

PNM 2023-2042 IRP: Public Advisory Group Day

STEERING MEETING #4

AUGUST 17, 2022



Talk to us.



DISCLOSURE REGARDING FORWARD LOOKING STATEMENTS

The information provided in this presentation contains scenario planning assumptions to assist in the Integrated Resource Plan public process and should not be considered statements of the company's actual plans. Any assumptions and projections contained in the presentation are subject to a variety of risks, uncertainties and other factors, most of which are beyond the company's control, and many of which could have a significant impact on the company's ultimate conclusions and plans. For further discussion of these and other important factors, please refer to reports filed with the Securities and Exchange Commission. The reports are available online at www.pnmresources.com.

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MEETING GROUND RULES

THE FOCUS OF THE MEETING IS THE DEVELOPMENT OF THE 2023 IRP

01



- Questions and comments are welcome – One Person Speaks at a Time

02



- Reminder; today's presentation is not PNM's plan or a financial forecast, it is an illustration of the IRP process

03



- When asking a question, please speak clearly and slowly as all questions will be logged and labeled with the person and organization responsible for asking the question

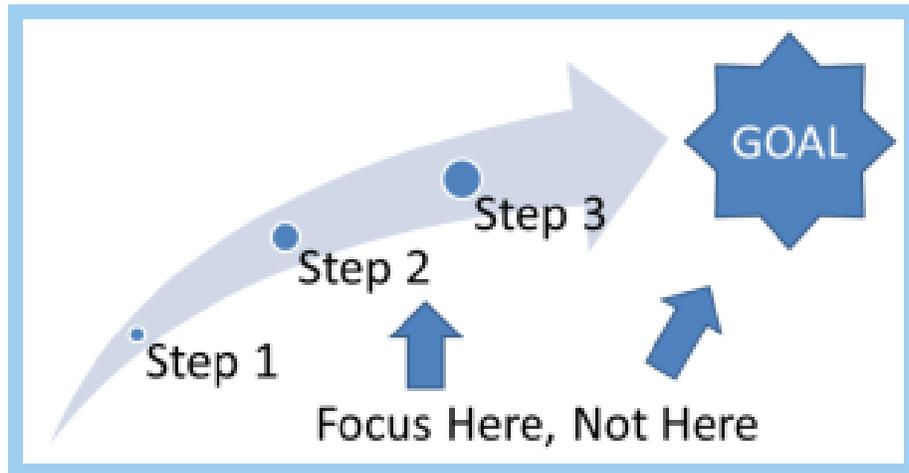
04



- These meetings are about the 2023 IRP, questions and comments should relate to this IRP. Any questions or comments related to other regulator proceedings should be directed towards the specific filing.

TECHNICAL SESSION

THE FOCUS OF THE MEETING IS THE DEVELOPMENT OF THE 2023 IRP



The technical sessions are about discussing the advantages and disadvantages regarding the application of different technical methodologies within the IRP modeling framework.

We are not here to focus on the results or drive towards a specific result. **We all know where we are going: 100% Carbon Free by 2040.** The focus in the IRP development is how do we get there in the best way possible for PNM's customers and New Mexico.

MEETING AGENDA

- Welcome and Introductions
- Presentation – Grid Strategies (Michael Goggin)
- Next steps and Near-Term Schedule

Potential methods to account for correlated generator outages

Michael Goggin

Grid Strategies LLC

August 17, 2022



Methods for accounting for correlated outages and derates of conventional generators

- Correlated conventional generator outages due to equipment failures and fuel supply interruptions have played a major role in recent reliability events.
- Effective Load Carrying Capability (ELCC) methods capture correlations in output patterns for renewable and storage resources. Conventional generators also exhibit correlated outages and derates, but those are not typically accounted for.
- Ignoring conventional generator correlated outages can bias resource selection, and mask reliability risk.
- Grid operators and others have developed methods for evaluating risks to resource adequacy and resilience from correlated conventional generator outages and derates.
- Some methods apply ELCC to conventional generators using historical patterns for generator outages.
- Other methods focus more on testing a large number of potential generation mixes under a range of plausible conditions.



Astrape “Accrediting RA Value to Thermal Gen”

		Winter Accreditation Impact	Winter Capacity Credit ¹	Summer Accreditation Impact	Summer Capacity Credit
Standard Accounting Practice	Forced Outage Rate	5.0%	95.0%	5.0%	95.0%
	Outage Variability	2.7%	92.3%	4.6%	90.4%
Proposed Additional Considerations	Outage Correlation	2.3%	90.0%		
	Weather Dependent Outages	10.0%	82.3% ²	5.6%	84.7%
	Fuel Supply Outages ³	6.2%	76.1% ⁴		

Astrape found that accounting for correlations in conventional generator outages due to equipment failures and fuel supply interruptions significantly reduced their capacity value. In summer the capacity value was reduced from 95% to 85%, and in winter to 76%. This analysis was done for PJM South (Dominion’s footprint in Virginia and parts of West Virginia and North Carolina), but could be done for other regions.



Ideas explored as part of MISO moving to Seasonal RA

- As it was developing a seasonal resource adequacy approach, MISO explored ways to account for correlated outages in both testing system LOLE and accrediting capacity value to resources.
- In SERVVM modeling of system LOLE, “an adjustment will be applied within the model to account for increased forced outages during extreme weather events. When the temperature drops below a certain threshold in the model, the outage rates for thermal resources will be increased to represent the correlation between extreme temperatures and forced outages.”
- Capacity value accreditation would be based on historical performance during tight system conditions, and class averages would be applied to new resources.



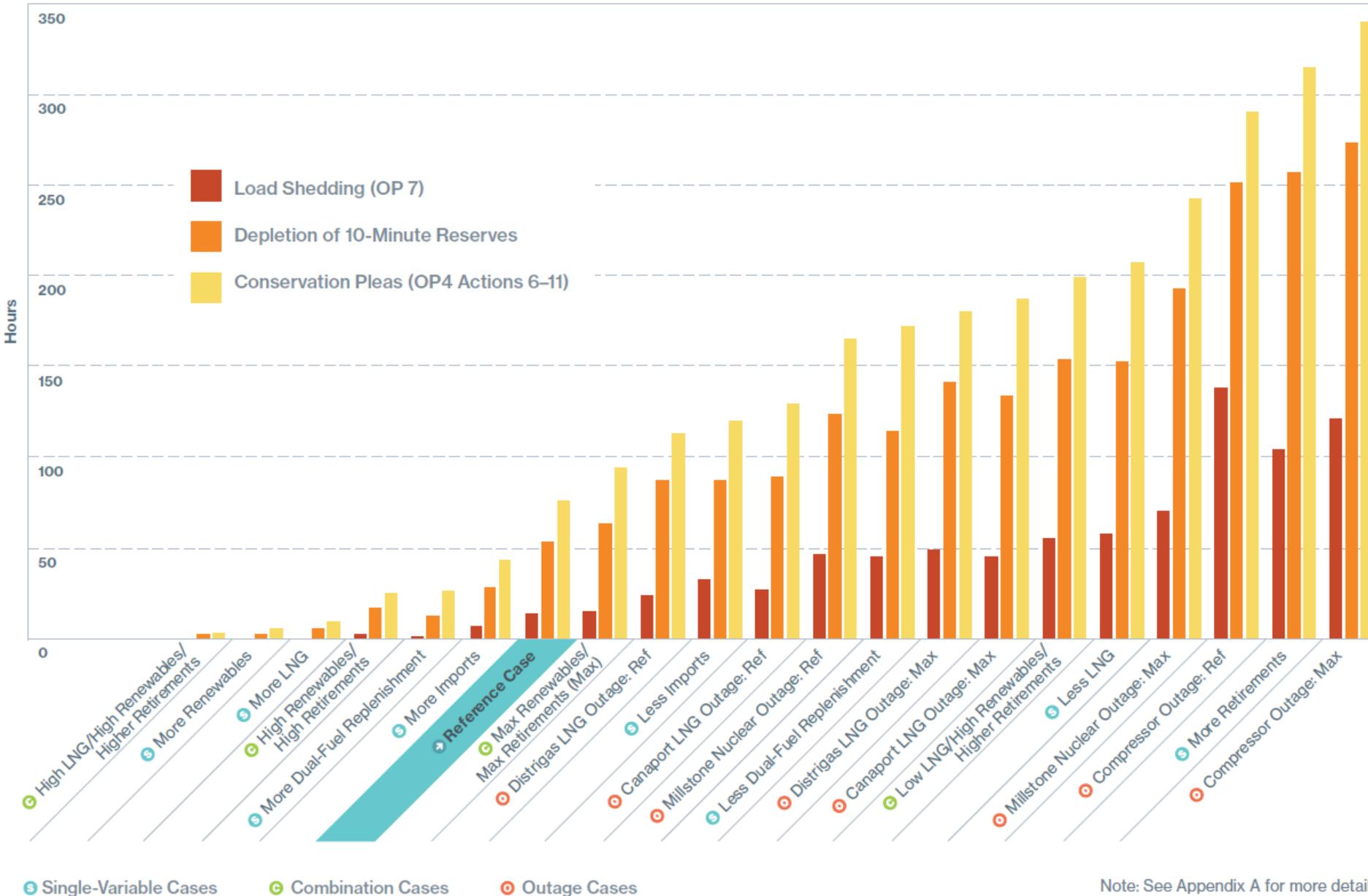
“PJM’s Evolving Resource Mix and System Reliability”

- First PJM conducted a risk analysis in which hundreds of potential generation mix “portfolios were assessed for their ability to provide the generator reliability attributes ... under four operational states: normal peak conditions, light load, extremely hot weather and extremely cold weather.”
- *The resilience of the portfolios identified as desirable by the risk analysis was tested by subjecting the desirable portfolios to a polar vortex event. Such an event may trigger higher-than-average unavailability rates for fuel types such as natural gas, coal and solar. To determine these potential higher-than-average unavailability rates, generator performance data from high load days during Winter 2014/2015 and Winter 2015/2016 were analyzed by fuel type. The maximum unavailability rates during those days were applied to the portfolios in the desirable region. Reliability indices and composite reliability indices were recalculated.*
- *Only 34 of the 98 portfolios which were classified as desirable were resilient when subjected to a polar vortex event. This sensitivity specifically captured the increased risk of natural gas delivery under extremely cold and high load conditions. The polar vortex sensitivity highlights the importance of resilience, which is not captured by the generator reliability attributes that were considered in this study.*



ISO-NE “Operational Fuel-Security Analysis”

Figure 4: Hours of Emergency Actions under Modeled Scenarios, Ordered Least to Most



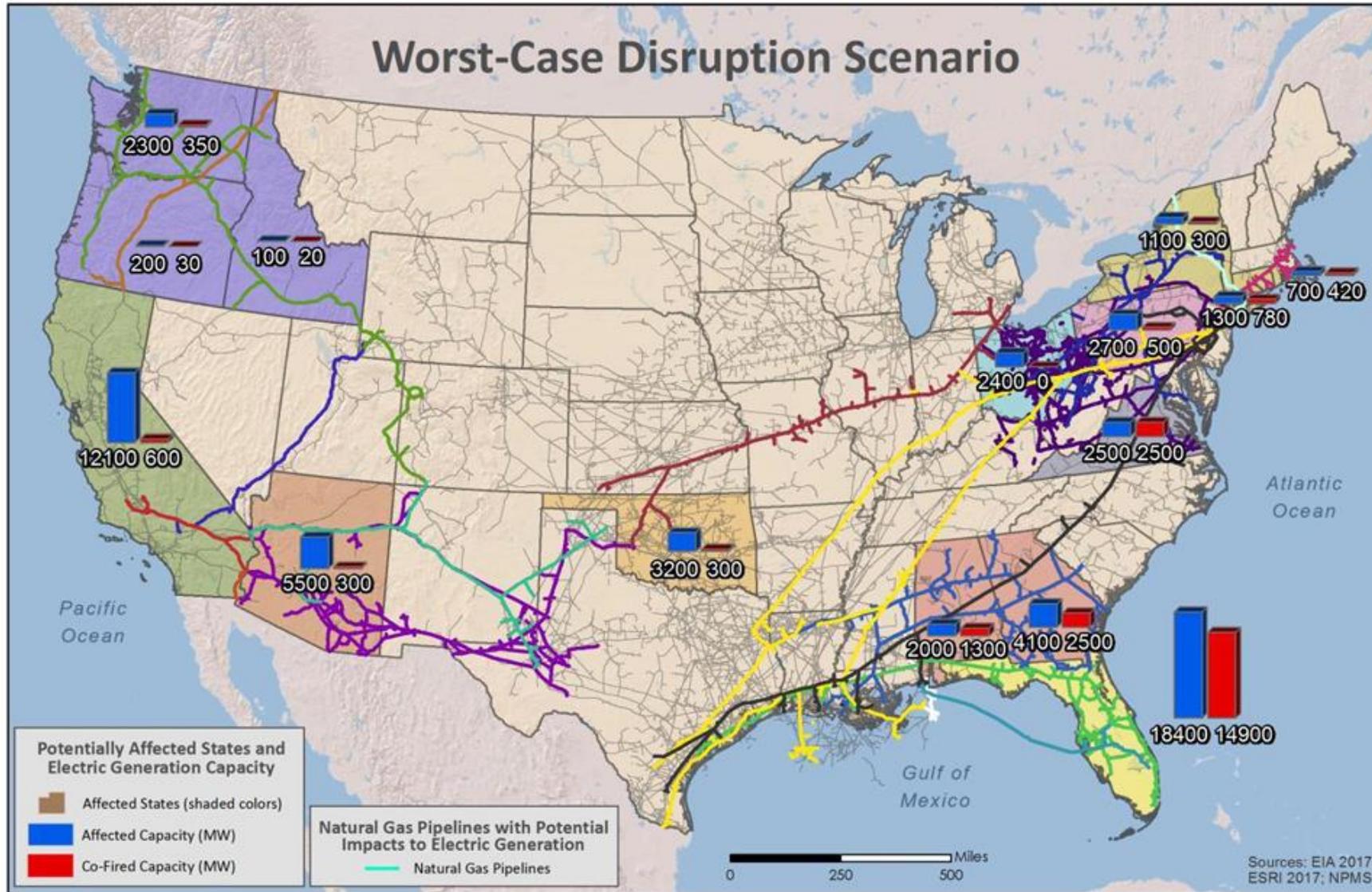
ISO-NE tested its ability to meet winter demand under 23 scenarios that varied the generation mix, generator outages, and gas supply outages.

https://www.iso-ne.com/static-assets/documents/2018/01/20180117_operational_fuel-security_analysis.pdf



Note: See Appendix A for more details.

NERC 2017 Special Reliability Assessment



An Argonne National Laboratory tool (NGfast) was used to model the amount of gas generating capacity that could be taken offline by potential disruptions to the interstate gas pipeline system.

Figure E.2: Summary of NGfast Simulation Results for the Worst-Case Scenario



QUESTIONS/COMMENTS

WE WOULD LIKE TO HEAR FROM YOU

Any comments or questions regarding any of the topics PNM has previously presented?

Any feedback regarding any of drivers/assumptions that will be used in the 2023 IRP?

NEAR TERM SCHEDULE

FUTURE MEETING TIME & LOCATION

When: August 31, 2022

Topic: Public Advisory Steering Meeting #5: Emerging/Evolving Grid Solutions

Start Time: 9:00 AM

Location: Virtual

PNM will hold virtual meetings until circumstances warrant a change. If there is strong interest to resume in person meetings for future sessions, please email us at IRP@pnm.com. We will continue to notify everyone through the email service list regarding upcoming meeting dates, topics and locations (virtual or in person).

NEAR TERM SCHEDULE

FUTURE MEETING TIME & LOCATION

When: September 15, 2022

Topic: Public Advisory Steering Meeting #6: Transmission

Start Time: 9:00 AM

Location: Virtual

PNM will hold virtual meetings until circumstances warrant a change. If there is strong interest to resume in person meetings for future sessions, please email us at IRP@pnm.com. We will continue to notify everyone through the email service list regarding upcoming meeting dates, topics and locations (virtual or in person).

NEXT MEETING

We encourage you to send in your thoughts ahead of time to IRP@pnm.com so that we can summarize them and distribute them for the next meeting. Please have your submissions in by August 29, 2022.

MAKE SURE WE HAVE UP TO DATE CONTACT INFORMATION FOR YOU

www.pnm.com/irp for documents

IRP@pnm.com for e-mails

Register your email on sign-in sheets to receive alerts of upcoming meetings and notices that we have posted to the website.

Thank you



Talk to us.

