20-Year Transmission Planning Study



APRIL 24, 2024

APRIL STAKEHOLDER MEETING

AGENDA

- Standard of Conduct
- PNM Team Introduction
- Study Objectives
- Methodology
- Modeling Assumptions
- Proposed Transmission Alternatives
- Schedule
- Stakeholder Engagement



PNM TEAM MEMBERS

- Laurie Williams Vice President, Integrated Planning
- Tom Duane Director, Integrated Resource Planning
- Karen Reedy Engineer, Transmission Planning
- Tohid Khalili Engineer, Integrated Resource Planning
- Quanta Technology Consultant



20-YEAR TRANSMISSION PLANNING STUDY

OBJECTIVE

- Identify transmission projects to enable PNM to become carbon free
 - Explore indicative transmission expansion options beyond IRP (retail*) and 10 Year Transmission Planning Study (Balancing Area*)
 - Options to export additional generation from New Mexico
 - Cost and schedule for identified projects
- Utilize results for PNM IRP modeling scenarios
- Inform the market for potential multi partner future transmission projects

*Retail is PNM load where the Balancing Area includes network customer



20-YEAR TRANSMISSION PLANNING STUDY

METHODOLOGY

- Base Scenarios: net peak and maximum renewable output (defined on following slides)
- Load Scenarios: Current Trends and Policies, High Economic Growth
- Study Years: Point-in-time studies for 2028 (near-term), 2033 (mid-term), 2040 (long-term)
- Steady State Analysis

NERC TPL-001-5.1* single element contingency events (P1) and select multiple contingency events (P2-P7)

Transient Stability Analysis

Critical NERC TPL-001-5.1* single element contingency events (P1) and select multiple contingency events (P2-P7)

*NERC TPL-000-5.1 is the federal mandatory and enforceable transmission planning standard that all utilities adhere to.



DETERMINATION OF "NET PEAK" SCENARIO | WHAT ARE WE LOOKING FOR?



*BA Net Load = BA Load – BA Solar



DETERMINATION OF "NET PEAK" SCENARIO | BASED ON 2023 HISTORICAL DATA

| Month | Load Peak ¹ | Time of Peak | Solar at Peak | Net Peak ² | Time of Net Peak | Solar at Net Peak | Wind at Net Peak |
|-----------|------------------------|-----------------|------------------|-----------------------|---------------------|----------------------|---------------------|
| January | 74.9% | 3:27 PM | 1.1% | 74.9% | 3:44 PM | 0.4% | 69.6% |
| February | 73.1% | 2:30 PM | 3.3% | 73.1% | 3:04 PM | -0.1% | 58.6% |
| March | 65.7% | 4:05 PM | 1.8% | 65.8% | 4:21 PM | 0.1% | 68.1% |
| April | 66.2% | 5:46 PM | 1.9% | 66.2% | 6:06 PM | -0.1% | 64.6% |
| May | 69.8% | 5:30 PM | 19.7% | 68.3% | 6:56 PM | 0.2% | 51.6% |
| June | 86.6% | 4:20 PM | 40.2% | 81.9% | 6:50 PM | 1.2% | 42.0% |
| July | 100.0% | 3:50 PM | 47.5% | 94.9% | 6:13 PM | 8.5% | 52.5% |
| August | 95.3% | 3:50 PM | 51.7% | 90.3% | 6:07 PM | 4.5% | 48.1% |
| September | 88.5% | 4:16 PM | 41.2% | 83.9% | 5:54 PM | 1.7% | 43.8% |
| October | 66.0% | 4:29 PM | 7.0% | 65.7% | 5:29 PM | 0.2% | 46.7% |
| November | 68.9% | 4:20 PM | 0.4% | 69.0% | 4:48 PM | 0.1% | 48.3% |
| December | 70.5% | 5:11 PM | 0.3% | 70.5% | 6:00 PM | -0.2% | 46.3% |

¹ Balancing Area load. Peak was 2,818 MW ² Net load = Load – Solar Net Peak Scenario Load = 95% of Peak Solar = 0% of Capacity Wind = 53% of Capacity



DETERMINATION OF "MAX RENEWABLE" SCENARIO | BASED ON 2023 HISTORICAL DATA

| Month | Avg. Load at Max Renew* (MW) | Time of Peak | Avg. Solar at Max Renew* (MW) | Avg. Wind at Max Renew* (MW) | Load Factor | Solar Factor | Wind Factor |
|-----------|------------------------------------|-----------------|-------------------------------------|------------------------------------|----------------------|-----------------|----------------|
| January | 1,721 | 11:48 AM | 228 | 2,015 | 61.1% | 35.4% | 84.1% |
| February | 1,636 | 11:15 AM | 266 | 1,827 | 58.0% | 41.2% | 76.3% |
| March | 1.556 | 12:25 PM | 268 | 1.981 | 55.2% | 41.5% | 82.7% |
| April | 1,483 | 12:30 PM | 256 | 1,937 | 52.6% | 39.7% | 80.9% |
| May | 1,610 | 2:15 PM | 207 | 1,612 | 57.1% | 32.0% | 67.3% |
| June | 1,866 | 2:52 PM | 271 | 1,614 | 66.2% | 42.0% | 67.4% |
| July | 2,086 | 12:36 PM | 98 | 1,749 | 74.0% | 15.1% | 73.0% |
| August | 2,021 | 2:56 PM | 278 | 1,549 | 71.7% | 43.1% | 64.7% |
| September | 1,824 | 3:08 PM | 243 | 1,538 | 64.7% | 37.6% | 64.2% |
| October | 1,493 | 11:52 AM | 320 | 1,370 | 53.0% | 49.6% | 57.2% |
| November | 1,547 | 9:22 AM | 224 | 1,686 | 55 <mark>.</mark> 0% | 34.7% | 70.4% |
| December | 1,646 | 11:09 AM | 315 | 1,424 | 58.4% | 48.9% | 59.5% |

*Average of daily Balancing Area value at time of peak renewables

Maximum Renewable Scenario Load = 53% of Peak Solar = 40% Capacity

Wind = 81% of Capacity



SLIDE 8 |APRIL 24, 2024

STARTING FROM 2023 IRP LOAD FORECAST





LOAD FOR STUDY SCENARIOS

| Year | | Current Trends & Policies (CTP) | Net Peak (95%) | Max Renewable (53%) | High Economic Growth (HE) | Net Peak (95%) | Max Renewable (53%) |
|------|----------------|---------------------------------------|----------------------|---------------------------|---------------------------------|-------------------|---------------------------|
| 2020 | IRP | 2,151 | 2,043 | 1,140 | 2,196 | 2,086 | 1,164 |
| 2028 | Balancing Area | 2,997 | 2,847 | 1,588 | 3,058 | 2,905 | 1,621 |
| 2022 | IRP | 2,194 | 2,084 | 1,163 | 2,289 | 2,175 | 1,213 |
| 2055 | Balancing Area | 3,054 | 2,901 | 1,619 | 3,181 | 3,022 | 1,686 |
| 2040 | IRP | 2,363 | 2,245 | 1,252 | 2,526 | 2,400 | 1,339 |
| 2040 | Balancing Area | 3,282 | 3,118 | 1,739 | 3,499 | 3,324 | 1,854 |



2023 IRP GENERATION FORECAST



GENERATION CAPACITY ADDITIONS

| Year | Туре | Capacity (MW) | | |
|------|-------------------------|---------------|--|--|
| | BESS | 593 | | |
| 2028 | Solar PV | 100 | | |
| | TOTAL | 693 | | |
| | BESS | 170 | | |
| | Long Duration Storage | 200 | | |
| 2033 | Solar PV | 533 | | |
| | Wind | 600 | | |
| | TOTAL | 1,503 | | |
| | BESS | 516 | | |
| | Solar PV | 609 | | |
| 2040 | Wind | 200 | | |
| | Non-carbon emitting CT* | 460 | | |
| | TOTAL | 1,785 | | |

*Assuming commercial non-carbon emitting combustion turbine available

Generation and load geographic location will influence transmission needs Generation placements were informed by

- Resources included in New Mexico PRC filings
- Renewable resource availability
- Trends in active generation interconnection requests



GEOGRAPHICAL ZONES

- Divided the state in 4 geographical zones (map on next slide)
- Purpose of zones
 - Split service territory based on
 - load
 - resources
 - existing transmission constraints and
 - renewable resource availability





PNM 20 Year Plan

Station

- Expanded Station
- New Station
- Transmission
- Merchant
- New Line
- COO Rebuild
- PNM Planning Zones

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> Zone 1 Northwest NM

PNM 20 Year Plan Station

- Expanded Station
- New Station

Transmission

- New Line
- COO Rebuild
- 😐 😐 PNM Planning Zones 1

Generation Additions BESS

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Zone 2 Load Center



Generation Additions BESS, Solar PV, noncarbon emitting CT

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> Zone 3 East NM

PNM 20 Year Plan Station Expanded Station New Station Transmission Merchant New Line Rebuild PNM Planning Zones 3

Generation Additions BESS, Solar PV, Wind. Long Duration Storage

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PNM System 20 Year Plan Proposed **Transmission Options** Zone 4 Southwest NM PNM 20 Year Plan Station Expanded Station New Station Transmission - Merchant New Line CON Rebuild

😑 😑 PNM Planning Zones 4

Generation Additions BESS, Solar PV

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20 YEAR PLAN SCHEDULE





STAKEHOLDER INPUT

PROVIDE AT THE MEETING OR BEFORE MAY 10, 2024

- PNM is seeking stakeholder input on transmission options
- PNM is not soliciting additional transmission options but would like input on which options are preferred.
- PNM is looking for at least one transmission option per zone

Provided feedback and questions to pnm20yeartransmissionstudy@pnmresources.com

Example of feedback

Zone # Ranking

- 1. Transmission Option B
- 2. Transmission Option A
- 3. Transmission Option C



