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

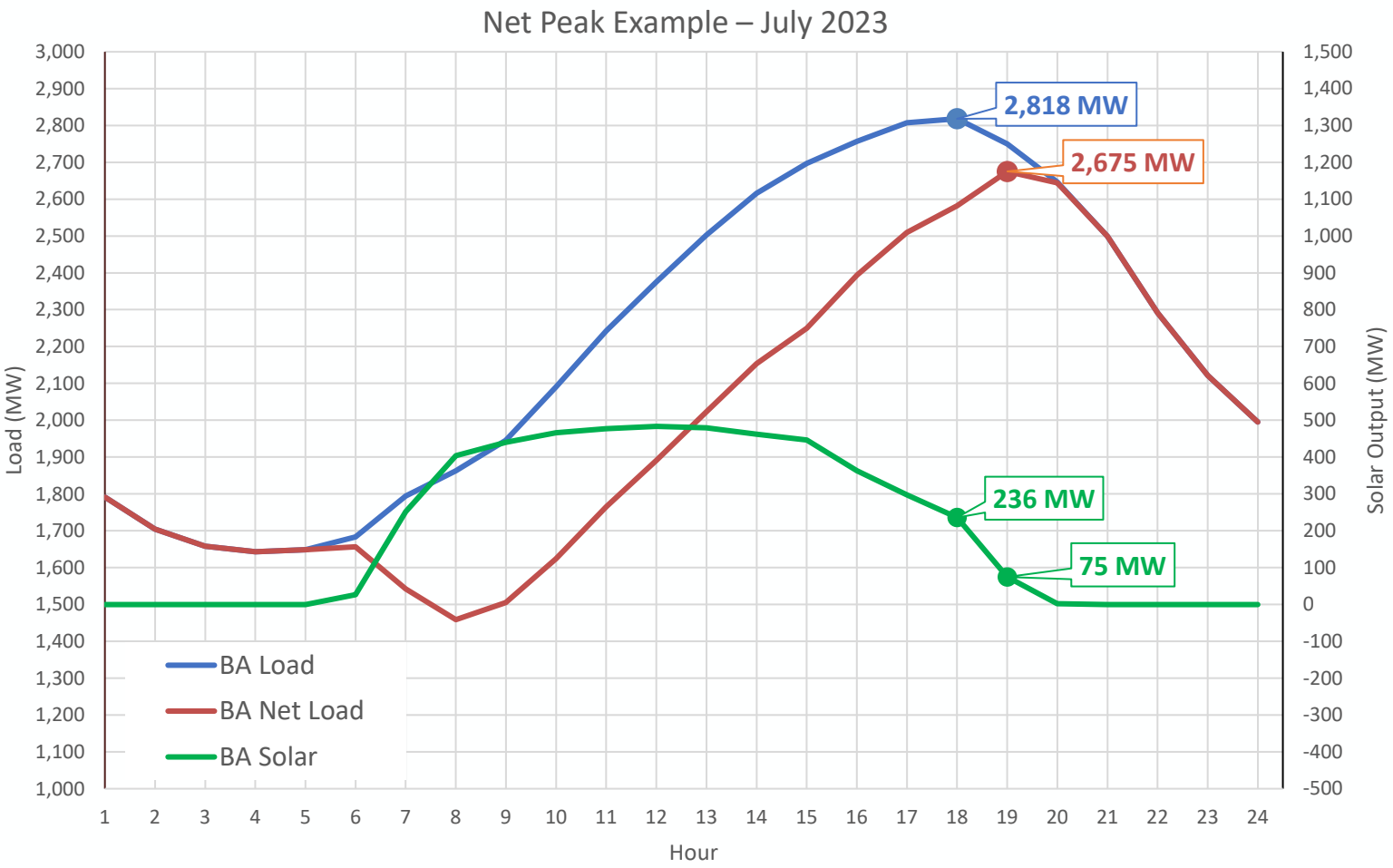
20-YEAR TRANSMISSION PLANNING STUDY

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

MODELING ASSUMPTIONS

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

MODELING ASSUMPTIONS

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

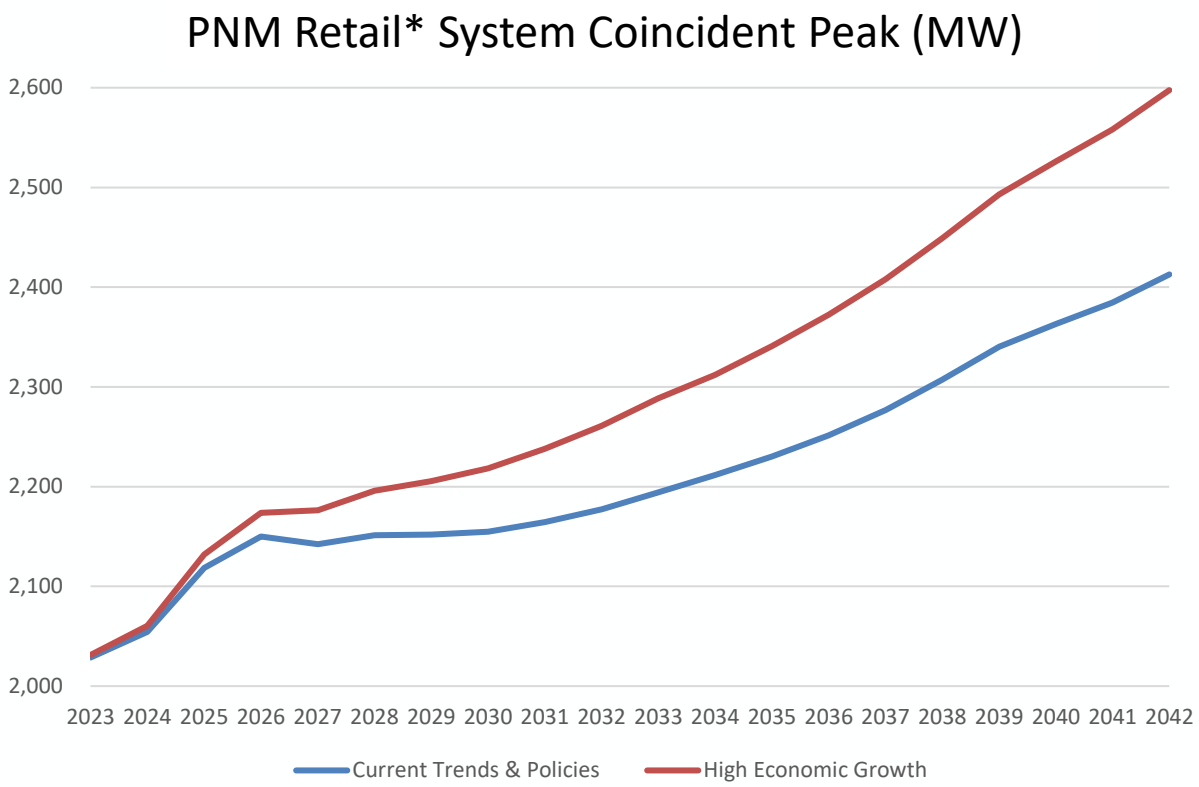
Month	Avg. Load at Max Renew* (MW)	Time of Peak	Avg. Solar at Max Renew* (MW)	Avg. Wind at Max Renew* (MW)	Load Factor	Solar Factor	Wind Factor
January	1,721	11:48 AM	228	2,015	61.1%	35.4%	84.1%
February	1,636	11:15 AM	266	1,827	58.0%	41.2%	76.3%
March	1,556	12:25 PM	268	1,981	55.2%	41.5%	82.7%
April	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	55.0%	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

MODELING ASSUMPTIONS

STARTING FROM 2023 IRP LOAD FORECAST



Includes:

- Retail Load,
- Data Center Load,
- Energy Efficiency,
- Customer Sited Solar

*PNM portion of the Balancing Area load

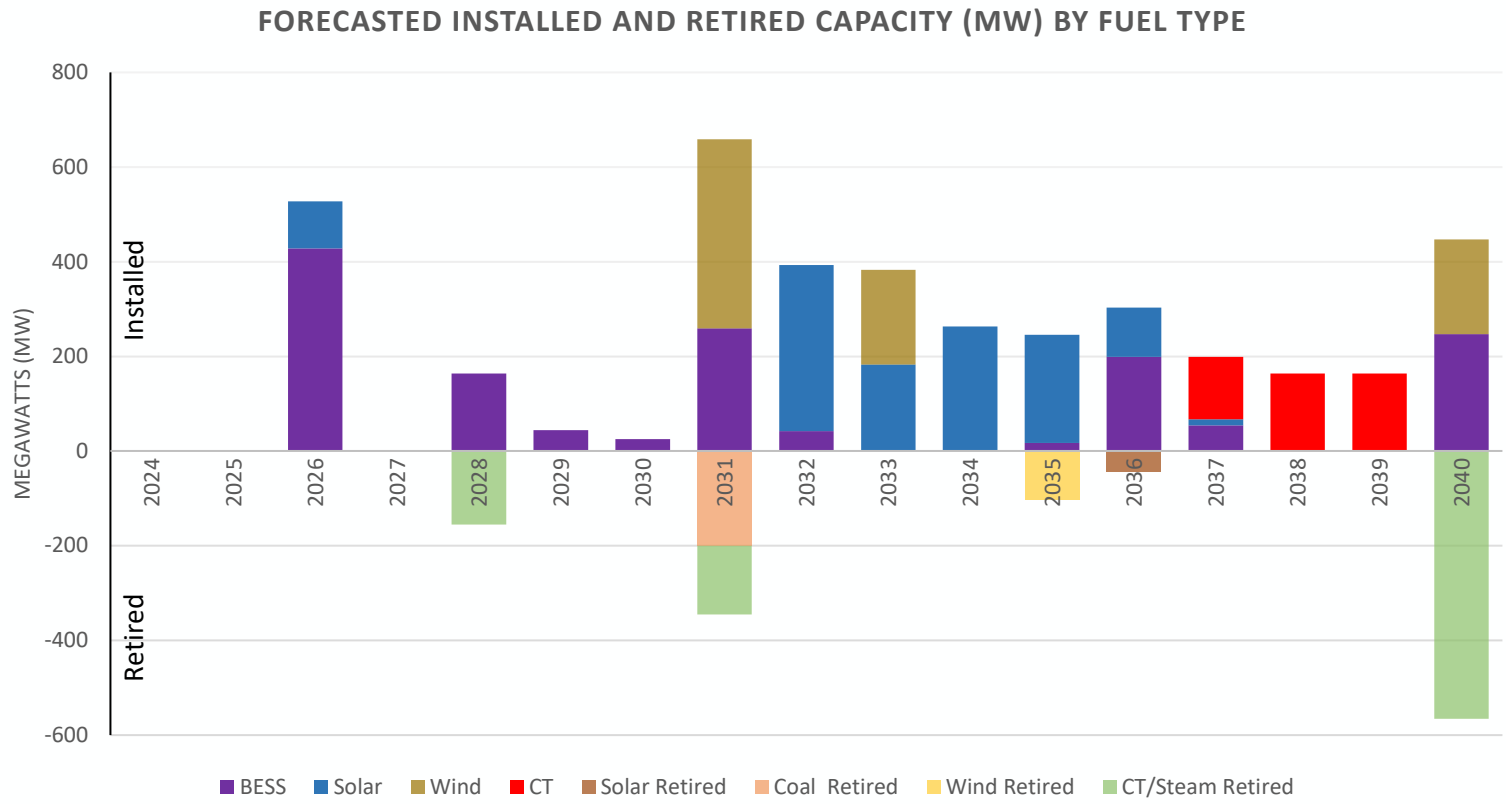
MODELING ASSUMPTIONS

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%)
2028	IRP	2,151	2,043	1,140	2,196	2,086	1,164
	Balancing Area	*2,997*	*2,847*	*1,588*	*3,058*	*2,905*	*1,621*
2033	IRP	2,194	2,084	1,163	2,289	2,175	1,213
	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
	Balancing Area	*3,282*	*3,118*	*1,739*	*3,499*	*3,324*	*1,854*

MODELING ASSUMPTIONS

2023 IRP GENERATION FORECAST



*Assuming CT additions are non-carbon emitting

MODELING ASSUMPTIONS

GENERATION CAPACITY ADDITIONS

Year	Type	Capacity (MW)
2028	BESS	593
	Solar PV	100
	TOTAL	**693**
2033	BESS	170
	Long Duration Storage	200
	Solar PV	533
	Wind	600
	TOTAL	**1,503**
2040	BESS	516
	Solar PV	609
	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

MODELING ASSUMPTIONS

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

Date: 4/18/2024
RFM# 3668

PNM System 20 Year Plan Proposed Transmission Options

PNM 20 Year Plan

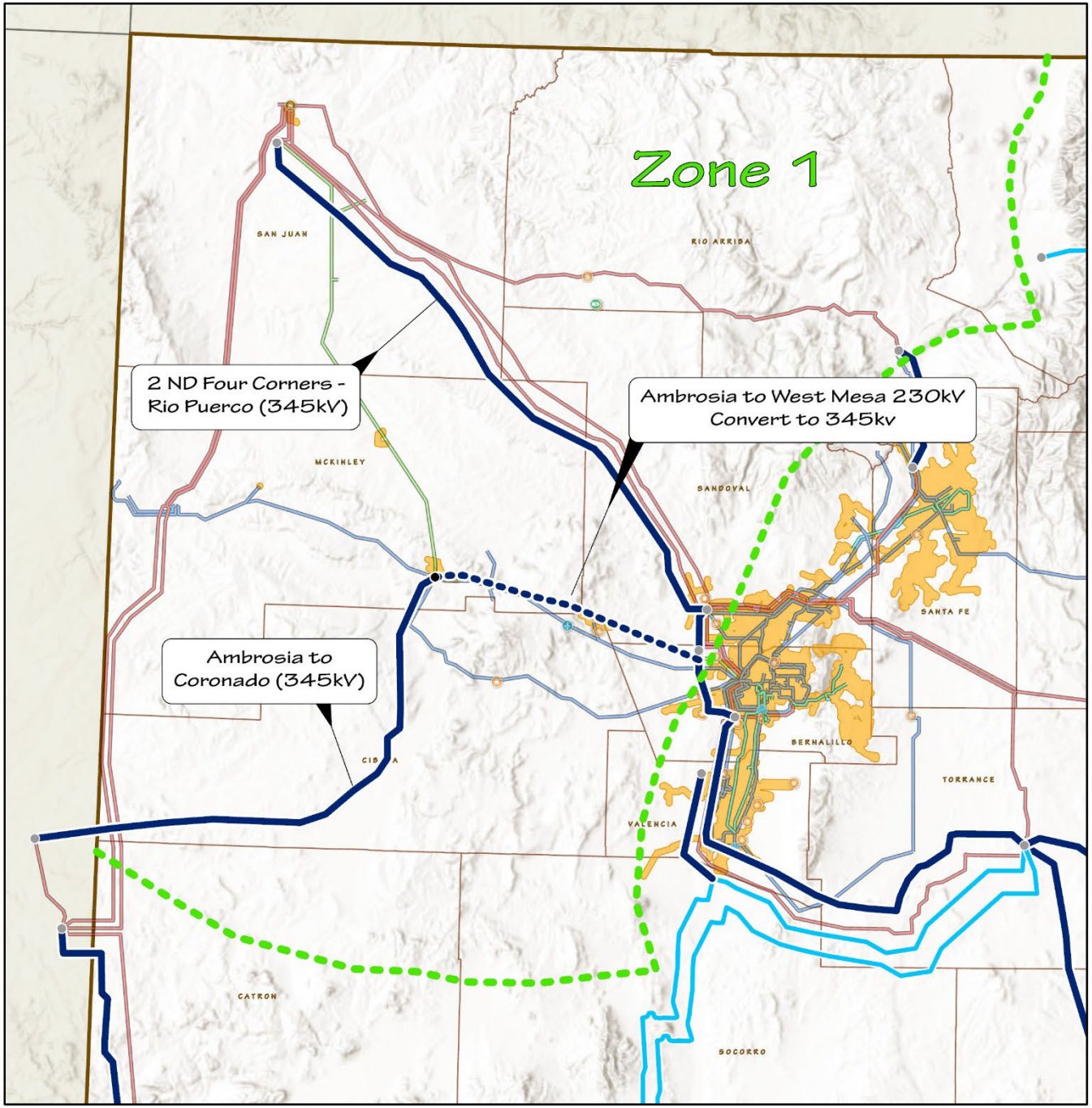
Station

- Expanded Station
- New Station

Transmission

- Merchant
- New Line
- Rebuild
- PNM Planning Zones

PNM



PNM System 20 Year Plan Proposed Transmission Options

Zone 1 Northwest NM

PNM 20 Year Plan

Station

- Expanded Station
- New Station

Transmission

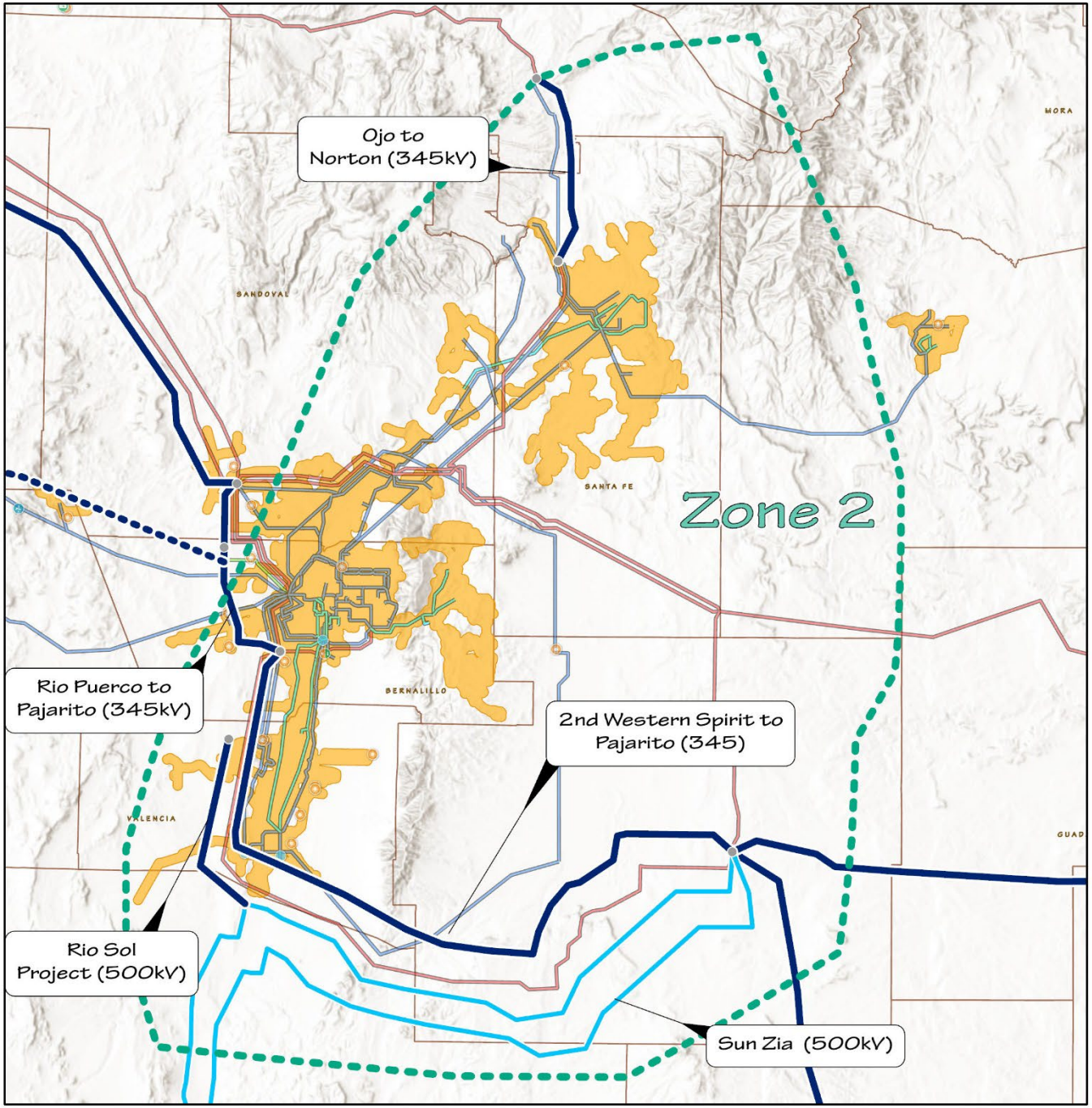
- Merchant
- New Line
- Rebuild
- PNM Planning Zones 1

Generation Additions
BESS

Date: 4/18/2024
RFM# 2908

PNM System 20 Year Plan Proposed Transmission Options

Zone 2 Load Center



PNM 20 Year Plan

Station

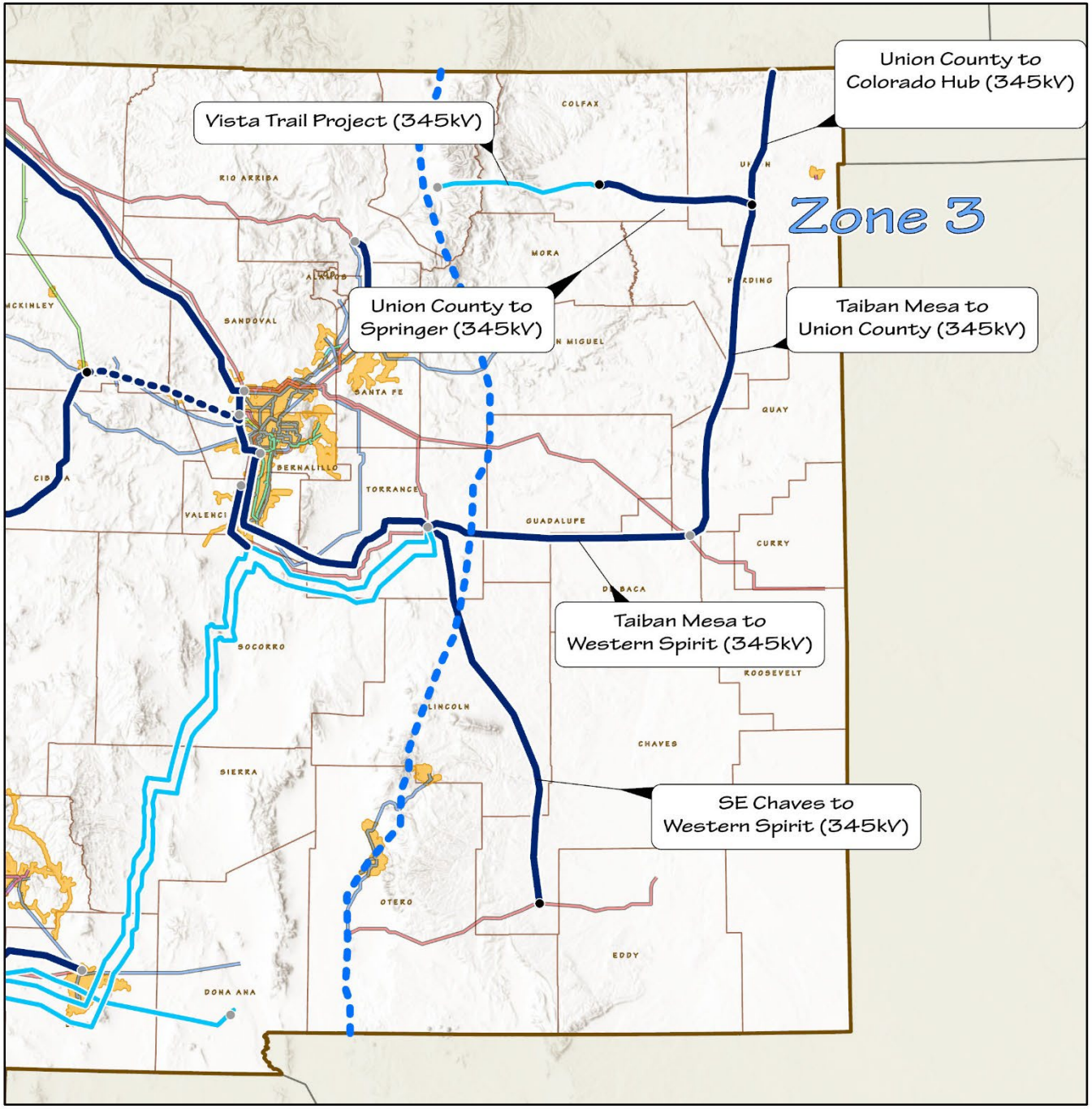
- Expanded Station
- New Station

Transmission

- Merchant
- New Line
- Rebuild
- PNM Planning Zones 2

Generation Additions
BESS, Solar PV, non-carbon emitting CT

PNM



PNM System 20 Year Plan Proposed Transmission Options

Zone 3 East NM

PNM 20 Year Plan

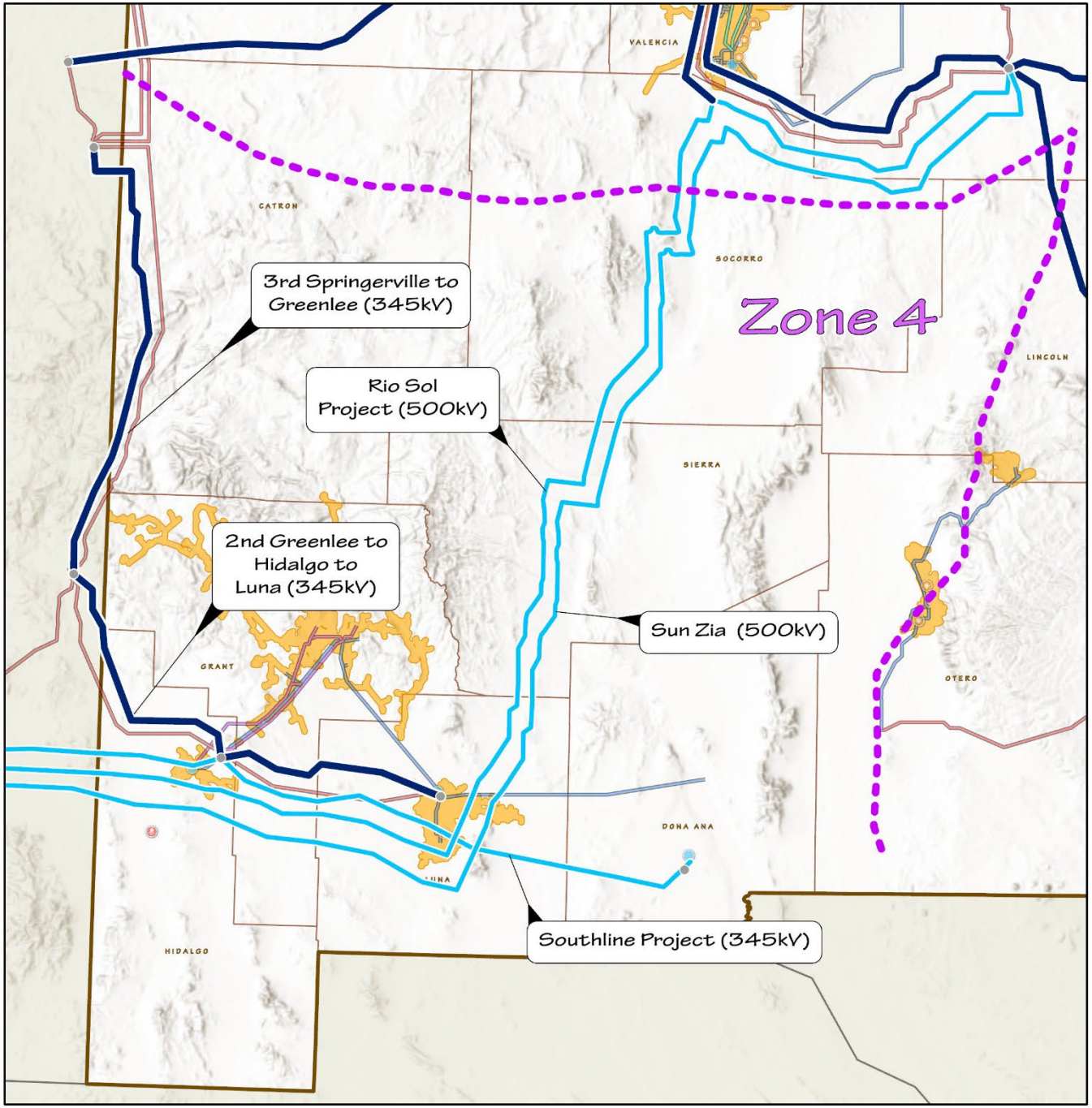
Station

- Expanded Station
- New Station

Transmission

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

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



PNM System 20 Year Plan Proposed Transmission Options

Zone 4 Southwest NM

PNM 20 Year Plan

Station

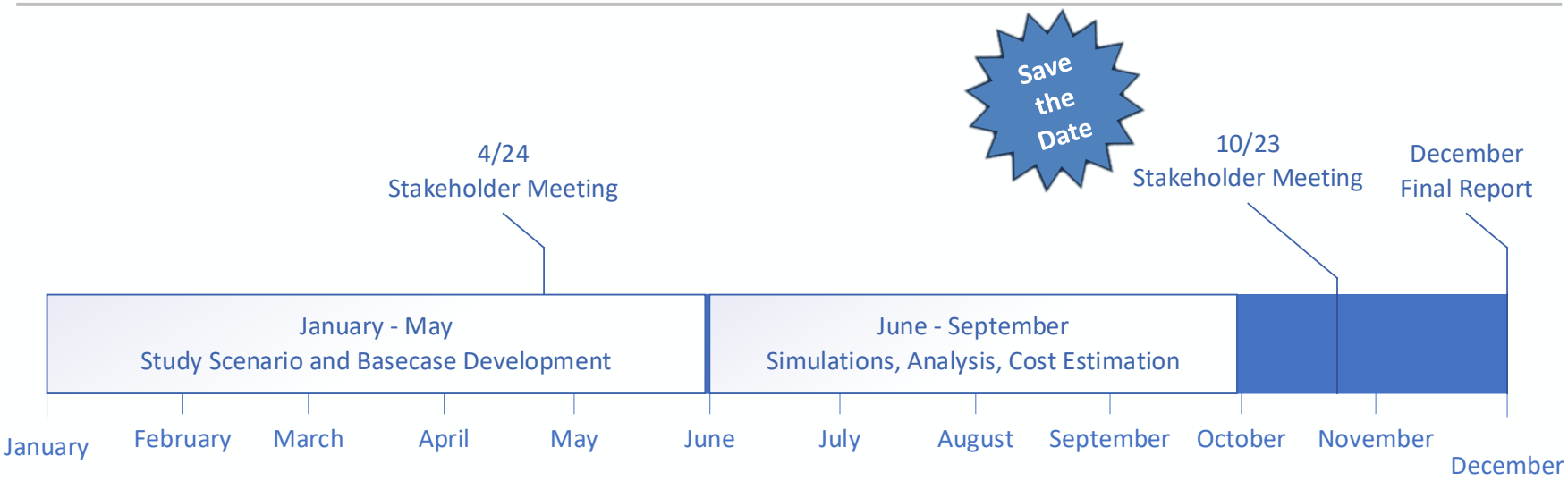
- Expanded Station
- New Station

Transmission

- Merchant
- New Line
- Rebuild
- PNM Planning Zones 4

Generation Additions
BESS, Solar PV

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


PNM