20-Year Transmission Planning Outlook

PNM INTEGRATED PLANNING

NOVEMBER 12, 2024

OVERVIEW & PURPOSE

PNM presents its first ever 20-year transmission outlook offering a strategic overview of the transmission infrastructure to reliably achieve PNM's goal of 100% carbon-free energy by 2040. **This outlook marks the initial step in identifying potential transmission concepts for the next two decades based on decarbonizing aligned with PNM's 2023 Integrated Resource Plan.**

The purpose of this outlook is to initiate a conversation with a broad group of stakeholders, PNM recognizes collaboration is essential to achieve significant transmission expansion in New Mexico. PNM has not committed to building any of the projects or infrastructure identified herein. Additional studies and/or detailed evaluations are required to prioritize transmission expansion investment.

Disclaimer: The information contained in this outlook is based on the information known to PNM at the time it was created. PNM makes no representation or warranty of any kind as to the completeness, accuracy, reliability, suitability or availability as to the information contained herein. It is intended for illustrative or discussion purposes only and should not be relied upon or construed as a proposal, counterproposal, offer, contract, commitment, or any other form of legally binding document.

NOVEMBER STAKEHOLDER MEETING

AGENDA

- Standards of Conduct
- Study Objectives
- Methodology
- Modeling Assumptions
- Benefits of Transmission
- Study Results
- Cost and Schedule Estimates
- Next Steps
- Stakeholder Engagement

OBJECTIVE

The 20-year transmission outlook serves as a foundational stage for future planning activities. It aims to:

Investigate Transmission for IRP Resources*:

- Support IRP-identified resources such as wind energy, long-duration storage, and hydrogen generation.
- Address potential service needs based on PNM's updated load forecast.

Alleviate Local Area Constraints:

- Develop transmission solutions to mitigate constraints resulting from gas power plant retirements.

Expand Beyond Traditional Planning:

- Provide information typically outside the scope of traditional utility transmission planning processes.
- Extend considerations beyond the Integrated Resource Plan (IRP) for retail and the 10-Year Transmission Planning Study for PNM's Balancing Authority Area.
- Generate potential market interest in joint transmission development outside of the utility's Large Generator Interconnection Queue.

Future Regional Planning:

- Develop concepts for evaluation future regional planning processes, extending beyond those identified in the IRP.

**Current Trends and Policies and High Economic Growth per 2023 IRP Material Event update*

METHODOLOGY

Three Point-in-Time Study Years
- 2028 (near-term)
- 2033 (mid-term)
- 2040 (long-term)

Two Load Scenarios
- Current Trends and Policies
- High Economic Growth

Two Generation Scenarios
- Net Peak
- Maximum Renewable

The analysis was conducted using the following methodology:

- **Methodology**: Conducted studies using single contingency power flow (N-1) analysis
    - Study did not identify additional solutions for underlying system overloads, etc.
- Utilized the 2040 High Economic (HE) Net Peak and Maximum Renewable scenarios as the initial benchmarks, representing potential system conditions at the end of the 20-year planning horizon
- Each Project was assessed based on its effectiveness in reducing or eliminating thermal loading concerns

Notes: *Prior to pursuing any investment, remaining planning analyses beyond this study including N-1-1, transient stability, short circuit analyses should be completed (and potentially electromagnetic transient or "EMT"). Additionally, PNM utilizes significant Grid Enhancing Technology (GETS) today and have extracted most latent capacity from system - Additional role for advanced conductor is possible but was outside the scope of this study*

STUDY ASSUMPTIONS

See April 2024 20-Year Plan Stakeholder presentation for additional details on study assumptions: *https://www.pnm.com/planning-for-the-future*

Initial Study Assumptions were adjusted to:

- Incorporate PNM's updated load forecast including expected economic development potential (May 2024)
- Simulate stressed generation scenarios on PNM's system
- Modified candidate project list –
    - Deferred to future study: Sun Zia Interconnection due to modeling complexity required, and Southline, Vista Trails, Second Greenlee-Hidalgo-Luna 345 kV Line, and the Third Springerville-Greenlee 345 kV Line due to time constraints

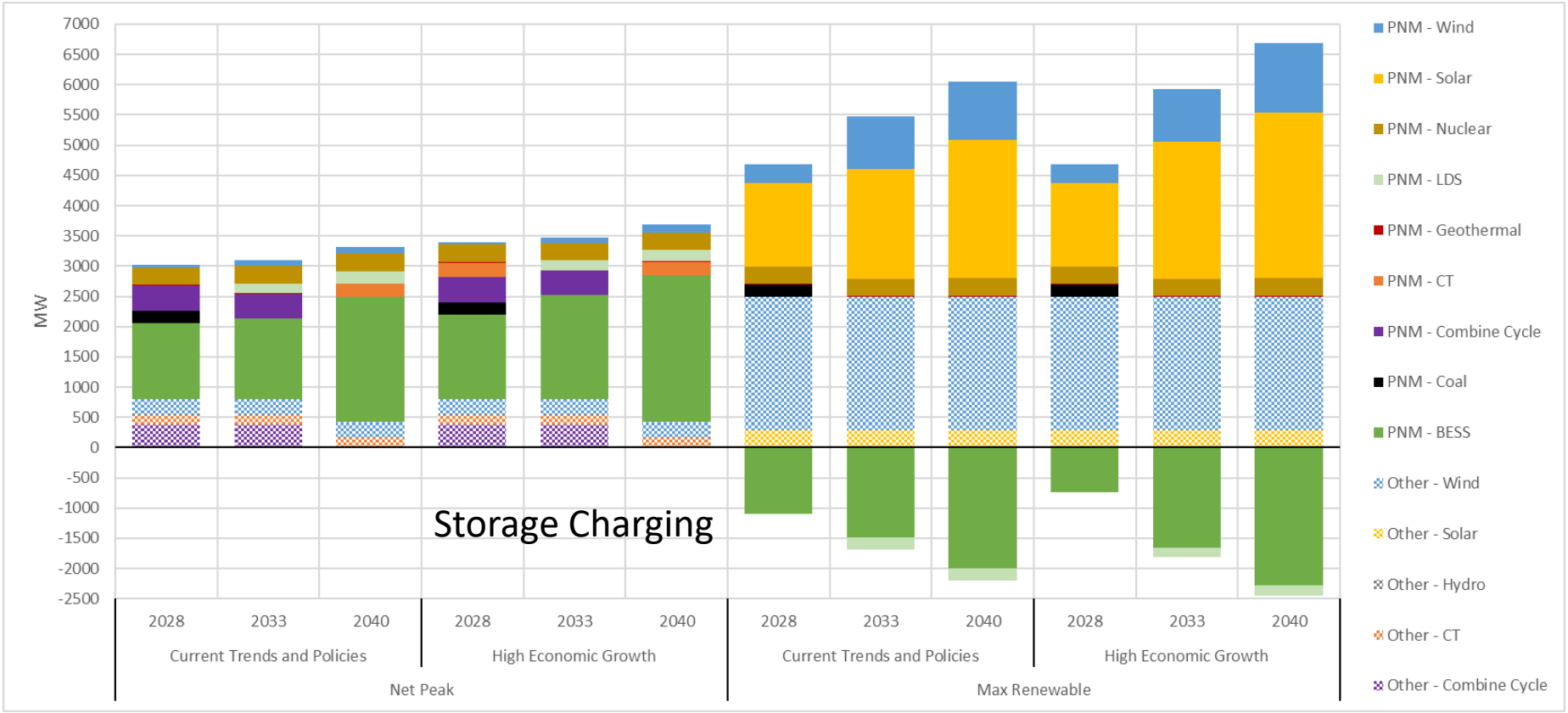
STUDY ASSUMPTIONS - BALANCING AREA LOAD

Load Scenario	2024 Historical	2028		2033		2040	
		CTP	Growth	CTP	Growth	CTP	Growth
Peak	2,758	3,161	403	3,285	527	3,585	827
Net Peak	2,620	3,003	383	3,121	501	3,406	786
Max Renewable	1,103	1,300	197	1,347	244	1,467	364

Future iterations of this study will seek to expand beyond these scenarios (e.g., gross peak case)

CTP = Current Tends and Policies
HEG = CTP + 370 MW by 2040

STUDY ASSUMPTIONS - BALANCING AREA GENERATION



Date: 11/4/2024
RPM# 2968

PNM System 20 Year Transmission Outlook

PNM 20 Year Plan

Station

- Expanded Station
- New Station

Transmission

- Merchant
- New Line
- Rebuild
- PNM Planning Zones 3
- PNM Planning Zones

PNM

CONCEPTUAL TRANSMISSION PROJECTS

Load Serving: Helps i*ntegrate new load: Ensuring the infrastructure can handle additional demand*
Loadside Gas Retirement(s): Transitioning smoothly from loadside gas to alternative energy sources
Market Access: *Enhance Market Opportunities: Expand opportunities for buying/selling in regional market(s)*
Resilience: Increase supply resilience in extreme events

- *Rio Puerco to* Pajarito *345 kV Line*
- Pajarito to Prosperity 345 kV Line
- Ojo to Norton 345 kV Line
- Four Corners-Rio Puerco 345 kV Line #2
- Western Spirit-Hidden Mountain-Pajarito 345 kV Line
- Rio Sol Interconnection Transmission Project
- Sun Zia Merchant Transmission Project
- West Mesa-Ambrosia 230 kV Conversion to 345 kV
- Ambrosia-Coronado (AZ) 345 kV Line
- Union County-Springer 345 kV Line
- Union County-Comanche (CO) 345 kV Line
- Union County-Taiban Mesa 345 kV Line
- Taiban Mesa-Western Spirit 345 kV Line
- Chaves County-Western Spirit 345 kV Line

Deferred: Southline Merchant Transmission, Vista Trails Merchant Transmission, Second Greenlee-Hidalgo-Luna 345 kV Line, Third Springerville-Greenlee 345 kV Line

RESULTS

Net Peak

Meeting Future Loads:

- Enabled PNM to deliver IRP resources effectively to meet projected future loads, including the High Economic Growth scenario.

Identified Overloads:

- During certain contingencies, overloads were identified on the underlying 115 kV system in Albuquerque. Improvements will need to be identified to address these overloads.

Max Renewable

Increased Export Capacity:

- Conceptual transmission projects allowed for the export of resources totaling twice the PNM Balancing Authority (BA) load.

Current Export Capacity:

- Currently, the system's export capacity is fully committed with existing resources.

2040 IRP CONCEPTUAL TRANSMISSION PORTFOLIO

Conceptual Project	Additional Load serving*	Additional Market Access*	Enables IRP LDES-Compressed Air Storage and/or Geothermal	Enables IRP Wind Delivery	Enables Loadside Gas Generation Retirement	Addresses Underlying System Issues	Conceptual IRP Role***
Rio Puerco-Pajarito 345 kV Line	300-600 MW	0 MW	No	No	Yes	Yes	Serve additional IRP load forecasted demand including High Economic Growth
Pajarito-Prosperity 345 kV Line	300-600 MW	0 MW	No	No	Yes	Yes	Serve additional IRP load forecasted demand including High Economic Growth
Rio Sol Interconnection to PNM	300-600 MW	0 MW**	No**	Yes	No	No	Potential Wind Access and Load Serving Capability
SunZia Interconnection to PNM	0 MW	Yes	No**	No**	No	No	Potential Wind and Market Access
Western Spirit-Hidden Mountain-Pajarito 345 kV Line #2	300-600 MW	0 MW**	No	Yes	Yes	No	Potential Wind and Load Serving Capability
Chaves County-Western Spirit 345 kV Line	0 MW	600-1000 MW	Yes	Yes	No	No	Potential CAES/Geothermal or Other Storage Access
Four Corners-Rio Puerco 345 kV Line #2 (could substitute w Ojo-Norton)	600-1000 MW	600-1000 MW	No	No	Yes	No	Potential Hydrogen or Storage Access and Market Access

Legend: Complimentary additions

**Further study needed to validate maximum values beyond IRP forecasts*
***When paired with certain other transmission solutions could create additional benefits*
**** Enable additional carbon free energy*

ADDITIONAL RESULTS

Other Conceptual Project Results	Additional Load serving	Additional Market Access	Enables IRP LDES-Compressed Air Storage and/or Geothermal	Enables IRP Wind Delivery	Enables Loadside Gas Generation Retirement	Addresses Underlying System Issues
West Mesa-Ambrosia 230 kV Line Conversion to 345 kV	300-600 MW	0 MW**	No	No	No	No
Ambrosia-Coronado (AZ) 345 kV Line	300-600 MW	600-1000 MW	No	No	No	No
Taiban Mesa-Western Spirit 345 kV Line (could pair well with HVDC expansion and WST Line #2)	0 MW**	0 MW**	No**	Yes**	No	No
Taiban Mesa-Union County-Comanche (CO) 345 kV Line	600-1000 MW	Yes*	No**	Yes**	No	No
Ojo-Norton 345 kV Line	300-600 MW	200-500 MW	No	No	Yes	No
Union County-Springer 345 kV Line	0 MW**	200-500 MW	No	Yes**	No	No

Legend: Complimentary additions

**Further study needed to validate maximum values beyond IRP forecasts*
***When paired with certain other transmission solutions could create additional benefits*

BENEFITS OF NEW TRANSMISSION

Supports Additional Load Growth:

- Facilitates service to new load growth, including economic development opportunities.

Increases Market Access:

- Enhances access to regional markets, promoting efficient use of clean energy resources across a wide geographic area and improving resilience during extreme weather events.

Access to Renewable Resources:

- Provides increased access to New Mexico's abundant wind, solar, and other renewable energy resources.

Improves System Reliability and Resilience:

- Strengthens the system's ability to withstand planned or unplanned outages and extreme weather conditions.

BENEFITS AND ENHANCEMENTS OF NEW TRANSMISSION

Enables Fossil Generation Retirement:

- Supports the future retirement of existing fossil fuel generation, particularly in load-concentrated areas.
- Enables loadside gas retirements while maintaining system performance criteria under certain conditions.

Facilitates Advanced Conductor Rebuilds:

- Enables future deployment of advanced conductor rebuilds in ABQ metro area load center by sufficiently offloading existing lines, allowing for necessary outages during construction. Similar potential also exists elsewhere on system.

RESULTS - PRELIMINARY COST AND SCHEDULE ESTIMATES

High level estimate provided to show the magnitude of the cost and time required to implement needed transmission.

Based on standard assumption and does not factor in project specific details like ROW procurement, permitting, and outages for construction.

Estimates are provided for evaluated projects excluding merchant transmission projects

Does not account for rapidly change long lead item procurement time frames.

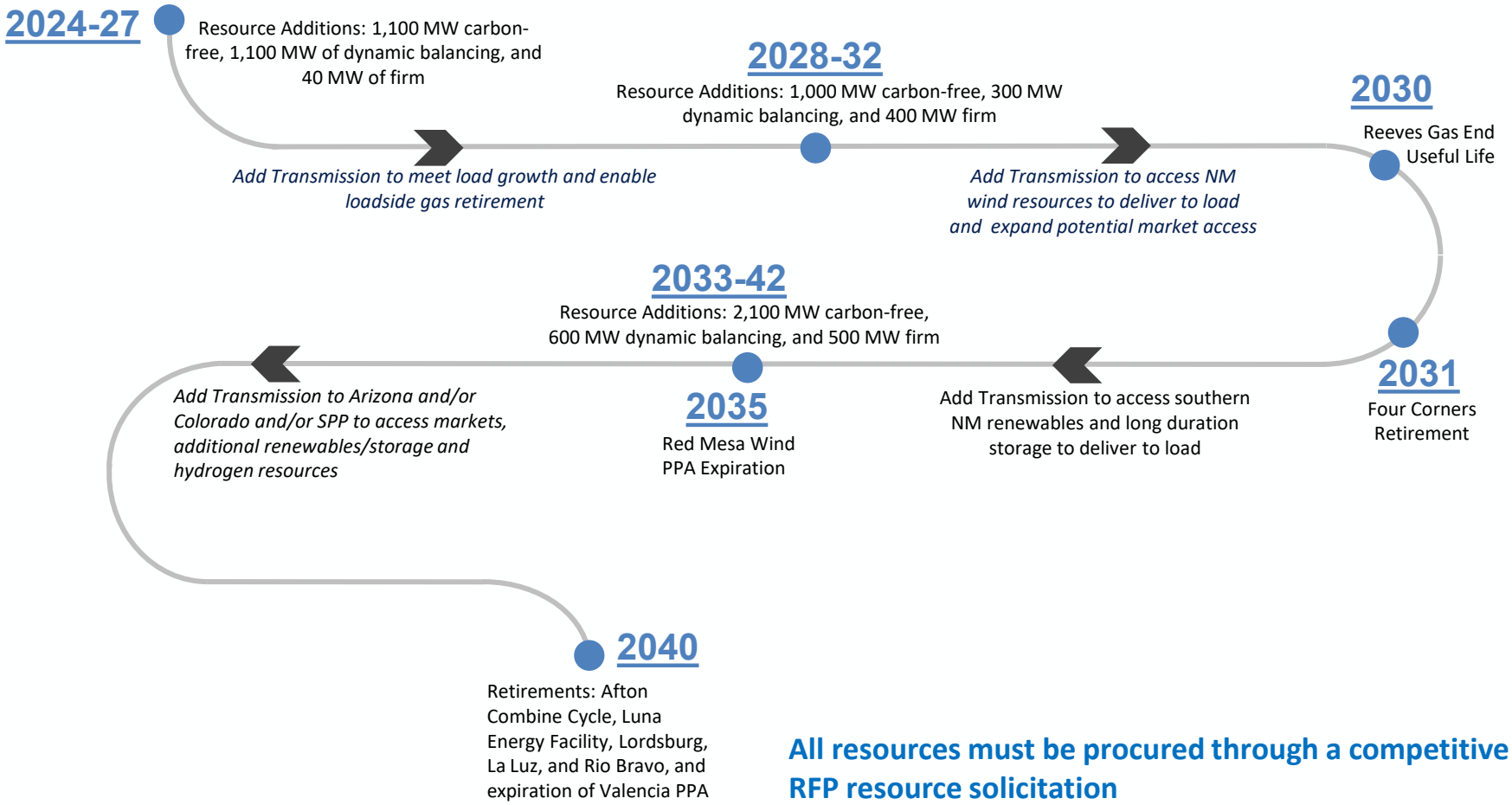
RESULTS - PRELIMINARY COST AND SCHEDULE ESTIMATES

Conceptual Transmission Project	Total ($M) in '24$	Estimated Schedule (Years)
Rio Puerco-Pajarito 345 kV Line	120-132	4-5
Pajarito-Prosperity 345 kV Line	65-72	3.5-4.5
Rio Sol Interconnection to PNM	170-185	4-6
Western Spirit-Hidden Mountain-Pajarito 345 kV Line	445-480	5-7.5
SunZia Interconnection to PNM	47-55*	4-6
Chaves County-Western Spirit 345 kV Line	510-540	7-10
Four Corners-Rio Puerco 345 kV Line #2	375-410	8-10
Ojo-Norton 345 kV Line	150-218	5-7.5
West Mesa-Ambrosia 230 kV Line Conversion to 345 kV	310-340	7-8.5
Ambrosia-Coronado (AZ) 345 kV Line	430-460	7-9
Taiban Mesa-Western Spirit 345 kV Line	325-350	6-8.5
Union County-Taiban Mesa 345 kV Line	400-430	6-10
Union County-Comanche (CO) 345 kV Line	415-460	8-10
Union County-Springer 345 kV Line	160-180	6-8.5

**Unknown required equipment/materials*

Please note these are high-level estimates in 2024$ based on indicative line routes. Detailed costs and schedules unknown until specific routes selected, permitting, ROW and easement, and engineering, procurement and construction bids obtained and contracted. These are subject to change based on permitting, easement, equipment, material, etc. cost escalations. As noted on previous slides some of these projects are compliments of each other.

CONCEPTUAL PNM DECARBONIZATION ROAD MAP



All resources must be procured through a competitive RFP resource solicitation

NEXT STEPS

Publish Final Report – Q1 2025 - https://www.pnm.com/planning-for-the-future

Future Study Work

- **Continuous Improvement:** Continue to refine 20-year Planning Approaches for future studies and perform evaluations on a periodicity to support the IRP including, nodal modeling
- **Incorporate insights from related studies**: Evaluate the project in the context of findings from other relevant studies
- **Examine alternative scenarios**: Analyze additional scenarios to test projects against a wider range of probable system conditions
- **Expand analysis**: Quantify the maximum possible increased load-serving and export capacity resulting from the projects beyond IRP portfolio levels under all scenarios
- **Evaluate Project Combinations:** Assess combinations of projects to identify additional potential benefits

Options for Developers

- PNM welcomes developers to utilize the non-tariff wires-wires or FERC Large Generator Interconnection Processes to evaluate the project

STAKEHOLDER FEEDBACK AND QUESTIONS

Send feedback and questions to pnm20yeartransmissionstudy@pnmresources.com

Feedback will help guide future study work and refine approaches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