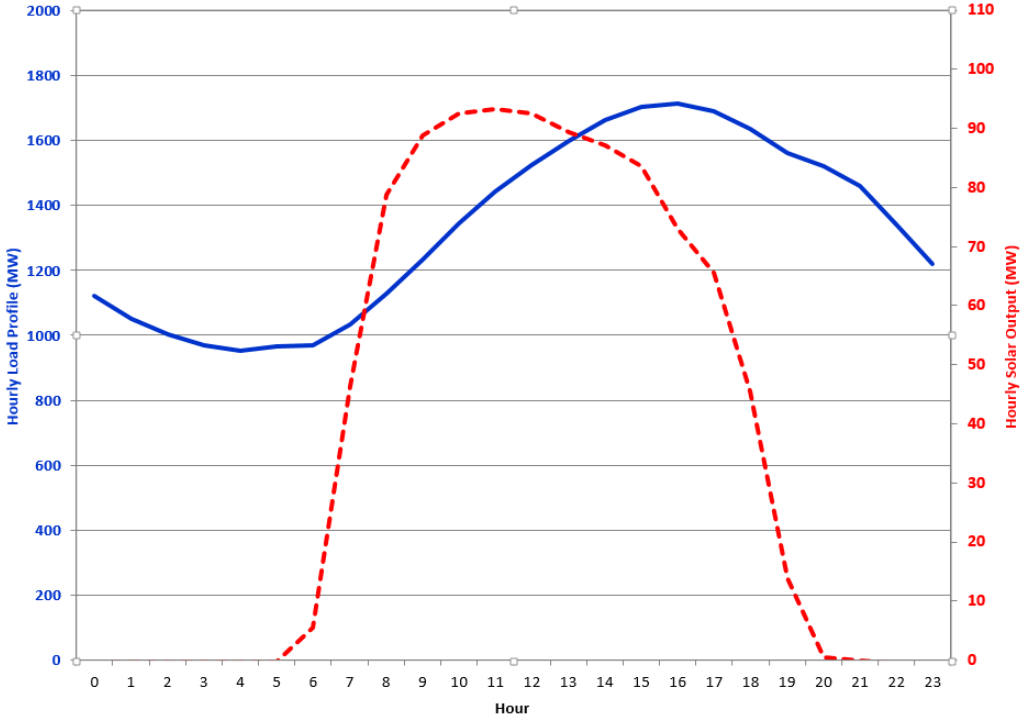


Resource Dispatchability

What items may impact the ability to dispatch a resource?

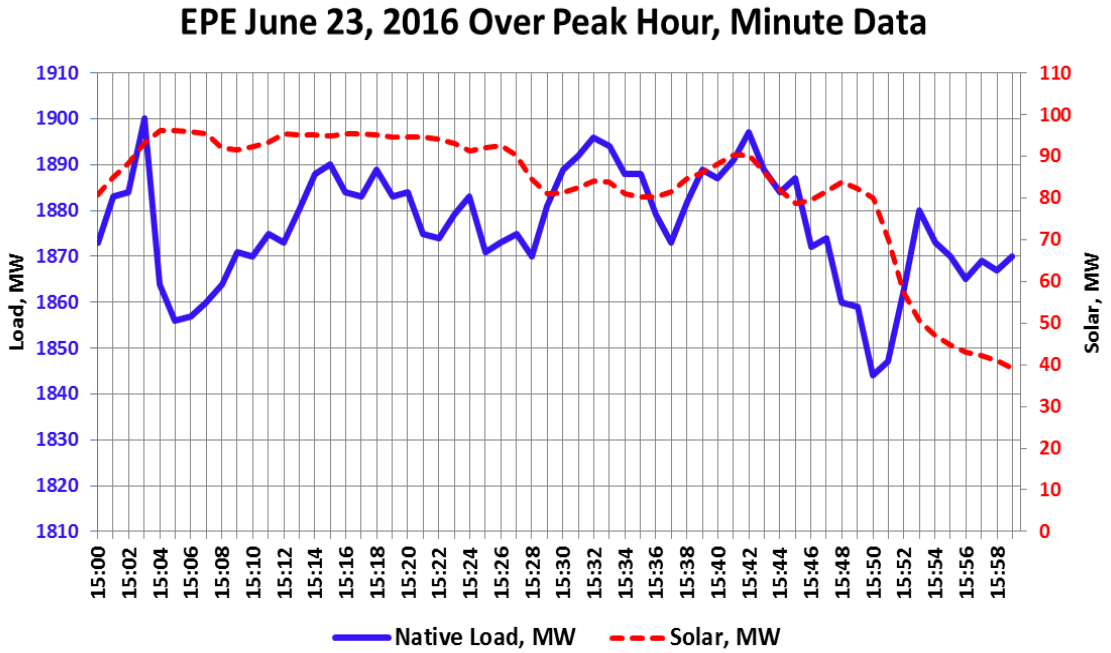
- **Fuel source limitations, such as:**
  - Access to fuel pipelines
  - Solar and wind profiles
  - Biogas or biomass – access to fuel supply and volume
  - Geothermal – any limitations on capacity
- **Technology limitations**
  - Battery storage energy capacity and charge/discharge capacities

Resource Dispatchability



- Can a resource be dispatched at will or is it limited in output available?
- Solar and wind have output profiles dictated by solar and wind patterns.
- Output not guaranteed at peak load hour…

Resource Intermittency

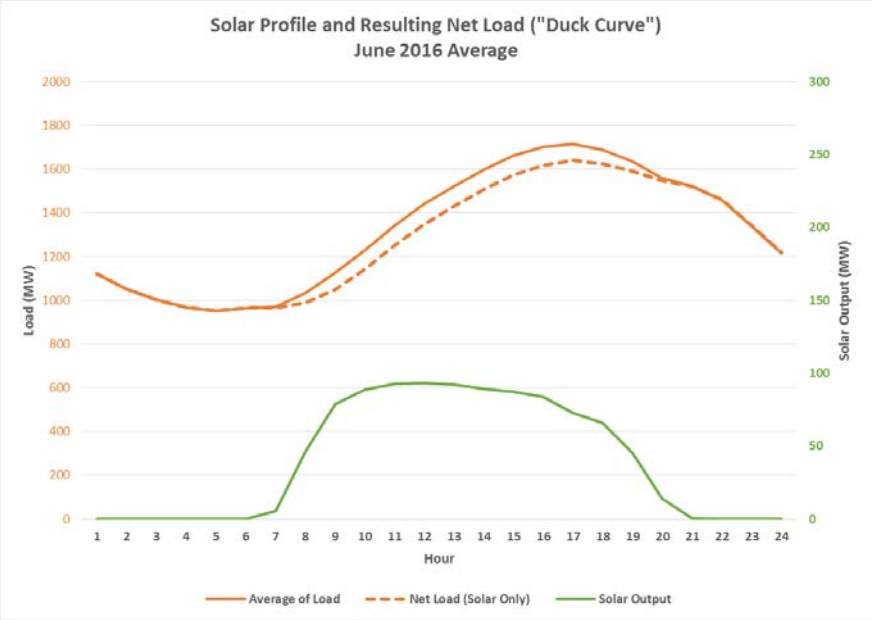


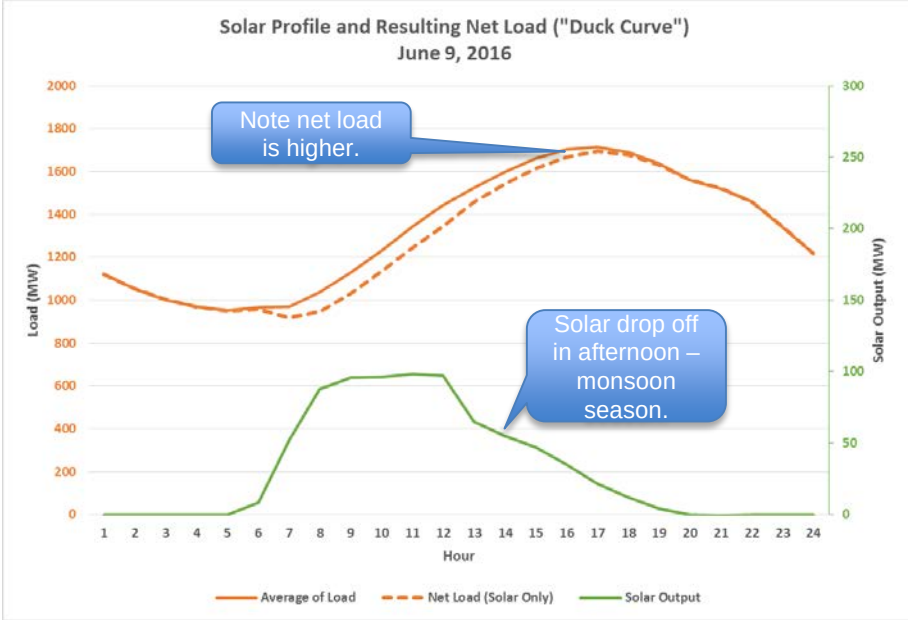
- … solar output may be intermittent due to cloud cover.
- Wind has a similar characteristic.
- Does not imply solar and wind are not viable; however…

Resource Intermittency

- **Intermittent resources need consideration of reserve margin or coupling of intermittent resources with firm options**
  - Larger planning reserve margin to address potential loss of load due to intermittency of solar or wind
  - Option to evaluate solar/wind coupled with storage or back-up generation

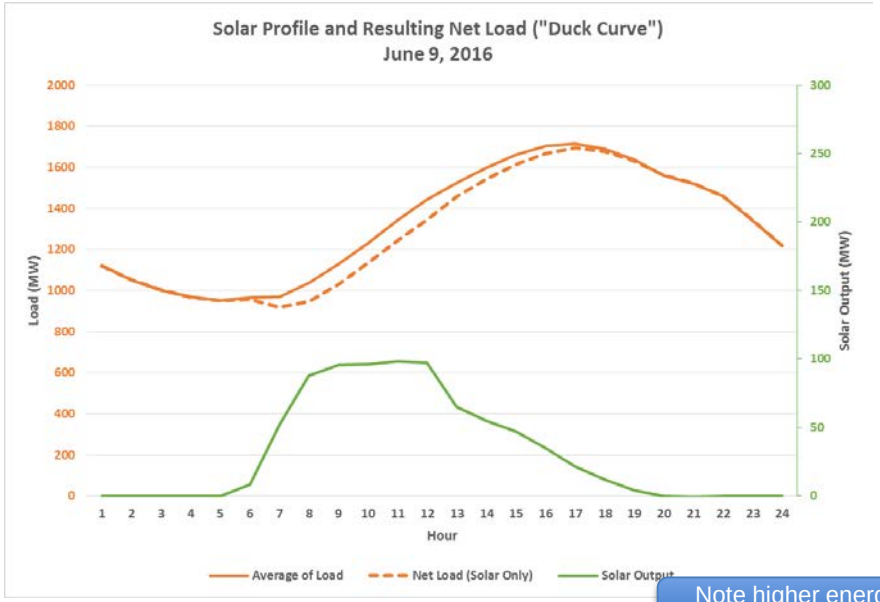
Resource Intermittency - Solar

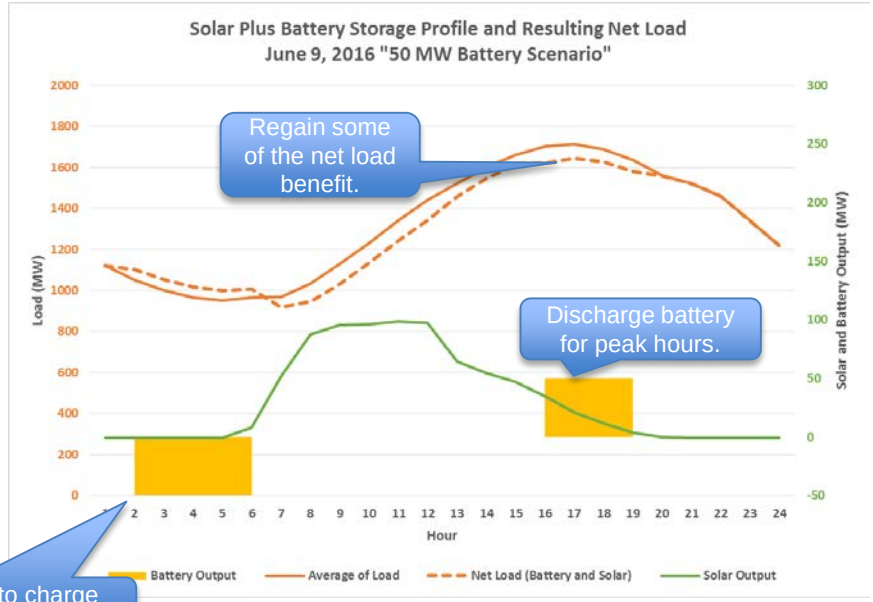




- … solar output may be intermittent due to cloud cover and reduces resources for peak hour.

Resource Intermittency - Solar

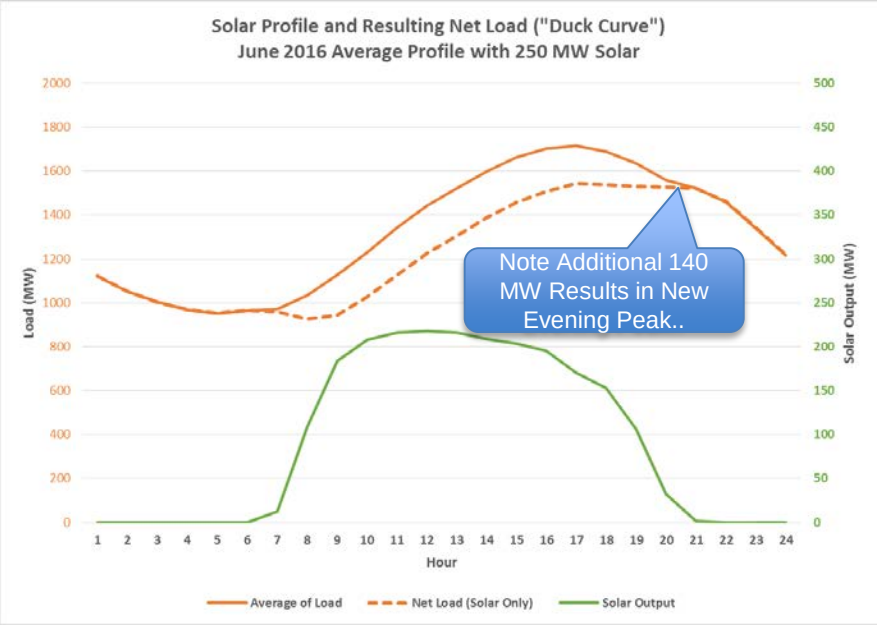


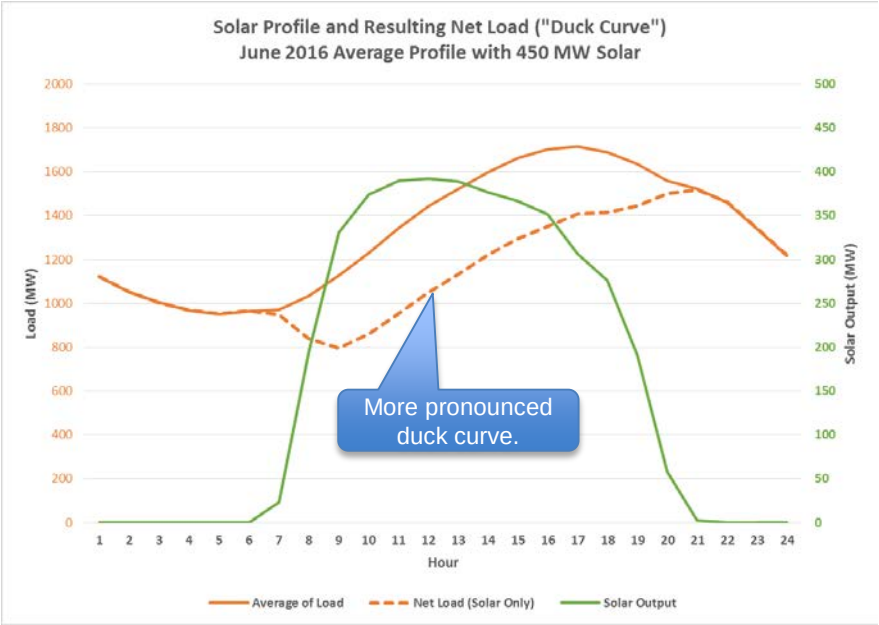


Note higher energy to charge with 80% efficiency.

- **Battery storage may allow for some mitigation of solar deficiency at peak hour.**

Resource Intermittency





- **More pronounced “duck curve” due to the higher solar output.**

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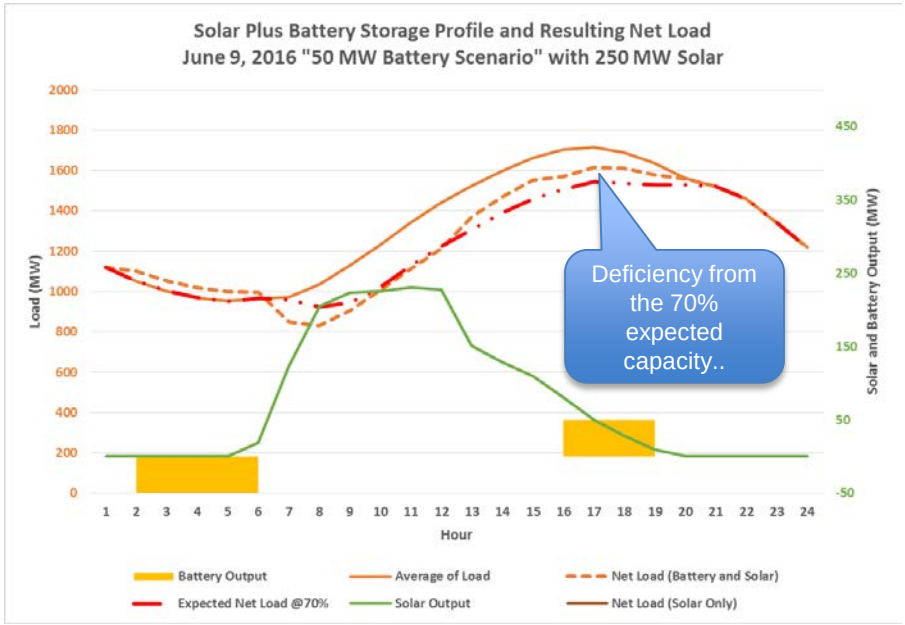
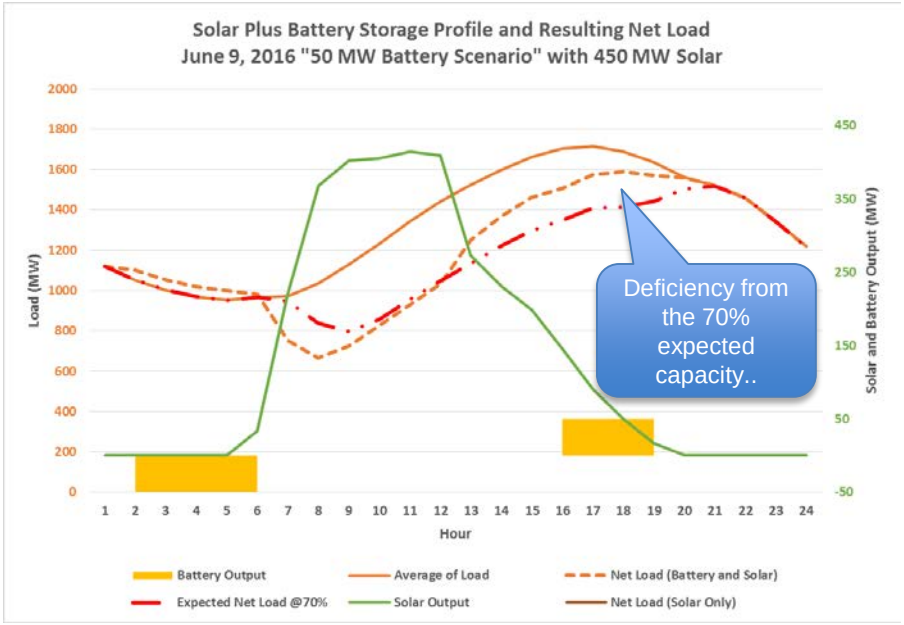
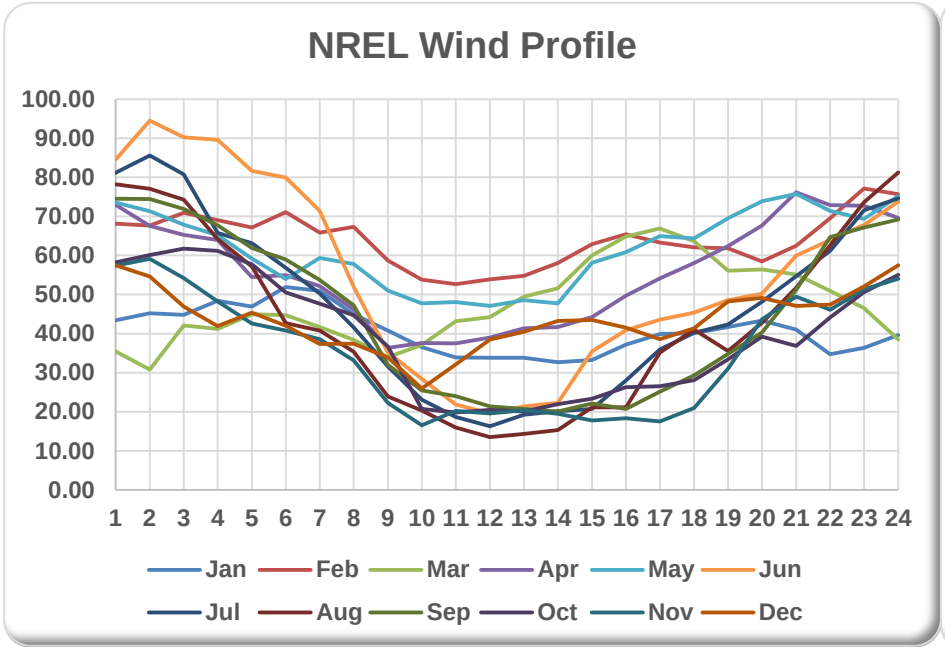
Resource Intermittency - Solar

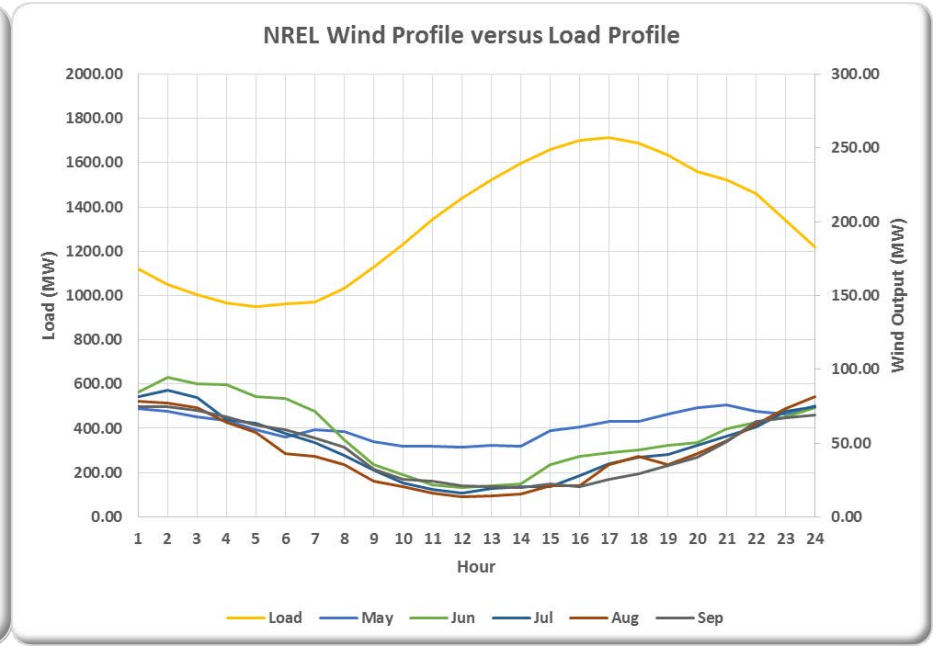




- **50 MW battery storage mitigates a smaller percentage of the potential intermittency.**

Wind Resource Profile



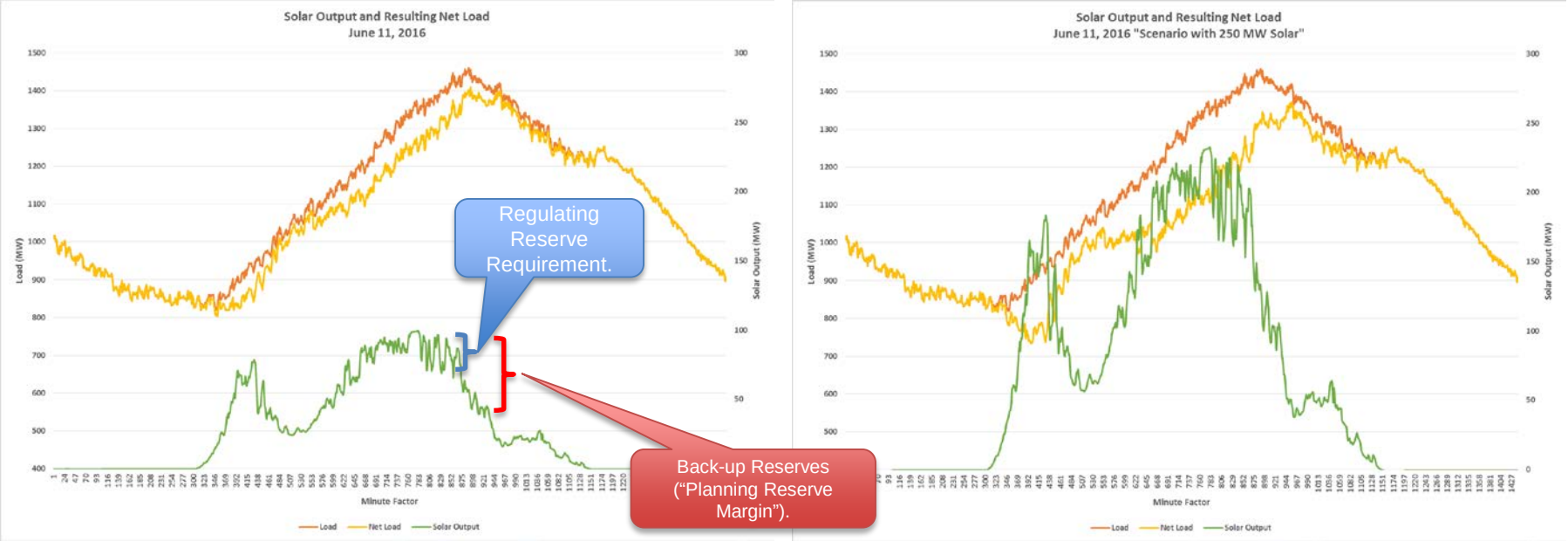


Reliability -- System Support Characteristics

- **Resources are an integrated part of the “Bulk Electric System”**
- **Resource characteristics determine if they provide:**
  - Frequency response
  - Load regulation
- **EPE will evaluate if the identified most effective portfolio provides adequate system support**
  - May be iterative in regards to the IRP analysis

Resource Intermittency – Solar

Similar for Wind at the Minute Level

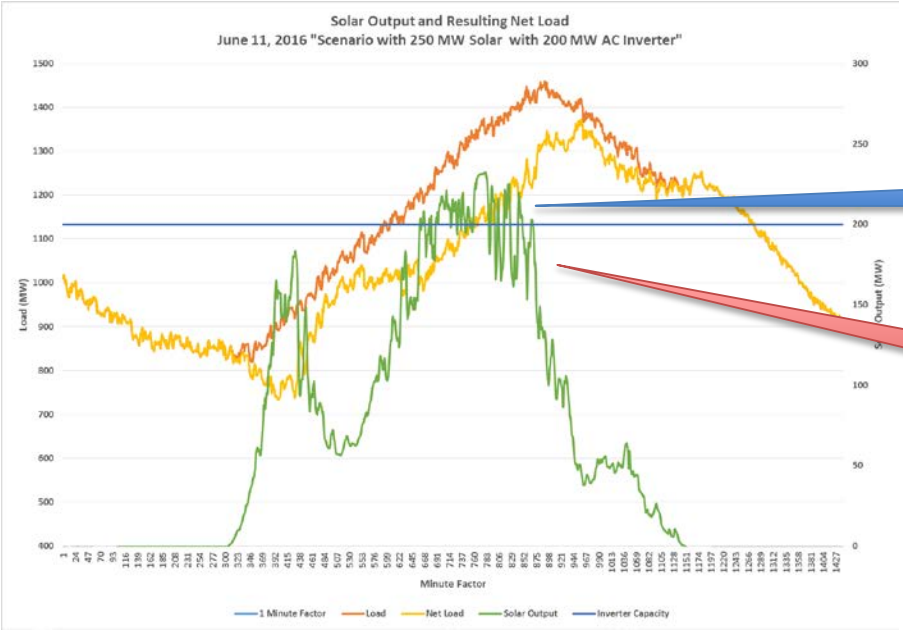


- **The need for regulating reserves and/or back-up reserves are accentuated by higher solar penetration.**

Reliability -- System Support Characteristics

- **Mitigate impact of intermittency by geographical dispersion of solar facilities.**
- **Possibility to utilize battery storage.**
- **Option to utilize smaller conventional generation such as CTs or Reciprocating Engines.**
- **Leverage over sizing of solar DC versus AC capacity of inverter.**
  - Illustrated in the following slide.

Resource Intermittency



Excess capacity addresses intermittency above the blue line.

Does not address need for back-up generation and still requires regulation below the blue line (solar inverter controls may slightly offset some regulation requirement).

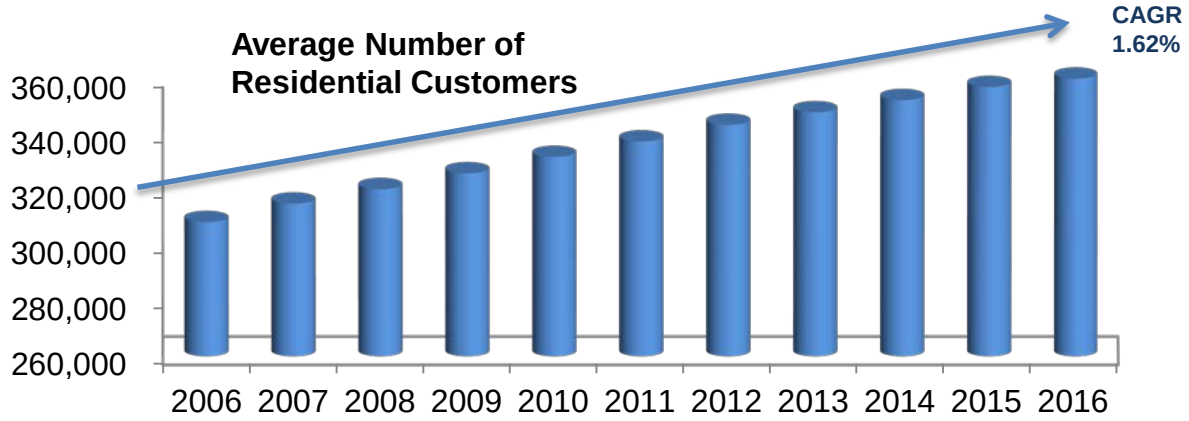
- **Over building capacity the solar DC above the inverter AC rating may provide some benefits, but does not eliminate intermittency.**

Integrated Resource Plan

Capacity Expansion Plan Model Assumptions

Initial Cost Estimates for Resource Planning Options

Residential Customer Growth



- Refrigerated air conditioning is being installed in 99% of new homes
- Majority of customers within our service territory utilize evaporative coolers
- Refrigerated air conditioning uses 85% less water and three times more electricity than evaporative coolers
- Usage per customer impacted by increased energy efficiency and conservation initiatives

10 Year CAGR – Avg. No. Customers		
	EE	Industry*
Usage per Customer	1.24%	-0.15%
Customer Growth	1.62%	0.42%

* Source EEI-2015 Statistical Yearbook

Base Case Load Forecast Assumptions

2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
1,889	1,906	1,922	1,945	1,968	1,991	2,010	2,041	2,066	2,093

2028	2029	2030	2031	2032	2033	2034	2035	2036
2,118	2,154	2,187	2,220	2,247	2,289	2,325	2,363	2,394

- Source: Total System Demand per EPE's 2017 Load Forecast, as shown in EPE's L&R line 5.0

Resource Option Costs Assumptions

- The tables below reflects EPE's Base Case assumptions for resource expansion options
- The tables below does not reflect any specific existing EPE unit costs
- Source: Pricing and operating characteristics were obtained from *Lazard's Levelized Cost of Energy Analysis - Version 10.0, Levelized Cost of Storage – Version 2.0, and EPE's Commission approved Demand Response Program*

Assumptions for Resource Options

Technology	Capital Costs ($/kw)	Heat Rate (Btu/kWh)	Fixed O&M ($/kW-yr.)	Variable O&M ($/MWh)
Solar*	$1,450	-	$12.00	-
Wind*	$1,700	-	$35.00	-
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	$20.00	$15.00
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.

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.

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.)

Generic Hourly Solar Profile

Solar 50MW Output Profile Availability												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of days -->	31	28	31	30	31	30	31	31	30	31	30	31
Hour ending												
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	1.3	3.0	0.6	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	1.5	16.2	27.0	29.9	18.1	11.6	8.0	2.3	0.0	0.0
8	2.7	8.4	27.7	41.1	43.5	43.0	30.5	31.2	35.5	26.1	14.2	3.9
9	33.9	31.6	43.3	47.1	48.9	47.6	38.7	38.8	44.6	36.2	32.6	29.8
10	39.0	36.2	44.5	48.0	48.3	48.3	41.2	41.5	47.2	37.9	36.2	33.6
11	39.1	36.6	45.4	49.8	48.3	48.3	44.2	44.5	47.3	39.1	35.2	34.8
12	34.8	36.3	46.2	48.6	48.0	47.8	46.4	43.2	45.9	38.0	34.7	33.0
13	35.3	36.0	46.4	45.9	47.7	48.6	47.7	43.0	45.5	37.4	36.7	32.5
14	36.6	37.6	42.7	45.5	46.6	48.5	44.4	39.9	42.2	37.9	39.4	34.6
15	36.1	38.6	43.6	45.2	44.4	42.9	42.4	38.6	44.4	36.8	40.6	35.7
16	37.8	38.2	42.9	47.3	41.9	38.0	38.3	31.7	41.0	33.7	40.1	36.1
17	27.4	34.6	40.4	42.3	39.9	38.4	34.7	27.7	38.2	20.4	4.7	0.0
18	0.1	2.5	13.9	33.2	35.0	29.4	29.3	22.1	11.7	1.2	0.0	0.0
19	0.0	0.0	0.0	0.8	1.6	6.5	6.8	0.8	0.0	0.0	0.0	0.0
20	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
21	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
23	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
24	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total MWh/day	322.8	336.6	438.5	511.0	522.3	520.1	463.3	414.6	451.5	346.9	314.5	274.1
Total On-Peak MWh	0.0	0.0	0.0	0.0	228.5	225.7	219.2	196.4	219.1	0.0	0.0	0.0
Total MWh/yr.	149,591.7											
Total On-Peak MWh	33,312.7											

Source: Generic Profile based on EPE owned resource

Generic Hourly Wind Profile

Wind 100 MW Output Profile Availability												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No. of days -->	31	28	31	30	31	30	31	31	30	31	30	31
Hour ending												
1	28.93	45.43	23.65	48.62	49.02	56.32	54.12	52.15	49.69	38.80	38.26	38.34
2	30.16	45.10	20.52	45.05	47.54	63.00	57.07	51.37	49.64	40.06	39.43	36.40
3	29.86	47.30	28.04	43.54	45.25	60.18	53.81	49.50	47.93	41.19	36.15	31.28
4	32.27	46.02	27.47	42.63	43.44	59.70	43.83	42.83	45.16	40.77	32.16	27.96
5	31.28	44.75	29.95	36.32	39.50	54.44	42.10	38.10	41.30	38.49	28.38	30.25
6	34.61	47.36	29.83	36.61	35.98	53.29	37.89	28.43	39.32	33.67	27.20	28.02
7	33.97	43.92	27.81	34.78	39.56	47.63	33.53	27.17	35.82	31.77	25.74	24.90
8	29.99	44.86	25.60	30.78	38.52	34.65	27.75	23.60	31.49	29.80	22.12	24.94
9	27.19	39.13	22.64	24.23	34.02	23.47	21.06	15.93	21.33	24.45	14.83	22.62
10	24.35	35.88	24.72	25.07	31.84	18.94	15.41	13.57	17.00	13.80	11.04	17.30
11	22.60	35.09	28.79	25.00	32.04	14.59	12.48	10.64	15.99	13.24	13.50	21.42
12	22.57	35.91	29.49	25.97	31.38	13.06	10.90	9.00	14.25	13.64	13.04	25.66
13	22.55	36.54	32.96	27.57	32.39	14.23	12.82	9.54	13.82	13.39	13.59	26.97
14	21.79	38.69	34.42	27.80	31.81	14.86	13.43	10.22	13.36	14.64	13.03	28.84
15	22.19	41.92	40.01	29.47	38.76	23.62	13.83	14.11	14.75	15.54	11.85	29.01
16	24.78	43.62	43.24	33.14	40.56	27.26	18.68	14.09	13.84	17.52	12.25	27.69
17	26.58	42.19	44.60	36.07	43.27	29.07	23.95	23.43	16.78	17.68	11.68	25.72
18	26.76	41.40	42.41	38.72	42.90	30.24	26.79	27.33	19.56	18.71	13.96	27.55
19	27.81	41.24	37.41	41.60	46.33	32.35	28.23	23.71	23.21	22.26	20.68	32.16
20	28.90	38.96	37.62	45.11	49.22	33.45	32.11	28.49	26.85	26.13	29.09	32.76
21	27.36	41.68	36.77	50.76	50.48	39.98	36.48	34.49	34.10	24.54	32.96	31.41
22	23.13	46.38	33.94	48.58	47.59	42.67	40.81	41.71	43.15	29.42	30.76	31.60
23	24.26	51.42	31.00	48.49	46.23	45.23	47.71	49.08	44.78	33.74	34.26	34.72
24	26.45	50.45	25.66	46.41	50.11	49.20	49.74	54.17	46.11	36.69	36.04	38.35
Total MWh/day	650.4	1,025.3	758.5	892.3	987.8	881.5	754.5	692.7	719.2	629.9	562.0	695.9
Total On-Peak MWh	0.0	0.0	0.0	0.0	174.9	93.0	69.7	57.0	70.0	0.0	0.0	0.0
Total MWh/yr.	280,617.4											
Total On-Peak MWh	14,238.8											

Source: NREL data

Discussion

Acronyms

AC	-	alternating current	kWh	-	kilowatt hour
AMI	-	Advanced Metering Infrastructure	L&R	-	Loads and Resources
CAGR	-	Compounded Average Growth Rate	MW	-	MegaWatts (1,000 kW)
CB	-	Capacity Bidding	MWh	-	Megawatt hours
CC	-	Combined Cycle	NMAC	-	New Mexico Administrative Code
CPP	-	Critical Peak Pricing	NMPRC	-	New Mexico Public Regulation Commission
CT	-	Combustion Turbine	NREL	-	National Renewable Energy Laboratory
DC	-	direct current	PAG	-	Public Advisory Group
DG	-	Distributed Generation	PP	-	Purchased Power
EE	-	Energy Efficiency	PPA	-	Power Purchase Agreement
EPE	-	El paso Electric Company, or "EPEC"	PTR	-	Peak Time Rebate
FERC	-	Federal Energy Regulation Commission	PV	-	Photovoltaic
GT	-	Gas turbine	Res	-	Residential
IRP	-	Integrated Resource Plan	RFI	-	Request for Information
KV	-	Kilovolt (1,000 volts)	RPS	-	Renewable Portfolio Standard
kW	-	kilowatt (1,000 watts)	ST	-	Steam Turbine
			TOU	-	Time of Use

For More Information

- EPE's IRP website https://www.epelectric.com/community/2017-18-public-advisory-group-meetings
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