

**BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION**

IN THE MATTER OF PUBLIC SERVICE )  
COMPANY OF NEW MEXICO'S )  
CONSOLIDATED APPLICATION FOR )  
APPROVALS FOR THE ABANDONMENT, )  
FINANCING, AND RESOURCE REPLACEMENT )  
FOR SAN JUAN GENERATING STATION )  
PURSUANT TO THE ENERGY TRANSITION ACT )  

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Case No. 19-00195-UT

**RECOMMENDED DECISION**  
**ON REPLACEMENT RESOURCES,**  
**PART II**

June 24, 2020

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## **APPENDIX**

### Map Locating PNM’s Proposed Replacement Resources in “Scenario One”

## **GLOSSARY OF ACRONYMS AND DEFINED TERMS**

<b><u>Acronym/Defined Term</u></b>	<b><u>Meaning</u></b>
Application	Consolidated Application for Approvals for the Abandonment, Financing, and Resource Replacement for San Juan Generating Station pursuant to the Energy Transition Act
ACC	Arizona Corporation Commission
APS	Arizona Public Service Company
Astrapé	Astrapé Consulting, LLC
Attorney General or NMAG	Attorney General of the State of New Mexico
BESS	Battery Energy Storage System
CCAE	Coalition for Clean Affordable Energy
CCN	Certificate of Public Convenience and Necessity
CCSD	Central Consolidated School District
CCUS	Carbon Capture and Utilization Storage
CFRE	Citizens for Fair Rates and the Environment
CO <sub>2</sub>	Carbon dioxide
Commission or NMPRC	New Mexico Public Regulation Commission
Community Groups	Diné C.A.R.E. and San Juan Citizens Alliance
COVID-19	Coronavirus disease
Diné C.A.R.E.	Diné Citizens Against Ruining Our Environment
DR	Demand Response
EFOR	Equivalent Forced Outage Rate
EIA	United States Energy Information Agency
EIM	Energy Imbalance Market
ELCC	Effective Load Carrying Capability

<b><u>Acronym/Defined Term</u></b>	<b><u>Meaning</u></b>
Enchant Energy	Enchant Energy Corporation and Enchant Energy LLC
EOR	Enhanced Oil Recovery
EPA	U.S. Environmental Protection Agency
EPC	Engineering, Procurement and Construction
ERCs	Emission Reduction Credits
ESA	Energy Storage Agreement
ETA	Energy Transition Act
ETCs	Energy transition charges
FCPP	Four Corners Power Plant
FEED Study	Front end engineering design study
FIR	Fiscal impact report
FPL	Florida Power & Light Company
FPPCAC	Fuel and Purchased Power Cost Adjustment Clause
GWh	Gigawatt-hour
HDR	HDR Engineering, Inc.
Interwest	Interwest Energy Alliance
IRP	Integrated Resource Plan
kW	Kilowatt
LOLE	Loss of load event
LCOS	Levelized cost of storage
LTPPA	Long-term purchased power agreement
MWh	Megawatt hour
NEE	New Energy Economy

<b><u>Acronym/Defined Term</u></b>	<b><u>Meaning</u></b>
NERC	North American Electric Reliability Corporation
NMAC	New Mexico Administrative Code
NM AREA	New Mexico Affordable Reliable Energy Alliance (f/k/a New Mexico Industrial Energy Consumers or NMIEC)
NMIPP	New Mexico Independent Power Producers
NMPSC	New Mexico Public Service Commission
NPV	Net Present Value
NOx	Nitrogen Oxides
O&M	Operation and maintenance costs or expenses
Participation Agreement	Amended and Restated San Juan Project Participation Agreement
PPA	Purchased Power Agreement
PNM	Public Service Company of New Mexico
PUA	Public Utility Act
PV	Photovoltaic
PVNGS	Palo Verde Nuclear Generating Station
REA	Renewable Energy Act
RECs	Renewable Energy Certificates
RFP	Request for Proposal
RPS	Renewable Portfolio Standard
Rule 551	Prior Approval of Purchased Power Agreements, 17.9.551 NMAC
SCR	Selective Catalytic Reduction
S.B. 489	Senate Bill 489, 2019 N.M. Laws, ch. 65, includes Energy Transition Act and amendments to Public Utility Act, Renewable Energy Act, and Air Pollution Control Ac

<b><u>Acronym/Defined Term</u></b>	<b><u>Meaning</u></b>
SDG&E	San Diego Gas & Electric Company
SJ	San Juan
SJCA	San Juan Citizens Alliance
SJC Entities	Board of County Commissioners of San Juan County, City of Farmington, Central Consolidated School District, and the San Juan Legislative Delegation
SJCC	San Juan Coal Company
SJGS	San Juan Generating Station
SNCR	Selective Non-Catalytic Reduction
SO <sub>x</sub>	Sulphur oxides
SPE	Special purpose entity
Staff	Commission's Utility Division Staff
T&D	Transmission and distribution
Tri-State	Tri-State Generation and Transmission Association, Inc.
Water Authority	Albuquerque Bernalillo County Water Utility Authority
WECC	Western Electricity Coordinating Council
Westmoreland	Westmoreland Coal, Inc.
WRA	Western Resource Advocates



The Hearing Examiners submit this Recommended Decision to the New Mexico Public Regulation Commission (“Commission” or NMPRC) pursuant to NMSA 1978, § 8-8-14 and the Commission’s Rules of Procedure 1.2.2.29(D)(4) and 1.2.2.37(B) NMAC. The Hearing Examiners recommend that the Commission adopt the following statement of the case, discussion, findings of fact, conclusions of law, and ordering paragraphs in an Order.

## **I. STATEMENT OF THE CASE**

On July 1, 2019, Public Service Company of New Mexico (PNM) filed its Consolidated Application for Approvals for the Abandonment, Financing, and Resource Replacement for San Juan Generating Station pursuant to the Energy Transition Act (“Application”) in a new docket – Case No. 19-00195-UT, rather than the existing docket in Case No. 19-00018-UT. In the Application, PNM requested the following approvals from the Commission:

- (a) Abandonment of the SJGS, including: (1) abandonment of the SJGS plant and facilities located at Waterflow, New Mexico; (2) decommissioning of the SJGS plant and facilities and reclamation of the coal mine that provides fuel for SJGS; and (3) recovery of abandonment costs and related energy transition costs as defined in the ETA of approximately \$360.1 million;
- (b) Approval of new generating resources to replace the retired 497 MW of capacity and energy produced by PNM’s share of the SJGS, including: (1) twenty-year purchased power agreements (PPAs) and energy storage agreements (ESAs) for the output from a 50 MW solar facility located on Jicarilla Apache tribal lands combined with a 20 MW battery storage agreement (the Jicarilla PPA/ESA) and for the output from a 300 MW solar facility located in McKinley County combined with a 40 MW battery storage agreement (the Arroyo PPA/ESA); (2) issuance of certificates of public convenience and necessity (CCNs) for (a) 40 MW and 30 MW utility-owned energy storage systems, referred to as the Sandia and Zamora facilities, respectively, located at two existing utility sites in Bernalillo County and (b) 280 MW of utility-owned natural gas-fired generating units, referred to as the Piñon gas plant, located in Waterflow, New Mexico at the SJGS site. In addition to the foregoing SJGS replacement resource proposals, PNM requests that consideration be given to a PNM-owned 20 MW solar facility to be installed at the SJGS site as a means of fulfilling PNM’s obligation under Paragraph 40 of the Modified Stipulation approved in Case No. 13-00390-UT; and

- (c) Approval of a financing order under the ETA providing for the issuance of highly-rated Energy Transition Bonds in the principal amount of approximately \$361 million secured by a non-bypassable customer charge that will provide for recovery of: (1) PNM's undepreciated investments totaling \$283.0 million; (2) costs for job training and severance for employees at SJGS and the coal mine in the amount of \$20.0 million; (3) decommissioning and reclamation costs of \$28.6 million; (4) transactional costs associated with issuing energy transition bonds and obtaining approval of abandonment of \$8.7 million; (5) the Energy Transition Indian Affairs Fund to be administered by the Indian Affairs Department, in the amount of \$1.8 million; (6) the Energy Transition Economic Development Assistance Fund to be administered by the Economic Development Department, in the amount of \$5.9 million; and (7) the Energy Transition Displaced Worker Assistance Fund, to be administered by the Workforce Solutions Department, in the amount of \$12.1 million.

On July 10, 2019, the Commission issued a Corrected Order on Consolidated Application, whereby the Commission bifurcated the review of PNM's Application into two separate proceedings. The abandonment and securitization issues (items a and c above) were addressed in Case No. 19-00018-UT. The replacement resource issues (item b) are being addressed in this case. The July 10, 2019 Order appointed the undersigned Hearing Examiners to jointly preside over Case Nos. 19-00018-UT and 19-00195-UT and issue recommended decisions within applicable statutory timeframes as established and extended by the Order.<sup>1</sup>

The Hearing Examiners held a joint prehearing conference in this case and Case No. 19-00018-UT on July 23, 2019. Representatives of the following parties participated in the conference: PNM, the Attorney General, Bernalillo County, CCAE, Interwest, IUOE Local 953, NEE, NMIEC (now New Mexico New Mexico Affordable Reliable Energy Alliance or NM AREA), the San Juan Citizens Alliance (SJCA) and Diné C.A.R.E., San Juan County, Sierra Club, SWG, the Water Authority, WRA, and Staff.

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<sup>1</sup> On February 21, 2020, the Hearing Examiners issued Recommended Decisions on, respectively, PNM's requests to abandon San Juan Units 1 and 4 and recover non-securitized costs and for a financing order in Case No. 19-00018-UT. The Commission issued Final Orders on the two decisions on April 1, 2020.

On July 25, 2019, the Hearing Examiners issued a Procedural Order with an attached Notice of Proceeding and Hearing (“Notice”). The Procedural Order provided for, *inter alia*: (a) PNM to publish the Notice in a newspaper of general circulation available in every county where PNM provides service in New Mexico by August 14, 2019; (b) PNM to post the Notice on its public website by August 1, 2019; (c) PNM to mail the Notice to its customers by September 3, 2019; (d) PNM to file a legal brief by August 23, 2019 regarding the issue of the extent to which N.M. Const. Article IV, § 34 prevents the application of the ETA to the issues in this case and, if PNM so chose, to allow PNM to file supplemental testimony regarding the foregoing issue by that date; (e) PNM to send the Notice by certified mail on or before August 1, 2019 to the proper regulatory officials or agencies of the affected government entities identified just below; (f) PNM to conduct face-to-face public community meetings in accordance with the Commission’s Orders of July 10 and 12, 2019 with affected government entities, including specifically the Nenahnezad Chapter, the Tse daa K’aan (Hogback) Chapter, the Shiprock Chapter, the San Juan Chapter and the Navajo Nation Council, to educate and provide answers to the public, including affected coal miners, concerning PNM’s plans and intentions with regard to the proposed shutdown of the San Juan Generating Station; (g) motions for leave to intervene by September 24, 2019; (h) Responses to the PNM legal brief filed on August 23, 2019 by October 18, 2019; (i) Staff and intervenor direct testimony by October 18, 2019; (j) rebuttal testimony filed by November 15, 2019; (k) motions *in limine*, motions to strike testimony, and other prehearing motions by November 22, 2019; (l) a prehearing conference on November 25, 2019; (m) a public comment hearing on December 9, 2019; and, finally, (n) evidentiary hearings starting on December 10, 2019 and running, as necessary, through December 19, 2019.

Pursuant to the July 10, 2019 Order, all motions to intervene filed in either this case or Case No. 19-00018-UT were accepted and treated as motions to intervene in both proceedings.

Pursuant to the July 10, 2019 Order, all motions to intervene filed in either this case or Case No. 19-00018-UT were accepted and treated as motions to intervene in both proceedings.

Twenty-six parties intervened or were deemed intervenors in this case. They include the following:

Attorney General  
City of Albuquerque (“Albuquerque”)  
Bernalillo County  
Central Consolidated School District (CCSD)  
Citizens for Fair Rates and the Environment (CFRE)  
Coalition for Clean Affordable Energy (CCAIE)  
City of Farmington (“Farmington”)  
County of Los Alamos (“Los Alamos”)  
Diné C.A.R.E.  
International Brotherhood of Electrical Workers, Local 611 (IBEW)  
International Union of Operating Engineers, Local 953 (IUOE)  
Interwest Energy Alliance  
M-S-R Public Power Agency  
New Energy Economy (NEE)  
NM AREA (f/k/a NMIEC)<sup>2</sup>  
New Mexico Legislative Delegation of San Juan County (“San Juan  
Legislative Delegation”)  
Prosperity Works  
Renewable Energy Industries Association (REIA)  
San Juan Citizens Alliance  
San Juan County  
Sierra Club  
Greg Sonnenfeld  
Southwest Generation Operating Company (SWG)  
Water Authority<sup>3</sup>  
Western Resource Advocates (WRA)  
Westmoreland Coal, Inc. (“Westmoreland”)

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<sup>2</sup> See NMIEC Amended Motion for Leave to Intervene and Request for Discovery (Aug. 21, 2019).

<sup>3</sup> The Water Authority subsequently withdrew its status as a party intervenor from this case and Case No. 19-00195-UT pursuant to its January 10, 2020 Notice of Withdrawal as Party Intervenor and Motion to Withdraw Previously Filed Pleadings and Supporting Documents.

On July 29, 2019, the Hearing Examiners issue a Protective Order that established procedures to facilitate discovery among the parties and provided for the expeditious handling of information that a party claimed Confidential Material.

On August 27, 2019, the Hearing Examiners issued an Order Addressing Revised PNM Proposal on Discovery Issues.<sup>4</sup> The Order approved a procedure for the parties to gain access to the resource planning models, including licenses to use the models, PNM used to develop its replacement resource portfolio. The procedure implemented the requirement in the Commission's January 30, 2019 Order initiating the abandonment proceeding in Case No. 19-00018-UT, that PNM "at its cost, afford all parties access by means of a proprietary license to all computer models used by PNM in support of its filing including, but not limited to, its decisions to abandon its interest in SJGS to serve New Mexico ratepayers and its selection of proposed replacement resources."<sup>5</sup>

On October 17, 2019, the Hearing Examiners granted PNM's October 7, 2019 motion for leave to file the direct errata and supplemental and direct errata testimony of six PNM witnesses.

On December 9, 2019, the New Mexico House of Representatives, Governor Michelle Lujan Grisham, and Navajo Nation President Jonathan Nez (collectively "Petitioners") filed an Emergency Verified Petition for Writ of Mandamus ("Petition") with the New Mexico Supreme Court seeking, pursuant to Rule 12-504 NMRA, an emergency writ of mandamus directed to the Commission and individual PRC Commissioners, "mandating," as asserted in the Petition, "that they comply with their duties under the New Mexico Constitution and apply the chaptered version of S.B. 489 (the 'Energy Transition Act' or 'ETA'), Chapter 65, §§ 1 through 36, to [PNM's]

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<sup>4</sup> Order Addressing Revised PNM Proposal on Discovery Issues (Aug. 27, 2019).

<sup>5</sup> Order Initiating Proceeding on PNM's December 31, 2018 Verified Compliance Filing Concerning Continued Use of and Abandonment of San Juan Generating Station, Case No. 19-00018-UT (Jan. 30, 2019), Ordering ¶ C. The Commission stated that the reimbursement of PNM's costs will be reviewed and addressed in PNM's next rate case.

*Application* to abandon, finance and replace the coal-fired [SJGS], currently being considered in PRC dockets 19-00018-UT and 19-00195-UT.”<sup>6</sup>

The Commission conducted a public comment hearing at San Juan College in Farmington, New Mexico on January 6, 2020. Sixty-four people provided oral comment during this hearing. The public record contains approximately 444 written comments as of the date of this decision.

The Commission held a public comment hearing in this case on January 21, 2020. Sixty-six people provided oral comment during this hearing.

In Prehearing Order No. 2, issued on January 16, 2020, the Hearing Examiners ordered that administrative notice would be taken of the evidentiary record developed in Case No. 19-00018-UT.

The evidentiary hearings in this case ran from January 22-31, 2020. The Commission received testimony from thirty-seven witnesses over those eight days of hearings.

On January 29, 2020, the New Mexico Supreme Court issued an Order granting the December 9, 2019 petition for a writ of mandamus in Case No. S-1-SC-38041. The Supreme Court also issued the Writ of Mandamus ordering the Commission to apply the ETA to these proceedings and those in Case No. 19-00195-UT. The Writ of Mandamus commands the Commission to:

apply the Energy Transition Act, 2019 N.M. Laws, ch. 65, to the proceedings for the Public Service Company of New Mexico’s proposed abandonment, financing, and replacement of units one and four of the San Juan Generating Station; and

. . . to vacate any provisions in provisions in prior orders issued by the Commission in Case Nos. 19-00018-UT and 19-00195-UT, including any provisions in the Commission’s orders dated January 10, 2019, and January 30, 2019, that are inconsistent with the order of this Court.<sup>7</sup>

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<sup>6</sup> Petition, Case No. S-1-SC-38041 (Dec. 9, 2019) at 1-2 (emphasis in original).

<sup>7</sup> Writ of Mandamus, Case No. S-1-SC-38041 (Jan. 29, 2020) at 2-3.

On February 5, 2020, the Commission issued a Compliance Order Pursuant to Writ of Mandamus in this case and Case No. 19-00195-UT. The Commission's Order provides, in material part, as follows:

A. Consistent with the provisions of the Writ of Mandamus and the Commission's July 30, 2019 Order, all provisions of the Energy Transition Act apply to and govern PNM's Application for Abandonment, Financing and Replacement of the San Juan Generating Station in these cases.

B. Consistent with the Court's determination and mandate above, any provisions in any order of the Commission entered previously in this case and Case No. 19-00195-UT inconsistent with the terms of the mandate are vacated.

C. The Hearing Examiners shall take such action is necessary to effectuate the terms of the mandate to the proceedings before them.

Parties filed post-hearing briefs in chief on February 21, 2020. Response briefs were filed on March 4, 2020.

On March 27, 2020, the Hearing Examiners issued a Recommended Decision on Replacement Resources, Part I. The Recommended Decision proposed that two of the projects included in the parties' replacement resource portfolios be approved. They recommended approval of the Arroyo 300 MW solar/40 MW battery project and the Jicarilla 50 MW solar/20 MW project because the projects were recommended by most of the parties and the agreements submitted by PNM for the projects were set to expire on April 30, 2020.

Exceptions and responses were filed on April 6 and 13, 2020.

On April 29, 2020, the Commission issued an Order on the Recommended Decision. The Commission found that bifurcation of the issues and dispositive orders was not appropriate at that time. The Commission found that the issues presented for determination in the Recommended Decision Part 1 would be best resolved as a whole in conjunction with the remaining issues not addressed by the initial Recommended Decision. The Commission stated that the deferral would permit the Hearing Examiners to fully develop the remaining issues and permit the Commission to

issue a single dispositive ruling on all issues without potentially impairing full consideration of all arguments that have been raised in the proceeding.<sup>8</sup>

This Recommended Decision is issued in accord with the Commission's April 29, 2020 Order. The Recommended Decision addresses all issues in this proceeding and completely supersedes the Recommended Decision on Replacement Resources, Part I that was issued on March 27, 2020.

## **II. BACKGROUND**

### **A. The Four Units of the San Juan Generating Station and Farmington's Efforts to Use Carbon Capture Technology to Continue Operating the Plant**

The four coal-fired generating units of the San Juan Generating Station came on line in 1976 through 1982.<sup>9</sup> The Station has been operated by PNM on behalf of the Station's nine owners pursuant to the San Juan Project Participation Agreement ("Participation Agreement").<sup>10</sup> The Participation Agreement is set to expire on July 1, 2022.

Four of the owners negotiated the exit of their participation in 2015 rather than be responsible for their shares of the costs required to install pollution control technology required by the U.S. Environmental Protection Agency and the New Mexico Environment Department to comply with the Regional Haze requirements of the federal Clean Air Act.<sup>11</sup>

To minimize the costs of complying with the EPA requirements, PNM and the remaining owners negotiated their ability to install a pollution control technology (i.e., Selective Non

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<sup>8</sup> Order on Recommended Decision on Replacement Resources, Part I (Apr. 29, 2020).

<sup>9</sup> CCNs for units were granted in Case No. 965 (Jan. 9, 1970), Case No. 1111 (Jan. 22, 1974) and Case No. 1221 (Sept. 2, 1975). The 340 MW Unit 1 came on line in 1976. The 340 MW Unit 2 came on line in 1973. The 496 MW Unit 3 came on line in 1979. The 507 MW Unit 4 came on line in 1982.

<sup>10</sup> The original nine owners included PNM, Tucson Electric Company, the City of Farmington, M-S-R Public Power Agency, the County of Los Alamos, the Southern California Public Power Authority, the City of Anaheim, Utah Associated Municipal Power Systems, and Tri-State Generation and Transmission Association, Inc. ("Tri-State").

<sup>11</sup> The exiting owners included M-S-R Public Power Agency, the Southern California Public Power Authority, the City of Anaheim, and Tri-State. The California owners in San Juan were subject to a California statute, S.B. 1368, which restricted their ability to own or procure energy from coal-fired generation sources.



Catalytic Reduction or SNCR) instead of the technology (i.e., Selective Catalytic Reduction or SCR) originally required by the EPA and based upon the owners' willingness to close Units 2 and 3. PNM accordingly filed an application in Case No. 13-00390-UT to abandon its interests in Units 2 and 3 and seek cost recovery for the SNCR pollution controls. PNM also sought Commission approval to assume the remaining shares of the exiting owners in Units 1 and 4 to enable the continued operation of those units. In the context of Case No. 13-00390-UT, the remaining owners also negotiated an extension of the facility's coal supply agreement to June 30, 2022 to coincide with the expiration of the owners' Participation Agreement. The coal supply agreement had been scheduled to expire on December 31, 2017.

The service life of the San Juan units for depreciation purposes was originally expected to end in 2023, after the expiration of the Participation Agreement. PNM requested approval to extend the service lives to 2053 in 2005 to reflect capital upgrades to and replacements of the units' turbine and boiler components.<sup>12</sup>

With the upcoming expiration of the ownership and coal supply agreements on July 1, 2022, four of the five owners that remained after Case No. 13-00390-UT announced their intentions in May through July 2018 not to continue their participation past July 1, 2022.<sup>13</sup> The City of Farmington, however, which owns a 5.076% interest in the plant, notified the exiting owners on June 14, 2018 of its interest in continuing the plant's operation.

The City has subsequently indicated its intention to exercise its right under the Participation Agreement to acquire the exiting owners' interests in an effort to continue the plant's operation. The City has entered into a series of preliminary agreements with an investment group and

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<sup>12</sup> See, Final Order Partially Approving Certification of Stipulation, Case No. 10-00086-UT, July 28, 2011, at 86-90, referencing October 19, 2015 PNM Letter to the Commission re San Juan Life Extension Depreciation Rates.

<sup>13</sup> Tucson Electric Company provided its notice on May 22, 2018. The County of Los Alamos provided its notice on June 15, 2018. PNM provided its notice on June 29, 2018. The Utah Associated Municipal Power Systems provided its notice on July 26, 2018.

developer, Enchant Energy Corporation and Enchant Energy LLC (collectively “Enchant Energy”), and several equipment manufacturers and construction companies to investigate and pursue the potential retrofit of the plant with Carbon Capture and Utilization Storage (CCUS) technology. The CCUS technology could potentially enable the plant’s continued operation with CO<sub>2</sub> emissions that satisfy the 1,100 pounds CO<sub>2</sub>/MWh emissions limits specified in the ETA to become effective in 2023. The Sargent and Lundy engineering firm has conducted a pre-feasibility study that suggests that the CCUS retrofit could be feasible and the U.S. Department of Energy recently awarded \$2.7 million in funding for a Front End Engineering Design Study (FEED Study) to further investigate the project’s feasibility and provide the support for the further development of the project. Farmington states that the study will be completed by the first quarter of 2021.

Preliminary negotiations have begun with PNM and the other exiting owners for the transfer of their ownership interests to the City, but it is too early to know whether the City’s efforts will be successful. Nevertheless, the City’s efforts draw into question whether the plant will, in fact, close on July 1, 2022 (irrespective of the abandonment of PNM’s interest) and the extent to which certain of the funds sought in PNM’s securitization request (i.e., for decommissioning, reclamation, severance and job training for plant and mine workers, and funding for state Indian Affairs, economic development and displaced worker programs) will need to be expended.

## **B. Senate Bill 489 and the Energy Transition Act**

Senate Bill 489 (“S.B. 489,” 2019 N.M. Laws, ch. 65) and the Energy Transition Act are often considered one and the same legislation. But the ETA is only one part of Senate Bill 489.

Senate Bill 489 includes 82 pages of double-spaced provisions. It contains primarily a new 49-page chapter of the Public Utility Act<sup>14</sup> entitled Energy Transition Act (ETA),<sup>15</sup> major revisions

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<sup>14</sup> NMSA 1978, §§ 62-1-1 to -7 (1909, as amended through 1993), 62-2-1 to -22 (1887, as amended through 2013), 62-3-1 to -5 (1967, as amended through 2019), 62-4-1 (1998), 62-6-4 to -28 (1941, as amended through 2018), 62-8-1  
(*Cont’d on next page*)

to the Renewable Energy Act (REA),<sup>16</sup> an amendment to the Air Quality Control Act,<sup>17</sup> and several other related amendments to the Public Utility Act.

The ETA establishes mechanisms to facilitate the abandonment of PNM's interests in two coal-fired generating plants -- the remaining Units 1 and 4 of the San Juan Generating Station in 2022 and PNM's interests in the Four Corners Generating Station in 2031.<sup>18</sup> The ETA provides for the use of bonds, i.e., securitization, to recover for PNM the undepreciated costs of its interests in the two plants; the estimated costs of decommissioning and reclamation; the estimated costs of severance and job training for affected employees at the plants and mines; financing costs associated with the securitization; and payments required to the state-administered funds for Indian affairs, energy transition economic development, and the assistance of displaced workers. The bonds would be issued by a wholly-owned subsidiary of PNM newly created as a special purpose entity (SPE).

The ETA then provides for the establishment of non-bypassable charges, i.e., Energy Transition Charges (ETCs), to be paid by PNM customers to cover the bonds' debt service costs over the estimated 25-year life of the bonds. The ETA also provides for ratemaking mechanisms designed (1) to eliminate the costs of the abandoned facilities at the time the ETC rates are first collected (upon the abandonment of the units), (2) to recover for PNM, separately from the ETCs, the difference between the estimated costs recovered through the bonds and PNM's future actual

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to -13-16 (1941, as amended through 2019). See *Tri-State Generation and Transmission Ass'n v. N.M. Pub. Regulation Comm'n*, 2015-NMSC-013, ¶ 8 n.1, 347 P.3d 274 (listing the foregoing statutory provisions of the "entire PUA" and noting that § 62-13-1 specifies "the range of articles in Chapter 62 that comprised the PUA in 1993.").

<sup>15</sup> NMSA 1978, §§ 62-18-1 to -23 (2019).

<sup>16</sup> NMSA 1978, §§ 62-16-1 to -10 (2004, as amended through 2019).

<sup>17</sup> NMSA 1978, § 74-2-5 (1967, as amended 2019).

<sup>18</sup> The San Juan and Four Corners stations are the only facilities in New Mexico that satisfy the ETA's definition of "qualifying generating facility." NMSA 1978, § 62-18-2(S).

costs, and (3) to adjust the ETCs throughout the life of the bonds to ensure the full and timely payment of the bonds' debt service payments.

The amendment to the Air Quality Control Act is intended to facilitate the potential closure of the two generating stations. It requires the state Environmental Improvement Board to establish standards of performance for coal-fired electric generating facilities with an original installed capacity exceeding 300 MW to limit carbon dioxide emissions to no more than 1,100 pounds per MWh on and after January 1, 2023 – a level that is not attainable with the pollution controls used by most coal-fired generating plants.

The amendments to the Renewable Energy Act are intended more generally to increase the use of renewable energy by the state's electric public utilities. Senate Bill 489's amendments to the Renewable Energy Act require that renewable energy comprise the following minimum percentages of each public utility's total retail sales to New Mexico customers:

- (1) 20% by January 1, 2020;
- (2) 40% by January 1, 2025;
- (3) 50% by January 1, 2030; and
- (4) 80% by January 1, 2040.

Ultimately, the REA amendments require, by January 1, 2045, that zero carbon resources supply 100% of all retail sales of electricity in New Mexico.

### **C. Evidentiary Standards**

As the applicant in this administrative adjudication, PNM's burden of proof is established as a matter of law.<sup>19</sup> The rule in administrative proceedings in general, and adjudications before

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<sup>19</sup> See, e.g., *Southwestern Public Service Company's Application Requesting: (1) Acceptance of its 2014 Annual Energy Efficiency and Load Management Report; (2) Approval of its 2016 EE/LM Plan and Associated Programs; (3) Approval of its Cost Recovery Tariff Rider; and (4) a Determination Whether a Separate Process Should be Established to Analyze a Smart-Meter Pilot Program*, Case No. 15-00119-UT, Certification of Stipulation, at 16 (Dec. 18, 2015) (citing *Gray v. State ex rel. Wyoming Workers' Safety and Compensation Div.*, 193 P.3d 246, 251 (Wyo. 2008)). See (Cont'd on next page)

this Commission in particular, is that unless a statute provides otherwise, the proponent of an order or moving party has the burden of proof.<sup>20</sup> The burden of proof is two-pronged: it includes both the *prima facie* burden of adducing sufficient evidence to go forward with a claim and the burden of ultimate persuasion. The quantum of proof in administrative adjudications is, again unless expressly provided otherwise, a preponderance of record evidence.<sup>21</sup>

### III. SUMMARY

#### A. Recommended replacement resources

This Recommended Decision reviews the resources proposed by PNM and the other parties to replace the generating capacity that will be lost with the abandonment of San Juan Units 1 and 4. It describes the factors the ETA requires the Commission to consider when approving replacement resources and assesses how the ETA intends the factors should be balanced.

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also NMSA 1978 § 62-8-7(A) (“At any hearing involving an increase in rates or charges sought by a public utility, the burden of proof to show that the increased rate or charge is just and reasonable shall be upon the utility.”).

<sup>20</sup> 3 Davis, Kenneth Culp, Administrative Law Treatise § 16.9 at 255-57 (2d ed. 1980). *See Int’l Minerals and Chemical Corp. v. N.M. Pub. Serv. Comm’n*, 81 N.M. 280, 283, 466 P.2d 557, 560 (1970) (“Although the statute does not specifically place any burden of proof on [complainant] International, the courts have uniformly imposed on administrative agencies the customary common-law rule that the moving party has the burden of proof.”).

<sup>21</sup> *See* Davis, *supra*, § 16.9 at 256 (“One can *never* prove a fact by something less than a preponderance of the evidence”) (emphasis in original). *See El Paso Electric Co. et al. v. N.M. Pub. Serv. Comm’n*, 1985-NMSC-085, ¶ 12 (“This Court, however, does express its deep concern regarding the reasonableness of this heightened standard of proof [‘clear and convincing evidence’], especially *since a ‘preponderance of evidence’ standard is customary in administrative and other civil proceedings.*”) (emphasis added); *Re Southwestern Public Service Co.*, Case No. 2678, Recommended Decision of the Hearing Examiner (Nov. 15, 1996) (“No matter how the Commission describes its standard of review, SPS bears the burden of proof in this case. SPS must demonstrate that a preponderance of evidence exists in the record on which to base approval of the requested authorizations surrounding the merger.”).

The prevailing evidentiary standard of proof for decisions rendered in administrative agency adjudications should not be confused with the standard of “substantial evidence in the record as a whole,” the appellate standard of review applied by the New Mexico Supreme Court in reviewing Commission orders. *See, e.g., New Mexico Indus. Energy Consumers v. PSC*, 1986-NMSC-059, ¶ 32 (“... *our review of Commission decisions must be based on substantial evidence in the record as a whole*”) (emphasis added); *New Mexico Exchange Carrier Group v. N.M. Public Regulation Comm’n*, 2016-NMSC-015, ¶ 13 (“A party *challenging a PRC Order* must establish that the order is arbitrary and capricious, *not supported by substantial evidence*, outside the scope of the agency’s authority, or otherwise inconsistent with law.”) (emphasis added; internal quotation marks and citation omitted). *See also* Davis, *supra* § 16.9 at 256 (“The requirement of ‘clear, unequivocal, and convincing evidence’ imposed by the Woodby case applies only to the agency, not to the reviewing court; the standard of substantial evidence applies at the court level. *Espinoza-Espinoza v. Immigration and Naturalization Service*, 554 F.2d 921, 924 (9<sup>th</sup> Cir. 1977).”).

Importantly, the Recommended Decision emphasizes that the balancing and ultimate selection of a portfolio of replacement resources involves policy considerations that are the province of the Commission. The Hearing Examiners do not aim or intend to make that decision for them.

No party has proposed that a single resource is sufficient to replace the capacity being abandoned. They propose combinations (portfolios) of resources. And because all parties propose a substantial amount of renewable energy, they include in their portfolios a substantial amount of non-renewable resources to back-up the intermittent generation of the renewable resources.

The primary difference among the parties' resource portfolios is whether the back-up resources should consist primarily of fossil fuel resources (i.e., natural gas units) or battery storage units. The decision on which to choose is a policy decision that depends upon the balancing done of the factors set forth in the ETA.

The Hearing Examiners therefore suggest two alternative approaches for the Commission's balancing. The first approach is based upon the Hearing Examiners' interpretation of the priorities set forth in Section 3 of the ETA. This approach recognizes the priority the ETA places on locating replacement resources in the Central Consolidated School District, with a second emphasis on the minimization of environmental impacts. Reliability is also important. Cost is a factor to be considered. The cost has to be reasonable, but it appears to be a factor that can be outweighed by location, environmental impacts, and reliability.

The second approach includes the priorities the Commission has traditionally applied to resource acquisition cases. This approach emphasize costs and prefers the resource portfolio that is the lowest cost of reasonable capacity alternatives. Reliability is of equal importance. Location and environmental impacts are of secondary importance.

Applying the first approach, the Hearing Examiners recommend that the Commission approve CCAE 1. CCAE 1 includes 650 MW of solar resources and 300 MW of battery storage resources. It would locate 430 MW and \$447 million of capital investment within the CCSD. It would also locate 520 MW and substantially more than \$430 million of capital investment in nearby McKinley County and the Jicarilla Apache reservation in Rio Arriba County.<sup>22</sup> CCAE 1 would also have the least environmental impacts compared to the portfolio options with natural gas turbines.

The second highest ranking portfolio under this first approach is PNM's Scenario 2. PNM Scenario 2 includes 440 MW of natural gas turbines with 11 natural gas units and a combined 100 MW/30 MW solar/battery project to be located in the CCSD. It would locate 570 MW of resources and between \$425 and \$485 million of capital investment in the CCSD, but it would not include any additional resources for McKinley County and the Jicarilla Apache reservation. The eleven natural gas units will also continue to emit CO<sub>2</sub>, making it a less preferred choice environmentally compared to CCAE 1.

CCAЕ 1 is reliable under the parties' reasonable quantitative and qualitative analyses, as is discussed at length below. Its direct costs to ratepayers are greater, but the ETA relegates cost to a lesser weight in the necessary balancing. Its avoidance of the social costs of the CO<sub>2</sub> emissions of a natural gas portfolio would also minimize or offset the difference.

Applying the second approach, the Hearing Examiners would recommend the least costly of the portfolio proposals – the mix of solar resources, battery resources and natural gas turbines in Sierra Club portfolio 2-4. Sierra Club 2-4 includes 200 MW of natural gas turbines (five units) and

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<sup>22</sup> PNM provided the \$430 million estimate for the smaller version of the Arroyo and Jicarilla projects, including only 40 MW for the Arroyo battery project. CCAE 1 would include a 150 MW Arroyo battery project, which would increase the capital investment substantially above \$430 million.

\$156 million of capital investment in the CCSD. It also includes the same 520 MW and substantially more than \$430 million of capital investment in nearby McKinley County and the Jicarilla Apache reservation in Rio Arriba County as CCAE 1. The final resource in the portfolio is a 40 MW stand-alone battery PPA located in Bernalillo County.

Sierra Club 2-4's cost to ratepayers is less than PNM's preferred natural gas scenario, PNM Scenario 1, which includes 280 MW of natural gas turbines (seven units) and \$189 million in capital investment in the CCSD. PNM Scenario 1 would include 420 MW and \$430 million of capital investment in nearby McKinley County and the Jicarilla Apache reservation. The Appendix at the end of this decision includes a map depicting the replacement resources in Scenario 1 and their location in relation to the San Juan School Districts and relative distance from the San Juan plant.

#### **B. Other Issues: Carbon Capture Technology and Fairness of PNM's RFP Process**

The potential to convert San Juan Units 1 and 4 to CCUS technology was also discussed. The project's primary purpose is to avoid the economic harm to the CCSD and Northwest New Mexico, including the loss of tax base and jobs, that will result if the plant is closed. But a CCUS project has still not been designed, and the feasibility of such a project is still being studied.

Westmoreland Mining asks that the Commission delay its approval of the 280 MW of PNM's proposed natural gas units until the project developer, Enchant Energy, is able to present a PPA proposal to PNM or until July 2021.<sup>23</sup> Westmoreland asserts there is a strong possibility that, after the conclusion of a currently progressing feasibility study, Enchant will be able to offer favorable terms to PNM for the approximately 280 MW of dispatchable capacity PNM needs to integrate the renewable resources it proposes in PNM Scenario 1.

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<sup>23</sup> Nevertheless, Westmoreland also asks the Commission to act now to approve the Arroyo and Jicarilla projects.



The SJC Entities request that complete re-bidding be allowed to enable the developers of a CCUS project to submit a proposal to provide replacement power and/or to complete their negotiations with the current San Juan owners for the transfer of the remaining San Juan facilities.

The Hearing Examiners do not recommend the Westmoreland and SJC Entities approaches. The many uncertainties associated with the CCUS project prevented its inclusion in any party's resource proposals. The project's feasibility is still being studied, and its prospects were heavily criticized during the hearings. Even among the most optimistic of forecasts, the project would not be completed and in service until a year after the units will have been abandoned, in approximately July of 2023. Perhaps most significant, no witness suggested that PNM should acquire the CCUS project after its completion or that PNM should purchase all of its replacement energy from the converted CCUS system. No witness could even describe a purchase of energy that would satisfy PNM's needs. All witnesses testified that PNM needs flexible resources, not the base-load capacity that the CCUS project would provide.

Several parties argued that all or parts of the RFP process conducted by PNM were unfair and contrary to the requirements of the ETA. They ask that an entirely new RFP be issued or that a rebidding be conducted for the sites at which PNM proposes stand-alone utility-owned battery storage units.

Despite the merits of some of the intervenors' arguments, the Hearing Examiners conclude that the proposals received and reviewed are sufficient for the Commission to approve a portfolio of replacement resources that is consistent with the ETA. PNM received 345 bids in response to the initial RFP and 45 bids for the Supplemental RFP in April 2019. PNM received 104 bids for resources in the CCSD representing approximately 12,000 MW and that the eventual short list included 2,100 MW of CCSD resources. The pricing for the Arroyo and Jicarilla projects is especially advantageous.

The Hearing Examiners acknowledge that the RFP was issued prior to the adoption of the ETA and before its requirements became known. There is a potential that better proposals might be obtained with a new RFP, but the risks and uncertainties created with the delay outweigh the likelihood of the benefits. The prices and projects might actually be worse, and the delay might result in insufficient resources being available by the time PNM abandons San Juan Units 1 and 4.

Furthermore, unfairness of PNM's RFP process primarily concerned the April 2019 supplemental RFP. Neither of the portfolio options recommended by the Hearing Examiners includes the utility-owned Sandia and Zamora battery storage units that resulted from that RFP process.

Moreover, there is insufficient time remaining in this docket to conduct any further RFPs and reach a final decision on both the new and previously-submitted proposals to avoid the automatic approval of PNM's CCN requests for the Piñon, Sandia, and Zamora projects that will occur on October 1, 2020 absent a final order on those requests by that date. The review period for PNM's replacement resource requests established in the Commission's Corrected Order on Consolidated Application of July 10, 2019 has already taken advantage of the maximum time period (nine months plus an optional additional six months) allowed the Commission to act on PNM's CCN requests under Section 62-9-1(C) of the Public Utility Act. The automatic approval of PNM's CCN requests that will occur on October 1, 2020 absent a Commission order denying them will also result in the automatic rejection of the other RFP proposals.

### **C. Implementation**

In order to implement the projects by which third party developers would sell electricity to PNM from the solar and battery facilities in CCAE portfolio 1, the Commission needs to approve the agreements for the purchases pursuant to Commission Rule 551. PNM included agreements in its Application for the projects it proposed, some of which are included in CCAE portfolio 1.

Thus, the Hearing Examiners recommend that the Commission approve the PPA submitted by PNM for the 300 MW Arroyo solar project, the 50 MW PPA submitted by PNM for the Jicarilla solar project, and the 20 MW ESA submitted by PNM for the Jicarilla battery storage project. To implement the remainder of CCAE 1, the Hearing Examiners recommend that PNM be required to negotiate an ESA for the 150 MW Arroyo battery storage proposal submitted to PNM in the RFP process, the 200 MW and 100 MW solar PPA proposals submitted by Bidders Nos. 2 and 5, and ESAs for the 100 MW and 30 MW battery storage proposals by Bidders Nos. 2 and 5. PNM would also be required to prepare a plan for an additional 24 MW of demand response resources. The agreements and PNM's demand response plan would be filed for the Commission's expedited review.

If the Commission opts for the natural gas scenario, the Hearing Examiners recommend that the Commission approve the 300 MW Arroyo solar project, the 50 MW PPA submitted by PNM for the Jicarilla solar project, and the 20 MW ESA submitted by PNM for the Jicarilla battery storage project. The Hearing Examiners would also recommend that PNM be required to negotiate an ESA for the 150 MW Arroyo battery storage proposal submitted to PNM in the RFP process, and the 40 MW battery project submitted by Bidder No. 12. The agreements would be filed for the Commission's expedited review under Commission Rule 551. PNM would also be required to file a new proposed estimate of certificated costs for the five-unit natural gas project.

## **IV. DISCUSSION**

### **A. PNM's RFP Processes**

#### **1. Background**

This docket considers PNM's and other parties' proposals for generating resources to replace San Juan Units 1 and 4. PNM's Application with its proposed resources was filed on July 1, 2019. Other parties filed proposals and analyses of PNM's proposals on December 13, 2019.

Hearings were held on January 21-31, 2020. The statutory period for the review of the proposals ends on September 30, 2020.

PNM conducted two Request for Proposal (RFP) processes to select the resources it proposes in this case to replace the capacity of San Juan Units 1 and 4. The first RFP process started in October 2017 and ended in 2019. A second Supplemental RFP, limited to utility-owned battery resources, was conducted starting in April 2019 and ended in June 2019.

The timing of PNM's initial RFP process was dictated by the Modified Stipulation approved by the Commission on December 16, 2015 in Case No. 13-00390-UT.<sup>24</sup> Paragraph 19 of the Modified Stipulation required PNM to make a filing with the Commission by December 31, 2018 to determine the extent to which San Juan Units 1 and 4 should continue serving PNM's retail customers' needs after June 30, 2022. The filing was to be supported by PNM's 2017-2036 Integrated Resource Plan (IRP), which was due to be filed by July 1, 2017. Paragraph 19 went on to require PNM to issue an RFP as soon as practicable after the filing of the 2017 IRP that would request proposals for resources identified in the IRP as the most cost effective portfolio using the assumption that San Juan does not continue to operate past 2022 ("non-SJGS alternative"). It also required that the RFP allow bidders to propose renewable resource options beyond those included in the IRP's non-SJGS alternative.<sup>25</sup>

PNM filed its 2017 IRP on July 3, 2017, which recommended the non-SJGS alternative as its four-year action plan. The IRP found that retiring PNM's 497 MW share of San Juan Units 1 and 4 would provide long-term cost savings for PNM's customers. It found that the retirement

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<sup>24</sup> See *In the Matter of the Application of Public Service Company of New Mexico for Approval to Abandon San Juan Generating Station Units 2 and 3, Issuance of Certificates of Convenience and Necessity for Replacement Power Resources, Issuance of Accounting Orders and Determination of Related Rate-Making Principles and Treatment*, Case No. 13-00390-UT, Final Order (Dec. 16, 2015).

<sup>25</sup> Certification of Stipulation, Attach. B, Case No. 13-00390-UT (Nov. 16, 2015), ¶ 19, approved by Final Order (Dec. 16, 2015).

would provide the opportunity to move from the fixed costs and baseload operation associated with coal plants to resources that better match varying loads and are better equipped to work with renewable energy.<sup>26</sup> It found that the best mix of new resources would include solar energy and flexible natural gas-fired peaking capacity but that it might also include energy storage. And, the IRP concluded that PNM would validate its conclusions by issuing a RFP and that it might rebalance the mix of replacement resources as a result of the bids received through that process.<sup>27</sup>

## **2. PNM's initial RFP**

On October 30, 2017, PNM issued the RFP with bids due by January 30, 2018. PNM received bids from 37 different bidders, across 49 potential project sites. Many bidders offered multiple variants of their proposals including different in-service dates, pricing structures, capacities, and commercial structures (PPA, Build-Transfer, or Engineering, Procurement and Construction (EPC)). In total, 345 bid variants were received for evaluation.

The bid evaluation team included representatives from PNM, HDR Engineering, Inc. (HDR), and Astrapé Consulting, LLC ("Astrapé"). PNM representatives provided direction, input, review, and concurrence through all aspects of the bid evaluation from appropriate subject matter experts. HDR served as a third-party evaluator to review, summarize, and evaluate proposal information in a consistent and controlled manner to facilitate PNM modeling and decision making, as well as to provide support for the later phases of the evaluation and negotiation. Astrapé performed generation system portfolio modeling to evaluate the overall system reliability and cost of service for varying generation portfolios.

As the following summary lays out, the bid evaluation was split into phases.

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<sup>26</sup> PNM 2017 IRP, July 3, 2017, Exec. Summ., p. 1.

<sup>27</sup> PNM 2017 IRP, pp. 2, 142.

**a. Initial Screening**

The Initial Screening phase assessed compliance with the requirements and intent of the RFP including an assessment of minimum requirements, completeness, and fatal flaws. The evaluation team compared the proposals to the minimum bid requirements identified in the RFP to identify proposals that did not meet the requirements or that lacked necessary information.

The first round of clarifying questions was submitted to bidders on March 1, 2018 with a second round subsequently issued on March 29, 2018 after responses were received from the first round. At the completion of the Initial Screening phase, the evaluation team decided to carry all proposals into the Phase One evaluation to more fully evaluate the characteristics and economics of each proposal. The team retained all proposal options regardless of whether they satisfied the minimum requirements of the RFP in an effort to make the evaluation as thorough and complete as possible and to more fully understand the potential value of each project. The initial screening phase extended from initial receipt of bids on January 30, 2018 through mid-April 2018.<sup>28</sup>

**b. Phase One evaluation**

The Phase One evaluation focused primarily on the cost and viability of the proposals to get into service in the time frame requested by PNM.<sup>29</sup> The factors considered included, but were not limited to performance, development status, land acquisition status, credit quality, safety metrics, transmission line losses and/or fees, achievable in-service dates, and total delivered cost. The team also considered the bidder's experience with these types of projects, commercial

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<sup>28</sup> PNM Exh. 29 (Nagel Dir.), Exh. RWN-4, pp. 10-11 of 30.

<sup>29</sup> Tr. (Nagel) 506.

experience of the technology, review of comments to the terms and conditions, and general quality of the proposal.<sup>30</sup>

Third and fourth rounds of clarifying questions were submitted to these bidders in May 2018 and July 2018. Of the 390 bid options evaluated in Phase One, PNM selected 51 bids on July 11, 2018 to proceed into Phase Two as a shortlist.<sup>31</sup>

The shortlist was developed to maintain the most favorable bids in each generation technology category including:

- a. Solar generation in varying size categories
- b. Wind generation in varying size categories
- c. Combined wind and solar generation
- d. Energy storage in varying size categories
- e. Heavy frame combustion turbines
- f. Aeroderivative combustion turbines
- g. Reciprocating engines
- h. Combined renewable (both solar and wind) and energy storage solutions
- i. Combined natural gas and energy storage solutions<sup>32</sup>

The shortlist also attempted to maintain offerings in each technology category with sufficient capacity to deliver the full replacement need for the San Juan Generating Station. This allowed the ability to subsequently perform more detailed system modeling with alternative generation portfolio mixes to investigate and identify the most cost-effective portfolio for PNM going forward.<sup>33</sup>

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<sup>30</sup> Nagel Dir., Exh. RWN-4, p. 9.

<sup>31</sup> Nagel Dir., Exh. RWN-4, pp. 10-11.

<sup>32</sup> Nagel Dir. 18, Exh. RWN-4, pp. 9-10.

<sup>33</sup> Nagel Dir. 27, Exh. RWN-4, pp. 12-15.

### c. Phase Two evaluation

The Phase Two evaluation was initiated to complete a more detailed assessment of the project characteristics, economics, commercial and contracting terms, and project validation to differentiate the short-listed bids and to support a final selection. The evaluation team conducted interview meetings with the shortlisted companies from July 24 through August 3, 2018 to allow the bidders to present their proposals and to have an open discussion with the team regarding the status, benefits, and challenges associated with the projects.<sup>34</sup>

Subsequent to the meetings, PNM issued updated terms and conditions to the shortlisted bidders to be considered in a bid refresh by August 31, 2018. The bid refresh was intended to allow the bidders to address any issues raised during the interview, to consider the updated terms and conditions presented by PNM and offer refreshed pricing and proposal information based upon updated information and market adjustments that had occurred since the original proposals. PNM requested that all refreshed bids include pricing for a December 31, 2021 in-service date and updated redlines to the PPA and EPC contract term sheets.<sup>35</sup>

PNM then used a weighted ranking matrix with quantitative and qualitative evaluation criteria to compare and rank bids. The matrix was used to rank projects of a specific technology and considered price and non-price factors with the following collaboratively developed qualitative weighting factors.<sup>36</sup>

*Commercial Conditions:* Bidders' overall conformance to commercial terms with exceptions to desired commercial terms, multiple exclusions, or projected significant negotiation challenges receiving lower ratings.

*Creditworthiness:* Bidder's (or their third-party enhancement) credit ratings among the credit agencies.

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<sup>34</sup> Nagel Dir., Exh. RWN-4, p. 12.

<sup>35</sup> Nagel Dir., Exh. RWN-4, pp. 12-13.

<sup>36</sup> Nagel Dir., Exh. RWN-4, pp. 13.



*Team Qualifications:* Bid options with a larger number of prior completed projects and long working relationships with personnel and/or contractors received higher ratings.

*Project Engineering:* Level of detail of the proposed project's engineering design, development and construction schedule, and O&M plan, and a rating on the measure of technology maturity.

*Environmental & Siting:* Bidder's land control status and plan, the status of an environmental site assessment and level of community engagement.

*Fuel Supply:* Bidder's fuel supply plan and interconnection status.

*Interconnection I Performance:* Bid options with secured transmission rights received higher ratings than ones yet to secure rights or that were deemed to have higher costs and significant schedule creep risk.<sup>37</sup>

The highest-ranking projects were modeled and again validated against the closest competitive bids and with varying pricing sensitivities by PNM's Resource Planning Group and Astrapé to understand the resource portfolio that most economically satisfied PNM's future load forecast. Results from the modeling concluded that a mix of gas, wind, solar, solar/battery, and battery resources would provide the most effective resource mix with the least impact to the rate payers while maintaining the desired system reliability. These included a final shortlist of 20 best in class bids issued on November 21, 2018.<sup>38</sup>

Of the highest-ranking projects, primary bids were selected based upon proposed pricing, overall ranking from the bid evaluation process, and modeling results. The top solar bids included the Arroyo hybrid solar/battery project in McKinley County<sup>39</sup> and the Jicarilla hybrid solar/battery project in Rio Arriba County.<sup>40</sup> The top wind bid included the 140 MW La Joya II wind project in

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<sup>37</sup> Nagel Dir., Exh. RWN-4, pp. 13-14.

<sup>38</sup> Nagel Dir., Exhibit RWN-4, pp. 15-16; Tr. 445-46 (Nagel).

<sup>39</sup> The Arroyo Solar project to be sited in Pueblo Pintado in McKinley County (PNM Exh. 5, Fallgren Dir., 63), was proposed as a 300 MW/150 MW hybrid solar/battery project, but to minimize technology risk associated with battery energy storage technologies, the bid evaluation team determined it would be prudent to limit the application of any single energy storage technology at any site to no more than 40 MW. Nagel Dir., Exh. RWN-4, p. 17.

<sup>40</sup> The GPS location description of the solar site to be located near Lindrith in Rio Arriba County is "36.316748, -107.316393, where PNM 345 line intersects State Highway 537." Fallgren Dir., Exh. TGF-11, Exh. A, p. 80 of 108.

Torrance County.<sup>41</sup> The top natural gas turbine bid included natural gas LM6000 turbines proposed for the San Juan site in the CCSO in San Juan County.<sup>42</sup>

A list of alternate bidders was also developed to maintain a competitive process during negotiations. These bids, although not ranked as the highest in the evaluation, were competitive and would meet future load forecast needs. The list of alternate bidders was selected to provide an amount of energy supply similar to the primary bidders.<sup>43</sup>

Wind projects were evaluated and considered for satisfaction of PNM's future renewable portfolio objectives and included accordingly.<sup>44</sup>

### **3. PNM's Supplemental RFP**

PNM also issued a Supplemental RFP on April 2, 2019 after the passage of the ETA to obtain additional bids for utility-owned energy storage resources.<sup>45</sup> PNM sought bids for up to 450 MW of battery storage resources with either two- or four-hour storage durations. It asked that projects be quoted with a 50 MW (AC) base proposal with pricing for additional 50 MW (AC) increments up to a total of 450 MW.

The Supplemental RFP required that bids for EPC projects be constructed on PNM controlled sites:

- The San Juan Generating Station site with capability to site up to a 450 MW project with interconnection to the existing 345 kV substation.
- The Reeves Generating Station site in Bernalillo County with capability to site up to a 150 MW project with interconnection to the existing 115 kV substation.

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<sup>41</sup> PNM proposed the La Joya II wind project for PNM's 2020 Renewable Portfolio Standard (RPS) compliance in Case No. 19-00159-UT. It was approved by the Commission's final order in that docket on January 29, 2020.

<sup>42</sup> Nagel Dir., Exh. RWN-4, p. 19; Tr. (Nagel) 438-39.

<sup>43</sup> Nagel Dir., Exh. RWN-4, p. 15.

<sup>44</sup> *Id.*

<sup>45</sup> Nagel Dir. 6.

- A Greenfield site in the Sandia Science and Technology Park near the Sandia substation in Bernalillo County with approximately 5.4 acres available with interconnection to the existing 115 kV substation.<sup>46</sup>

Build to transfer projects were to be bid on sites selected and controlled by the bidders.<sup>47</sup>

Bids were required by May 24, 2019.<sup>48</sup> An additional 45 bid variants were submitted from 4 bidders.<sup>49</sup>

PNM issued the Supplemental RFP for two reasons. First, the ETA included specific requirements for energy storage systems, including that they provide the “public utility with the discretion, subject to applicable laws and rules, to operate, maintain and control energy storage systems so as to ensure reliable and efficient service to customers[.]”<sup>50</sup> PNM said most of the non-utility-owned storage bids received in the initial RFP were in the form of proposed PPAs that imposed operational restrictions that were inconsistent with the new ETA provisions. PNM said utility-owned storage generally affords greater flexibility with respect to the operation, maintenance, and control of energy storage in conformity with this amended statutory criteria.<sup>51</sup> PNM’s Vice President of Generation, Thomas Fallgren, explained that while batteries themselves are a known technology, their introduction and integration into utility generation portfolios is relatively new. The utility industry is trying to develop modeling software that is able to demonstrate and capture the full value of battery storage facilities. Fallgren said battery storage facilities not only provide energy arbitrage but also ancillary services such as frequency response,

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<sup>46</sup> Nagel Dir., Exh. RWN-6, pp. 4-5 of 20.

<sup>47</sup> Nagel Dir., Exh. RWN-6, p. 5 of 20.

<sup>48</sup> Nagel Dir., Exh. RWN-6, p. 14 of 20.

<sup>49</sup> Nagel Dir., Exh. RWN-4, p. 5.

<sup>50</sup> NMSA 1978, § 62-9-1(D)(6).

<sup>51</sup> Nagel Dir. 6-7.

spinning reserve and ramp control, and a utility's ability to realize the full potential is dependent on the operation, control, and location of the facilities.<sup>52</sup>

Second, many of the EPC bids for utility ownership received in response to the initial RFP were eliminated because EPC bidders were required to have a New Mexico contractor's license from the New Mexico Construction Industries Division at the time of bid submission, while PPA bidders did not have the same requirement. PNM said it issued the Supplemental RFP for utility-owned resources to ensure EPC bids could be considered consistent with available PPA bids.<sup>53</sup>

Clarifying questions were submitted on May 29, 2019 and addressed within June 2019. Shortlisting for the Supplemental RFP occurred during early June 2019 with subsequent meetings held with the shortlisted bidder.<sup>54</sup>

The Phase Two evaluation for the shortlisted battery storage bidder was performed in June 2019 with results compared and evaluated against the Replacement Resource RFP bid evaluation results. The Phase Two evaluation for the Supplemental RFP also considered additional value to PNM for a utility-owned battery storage project including battery locational value, capital investment deferral, avoidance of curtailment of renewable generation, system reliability, and other factors. Studies were completed by the Brattle Group, Ascend Analytics, Astrapé, and Enovation Partners.<sup>55</sup>

#### **4. Resource Modeling**

##### **a. Costs and reliability**

The resource modeling in this case estimated and compared the projected costs and reliability of the various portfolios of replacement resources over a 20-year planning period. The

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<sup>52</sup> PNM Exh. 7 (Fallgren Reb.) 23.

<sup>53</sup> Fallgren Reb. 22.

<sup>54</sup> Nagel Dir., Exh. RWN-4, p. 11.

<sup>55</sup> Nagel Dir., Exh. RWN-4, p. 12.

models calculated various measures of revenue requirements over the 20-year period and brought the estimated costs forward to Net Present Values (NPVs). The parties used the 20-year NPVs as a basis to compare the relative costs of the portfolios.

The reliability of the various portfolios was judged based upon a measure increasingly relied upon by utilities to evaluate the addition of renewable resources. PNM witness Nicholas Phillips explained that the Commission has until recently required a minimum planning reserve margin to ensure reliability, but the planning reserve margin is no longer adequate to ensure system reliability.<sup>56</sup>

Planning reserves are forecasted generation capacity over and above the amount required to serve the projected peak-hour demand of the year. When utility systems were dominated by conventional resources that could be dispatched to meet changing system requirements, planning reserve margins were sufficient for peak load capacity planning. But with the increase in non-dispatchable renewable resources required to meet the RPS and zero-carbon goals contained within the ETA, PNM's system need the right balance of firm and flexible capacity to ensure reliability.<sup>57</sup>

In the past, regulators and resource planners used a single metric such as reserve margin as an indicator of expected reliability, at least for long-term system construction planning. Supply resources tended to be conventional generators that provided roughly the same delivery capacity around the clock and through the different seasons of the year.<sup>58</sup>

PNM's planning reserve requirement has been defined by the Commission and not by a specific North American Electric Reliability Corporation or Federal Energy Regulatory Commis-

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<sup>56</sup> Mr. Phillips is the Director of PNM's Integrated Resource Planning team. The Integrated Resource Planning team is responsible for developing PNM's resource plans and the regulatory filings to support those resource plans, including the annual renewable energy portfolio procurement plan and the triennial IRP. The team is also responsible for performing resource planning analysis to support abandonment and retirement decisions as well as resource additions and acquisitions.

<sup>57</sup> PNM Exh. 10 (Phillips Dir.) 24-25.

<sup>58</sup> Phillips Dir. 26-27.

sion regulation. Section 9 of the Stipulation approved in Case No. 08-00305-UT established a planning reserve requirement of 13 percent when levels of renewable penetration across the grid were low.<sup>59</sup>

Mr. Phillips opined that, today, the reserve margin measure is inadequate to meet the volatile nature of high levels of intermittent resources on the grid. As more renewables are integrated, reliability assessments and metrics need to change to consider the system's ability to meet peak load (both gross and net of renewable resources) as well as the ability of the system to respond to sudden changes in renewable output.<sup>60</sup>

Given the variability in generation caused by sunshine and weather, the hour of the day and the season, he said the key moment of stress on the system is no longer the summer afternoon hour when load is highest. It tends to be the occasions when net load (load less current renewable production) is highest. To assure reliability, PNM must look at year-round capacity reserves and also load following flexibility. Resource additions on PNM's system must be able to respond rapidly to supply and demand imbalances.<sup>61</sup>

As a result, PNM's resource proposals in this case are based primarily on reliability metrics. PNM recommended the use of a Loss of Load Event (LOLE) of .02 per year (i.e., 2 events per 10 years).<sup>62</sup> The LOLE metric represents the number of loss of load events due to capacity shortages, calculated in events per year.

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<sup>59</sup> Phillips Dir. 26, *citing* Case No. 08-00305-UT, Certification of Stipulation (Mar. 9, 2009), Exhibit 1, *approved in* Final Order Approving Certification of Stipulation (May 26, 2009).

<sup>60</sup> Phillips Dir. 26-27.

<sup>61</sup> *Id.*

<sup>62</sup> PNM witness Nick Wintermantel distinguished between LOLE<sub>CAP</sub> and LOLE<sub>FLEX</sub> as measures of reliability. The LOLE<sub>CAP</sub> metric represents the number of loss of load events per year due to capacity shortages, while the LOLE<sub>FLEX</sub> metric is the number of loss of load events due to system flexibility problems, calculated in events per year. In these events, there was enough capacity installed but not enough flexibility to meet the net load ramps, or startup times prevented a unit coming online fast enough to meet the unanticipated ramps. LOLE<sub>FLEX</sub> events are typically very short in duration and are caused by a rapid drop in solar or wind resource output over a short time interval. He said  
(*Cont'd on next page*)

A Loss of Load Event does not necessarily result in a system outage. Staff witness Jack Sidler testified that many times the loss of load can be managed without significant impacts on customers.<sup>63</sup> Sierra Club witness Michael Goggin testified that capacity shortages often do not result in a loss of load, as for that to occur the shortfall must occur at the same time that transmission capacity and market purchases are unavailable. When faced with shortage conditions, operators also have many solutions, including offering higher prices for market purchases, operating tie lines at emergency ratings, issuing consumer conservation notices, dipping into operating reserves, or reducing consumption through system voltage reductions. Because of solutions like these, customer outages due to supply shortages occur much less frequently than predicted by power system planning criteria such as a 0.2 loss of load expectation.<sup>64</sup> DOE data confirm that generation inadequacy causes less than 1/100<sup>th</sup> of 1% of all customer-hours of electricity outages.<sup>65</sup>

PNM's witnesses stated that the LOLE standard in the industry is .01 per year, but they said the .01 LOLE is difficult for a relatively small utility, such as PNM, to achieve. Based on the size of PNM's system, for example, PNM witness Wintermantel recommended a 0.2 LOLE (two events in ten years) standard at a minimum. For small systems with limited interconnections, the .01 LOLE level of reliability is difficult and costly to achieve. Wintermantel said a system such as PNM's with a relatively small number of large units will find it more difficult and costly to achieve

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traditional LOLE calculations only calculate LOLE<sub>CAP</sub>. PNM Exh. 36 (Wintermantel Dir.) 9-10. Thus, the reliability modeling presented by the parties focused primarily upon the proposed portfolios' satisfaction of the LOLE<sub>CAP</sub> standard of .02 LOLE<sub>CAP</sub>. Because the LOLE<sub>FLEX</sub> metric is not recognized in the industry as a standard of reliability, the Recommended Decision refers only to the parties' estimates of LOLE<sub>CAP</sub> and uses the term LOLE.

<sup>63</sup> Staff Exh. 5 (Sidler Dir.) 4-5. *See also* Tr. (Solomon) 1933-34.

<sup>64</sup> Sierra Club Exh. 15 (Goggin Dir.) 40-41, *citing* Stephen Huntoon, "Have Mandatory Standards Improved Reliability?" (January 2015), *available at* <https://www.fortnightly.com/fortnightly/2015/01/have-mandatory-standards-improved-reliability>.

<sup>65</sup> Goggin Dir. 40-41, *citing* Trevor Houser, John Larsen, and Peter Marsters, "The Real Electricity Reliability Crisis," (October 3, 2017), *available at* <https://rhg.com/research/the-real-electricity-reliability-crisis-doe-nopr/>.

the .01 LOLE than a system that might include more than 50 generators.<sup>66</sup> No party disagreed with the use of the .02 LOLE standard.

For example, PNM witnesses Wintermantel and Gary Dorris used proprietary computer modeling (SERVM and PowerSimm) to evaluate PNM's and other parties' proposed replacement portfolios based on loss of load probability metrics, not planning reserve margin analysis. Their LOLE modeling assesses the variability of demand as well as the capabilities of resources such as batteries and flexible gas turbines to load follow, provide sufficient operating and contingency reserves, and to provide resilience to the system on a sub-hourly level.<sup>67</sup>

The resource models used in this case estimated the costs and LOLE probabilities of the various resource replacement portfolios proposed by the parties. PNM used the EnCompass, SERVM, and PowerSimm models. Each has different focuses and strengths and PNM used them in an iterative process to develop its proposed portfolio of replacement resources.

#### **b. EnCompass**

Encompass is a traditional utility planning model.<sup>68</sup> It analyzes a utility's generation and load under a projected scenario and develops a system to meet the load, including the utility's reserve margin, at least cost. It includes assumptions about fuel costs, heat rates and details about generation behavior. It models hourly increments of data and does not capture the volatile aspects of solar and wind. Encompass shows the total cost to serve the utility's load as projected and the NPV of the costs over a planning period. The planning period used in this case was 20 years.<sup>69</sup>

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<sup>66</sup> Wintermantel Dir. 11-12.

<sup>67</sup> Phillips Dir. 27-29.

<sup>68</sup> Previously PNM used Strategist to perform resource planning analysis. The EnCompass model performs similar analysis to Strategist but utilizes a more modern optimization algorithm and contains additional logic to support more resources (both number of resources and resource types) and constraints than Strategist. Strategist has reached the end of its life cycle and is no longer supported. Phillips Dir. 11-12.

<sup>69</sup> Phillips Dir. 6-7, 11-12; Tr. (Babcock) 1588-89.



PNM used the sub-hourly capabilities of the SERVМ and PowerSimm models to better predict the intermittency of renewable resources and the support that could be provided with quick-start natural gas turbines and battery storage technologies.

### **c. SERVМ**

SERVМ calculates LOLE metrics and the NPV of the total system production costs to serve load and the fixed capital and O&M costs of proposed replacement resources over a 20-year planning period. SERVМ takes into account the uncertainty of weather, load forecast, generator outages, and intra-hour volatility of intermittent resources. It also models the loads and resources of neighboring balancing authorities to incorporate potential imports and exports of energy. Thousands of yearly simulations are performed at 5-minute time steps for each replacement resource combination, which allows the model to calculate both reliability metrics and costs. SERVМ does not have perfect knowledge of net load<sup>70</sup> when it makes its commitment and dispatch decisions. It mimics the uncertainty faced by utility operators.<sup>71</sup>

SERVМ quantifies the savings that flexible resources such as battery or fast-start gas resources provide to the system, as compared to slower-starting resources with poor ramping capability. It also captures the additional costs that inflexible resources such as solar and wind have on the system since these resources cause the dispatchable fleet to ramp up and start up more frequently in order to maintain reliability.<sup>72</sup>

Due to the number of iterations required in reliability modeling, study years 2023, 2028, and 2033 were simulated and production costs were interpolated to produce 20-year production costs. Fixed costs, including capital costs, O&M, transmission costs, and fixed gas transportation

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<sup>70</sup> Net load is defined as gross load minus renewable resources and reflects the load the conventional fleet must serve on a minute to minute basis.

<sup>71</sup> Wintermantel Dir. 6-8.

<sup>72</sup> Wintermantel Dir. 12-13.

if applicable, of the replacement portfolio were included over the 20-year period. The expansion plan beyond the replacement resources was held constant across each replacement resource combination analyzed.<sup>73</sup>

The results are the NPV over 20 years of the annualized production costs, net purchase costs, and fixed costs of the replacement resources. Production costs include all fuel burned, variable O&M costs, startup costs, and CO<sub>2</sub> costs for the entire PNM Balancing Area. To calculate the NPV, Astrapé used PNM's most recent weighted average cost of capital (7.2%) that was approved in the last rate case.<sup>74</sup>

#### **d. PowerSimm**

The owner of the PowerSimm software, Ascend, specializes in resource planning for high renewables systems. The PowerSimm model attempts to reflect the energy system conditions that result from adding large amounts of weather-driven intermittent power resources. PowerSimm attempts to capture (i) 5 and 15-minute market conditions, including interactions with the Western Energy Imbalance Market (EIM); (ii) the power market dynamics of a more volatile energy landscape with weather as a fundamental driver of renewable energy production, load, and market prices; and (iii) battery storage economics.<sup>75</sup>

PowerSimm generates renewable output, load, and energy prices as a function of simulated weather, the shared core driver. Instead of a single deterministic and weather-normalized run, PowerSimm simulates hundreds of hourly and sub-hourly system conditions benchmarked to current and evolving system fundamentals. Dispatch and market interactions are optimized to respond to the increasingly volatile simulated price conditions, thereby revealing the true value of

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<sup>73</sup> Wintermantel Dir. 13.

<sup>74</sup> Wintermantel Dir. 13-14.

<sup>75</sup> PNM Exh. 33 (Dorris Dir.) 6-7.

flexible generation. The sub-hourly capabilities enable PowerSimm to simulate the behavior and economics of resources in the EIM and thereby reveal the value of flexible resources in responding to market volatility.<sup>76</sup> The model used an independent set of fuel, power price, and market assumptions to evaluate the economics of the portfolios and assess reliability.<sup>77</sup>

**e. The models' similarities and differences**

Encompass selects the lowest cost portfolio of resources based upon resource costs input into the model. The SERVIM and PowerSimm models estimate the costs of selected portfolios of resources.<sup>78</sup>

EnCompass models the total costs (i.e., total fixed costs and total variable costs) of a utility's system, and it does so on an hourly basis based upon average costs and conditions the modeler asks the model to assume. The SERVIM and PowerSimm models estimate incremental fixed costs and the total variable production costs, and it does so on a five-minute stochastic basis that allows the model the ability select from a variety of potential cost assumptions and weather conditions.

The fixed costs of the utility's current generating resources are omitted from the SERVIM and PowerSimm models in an effort to conserve on computing resources and because the fixed costs of current assets are considered to be constants.<sup>79</sup> That is the primary reason why the NPV results of the SERVIM and PowerSimm models are substantially lower than the NPV results of the EnCompass model.

Both SERVIM and PowerSimm attempt to capture the dynamics of sub-hourly markets and the value that battery storage can serve, but elements of the models differ. SERVIM models

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<sup>76</sup> Dorris Dir. 15-16.

<sup>77</sup> Phillips Dir. 32.

<sup>78</sup> Tr. (Phillips) 1222-24, 1354.

<sup>79</sup> Tr. (Phillips) 2271.

potential imports and exports from service territories of utilities in neighboring states in addition to the conditions of the utility being modeled. PowerSimm models potential imports and exports in the EIM.

**f. PNM's use of the models and Mr. Kemp's battery limits to justify abandonment and its preferred replacement resource portfolio**

PNM initially applied the EnCompass and SERVVM models to the best in class bids (i.e., the Tier 1 and Tier 1 bids) shortlisted by HDR in November 2018. The purpose was to support PNM's abandonment filing (i.e., to show that the cost of abandoning San Juan Units 1 and 4 was less costly than continuing its operation) and a replacement resource portfolio.

Using EnCompass, PNM incorporated the best RFP offers from HDR's November 2018 shortlist to the portfolios of resource types proposed in PNM's 2017 IRP.<sup>80</sup> Scenario 1 included a combination of solar facilities supported with quick start LM6000 aeroderivative natural gas turbines and battery storage facilities. Scenario 2 was an all-natural gas approach, including a relatively large heavy frame natural gas facility and quick start LM6000 aeroderivative natural gas turbines. Scenario 3 was a no fossil fuel scenario that only included solar and battery storage facilities. These three scenarios were compared to a scenario that anticipated the continued operation of San Juan Units 1 and 4 through its useful life. The last scenario was used as a point of comparison to prove the reasonableness of abandoning the remaining San Juan units.

After conducting initial SERVVM modeling assisting HDR in its screening of "Best in Class" bids (discussed in Section V.B.2.g.iii below), Mr. Wintermantel took a more comprehensive approach after HDR completed its shortlist, evaluating all possible combinations of the Tier 1 and Tier 2 shortlisted offers. Wintermantel initially modeled all combinations of the renewable proposals to determine if they could provide system reliability. He found that, due to the

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<sup>80</sup> See 2017 PNM IRP, pp. 128-31.

intermittent nature of wind and solar, the all renewable combinations could not meet the reliability criteria.<sup>81</sup>

Then, Wintermantel used the Tier 1 offers to create replacement resource combinations that would meet the reliability standards discussed above. The Tier 1 combinations included capacity resources ranging from all battery/renewable combinations to all gas combinations. Dispatchable capacity was added or removed to achieve the reliability standard.<sup>82</sup>

Next, Wintermantel used the Tier 2 offers which were ranked further down in HDR's evaluation to stress test the least cost replacement resource combination from the Tier 1 Modeling to determine if more optimal combinations existed. No constraints were put on technology or project size for this initial modeling.<sup>83</sup>

Based on this initial modeling, the least cost replacement resource combination that met reliability targets consisted of 6 aeroderivative natural gas units totaling 231 MW (240 MW nameplate capacity) and two combined solar/battery projects. The combined solar/battery projects included the 300 MW solar/150 MW battery Arroyo project and the 50 MW solar/20 MW battery Jicarilla project.<sup>84</sup>

Subsequently, Wintermantel conducted further SERVVM modeling, adding the least cost offers of utility-owned battery storage from of the April 2019 Supplemental RFP to the shortlisted offers from the 2017 RFP. He said the new offers did not improve the economics of the unconstrained set of replacement resources he had previously modeled.<sup>85</sup>

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<sup>81</sup> Wintermantel Dir., Exh. NW-2, p. 7 of 70.

<sup>82</sup> Wintermantel Dir., Exh. NW-2, p. 8 of 70 (Corrected).

<sup>83</sup> *Id.*

<sup>84</sup> *Id.*

<sup>85</sup> Wintermantel Dir., Exh. NW-2, p. 9 of 70 (Corrected).

PNM later hired Ascend and a battery storage economist, William Kemp, to further analyze and model the size of the battery storage additions PNM should pursue.<sup>86</sup> Mr. Kemp recommended limitations on the use of the battery proposals received in the RFPs. For PNM's initial implementation of battery storage technologies, he recommended a 40 MW maximum size for a single battery storage installation and a 5% of system peak (130 MW) maximum of battery installations system-wide. He also recommended the value of using utility-owned battery storage proposals in addition to the third-party proposals.<sup>87</sup>

PNM thereafter modified the Scenario 1 it originally constructed based upon the November 2018 short list of best in class bids to include the 40 MW Sandia and 30 MW Zamora battery storage proposals received in the Supplemental RFP.

PNM then asked Mr. Wintermantel to conduct additional modeling incorporating the recommendations of Mr. Kemp that initial energy storage implementation should not be beyond 2% - 5% of the system peak load and that individual projects should be between 10 MW and no more than 40 MW. Keeping the same 350 MW of solar resources 269 MW to 345 MW of aeroderivative gas resources determined as most cost effective in the unconstrained modeling and re-pricing the larger battery projects to 40 MW, two combinations were within \$1 million NPV of each other. Given the small difference, PNM chose the combination that included the Arroyo project with the battery component reduced from 150 MW to 40 MW, the Jicarilla project, 269 of aeroderivative and the stand-alone utility-owned battery projects – the 40 MW Sandia project and the 30 MW Zamora project. This portfolio became PNM Scenario 1.<sup>88</sup>

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<sup>86</sup> Although hired in January 2019, Dr. Dorris first applied the PowerSimm model to PNM's replacement resource scenarios on June 20, 2019. Tr. (Dorris) 793.

<sup>87</sup> Kemp Dir. 23-26.

<sup>88</sup> Wintermantel Dir., Exh. NW-2, p. 9 of 70 (Corrected).

Finally, in addition to this modeling, PNM asked Mr. Wintermantel to run three additional scenarios to compare against PNM's proposed scenario. These were developed by PNM's resource planning department and included the 40 MW battery size project limit. The scenarios include two of the scenarios that had been included in PNM's EnCompass modeling – (1) the all-natural gas (seven unit) and heavy frame scenario located in the CCSD (later modified to include 11 natural gas units and a 100 MW solar/30 MW battery scenario) and (2) the no new fossil fuel alternative that included only solar and battery resources (the “No Gas” scenarios). PNM also asked that he model a further scenario that included all renewable resources.<sup>89</sup>

Then, based upon Mr. Kemp's battery size constraints, Ascend also conducted modeling. Dr. Dorris used PowerSimm to model the scenarios previously modeled by PNM and Astrapé and also included two additional No Gas scenarios. Ascend No Gas 1 included 100 MW 4 hour batteries, 300 MW 2-hour batteries, 500 MW solar, 540 MW wind) \$4,077 million (\$4.08 billion), and Ascend No Gas 2 included 150 MW 4-hour batteries, 300 MW 2 hour batteries, 200 MW solar, 140 MW wind) \$3,887 million (\$3.89 billion).<sup>90</sup> Ascend found that PNM's Scenario 1 is the most cost-effective supply portfolio to transition to a carbon free energy supply and meet reliability requirements. Scenario 2, while reliable, is significantly more costly. Scenario 3 is both more costly and less reliable than Scenario 1. Dorris found that Scenario 4 is not reliable and would put PNM customers at risk of supply interruptions and thus the potential for blackouts. Ascend No Gas 1 satisfied the loss of load reliability criteria. Ascend No Gas 2 failed these criteria. Both were slightly more costly than PNM's Scenario 1.<sup>91</sup>

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<sup>89</sup> Wintermantel Dir., Exh. NW-2, p. 10 of 70 (Corrected).

<sup>90</sup> Dorris Dir. 18-19.

<sup>91</sup> Dorris Dir. 3-4, 21.

The results of the three models were included in PNM's July 1, 2019 Application. Based upon PNM's modeling assumptions, Scenario 1 had the lowest reasonable overall cost that meets reliability requirements.

<b>Model</b>	<b>Scenario 1</b>	<b>Scenario 2*</b>	<b>Scenario 3</b>	<b>Scenario 4</b>	<b>SJ Continued Operation</b>
<b>EnCompass (\$M)</b>	\$5,923	\$5,944	\$6,015	--	\$6,302
<b>Difference from Scenario 1 (\$M)</b>		\$21	\$92	--	\$379
<b>SERVM (\$M)</b>	\$4,678	\$4,732	\$4,834	\$5,452	--
<b>Difference from Scenario 1 (\$M)</b>		\$54	\$156	\$774	--
<b>PowerSimm (\$M)</b>	\$3,803	\$3,902	\$3,846	\$4,363	--
<b>Difference from Scenario 1 (\$M)</b>		\$99	\$43	\$560	--

\* Scenario 2 includes 196 MW heavy frame gas turbine and 280 MW (7 units) aeroderivative LM6000 natural gas turbines

Phillips Dir., 19-20, Tables NLP 1-A and NLP 1-B, & 33.

Wintermantel Dir., 28, Table NW-8.

Dorris Dir., 19.

On September 20, 2019, PNM filed an errata that made a number of changes to its Application. One of the changes included a modified Scenario 2. Instead of the all-natural gas scenario consisting of a 196 MW heavy frame gas facility and seven quick start LM6000 natural gas turbines, PNM deleted the heavy frame gas facility, increased the number of LM6000 natural gas turbines from seven to eleven and added a hybrid 100 MW solar/30 MW battery storage facility. The revised Scenario 2 would again locate all resources in the CCSD.



The revisions from PNM’s errata resulted in the following changes to the EnCompass and SERVM modeling results. The PowerSimm results were not updated.

<b>Model</b>	<b>Scenario 1</b>	<b>Scenario 2</b>	<b>Scenario 3</b>	<b>Scenario 4</b>	<b>SJ Continued Operation</b>
<b>EnCompass (\$M)</b>	\$5,916	\$5,927	\$6,024	--	\$6,315
<b>Difference from Scenario 1 (\$M)</b>		\$12	\$108	--	\$399
<b>SERVM (\$M)</b>	\$4,673	\$4,717	\$4,837	\$5,454	--
<b>Difference from Scenario 1 (\$M)</b>		\$44	\$164	\$781	--
<b>PowerSimm (\$M) **</b>	\$3,803**	\$3,902**	\$3,846**	\$4,363**	--
<b>Difference from Scenario 1 (\$M)</b>		\$99**	\$43**	\$560**	--

\* Scenario 2 includes 440 MW (11 units) of aeroderivative LM6000 natural gas turbines

\*\* Dorris NPVs still reflect pre- and uncorrected data from July 1, 2019 Application.

Phillips Dir., 19-20, Tables NLP 1-A and NLP 1-B (Corrected), & 33 (Corrected).

Wintermantel Dir., 28, Table NW-8 (Corrected).

Dorris Dir., 19.

**g. Other parties’ use of the models to support alternative replacement resource portfolios**

As discussed earlier, PNM made the models available to the parties pursuant to the Commission’s Order of January 30, 2019 in Case No. 19-00018-UT and the discovery plan approved by the Hearing Examiners in this case on August 27, 2019.<sup>92</sup> All of the non-PNM (intervenor) parties that proposed competing replacement resource proposals relied upon one or both of the models used by PNM.

Thus, the most significant line of analysis during the hearings concerned the NPV cost and reliability results of PNM’s models (primarily EnCompass and SERVM) and the reasonableness of

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<sup>92</sup> Ordering paragraph C in the Commission’s January 30, 2019 Order provided that “PNM shall, at its cost, afford all parties access by means of a proprietary license to all computer models used by PNM in support of its filing including, but not limited to, its decisions to abandon its interest in SJGS to serve New Mexico ratepayers and its selection of proposed replacement resources. The reimbursement of PNM’s costs shall be reviewed and addressed in PNM’s next rate case.” Order Initiating Proceeding on PNM’s December 31, 2018 Verified Compliance Filing Concerning Continued Use of and Abandonment of San Juan Generating Station, Case No. 19-00018-UT (Jan. 30, 2019), Ordering ¶ C. *See also* Order Addressing Revised PNM Proposal on Discovery Issues, Case No. 19-00195-UT, (Aug. 27, 2019).

the assumptions used in the parties’ model runs. The parties’ proposed portfolios and the results of their modeling are discussed in the following section.

## **B. PNM’s Proposed Replacement Resource Portfolios**

PNM asks the Commission to approve a replacement portfolio, which it labeled “Scenario 1.” Scenario 1 is a combination of renewable energy and energy storage facilities supported by natural gas-fired peaking units. Scenario 1 includes the 300 MW/40 MW Arroyo hybrid solar/battery project and the 50 MW/20 MW Jicarilla hybrid solar/battery project. The 300 MW Arroyo PPA includes an energy purchase price of \$18.65 MWh, and the ESA charges a capacity price for the 40 MW of battery storage of \$7.46 kW-month. The 50 MW Jicarilla PPA includes an energy purchase price of \$19.73 MWh and the ESA charges a capacity price for the 20 MW of battery storage of \$9.97 kW-month.<sup>93</sup> Scenario 1 is summarized in the table below.

**Scenario 1 (760 MW)<sup>94</sup>**

<b>Name</b>	<b>Resource Type</b>	<b>Nameplate Capacity</b>	<b>Ownership</b>	<b>Location</b>
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Arroyo Storage Project with Arroyo Solar Above	Battery	40 MW	ESA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Jicarilla Storage Project with Jicarilla 1 Solar Above	Battery	20 MW	ESA	Rio Arriba
Sandia Storage Project	Battery	40 MW	EPC	Bernalillo
Zamora Storage Project	Battery	30 MW	EPC	Bernalillo
Piñon Gas Plant (7 units)	Natural Gas	280 MW	EPC	CCSD

Scenario 1 also includes CCNs to construct, own and operate two separate energy storage facilities, the Sandia 40 MW facility and the Zamora 30 MW facility, located in Bernalillo County at sites where PNM has an existing substation and a planned substation. PNM would seek to recover the certificated estimated capital cost of the Sandia facility of \$48.9 million and the

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<sup>93</sup> See PNM Exh. 1 (Application) 16.

<sup>94</sup> See Fallgren Dir., 4, PNM Table TGF-1.

certificated estimated capital cost of the Zamora facility of \$39.0 million, respectively, in PNM's rate base in a future general rate case.<sup>95</sup>

Scenario 1 further seeks a CCN to construct the Piñon gas plant, which consists of 280 MW of nameplate capacity natural gas-fired generating units at the San Juan coal plant site in Waterflow, New Mexico. The 280 MW facility consists of seven 40 MW LM6000 simple-cycle aeroderivative units capable of providing quick start generation to meet PNM's peak load capacity requirement and to meet the increased system reliability needs caused by the increasing use of intermittent generation with additional renewable energy resources. PNM will seek to recover the certificated estimated capital costs of the Piñon gas plant of \$190.9 million in PNM's total rate base in a future general rate case, in accordance with Rule 17.3.580 NMAC.<sup>96</sup>

As an alternative, PNM has developed another resource mix, "Scenario 2", which locates 570 MW of new resources in San Juan County. This alternative involves installing eleven LM6000 natural gas units and a solar/battery hybrid project at the San Juan site to preserve as much as possible the property tax base for the CCSD.<sup>97</sup>

**Scenario 2- San Juan Location Preference (570 MW)<sup>98</sup>**

<b>Name</b>	<b>Resource Type</b>	<b>Nameplate Capacity</b>	<b>Ownership</b>	<b>Location</b>
Piñon Gas Plant (11 units)	Gas	440 MW	EPC	CCSD
Bidder #5 Solar/Battery Hybrid	Solar/Battery	100 MW Solar 30 MW Battery	PPA/ESA	CCSD

PNM also evaluated two additional scenarios that totally eliminate natural gas generation, but the company does not recommend their approval. Scenario 3, summarized in the next table, would rely heavily on battery storage.<sup>99</sup>

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<sup>95</sup> See Application 17.

<sup>96</sup> Application 18.

<sup>97</sup> Application 1.

<sup>98</sup> Fallgren Dir. 27 (Corrected), PNM Table TGF-4.

<sup>99</sup> Application 1-2.

### Scenario 3 – No New Fossil Fuels (910 MW)<sup>100</sup>

Name	Resource Type	Nameplate Capacity	Ownership	Location
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Arroyo Storage Project with Arroyo Solar Above	Battery	40 MW	ESA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Jicarilla Storage Project with Jicarilla 1 Solar Above	Battery	20 MW	ESA	Rio Arriba
Solar Project #1	Solar	150 MW	ESA	Not identified
Battery #1	Battery	40 MW	ESA	Not identified
Battery #2	Battery	40 MW	ESA	Not identified
Battery #3	Battery	40 MW	ESA	Not identified
Battery #4	Battery	40 MW	ESA	Not identified
Battery #5	Battery	40 MW	EPC	Not identified
Battery #6	Battery	40 MW	EPC	Not identified
Battery #7	Battery	40 MW	ESA	Not identified
Sandia Storage Project	Battery	40 MW	EPC	Bernalillo
Zamora Storage Project	Battery	30 MW	EPC	Bernalillo

Finally, Scenario 4 would eliminate gas generation through exclusive reliance on renewable generation.

### Scenario 4 - All Renewables (2,174 MW)<sup>101</sup>

Name	Resource Type	Nameplate Capacity	Ownership	Location
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Solar #1	Solar	150 MW	PPA	Not identified
Solar #2	Solar	50 MW	PPA	Not identified
Solar #3	Solar	150 MW	PPA	Not identified
Solar #4	Solar	75 MW	PPA	Not identified
Solar #5	Solar	100 MW	PPA	Not identified
Solar #6	Solar	100 MW	PPA	Not identified
Wind #1	Wind	479 MW	PPA	Not identified
Wind #2	Wind	400 MW	PPA	Not identified
Wind #3	Wind	180 MW	PPA	Not identified
Wind #4	Wind	140 MW	PPA	Not identified

PNM asserts Scenarios 3 and 4 are not adequate and reliable replacement portfolios for the San Juan coal plant.<sup>102</sup> However, in its Response Brief PNM identifies the two WRA options 1-A and 1-B (discussed below) as viable options. PNM volunteers that “[a]lthough PNM has concerns

<sup>100</sup> Fallgren Dir. 28, PNM Table TGF-5.

<sup>101</sup> Fallgren Dir. 30, PNM Table TGF-6.

<sup>102</sup> Fallgren Dir. 28-30.

about the feasibility of meeting overly-optimistic energy efficiency and demand response targets [as proposed in options 1-A and 1-B] on an accelerated timeframe, and is already proposing to undertake a significant initial battery storage deployment, any of these three outcomes could work depending on the Commission’s weighting of the Energy Transition Act criteria.”<sup>103</sup>

### C. Other Parties’ Proposals

Other parties, except the SJC Entities and Staff, propose or support portfolios with additional battery resources to reduce the need for the quick-start natural gas turbines PNM proposes. These parties all recommend approval of the Arroyo and Jicarilla projects. The intervenor parties’ proposals are summarized on the following pages and tables below.

WRA recommended two alternatives. WRA Scenario 1-A substitutes a 100 MW/30 MW hybrid solar/battery project in the CCSD to replace one of the 7 gas turbines in PNM’s Scenario 1.

**WRA Scenario 1-A (850 MW)<sup>104</sup>**

<b>Name</b>	<b>Resource Type</b>	<b>Nameplate Capacity</b>	<b>Ownership</b>	<b>Location</b>
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Arroyo Storage Project with Arroyo Solar Above	Battery	40 MW	ESA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Jicarilla Storage Project with Jicarilla 1 Solar Above	Battery	20 MW	ESA	Rio Arriba
Sandia Storage Project	Battery	40 MW*	EPC	Bernalillo
Zamora Storage Project	Battery	30 MW*	EPC	Bernalillo
Piñon Gas Plant (6 units)	Natural Gas	240 MW	EPC	CCSD
Bidder #5 Solar/Battery Hybrid	Solar/Battery	100 MW Solar 30 MW Battery	PPA/ESA	CCSD

\* WRA states that the Sandia and Zamora projects should be contingent upon a further competitive bidding process.

WRA also recommended a Scenario 1-B that proposes only five natural gas turbines and replaces them with the 100 MW/30 MW hybrid solar battery project in the CCSD plus two

<sup>103</sup> PNM Resp. Br. 5.

<sup>104</sup> See Commission Exh. 11 (Updated Verified Response of Public Service Company of New Mexico to the Hearing Examiners’ Jan. 28, 2020 Bench Request Order) p. 3; WRA Resp. Br. 3.

additional resources – 15 MW of additional energy efficiency programs and increased demand response programs designed to reduce demand by 28 MW.

**WRA Scenario 1-B (853 MW)<sup>105</sup>**

<b>Name</b>	<b>Resource Type</b>	<b>Nameplate Capacity</b>	<b>Ownership</b>	<b>Location</b>
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Arroyo Storage Project with Arroyo Solar Above	Battery	40 MW	ESA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Jicarilla Storage Project with Jicarilla 1 Solar Above	Battery	20 MW	ESA	Rio Arriba
Sandia Storage Project	Battery	40 MW*	EPC	Bernalillo
Zamora Storage Project	Battery	30 MW*	EPC	Bernalillo
Piñon Gas Plant (5 units)	Natural Gas	200 MW	EPC	CCSD
Bidder #5 Solar/Battery Hybrid	Solar/Battery	100 MW Solar 30 MW Battery	PPA/ESA	CCSD
Energy Efficiency		15 MW		System-wide
Demand Response		28 MW		System-wide

\* WRA states that the Sandia and Zamora projects should be contingent upon a further competitive bidding process.

WRA Scenarios 1-A and 1-B, as indicated above, correspond to the alternative scenarios PNM stated were viable in its Response Brief. In WRA's Response Brief, however, WRA appears to have dropped its support of WRA Scenario 1-A (which included six natural gas units) and recommends either WRA Scenario 1-B (which includes five natural gas units) or a variant of WRA Scenario 1-B containing four natural gas units (160 MW) with a potentially higher loss of load probability.<sup>106</sup> WRA's four gas unit portfolio omits one natural gas unit but is otherwise the same as its five unit portfolio.

WRA witness Patrick O'Connell recommended that the stand-alone storage resources that PNM proposed as utility-owned resources should be approved but be re-bid. Mr. O'Connell believed PNM's portfolio should include some stand-alone battery storage. He said solar/battery hybrid projects lower the cost of the storage facility due to the available investment tax credit, but the investment tax credit also limits the operational benefit of storage for the first five years due to

<sup>105</sup> See Commission Exh. 11, p. 3; WRA Resp. Br. 3.

<sup>106</sup> WRA Resp. Br. 3.

the requirement that the battery store only solar energy. In addition, hybrid facilities owned by a third party limit the ability for PNM to control the cycling and dispatch of battery energy for any potential system need.<sup>107</sup>

O’Connell also said stand-alone battery storage can help avoid or defer transmission or distribution system investments and can assist reliability with their interconnections at the Sandia and Zamora substations.<sup>108</sup>

O’Connell recommended re-bidding because PNM only solicited turn-key proposals for its stand-alone battery projects. He said it is possible that a non-owned resource could meet PNM’s needs for flexibility and operational discretion as well as a company-owned resource. O’Connell also contended PNM’s April 2019 RFP was not fully competitive.<sup>109</sup>

CCAE proposed a portfolio that eliminates the addition of new natural gas units. The portfolio includes the Arroyo and Jicarilla projects but increases the size of the battery resource for the Arroyo project to 150 MW instead of the 40 MW PNM proposed. The CCAE proposal also eliminates PNM’s proposed utility-owned battery projects and substitutes two hybrid solar/battery projects in the CCSD – a 200 MW/100 MW project and a 100 MW/30 MW project – and 24 MW of demand response resources.

CCAE witness Justin Brant testified that PNM could add 24 MW to its Power Saver demand response program by 2022. The Power Saver program is a Direct Load Control program offered by PNM to residential, small commercial, and medium commercial customers. He said, according to PNM’s most recent Energy Efficiency Potential study, 41% of its residential customers have central air conditioning, similar to central air conditioning penetration in the Xcel

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<sup>107</sup> WRA Exh. 3 (O’Connell Dir.) 26.

<sup>108</sup> O’Connell Dir. 26.

<sup>109</sup> O’Connell Dir. 27.

Energy service territory in Colorado. But Xcel Saver’s Switch program has approximately 16% of its residential customers enrolled, compared with 8% for PNM. Brant concluded PNM could ramp the program up by 24 MW by 2022 and 16% by 2027.<sup>110</sup>

**CCAE Preferred (950 MW)<sup>111</sup> (“CCAE 1”)**

<b>Name</b>	<b>Resource Type</b>	<b>Nameplate Capacity</b>	<b>Ownership</b>	<b>Location</b>
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Arroyo Storage Project with Arroyo Solar Above	Battery	150 MW	ESA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Jicarilla Storage Project with Jicarilla 1 Solar Above	Battery	20 MW	ESA	Rio Arriba
Bidder #2 Solar/Battery Hybrid	Solar/Battery	200 MW Solar 100 MW Battery	PPA/ESA	CCSD
Bidder #5 Solar/Battery Hybrid	Solar/Battery	100 MW Solar 30 MW Battery	PPA/ESA	CCSD
Demand Response		24 MW		System-wide

CCAE’s alternative project (“CCAE 2”) depicted in the table below would reduce the Arroyo battery to 80 MW and add the 70 MW of PNM’s proposed utility-owned battery projects to CCAE’s preferred portfolio.

**CCAE 2 (950 MW)<sup>112</sup>**

<b>Name</b>	<b>Resource Type</b>	<b>Nameplate Capacity</b>	<b>Ownership</b>	<b>Location</b>
Arroyo Solar Project	Solar	300 MW	PPA	McKinley
Arroyo Storage Project with Arroyo Solar Above	Battery	80 MW	ESA	McKinley
Jicarilla 1 Solar Project	Solar	50 MW	PPA	Rio Arriba
Jicarilla Storage Project with Jicarilla 1 Solar Above	Battery	20 MW	ESA	Rio Arriba
Bidder #2 Solar/Battery Hybrid	Solar/Battery	200 MW Solar 100 MW Battery	PPA/ESA	CCSD
Bidder #5 Solar/Battery Hybrid	Solar/Battery	100 MW Solar 30 MW Battery	PPA/ESA	CCSD
Sandia Storage Project	Battery	40 MW	EPC	Bernalillo
Zamora Storage Project	Battery	30 MW	EPC	Bernalillo
Demand Response		24 MW		System-wide

<sup>110</sup> In the Power Saver program, PNM installs devices on customer’s cooling systems that can shut down or cycle those units on the hottest days of the year, when electricity demand is highest. In 2018, PNM had approximately 43,700 devices under control, of which about 37,000 were residential customers (i.e., 8% of PNM’s 470,000 residential customers). CCAE Exh. 18 (Brant Dir.) 9-11.

<sup>111</sup> CCAE Exh. 16 (Sommer Dir.) 4; CCAE Resp. Br. 13-14.

<sup>112</sup> Sommer Dir. 4; CCAE Resp. Br. 15.



Sierra Club’s preferred portfolio also eliminates natural gas turbines. Sierra Club recommends the Arroyo and Jicarilla projects, and, like CCAE’s preferred portfolio, it recommends that the battery portion of the Arroyo project be increased from 40 MW to 150 MW. It also recommends a second hybrid solar/battery project (150 MW solar/40 MW battery) to be located in Rio Arriba County. Otherwise, it recommends three additional battery storage projects totaling 240 MW. None of the projects is proposed for the CCSD.<sup>113</sup>

**Portfolio SC 15 (950 MW)<sup>114</sup>**

<b>Generation/Storage Unit</b>	<b>MW</b>	<b>Location</b>	<b>In the CCSD?</b>	<b>Ownership</b>
Clenera Arroyo	300 MW solar, 150 MW 4 hr. battery	McKinley	No	PPA/ESA
Hybrid Project #1	150 MW Solar, 40 MW 4 hr. battery	Rio Arriba	No	PPA/ESA
Primary Energy Solar/BESS	50 MW Solar, 20 MW 4 hr. battery	Jicarilla Apache Nation	No	PPA/ESA
ES Rio Puerco 1	100 MW 4 hr. battery	Rio Rancho	No	ESA
ES West Mesa 1	100 MW 4 hr. battery	Bernalillo	No	ESA
Bidder 9 Reeves Battery	40 MW 4 hr. battery	Rio Rancho	No	ESA
<b>Total capacity added, by resource type:</b>	500 MW solar, 450 MW batteries, 0 MW gas			
<b>Total capacity added in the CCSD:</b>	0 MW			

Sierra Club proposes two alternatives that include five natural gas turbines (192 MW) at the San Juan site and, again, include the Arroyo and Jicarilla projects with the 150 MW storage facility in the Arroyo project. Portfolio 2-4 adds a 40 MW battery PPA in Bernalillo County and Portfolio 2-6 adds a 150 MW/ 40 MW battery project in Rio Arriba County. Sierra Club’s proposed resource portfolios are summarized in the tables on the next page.

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<sup>113</sup> Sierra Club also includes in each of its three options the 140 MW La Joya II wind project (identified by Sierra Club as the Avangrid Lucia 2021 project) that was approved by the Commission in PNM’s recent Renewable Portfolio Standard case in Case No. 19-00159-UT.

<sup>114</sup> Sierra Club Resp. Br. 1. Not included in the table above is the 140 MW La Joya II wind project that was approved in PNM’s recent RPS plan proceeding in Case No. 19-00195-UT.

**Portfolio Tier 2-4 (760 MW)<sup>115</sup>**

<b>Generation/Storage Unit</b>	<b>MW</b>	<b>County</b>	<b>Location</b>	<b>Ownership</b>
5 aeroderivative units at Piñon*	200 MW gas CT	San Juan	Yes	CCN
Clenera Arroyo	300 MW solar, 150 MW 4 hr. battery	McKinley	No	PPA/ESA
Primary Energy Solar/BESS	50 MW Solar, 20 MW 4 hr. battery	Jicarilla Apache Nation	No	PPA/ESA
Bidder #12 Battery	40 MW 4 hr. battery	Bernalillo	No	ESA
<b>Total capacity added, by resource type:</b>	350 MW solar, 210 MW batteries, 200 MW gas			
<b>Total capacity added in the CCSD:</b>	200 MW			

\* The aeroderivative units correspond to the LM6000 turbines proposed by PNM. Sierra Club described the units as having 192 MW of capacity, but 192 MW represents their summer net capacity output. The nameplate capacity is 200 MW.

**Portfolio Tier 2-6 (910 MW)<sup>116</sup>**

<b>Generation/Storage Unit</b>	<b>MW</b>	<b>Location</b>	<b>In the CCSD?</b>	<b>Ownership</b>
5 aeroderivative units at Piñon*	200 MW gas CT	San Juan	Yes	CCN
Clenera Arroyo	300 MW solar, 150 MW 4 hr. battery	McKinley	No	PPA/ESA
Hybrid Project #1	150 MW Solar, 40 MW 4 hr. battery	Rio Arriba	No	PPA/ESA
Primary Energy Solar/BESS	50 MW Solar, 20 MW 4 hr. battery	Jicarilla Apache Nation	No	PPA/ESA
<b>Total capacity added, by resource type:</b>	500 MW solar, 210 MW batteries, 200 MW gas			
<b>Total capacity added in the CCSD:</b>	200 MW			

\* The aeroderivative units correspond to the LM6000 turbines proposed by PNM. Sierra Club described the units as having 192 MW of capacity, but 192 MW represents their summer net capacity output. The nameplate capacity is 200 MW.

SWG argues that PNM’s RFP and RFP process was flawed, which flaws will be discussed in Section V.E below. Nevertheless, in its Response Brief, SWG recommends the “no new gas” portfolios proposed by CCAE, either CCAE 1 or CCAE 2, as a “no regrets” regulatory approach for PNM’s “first step” toward procuring the resources needed to satisfy the ETA’s longer-term RPS and “zero carbon requirements.”<sup>117</sup> SWG states that PNM will be addressing the next step soon, in

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<sup>115</sup> Sierra Club Resp. Br. 2. Not included in the table above is the 140 MW La Joya II wind project that was approved in PNM’s recent Renewable Energy Case in Case No. 19-00195-UT.

<sup>116</sup> Sierra Club Resp. Br. 2. Not included in the table above is the 140 MW La Joya II wind project that was approved in PNM’s recent Renewable Energy Case in Case No. 19-00195-UT.

<sup>117</sup> SWG Resp. Br. 2-5.

its 2020 IRP expected in July.<sup>118</sup> SWG also recommends that, if the Commission determines that PNM needs some new gas-fired capacity to maintain service reliability in the near-term, the Commission should approve the “less new gas” portfolio WRA 1-B with four LM6000 units.<sup>119</sup>

Staff proposes the approval of PNM’s Scenario 2. Staff argues that Scenario 2 is the most reliable of the resource combinations proposed in response to PNM’s RFP, and it locates the most resources in the CCSD.<sup>120</sup>

The SJC Entities object to the approval of any resources in this proceeding. They argue that PNM’s procurement process was not conducted in conformance with the requirements of the ETA and that a further RFP process should be conducted.<sup>121</sup> Alternatively, they state, if the Commission determines that replacement resources must be authorized in this proceeding, PNM Scenario 2 is the only scenario that satisfies the ETA. They say only the 570 MW of the 440 MW gas plant and 100 MW/30 MW solar/battery project will satisfy the ETA’s requirement that PNM locate up to 450 MW in the CCSD. They assert the gas plant is the most reliable of the portfolios and that the \$12 million higher NPV of PNM Scenario 2 compared to PNM Scenario 1 is not significant when compared to the \$5.916 billion NPV of PNM’s total system.<sup>122</sup>

NM AREA believes approval of either WRA Scenario would provide the best overall resolution of this complex case from a long-term cost perspective. NM AREA states that the additional \$38 million and \$48 million NPV costs of WRA Scenario 1-A and 1-B are significant, but their addition of fewer gas plants and more renewables is more in line with the increased

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<sup>118</sup> SWG Resp. Br. 2.

<sup>119</sup> SWG Resp. Br. 11-17.

<sup>120</sup> Staff Resp. Br. 4-7.

<sup>121</sup> SJC Entities Resp. Br. 9-14.

<sup>122</sup> SJC Entities BIC 11-13.

renewable/zero carbon policy goals of the ETA and might therefore reduce PNM's future cost of complying with the ETA mandates.<sup>123</sup>

In the alternative, if the Commission decides that the WRA Scenarios are too costly, NM AREA believes that the most acceptable replacement scenario is PNM Scenario 1, provided that PNM is required to initiate a robust interruptible rate program that could displace capacity additions post-2023.<sup>124</sup>

NEE argues that a new RFP process should be required because PNM's RFP process was manipulated to pursue the gas turbine project it sought in prior proceedings, to pursue utility-owned battery storage projects and to select Affordable Solar as the contractor for the utility-owned battery storage projects. Nevertheless, NEE states that it supports any wholly renewable and battery storage portfolios, such as the portfolios proposed by CCAE. It also supports the Jicarilla and Arroyo PPAs.<sup>125</sup>

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<sup>123</sup> NM AREA BIC 19-20. NM AREA supports WRA Scenario 1-B option if the following customer protections are required by the Commission:

First, PNM must be required to negotiate in good faith with Bidder No. 5 to achieve the lowest possible pricing for the 130 MW Solar/Battery PPA located in the CCSD. As part of this requirement, PNM must file a compliance filing with the Commission, within sixty days of a final order in this case, describing the results of the negotiations and setting forth the cost savings gained in the negotiations with Bidder No. 5.

Second, PNM must commit to proposing a robust DR program, in either its upcoming rate case or in its 2020 Energy Efficiency Plan filing, that maximizes the savings to the system. This program must be sized to achieve at least 28 MW in callable DR, as provided in Scenario 1-B, but preferably up to 40 MW of DR. A larger DR program would help ensure that the program can be used to avoid the construction of one gas plant.

Third, the signatories to the Modified Stipulation in Case 13-00390 must agree that any continuing obligation, pursuant to Paragraph 40 of that agreement, by PNM customers to purchase RECs, of any kind or description, in an amount equal to the MWHs produced by 197 MW of SJGS Unit 4 between January 1, 2020 and June 30 2022, is waived.

Fourth, PNM must agree that Commission approval of any scenario, including WRA Scenario 1-B, cannot be interpreted as Commission approval of the battery limitations that the Company included in its resource modeling. In all future cases, batteries will be sized based on the evidence in those resource selection proceeding.

NM AREA BIC 22.

<sup>124</sup> NM AREA BIC 23.

<sup>125</sup> NEE BIC 8-32, 43.

#### **D. Extension of Bids**

PNM presented proposed contracts with the bidders it selected in Scenario 1. The contracts are subject to Commission approval, however, and the Arroyo and Jicarilla contracts included April 30, 2020 deadlines for Commission action.<sup>126</sup>

Pursuant to the Hearing Examiners' bench request of January 31, 2020, PNM asked the bidders for all of the projects under discussion at the January hearings to indicate if they were willing to extend their bids to September 30, 2020 – the deadline under the Public Utility Act and the Commission's rules for it to act on PNM's request for approval of the replacement resources – or, if not, to the latest date they are willing to extend their bids.

Most of the bidders, including the developer of the Jicarilla project, agreed to the extension. The Jicarilla developer said, however, that “the further the date extends from the original April date in the contract, the more pressure it puts on the economics of the project due to the delay.”<sup>127</sup> The developer of the Arroyo project agreed to an extension to July 31, 2020, but only in exchange for an extension fee of \$500,000.

### **V. RECOMMENDATIONS**

#### **A. Legal Standard**

This is the first case in which a utility is proposing generating resources to replace the resources being abandoned by a utility seeking securitization under the ETA. Two legal issues need to be considered.

The first issue is the extent to which the resources proposed to replace the abandoned resources need to be located in the school district in which the abandoned facilities are located.

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<sup>126</sup> Fallgren Dir. 47, 53-54, Exhs. TGF-9, p. 65, TGF-10, p. 60, TGF-11, p. 65, and TGF-12, p. 61 (specifying “Regulatory End Date” of April 30, 2020).

<sup>127</sup> Commission Exh. 13 (Verified Response of Public Service Company of New Mexico to the Hearing Examiners' Jan. 31, 2020 Bench Request).

Some parties argue that the ETA requires only requires “up to” 450 MW be located in the school district. Others argue that the ETA requires that all or the first 450 MW of proposed resources must be located in the school district.

The second issue is what legal standard should be applied to evaluate the approval of the proposed resources if the utility proposes resources located *outside* the school district – in addition to resources *in* the school district. The ETA establishes standards to evaluate the approval of resources proposed to be located in the school district, but the act says nothing about the evaluation of other resources.

### **1. “Up to” 450 MW of replacement resources to be located in the CCSO**

Section 3(A) of the ETA requires a qualifying utility<sup>128</sup> that abandons a qualifying generating facility<sup>129</sup> in New Mexico prior to January 1, 2023, to “no later than one year after approval of the abandonment, apply for commission approval of competitively procured *replacement resources*.”<sup>130</sup> Section 3(F) defines “replacement resources” as follows:

F. As used in this section, “replacement resources” means up to four hundred fifty megawatts of nameplate capacity identified by the qualifying utility as replacement for a qualifying generating facility, and may include energy storage capacity; provided that such resources are located in the

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<sup>128</sup> The ETA defines “qualifying utility” as “a public utility that . . . owns or leases all or a portion of a qualifying generating facility and its successor or assignees.” NMSA 1978, § 62-18-2(T).

<sup>129</sup> The ETA defines “qualifying generating facility” as “a coal-fired generating facility in New Mexico that may be composed of multiple generating units” that:

- (1) has been granted a certificate of public convenience and for which abandonment authority is granted after December 31, 2018;
- (2) is owned or leased, in whole or in part, by a qualifying utility;
- (3) if operated by a qualifying utility prior to the effective date of the Energy Transition Act, is to be abandoned prior to January 1, 2023; and
- (4) if not operated by a qualifying utility prior to the effective date of the Energy Transition Act, is to be abandoned prior to January 1, 2032.

NMSA 1978, § 62-18-2(S).

<sup>130</sup> NMSA 1978, § 62-18-3(A) (emphasis added).

school district in New Mexico where the abandoned facility is located, are necessary to maintain reliable service and are in the public interest as determined by the commission.<sup>131</sup>

This is the first case in which Section 62-18-3 (“Section 3”) of the ETA is being applied, and some of the parties disagree on the extent to which Section 3(F) requires that “replacement resources” must be located in the CCSD.

Most of the parties focus on the first underscored phrase in Section 3(F). They argue that Section 3(F) establishes a maximum number of 450 MW that is required to be located in the affected school district.<sup>132</sup> They believe the language may reflect a legislative intent to benefit the affected school district, but it does not require any particular amount of capacity to be located there – that resources can also be proposed outside the affected school district to replace the abandoned capacity. They argue that up to 450 MW of capacity needs to be located in the CCSD.

For example, PNM asserts “the legislative intent is to allow less than 450 MW of nameplate capacity to be located in the School District. Moreover, nothing in the [ETA] alters the Commission’s existing authority to approve the other resources in PNM Scenario 1 under the Public Utility Act.”<sup>133</sup>

Interwest Energy Alliance contends that “[t]he ETA does not mandate that every replacement resource must be located in the affected school district. Rather, the ETA expressly provides that ‘up to’ 450 MW be located in the school district provided those resources are necessary to maintain reliability and are in the public interest. The phrase ‘up to’ is an important part of this statutory provision and indicates an upper limit or ceiling, not a floor. It is a well-

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<sup>131</sup> NMSA 1978, § 62-18-3(F) (emphasis added).

<sup>132</sup> These parties include PNM, Interwest, Sierra Club, NM AREA, CCAE, CFRE, and WRA.

<sup>133</sup> PNM BIC 7-8.

established canon of statutory construction that words contained in a statute cannot be ‘read out of’ of the statute.”<sup>134</sup>

Sierra Club concludes, “[i]n sum, in this case, the ETA authorizes, but does not require, the Commission to approve up to 450 MW of ‘replacement resources’ (which by definition must be in the CCSD), even if such resources are more expensive than other resources. . . . Nothing in the ETA prohibits the Commission from approving less than 450 as ‘replacement resources’ under Section 3 of the ETA and approving the remainder of a replacement portfolio under non-ETA standards.”<sup>135</sup>

NM AREA thinks the phrase “up to” 450 MW is a “preference” “intended to replace the property tax base that will be lost if SJGS is abandoned and also ceases operations.” NM AREA maintains that the phrase “does not specify any minimum amount of such replacement resources” and that “Section 3.F gives the Commission wide discretion to determine the total number of new resources that should be located in the CCSD.” NM AREA, thus, reasons that the preference is “clearly secondary in nature” to the mandatory provisions of the ETA, such as the stepped increases to the renewable portfolio standard and the ETA’s limits on CO<sub>2</sub> emissions.<sup>136</sup>

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<sup>134</sup> Interwest BIC 15-16.

<sup>135</sup> Sierra Club BIC 11.

<sup>136</sup> NM AREA BIC 8-9. *See also* the following parties’ arguments:

CCAEC: “The statute does not mandate that 450 MW of replacement resources be located in the school district; rather it describes those resources that qualify as ‘Replacement Resources’ subject to the special approval criteria in §62-18-3 and avoiding the typical ‘least-cost’ analysis. . . . The actual amount of ‘Replacement Resources’ is to be determined by the Commission, which ‘shall’ prefer resources ‘with the least environmental impacts, those with higher ratios of capital costs to fuel costs and those able to reduce the cost of reclamation and use for lands previously mined within the county of the qualifying generating facility.’”

CCAEC BIC 4-5.

CFRE: “The language of NMSA 1978, 62-18-3(F) is ambiguous in that ‘replacement resources’ means *up to* four hundred fifty megawatts of nameplate capacity;’ therefore, PNM has the flexibility to locate any amount between 0 and 450 megawatts within the school district.”

(Cont’d on next page)



The SJC Entities, on the other hand, focus intently on the second underscored phrase. The SJC Entities argue that “[u]nder the requirements of Section 62-18-3 of the ETA, the first 450 megawatts of replacement resources must be located in the CCSD. Any additional resources exceeding the 450 MW-in-the-CCSD threshold are not replacement resources and can be located wherever PNM chooses (e.g., where low cost is more pertinent than location).”<sup>137</sup> “Under the law, PNM cannot locate any resources connected to the abandonment of the SJGS outside of the CCSD until PNM has first committed to locating up to 450 MW of replacement resources in the CCSD.”<sup>138</sup>

Westmoreland claims that “[p]lainly, the legislature intended for this definition to have some meaningful benefit for CCSD. It would therefore be disingenuous and would thwart statutory intent to claim that locating zero MW of the replacement resources in CCSD constitutes ‘up to 450 MW’ under this definition. . . . Westmoreland believes that the best interpretation of this definition is to read the phrase ‘up to 450 MW’ as referencing the total number of replacement MWs that can be approved – not how many of those MWs must be located in CCSD. In other

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CFRE BIC 6-7 (emphasis in original).

WRA: “The ETA specifically defines ‘replacement resources’ as up to 450 MW of nameplate capacity identified by the qualifying utility, which may include energy storage, and must be located in the school district of the abandoned plant which is being replaced. The replacement resources in PNM’s Scenario 1, the Piñon Gas Plant (7-LM6000s), located in the CCSD meets that definition, but is not optimal.”

WRA BIC 14.

<sup>137</sup> SJC Entities BIC 7.

<sup>138</sup> SJC Entities BIC 12-13. Staff notes that the ETA defines “replacement resources” as resources “located in the school district in New Mexico where the abandoned facility is located” but does not specifically address the meaning of the phrase “up to” 450 MW of replacement resources. Staff’s support of PNM Scenario 2, which includes only resources proposed for the CCSD (i.e., 400 MW of gas turbines and a 100 MW/30 MW solar/battery hybrid resource), might suggest that Staff also supports the view that the phrase requires all, or at least, 450 MW of replacement capacity be located in the CCSD. Staff BIC 6, 9.

words, the best reading appears to be that all replacement resources must be located in CCSD, and ‘up to four hundred fifty megawatts’ may be approved in total.”<sup>139</sup>

The Hearing Examiners find that, although less than precisely drafted, Section 3(F) should be interpreted as requiring a maximum of 450 MW of resources to be located in the school district in which the abandonment of a qualifying generating facility is approved. It is a fundamental rule of statutory interpretation that statutes need to be interpreted to give effect to all the words in the sections at issue.<sup>140</sup> The words “up to” 450 MW do not mean all, and they do not mean the first 450 MW. They indicate a maximum amount to be required under Section 3 and that an amount less than 450 MW will also qualify as replacement resources.<sup>141</sup>

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<sup>139</sup> Westmoreland BIC 3. Westmoreland asks that the Commission approve the Arroyo and Jicarilla projects but delay approval of the Piñon gas units until July 2021, leaving an opportunity for a potential PPA with Enchant:

Importantly, Westmoreland is not opposing approval of the Arroyo or Jicarilla projects, which have timing constraints associated with qualifying for federal tax credits that could be ‘make-or-break’ for project economics. Westmoreland believes that these low-cost resources, which were not opposed by any party to the case, can be coupled with some form of dispatchable capacity –whether gas, the CCUS Project, or some combination of the two--to create a viable and cost-effective portfolio that satisfies the ETA. Westmoreland asks that the Commission approve these solar resources, but delay approval of any of the Pinion gas units until July 2021.

Westmoreland BIC 2.

<sup>140</sup> See, e.g., *In the Matter of Southwestern Public Service Company’s Application for: (1) Authorization to Establish the Voluntary Solar\*Connect Community Program (“Solar\*Connect”) and Enter into a Purchased Power Agreement for the Purchase of 1.98 MW of Nominal Solar Capacity and Associated Energy for Solar\*Connect; (2) Approval of the Proposed Methodology for Calculating and Annually Adjusting the Solar\*Connect Rate; and (3) Authorization to Flow Through all Solar\*Connect Costs and Revenues through the Solar\*Connect Rider and its Fuel and Purchased Power Cost Adjustment Clause*, Case No. 18-00308-UT, Recommended Decision (Aug. 21, 2019), at 37 (citing *Benavidez v. Sierra Blanca Motors*, 1996-NMSC-045, ¶ 18, 122 N.M. 209, 213,922 P.2d 1205, 1209 for the rule of statutory construction that when several statutes relate to the same subject matter, the courts and also the Commission will, if possible, construe them so as to give effect to every relevant provision.).

<sup>141</sup> Although the issue is not raised by any of the parties’ proposals, Section 3 of the ETA does not appear to establish a hard cap on the amount of resources that can be located in the school district. What Section 3 does establish are standards for the first 450 MW of “replacement resources” [i.e., those defined in Section 62-18-3(F)] to be located in the school district where the abandoned facility is situated.

Assuredly, if the legislature intended to require that 450 MWs of capacity be located in the CCSD, it could have said so. Similarly, if the legislature intended to require that most or some portion of the 450 MW be located in the CCSD, it could have said so.

## **2. Legal Standards to approve resources located inside and outside the CCSD**

PNM's ownership share of San Juan Units 1 and 4 totals 562 MW.<sup>142</sup> PNM and the other parties do not propose to replace that share or any part of the 450 MW referenced in Section 3 of the ETA with a single generating resource. Most parties propose portfolios that include some resources inside the CCSD and some outside the CCSD. Only Staff and the SJC Entities propose that all of the resources replacing the abandoned units be located in the CCSD.

Section 3 defines criteria to evaluate the approval of replacement resources proposed to be located in the CCSD under Subsection 3(F), but it is not clear what standards should be applied to resources to be located outside the CCSD or whether the entire portfolio of multiple resources located inside and outside the CCSD should be evaluated under, or held to, the same standards.

Most parties argue that resources that do not meet the Section 3 criteria should be evaluated and approved under the traditional non-ETA standards under the Public Utility Act. They argue that the standards in Section 3 apply only to the capacity located in the school district and that the traditional standards in the Public Utility Act that apply to CCNs and PPAs should apply to the resources not located in the CCSD.

For a traditional utility plant addition, the Public Utility Act requires public utilities to obtain a CCN before constructing or operating any new public utility plant or system.<sup>143</sup> In determining whether to issue a CCN, the Commission must consider whether the new public utility

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<sup>142</sup> PNM's agreement in Case No. 13-00390-UT to not seek cost recovery for the additional 65 MW in Unit 4 that PNM acquired as non-jurisdictional merchant plant in that case dictates that PNM's interest subject to cost recovery is reduced to 497 MW.

<sup>143</sup> NMSA 1978, § 62-9-1(A).

plant or system is consistent with the public convenience and necessity.<sup>144</sup> The “public convenience and necessity” standard implies a net public benefit.<sup>145</sup> The utility applicant has the burden to show that the resource it proposes is the most cost effective resource among feasible alternatives.<sup>146</sup>

The standard for review and approval of long-term PPAs such as those at issue is a modified version of the “public convenience and necessity” standard for CCNs based on the application of Rule 17.9.551 NMAC (“Rule 551”).<sup>147</sup> Rule 551 provides the opportunity for a full evaluation of the need and reasonableness of a long-term PPA. The utility must demonstrate that the long-term PPA is needed and will provide net benefits to customers over the duration of the

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<sup>144</sup> NMSA 1978, §§ 62-9-1(A) and 62-9-6.

<sup>145</sup> See e.g., *Re Alto Lakes Water Corporation*, Recommended Decision, Case No. 07-00398-UT (Feb. 6, 2008) at 6, *approved in* Final Order (Feb. 14, 2008); *Re Valle Vista Water Co. Inc.*, Recommended Decision, Case No. 3571 (Mar. 18, 2001) at 6-7, *approved in* Final Order (June 19, 2001); *Re Southwestern Public Service Co.*, Corrected Recommended Decision, Case No. 2678, (Nov. 25, 1996) at 19-20, *approved in* Final Order (Jan. 28, 1997). See also *New Energy Econ. v. N.M. Pub. Regulation Comm’n*, 2018-NMSC-024, ¶ 14, 416 P.3d 277 (“The PRC has interpreted the ‘public convenience and necessity’ to entail a net public benefit.”).

<sup>146</sup> See Corrected Recommended Decision, Case No. 15-00261-UT (Aug. 15, 2016) at 89, 96-99, *approved in* Final Order Partially Adopting Corrected Recommended Decision (Sept. 28, 2016); Final Order, Case No. 13-00390-UT (Dec. 16, 2015) at 5-11; Order Partially Granting PNM Motion to Vacate and Addressing Joint Motion to Dismiss, Case No. 15-00205-UT (Dec. 22, 2015) at 10-11; In *Re Public Service Company of New Mexico*, Case No. 2382, 166 P.U.R. 4th 318, 337, 355-356 (1995).

<sup>147</sup> See *In the Matter of Southwestern Public Service Company’s Application for Approval and Authority to: (1) Enter into Separate Purchased Power Agreements with NextEra Energy Resources’ Roswell and Chaves County Solar Facilities; (2) Recover the Associated Energy Costs through its Fuel and Purchased Power Cost Adjustment Clause; and (3) Establish and Implement a Shared Savings Mechanism*, Case No. 15-00083-UT, Recommended Decision (Sept. 21, 2015) at 24-25, *adopted by* Final Order (Oct. 7, 2015).

The Commission adopted Rule 551 (entitled “Prior Approval of Purchased Power Agreements”) in 2012 to govern the Commission’s review and approval of long-term PPAs. Long-term PPAs are defined as purchased power agreements with a term of five years or more for which the utility requests, or intends to request, cost recovery from its New Mexico customers (Rule 551.7(E)). Rule 551, among other things: (1) establishes a prior approval requirement as a prerequisite for an electric utility to enter into long-term PPAs (Rule 551.8(A)); (2) provides filing requirements and criteria for evaluating the reasonableness of long-term PPAs (Rule 551.8); (3) allows recovery of energy costs incurred under approved long-term PPAs through a utility’s fuel clause (Rule 551.9(A)(1)); (4) allows recovery of capacity costs and fixed costs incurred under a PPA, as well energy costs incurred by a utility without an approved FPPCAC through base rates if approved by the Commission Rule 551.9(A)(2); (5) allows a the electric utility applicant to request that the commission determine other ratemaking treatment to apply to the long-term PPA (Rule 551.9(B)); and (6) establishes deadlines for approving long-term PPAs (Rule 551.10).

agreement.<sup>148</sup> In adopting the Rule 551 in Case No. 09-00413-UT, the Commission contemplated a review and approval process for long-term PPAs similar to the CCN approval requirements established by Section 62-9-1 of the PUA, stating that the rule is intended to:

. . . consider in advance the reasonableness of a proposed long-term commitment to a resource category in a fashion similar to what is currently required for a self-build or loaned option (the Certificate of Convenience and Necessity (CCN) process).<sup>149</sup>

The rule, in particular, requires that the utility submit evidence that the PPA “is consistent with the provision of safe and reliable electric utility service at the lowest *reasonable* cost, considering both short and long-term costs and all other relevant factors.”<sup>150</sup>

As discussed above, however, “replacement resources” are limited to resources located in the school district in New Mexico where the abandoned facility is located, are necessary to maintain reliable service, and are in the public interest as determined by the Commission.<sup>151</sup> Nevertheless, within that limited group of replacement resources, Section 3 of the ETA authorizes the consideration of factors in addition to cost. Subsection 3(B) states that the Commission “shall prefer resources with the least environmental impacts, those with higher ratios of capital costs to fuel costs and those able to reduce the cost of reclamation and use for lands previously mined within the county of the qualifying generating facility.”<sup>152</sup> Subsections 3(A)<sup>153</sup> and 3(C)<sup>154</sup> do not

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<sup>148</sup> Recommended Decision, Case No. 15-00083-UT, at 24.

<sup>149</sup> See *id.* at 21 (quoting *In the Matter of a Notice of Proposed Rulemaking Regarding Commission Review and Approval of Certain Long-term Purchased Power Agreements*, Case No. 09-00413-UT, Final Order Adopting Rule, Findings and Conclusions No. 9 (Jul. 3, 2012) at 3.).

<sup>150</sup> 17.9.551.8(D)(6) NMAC (emphasis added.).

<sup>151</sup> NMSA 1978, § 62-18-3(F).

<sup>152</sup> NMSA 1978, § 62-18-3(B).

<sup>153</sup> Subsection 3(A) states that, “as part of that competitive procurement and in addition to the criteria set forth in Subsections B and C of this section, projects shall be ranked based on their cost, economic development opportunity and ability to provide jobs with comparable pay and benefits to those lost due to the abandonment of a qualifying generating facility.” NMSA 1978, § 62-18-3(A). SWG and others argue that all of the factors mentioned need to be considered in the Commission’s evaluation of a project. SWG BIC 42-43.

explicitly establish preferences, but they permit the consideration of cost, economic development opportunity, the ability to provide jobs with comparable pay and benefits to those lost due to the abandonment of a qualifying generating facility, and the use of workers residing in New Mexico to the greatest extent practicable. Subsection 3(D) provides that the Commission may reject the replacement resource proposed by the qualifying utility and approve as “alternative replacement resource” as long as the alternative replacement resource meets the conditions of Section 3.<sup>155</sup>

Thus, if the Commission determines that one or more alternatives to a “replacement resource” proposed by PNM should be approved, the alternative resources must be located in the CCSD *and* must be found by the Commission to be ‘necessary to maintain reliable service’ and ‘in the public interest.’<sup>156</sup> Subsection 3(D) further suggests that the focus on least cost under the traditional CCN analysis does not apply under the ETA: “The commission shall not disallow recovery of reasonable costs associated with requirements as to where the resources are located.”<sup>157</sup>

Parties such as WRA, SWG, and PNM assert that a broader, more flexible standard should be applied to the entire portfolio. WRA believes the Commission should consider not only the particular criteria in Section 3 of the ETA but also the traditional standards under the Public Utility Act. The Commission should approve the resource portfolio scenario that provides the greatest net public benefit, WRA suggests, taking into consideration the ETA’s particular criteria for

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<sup>154</sup> Subsection 3(C) states that “[i]n considering responses to requests for proposals for replacement resources pursuant to this section, the qualifying utility shall inform prospective bidders that it promotes and encourages the use of workers residing in New Mexico to the greatest extent practicable and shall take that use into consideration in evaluating proposals.” NMSA 1978, § 62-18-3(C).

<sup>155</sup> NMSA 1978, § 62-18-3(D).

<sup>156</sup> See SWG BIC 12-13 (emphasis in original).

<sup>157</sup> NMSA 1978, § 62-18-3(D).

replacement resources and also the broader public interest mandate under the traditional standards.<sup>158</sup>

WRA reads the provisions of the ETA as being in addition to the standards that existed prior to enactment of the new law. The ETA does not change PNM's responsibility to provide reliable service. Lowest cost, however, is only one criterion among many that the Commission should consider in evaluating resources. The standard is broader than lowest cost but still encompasses lowest *reasonable* cost,<sup>159</sup> since the term "reasonable" would take into consideration the particular criteria in Section 3 and the traditional criteria. Reliability, economic and environmental impacts, risk, and other features all must be balanced in determining an outcome that is in the public interest.<sup>160</sup>

WRA asserts that a portfolio of resources required to maintain service when SJGS is abandoned should be evaluated by whether it provides up to 450 MW of "replacement resources" in the school district, while also minimizing environmental impacts, and expected costs and risks, including those associated with environmental impacts. WRA contends that the balance is necessarily subjective and provides the Commission reasonable discretion to advance the public interest.<sup>161</sup>

SWG argues that "although Section 3.A of the ETA requires that a 'qualifying utility' rank proposed projects 'based on their cost,' Sections 3.B and 3.F of the ETA include other ranking criteria that are not tied to a 'lowest cost' or 'most cost-effective' test or standard. Those criteria include 'economic development opportunity and ability to provide jobs with comparable pay and

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<sup>158</sup> WRA BIC 8.

<sup>159</sup> For example, PPA approval requires evidence that the PPA "is consistent with the provision of safe and reliable electric utility service at the lowest *reasonable* cost, considering both short and long-term costs and all other relevant factors." 17.9.551.8(D)(6) NMAC (emphasis added).

<sup>160</sup> WRA BIC 9.

<sup>161</sup> WRA BIC 9-10.

benefits to those lost due to the abandonment of a qualifying generating facility, an environmental preference (for ‘resources with the least environmental impacts’) and the location (CCSD) of alternative replacement resources determined by the Commission.”<sup>162</sup>

PNM states that the traditional resource planning standards have centered on the provision of low-cost and reliable electric service.<sup>163</sup> PNM submits that the traditional resource planning norms have not been supplanted, but with regard to replacement resources for retired coal plants, they are informed by the new overlay of the ETA, which adds other criteria for the Commission to consider in maintaining low-cost, reliable resources to serve PNM customers.<sup>164</sup>

PNM points out that the ETA adds criteria relating to environmental attributes, ultimately leading to a carbon-free mandate by 2045. The act also contains preferences for locating resources in the CCSD and for use of New Mexico labor. PNM posits that the overlay of the ETA on traditional standards retains the regulatory focus on reliability and cost, but, all things being equal, Section 3 allows the Commission to also weigh the additional factors introduced by the ETA to select specific resources. However, the Commission may also favor alternative resources located in the School District, even when more costly, so long as reliable service is maintained and is in the public interest as determined by the Commission.<sup>165</sup>

No party proposes to satisfy the deficit in PNM’s portfolio created by the abandonment of San Juan Units 1 and 4 with a single resource. The parties propose a combination of resources as an integrated portfolio. Each resource has a purpose within the whole. And since most of the proposed portfolios include an historically large amount of capacity from renewable resources,

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<sup>162</sup> SWG BIC 42-43.

<sup>163</sup> PNM BIC 4 (*citing* 17.7.3.6 NMAC).

<sup>164</sup> PNM notes that NMSA 1978, § 62-18-3(F) retains the traditional requirements that utility generation resources must “maintain reliable service” and be “in the public interest.” PNM BIC 14, n.54.

<sup>165</sup> PNM BIC 4 (*citing* NMSA 1978, § 62-18-3(D)).



each portfolio includes a quick-start natural gas or battery resource to compensate for the intermittent generation of the renewable resource.

Historically, utilities have asked the Commission for approvals (either CCN or PPA) one resource at a time, and the standards that have been developed over time have focused on the characteristics of the single resource at issue. The record, here, however, indicates that any one of the resources proposed as part of a portfolio might not be the preferred selection (i.e., the most cost-effective resource among reasonable alternatives) if viewed in isolation under the traditional analyses. But the resource might form a part of the most cost-effective portfolio if considered as a whole under the traditional analyses. Or the resource might form a part of the preferred portfolio when considering both the traditional analyses and the variety of additional factors in Section 3 of the ETA.

The Hearing Examiners, accordingly, recommend that the resources proposed here be evaluated as a portfolio and not as separate resources and that the factors considered include the factors under both the traditional analyses and Section 3 of the ETA. The consideration will require a balancing of interests which will involve policy judgments. Overall, the portfolio should provide a net public benefit, but the standards in Section 3 should be considered and might outweigh the most cost-effective resource focus of the traditional standards. Consequently, the individual resources proposed outside the CCSD need not be the most cost-effective if they are elements of an integrated portfolio that satisfies the standards in Section 3.<sup>166</sup> Similarly, the entire

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<sup>166</sup> The Hearing Examiners also note the amendment in Senate Bill 489 to the CCN section of the Public Utility Act that favors utility ownership of storage facilities. The amendment added subsection D to Section 62-9-1, which set forth standards for the approval of energy storage systems, including a provision apparently preferring systems that provide the utility with, as emphasized below, “the discretion . . . to . . . maintain” the systems:

D. In an application for a certificate of public convenience and necessity for an energy storage system, the commission shall approve energy storage systems that:

(1) reduce costs to ratepayers by avoiding or deferring the need for investment in new generation and for upgrades to systems for the transmission and distribution of energy;

*(Cont'd on next page)*

portfolio of proposed resources also need not be the most cost-effective of feasible portfolios if they satisfy the standards in Section 3.

## **B. Gas versus no gas portfolios**

### **1. Choice of resources to back up renewables**

Each party recommends a combination (i.e., portfolio) of resources to replace the capacity abandoned at the San Juan generating station. Each of the portfolios includes two types of resources: (1) a large amount of solar generation as a renewable resource and (2) varying amounts of natural gas and/or battery resources to back up and support the intermittency of the renewable resources. The parties are not at odds over the type of renewable resource to be included in the replacement resource portfolio. All propose a significant amount of solar resources. Except for Staff and the SJC Entities, all interested parties propose the 300 MW and 50 MW solar resources from the Arroyo and Jicarilla projects. Staff and the SJC Entities emphasis is on the construction of seven natural gas units on the San Juan site, but they, too, propose a significant solar resource (100 MW) that is combined with a 30 MW battery in PNM's alternative Scenario 2.

The primary disagreement among parties concerns the type and amount of the backup resources. PNM and WRA propose a combination of natural gas and battery resources. CCAE

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(2) reduce the use of fossil fuels for meeting demand during peak load periods and for providing ancillary services;

(3) assist with ensuring grid reliability, including transmission and distribution system stability, while integrating sources of renewable energy into the grid;

(4) support diversification of energy resources and enhance grid security;

(5) reduce greenhouse gases and other air pollutants resulting from power generation;

(6) provide the public utility with the *discretion*, subject to applicable laws and rules, to operate, *maintain* and control energy storage systems so as to ensure reliable and efficient service to customers; and

(7) are the most cost effective among feasible alternatives.

NMSA 1978, §62-9-1(D) (emphasis added). The Hearing Examiners find that, in a replacement resource proceeding under the ETA, the standards in Subsection D do not supersede the standards in the ETA but need to be balanced in conjunction with the ETA factors in the same manner as the other traditional standards for CCN approval.

and Sierra Club propose only battery resources, although Sierra Club also presents a “less gas” alternative if the Commission opts for natural gas as a backup. Staff’s and the SJC Entities’ preference for PNM Scenario 2 includes natural gas as a peaking and backup resource generally for PNM’s entire system (including the 100 MW solar project in Scenario 2). It also includes the 30 MW battery unit included in the hybrid 100 MW solar/30 MW battery project.

The Hearing Examiners conduct an analysis and recommendation below of how the various factors outlined in the ETA and the Public Utility Act can be balanced based upon the evidence presented, but the final decision on how the factors should be balanced will entail a policy decision that is more appropriate for the Commission. The Hearing Examiners leave that decision for the Commission. The Hearing Examiners make separate and more definitive recommendations on the portfolios to be approved depending on the Commission’s policy choice.

## **2. Backup resources – natural gas and battery storage vs. battery storage only**

### **a. Location in the CCSD**

Subsection 3(A) of the ETA requires a qualifying utility that abandons a qualifying generating facility in New Mexico prior to January 1, 2023 to no later than one year after approval of the abandonment, apply for commission approval of competitively procured replacement resources.<sup>167</sup> Subsection 3(F), as noted earlier, requires that up to 450 MW of replacement resources be located in the school district where the abandoned facility is located, provided that the resources are necessary to maintain reliable service and are in the public interest as determined by the commission.<sup>168</sup>

The following tables show the amount of investment in the CCSD that would result with each of the recommended portfolios. They indicate that PNM Scenario 2 (with gas turbines) and

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<sup>167</sup> NMSA 1978, § 62-18-3(A).

<sup>168</sup> NMSA 1978, § 62-18-3(F).

the CCAE portfolios 1 and 2 (with no gas turbines) place substantially more investment (\$425 to \$485) in the CCSD than the other portfolios:

**Portfolios with natural gas turbines  
(Underscored resources are in the CCSD)**

<b>Proposed Portfolio</b>	<b>Resources</b>	<b>MWs and Investment in CCSD (\$M)</b>
<b>PNM Scenario 1</b>	<u>280 MW gas (7 units) (Piñon)</u> 350 MW solar (Arroyo & Jicarilla) 60 MW battery (Arroyo & Jicarilla) 70 MW battery (Sandia & Zamora)	280 MW \$189
<b>PNM Scenario 2</b>	<u>440 MW gas (11 units) (Piñon)</u> <u>100 MW solar (Bidder #5)</u> <u>30 MW battery (Bidder #5)</u>	570 MW \$425 to \$485
<b>WRA 1-A</b>	<u>240 MW gas (6 units) (Piñon)</u> <u>100 MW solar (Bidder #5)</u> <u>30 MW battery (Bidder #5)</u> 350 MW solar (Bidder #5) (Arroyo & Jicarilla) 60 MW battery (Arroyo & Jicarilla) 70 MW battery (Sandia & Zamora)	370 MW \$322
<b>WRA 1-B &amp; other WRA scenarios with 5 gas units</b>	<u>200 MW gas (5 units) (Piñon)</u> <u>100 MW solar (Bidder #5)</u> <u>30 MW battery (Bidder #5)</u> 350 MW solar (Arroyo & Jicarilla) 60 MW battery (Arroyo & Jicarilla) 70 MW battery (Sandia & Zamora) 15 MW energy efficiency 28 MW demand response	330 MW \$295
<b>WRA (4 gas units)</b>	<u>160 MW gas (4 units) (Piñon)</u> <u>100 MW solar (Bidder #5)</u> <u>30 MW battery (Bidder #5)</u> 350 MW solar (Arroyo & Jicarilla) 60 MW battery (Arroyo & Jicarilla) 70 MW battery (Sandia & Zamora) 15 MW energy efficiency 28 MW demand response	290 MW \$268
<b>Sierra Club Tier 2-4</b>	<u>200 MW gas (5 units) (Piñon)</u> 350 MW solar (Arroyo & Jicarilla) 170 MW battery (Arroyo & Jicarilla) 40 MW battery (Bidder #12) (Bernalillo)	200 MW \$156
<b>Sierra Club Tier 2-6</b>	<u>200 MW gas (5 units) (Piñon)</u> 350 MW solar (Arroyo & Jicarilla) 170 MW battery (Arroyo & Jicarilla) 150 MW solar (Hybrid Project #1) (Rio Arriba) 40 MW battery (Hybrid Project #1) (Rio Arriba)	200 MW \$156

**Portfolios *without* natural gas turbines**

<b>Proposed Portfolio</b>	<b>Resources</b>	<b>MW and Investment in CCSD (\$M)</b>
<b>Sierra Club (SC 15)</b>	350 MW solar (Arroyo & Jicarilla) 170 MW battery (Arroyo & Jicarilla) 150 MW solar (Hybrid Project #1) (Rio Arriba) 40 MW battery (Hybrid Project #1) (Rio Arriba) 100 MW battery (ES Rio Puerco 1) (Rio Rancho) 100 MW battery (ES West Mesa) (Bernalillo) 40 MW battery (Bidder 9 Reeves) (Rio Rancho)	0 MW \$0
<b>CCAIE 1</b>	<u>200 MW solar (Bidder #2)</u> <u>100 MW battery (Bidder #2)</u> <u>100 MW solar (Bidder #5)</u> <u>30 MW battery (Bidder #5)</u> 350 MW solar (Arroyo & Jicarilla) 170 MW battery (Arroyo & Jicarilla) 24 MW demand response	430 MW \$447
<b>CCAIE 2</b>	<u>200 MW solar (Bidder #2)</u> <u>100 MW battery (Bidder #2)</u> <u>100 MW solar (Bidder #5)</u> <u>30 MW battery (Bidder #5)</u> 350 MW solar (Arroyo & Jicarilla) 100 MW battery (Arroyo & Jicarilla) * 70 MW battery (Sandia & Zamora) * 24 MW demand response	430 MW \$447

\* Reduces Arroyo battery from 150 MW to 80 MW and adds the 40 MW Sandia and 30 MW batteries

Warren Unsicker, the City of Farmington’s Director of Economic Development & Outdoor Recreation Initiative, attached to his testimony a Fiscal Impact Report (FIR) prepared for the New Mexico Legislature during its consideration of the ETA. The FIR cited a 2019 study that found that the closure of San Juan Units 1 and 4 and the associated mine would result in a loss of \$3.5 million in annual property tax revenues for the CCSD, approximately 49% of the school district’s property tax revenues and 4.1% of its total annual revenues.<sup>169</sup>

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<sup>169</sup> The 2019 study found that the closure would result in a loss of about 450 jobs, \$3.2 million in property tax revenues for San Juan County (4.1% of the County’s total annual property tax revenues and 3.2% of its total annual revenues), \$3.5 million in property tax revenues for the CCSD (49% of the district’s total annual property tax revenues and 4.1% of its total annual revenues) and \$1.9 million for San Juan Community College (11% of the college’s total annual property tax revenues and 2.6% of its total annual revenues). SJ/Farmington Exh. 1, Unsicker Dir., Exh. WU-2, Legislative Finance Committee, Fiscal Impact Report, “Energy Transition Act,” p. 3.

PNM states that Scenario 1 provides for an approximate 50% replacement of the tax base within the CCSD.<sup>170</sup> PNM estimates that the resources in Scenario 1 that it proposes to locate in the CCSD will generate \$1.5 to \$1.75 million of the \$3.2 million in annual property tax revenues and that Scenario 2 would generate \$3.25 to \$3.75 million.<sup>171</sup>

**b. Economic development opportunity and ability to provide jobs with comparable pay and benefits to those lost due to the abandonment of a qualifying generating facility**

Section 3(A) of the ETA states that, as part of the competitive procurement required of a qualifying utility proposing replacement resources, the utility should rank projects based on their cost, economic development opportunity and ability to provide jobs with comparable pay and benefits to those lost due to the abandonment of a qualifying generating facility. Unlike Section 3(B) of the ETA, however, Section 3(A) does not establish economic development opportunity and ability to provide jobs with comparable pay and benefits as factors to receive preference in the Commission's decision-making.

PNM and most of the parties said they were intending to maximize the location of resources within the CCSD, as just discussed. PNM, however, went further and described the economic impact of its proposed Scenario 1 within the CCSD and a 100-mile radius of the CCSD.<sup>172</sup> The Arroyo and Jicarilla projects are located outside the CCSD but are within the 100-mile radius. The Arroyo project is estimated to include \$360 million of capital investment (with

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<sup>170</sup> Mr. Fallgren stated that Scenario 1 results in almost \$730 million in capital investments and an estimated 1,145 construction jobs across New Mexico in the form of both vendor-supplied and utility-owned resources. Fallgren Dir. 12 (Corrected).

<sup>171</sup> Staff Exh. 8 (Eschberger Dir.) 14, Table BSE-7, *citing* PNM's response to a Staff discovery request.

<sup>172</sup> Section 16 of the ETA establishes three funds – the Energy Transition Indian Affairs Fund, the Energy Transition Economic Development Assistance Fund, and Energy Transition Displaced Worker Assistance Fund to assist “affected communities.” “Affected communities” are defined as a New Mexico county located within 100 miles of a New Mexico facility producing electricity that closes, resulting in at least 40 displaced workers. NMSA 1978, § 62-18-16(L)(1).

the 40 MW battery limit) in McKinley County and \$70 million of capital investment in the Jicarilla Apache reservation in Rio Arriba County.

All of the proposed portfolios, except PNM Scenario 2, would include this \$430 million of additional capital investment. The CCAE and Sierra Club portfolios would likely include an additional substantial amount of capital investment in excess of the \$430 million to increase the size of the Arroyo battery project from 40 MW to 150 MW.

#### **Portfolios with natural gas turbines**

<b>Proposed Portfolio</b>	<b>Investment in CCSD (\$M)</b>	<b>Investment in McKinley &amp; Rio Arriba Counties (\$M)</b>	<b>Total CCSD &amp; McKinley &amp; Rio Arriba Counties (\$M)</b>
<b>PNM Scenario 1</b>	\$189	\$430	\$619
<b>PNM Scenario 2</b>	\$425 to \$485	--	\$425 to \$485
<b>WRA 1-A</b>	\$322	\$430	\$752
<b>WRA 1-B &amp; other WRA scenarios with 5 gas units</b>	\$295	\$430	\$725
<b>WRA (4 gas units)</b>	\$268	\$430	\$698
<b>Sierra Club Tier 2-4</b>	\$156	> \$430*	> \$586*
<b>Sierra Club Tier 2-6</b>	\$156	> \$430*	> \$586*

\* Capital investment for 150 MW Arroyo battery would exceed \$430 M estimate provided by PNM for 40 MW Arroyo battery. No estimate was provided for the 150 MW unit.

#### **Portfolios *without* natural gas turbines**

<b>Proposed Portfolio</b>	<b>Investment in CCSD (\$M)</b>	<b>Investment in McKinley &amp; Rio Arriba Counties (\$M)</b>	<b>Total CCSD &amp; McKinley &amp; Rio Arriba Counties (\$M)</b>
<b>Sierra Club (SC 15)</b>	\$0	> \$430*	> \$430*
<b>CCAЕ 1</b>	\$447	> \$430*	> \$877*
<b>CCAЕ 2</b>	\$447	> \$430*	> \$877*

\* Capital investment for 150 MW Arroyo battery would exceed \$430 M estimate provided by PNM for 40 MW Arroyo battery. No estimate was provided for the 150 MW unit.

All of the replacement portfolios would provide substantial numbers of construction jobs, with the estimated number increasing with the dollar value of the project. For example, PNM estimated 200 construction jobs for the \$70 million Jicarilla project, 225 construction jobs for its proposed \$189.9 million Piñon gas project, and 500 construction jobs for the Arroyo project.<sup>173</sup>

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<sup>173</sup> Fallgren Dir. 12, Table TGF-3 (Corrected).

Unfortunately, none of the proposed resources would provide a substantial number of long-term jobs. None of the resources is estimated to provide more than 10 long-term jobs.<sup>174</sup>

The SJC Entities, on the other hand, favor the conversion of the San Juan facility into the CCUS project. They cite the estimated \$1.2 billion of capital costs the project would provide in the CCSD and the saving of approximately 400 remaining jobs at the generating station and mine.<sup>175</sup> The developers of the CCUS project, however, are still studying the feasibility of the project and have not been able to submit a proposal for PNM's RFP and had not, at the time of the hearing, been able to describe a potential PPA proposal they might eventually make to PNM upon the completion of the feasibility study.

The Community Groups provided the testimony of Michael Eisenfeld, Energy and Climate Program Manager of the San Juan Citizens Alliance, who testified about the importance of diversifying the economy in the Four Corners area and transitioning away from the fossil fuel industry. Eisenfeld cited the City of Farmington's efforts to market the city as a recreation destination using a "Jolt Your Journey" campaign. He said continuing to build large-scale fossil fuel projects constrains the greater economic benefits in the region that could be attained by cleaner, sustainable, diversified economic approaches for job creation, community reliance and growth.<sup>176</sup>

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<sup>174</sup> Fallgren Dir. 12, Table TGF-3 (Corrected).

<sup>175</sup> PNM witness Ronald Darnell, testified that, as of July 1, 2019, there were approximately 200 PNM employees at the generating station and that, after attrition through June 2022, there would be 168 PNM employees and 12 PNM Resources service employees eligible for severance payments. Mr. Darnell also testified that there were 242 coal mine employees as of July 1, 2019 and that all but 57 employees required for extended reclamation activities would be eligible for severance payments. PNM Exh. 2 (Darnell Dir.) 20-21. In his direct testimony, Steve Pierro, General Manager of the mine, stated there were 273 full-time employees at the mine. Westmoreland Exh. 2 (Pierro Dir.) 2. Pierro said the mine employed about 450 workers in the 2014-2015 period prior to the shutdown of San Juan Units 2 and 3. Tr. (Pierro) 836.

<sup>176</sup> Community Groups Exh. 3 (Eisenfeld Reb.) 12. Eisenfeld also cited the funding for economic development provided by the ETA. Eisenfeld Reb. 13-14.



The Community Groups presented similar testimony in Case No. 19-00018-UT of Kelly O'Donnell, a Ph.D., a researcher and professor at the University of New Mexico. Dr. O'Donnell testified that research comparing western counties that were economically dependent on fossil fuel extraction to western counties with more diverse economies found that energy-dependent counties lagged comparison counties on key economic measures, including real personal income, employment, and population. She asserted that investments in quality of life are key to sustainable economic development. Regions with high quality of life are better able to attract and retain residents, businesses, and tourism dollars.<sup>177</sup>

Dr. O'Donnell postulated that instead of investing millions of dollars attempting to resuscitate the region's coal industry, Northwest New Mexico should aggressively pursue an economic development strategy that leverages local assets and prioritizes quality of life, with a focus on three key areas: tourism and recreation, solar power generation and storage, and mine reclamation/plant decommissioning. O'Donnell said the Four Corners region is an ideal location for outdoor recreation and agritourism. She cited Chaco Canyon, Mesa Verde National Park, Navajo State Park, Monument Valley Tribal Park, Canyon De Chelly National Monument, Glen Canyon National Recreational Area, and the Grand Canyon.<sup>178</sup>

Dr. O'Donnell further said existing transmission capacity and high solar values position Northwest New Mexico to serve as a major producer and exporter of solar electricity. She claimed San Juan County is an excellent site for a commercial scale energy storage facility to serve as a trading hub for southwest utilities. She acknowledged that solar jobs do not typically pay as well

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<sup>177</sup> Community Groups Exh. 1 (O'Donnell Dir.) 5-6.

<sup>178</sup> O'Donnell Dir. 6-7.

as coal jobs, particularly for workers with only a high school diploma, but they are in high demand.<sup>179</sup>

Dr. O'Donnell also said coal mine reclamation and plant decommissioning have the potential to improve environmental quality, increase property values, enhance business opportunities, and generate a substantial number of new, multi-year jobs in the process. She reasoned that reclamation, like solar plant construction, can serve as a bridge between a resource-dependent community's extractive past and a future based on a diverse set of new economies.<sup>180</sup>

### c. Cost

The direct cost to ratepayers (in terms of customer rates) is less with a portfolio that is filled out with a mix of natural gas and battery storage resources compared to a portfolio filled out solely with battery storage resources. The parties submitting portfolios with natural gas turbines disagree on their proposed mix of resources and on the assumptions to be used in the resource models. But all are lower cost than the least cost portfolio that excludes all gas turbines.

The parties generally compare the NPV of the costs of their portfolios against PNM's Scenario 1, which includes seven natural gas turbines (280 MW) and 130 MW of battery storage resources. The tables below display the NPV results of the various proposed portfolios calculated with EnCompass and SERVIM. PowerSimm results are omitted, because the model was used only to calculate NPVs for PNM Scenarios 1-4, not the scenarios proposed by the intervenors.

Based upon the most contested assumption, that the Equivalent Forced Outage Rate (EFOR) of the Four Corners Generating Station, is 20% per year, PNM calculated a 20-year NPV of total costs of \$4,673 million (\$4.67 billion).<sup>181</sup> The choice of an appropriate EFOR for the Four

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<sup>179</sup> O'Donnell Dir. 8-9.

<sup>180</sup> O'Donnell Dir. 11.

<sup>181</sup> As discussed in Section IV.A.4.c above, the NPVs calculated with SERVIM exclude the fixed costs of PNM's existing resources to conserve on computing resources. They include the fixed costs of the new resources and the  
(Cont'd on next page)

Corners plant has significance for the lowest cost mix of backup resources (as is evident in the tables below), but it may have even greater significance in the evaluation of the reliability of the competing portfolios. The choice of an appropriate EFOR is therefore discussed in the following section (ii) on reliability.

Using the same 20% EFOR, WRA's portfolios 1-A (with six gas units (240 MW) and 160 MW of battery storage) and 1-B (with five gas units (200 MW) and 160 MW of battery storage) produce NPVs of costs \$23 million and \$27 million greater than PNM Scenario 1 respectively. Using an 8.9% and 16% EFOR, WRA's two portfolios of four gas units (160 MW) and 160 MW of battery storage units produce NPVs of costs \$10.0 million and \$12.8 million less than PNM Scenario 1. Sierra Club's primary recommendation is for a No Gas alternative, but it also proposes two minimal gas alternatives. Using a 20% EFOR for Four Corners, Sierra Club's two 5-unit gas portfolios produce NPVs of costs \$25 million and \$19 million less than PNM Scenario 1 respectively. Sierra Club Tier 2-4, which saves \$25 million in NPV costs, includes 350 MW of solar, 192 MW of natural gas and 210 MW of battery storage. Sierra Club Tier 2-6 includes 500 MW of solar, 192 MW of natural gas, and 210 MW of battery storage.

Portfolios	Resources	20-year NPV (\$M) (Calculated with SERVM)	Difference (\$M)
<b>20% EFOR Assumptions</b>			
PNM Scenario 1 (20% Four Corners EFOR)	350 MW solar 280 MW gas (7 units) 130 MW battery	\$4,673 <sup>182</sup>	--
PNM Scenario 2 (20% Four Corners EFOR)	100 MW solar 440 MW gas (11 units) 0 MW battery	\$4,717 <sup>183</sup>	\$44

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variable production costs of all of the resources. EnCompass includes the fixed and variable costs of all PNM's resources and therefore produces higher NPVs generally. EnCompass is able to include all costs because its calculations are done on an hourly basis compared to the 5-minute interval calculations of SERVM (and PowerSimm).

<sup>182</sup> Wintermantel Dir. 25 (Corrected).

<sup>183</sup> Wintermantel Dir., Exh. NW-2, p. 12 of 70, Table ES3 (Corrected).

WRA 1-A (20% Four Corners EFOR)	450 MW solar 240 MW gas (6 units) 160 MW battery	\$4,711 <sup>184</sup>	\$38
WRA 1-B (20% Four Corners EFOR)	450 MW solar 200 MW gas (5 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$4,721 <sup>185</sup>	\$48
Sierra Club Tier 2-4 (20% Four Corners EFOR)	350 MW solar 200 MW gas (5 units) 210 MW battery	\$4,648 <sup>186</sup>	-\$25
Sierra Club Tier 2-6 (20% Four Corners EFOR)	500 MW solar 200 MW gas (5 units) 210 MW battery	\$4,654 <sup>187</sup>	-\$19
<b>8.9% and 16% EFORs</b>			
PNM Scenario 1 8.9% and 16% EFOR Assumptions		Not calculated	Not calculated
WRA (5 gas units; 8.9% Four Corners EFOR)	450 MW solar 200 MW gas (5 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$4,689 <sup>188</sup>	\$16.4
WRA (5 gas units; 16% Four Corners EFOR)	450 MW solar 200 MW gas (5 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$4,687 <sup>189</sup>	\$13.8
WRA (4 gas units; 8.9% Four Corners EFOR)	450 MW solar 160 MW gas (4 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$4,663 <sup>190</sup>	-\$10.0
WRA (4 gas units; 16% Four Corners EFOR)	450 MW solar 160 MW gas (4 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$4,660 <sup>191</sup>	-\$12.8

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<sup>184</sup> Commission Exh. 11, p. 2.

<sup>185</sup> *Id.*

<sup>186</sup> Wintermantel Dir., Exh. NW-2, p. 54 of 70 (Corrected).

<sup>187</sup> *Id.*

<sup>188</sup> WRA Exh. 5 (PNM Resp. to WRA 8<sup>th</sup> Set of Interrogs. & Requests for Prod. of Docs.) p. 6 of 9.

<sup>189</sup> *Id.*

<sup>190</sup> *Id.*

<sup>191</sup> *Id.*

The No Gas recommendations of CCAE and Sierra Club are more costly. Using the 20% EFOR assumption recommended by PNM, the 20-year NPV calculations for Sierra Club portfolio SC 15 is \$14 million higher than PNM Scenario 1. Even using a lower Four Corners EFOR assumption of 8.9%, CCAE's 20-year NPV calculations are \$72 million and \$149 million higher for CCAE 1 and CCAE 2 than the costs of PNM Scenario 1.

Portfolio	Resources	20-year NPV (\$M)	Difference (\$M)
PNM Scenario 1 (20% Four Corners EFOR)	350 MW solar 280 MW gas (7 units) 130 MW battery	Encompass: \$5,916 <sup>192</sup>	
Sierra Club (SC 15) (20% Four Corners EFOR)	500 MW solar 0 MW gas (0 units) 450 MW battery	\$5,930 <sup>193</sup>	\$14
		20-year NPV (\$M)	Difference (\$M)
PNM Scenario 1 (20% Four Corners EFOR)	350 MW solar 280 MW gas (7 units) 130 MW battery	SERVM: \$4,673 <sup>194</sup>	
Sierra Club (SC 15) (20% Four Corners EFOR)	500 MW solar 0 MW gas (0 units) 450 MW battery	\$4,764 <sup>195</sup>	\$91
		20-year NPV (\$M)	Difference (\$M)
PNM Scenario 1 (CCAIE assumptions) *	350 MW solar 280 MW gas (7 units) 130 MW battery	Encompass: \$5,255 <sup>196</sup>	
CCAIE 1 (CCAIE assumptions) *	650 MW solar 0 MW gas (0 units) 300 MW battery 24 MW demand response	EnCompass: \$5,327 <sup>197</sup>	\$72
CCAIE 2 (CCAIE assumptions) *	650 MW solar 0 MW gas (0 units) 300 MW battery** 24 MW demand response	EnCompass: \$5,404 <sup>198</sup>	\$149

\* Encompass modeling with 8.9% EFOR for Four Corners; ELCC Wind 22%, 2-hour battery 50%; Import level 300 MW.

\*\* CCAIE 2 reduces Arroyo battery from 150 MW to 80 MW and adds the 40 MW Sandia and 30 MW batteries.

<sup>192</sup> Phillips Dir. 19, Table NLP-1A (Corrected).

<sup>193</sup> Sierra Club Exh. 17 (Goggin Supp. Reb.) 6.

<sup>194</sup> Wintermantel Dir. 25 (Corrected).

<sup>195</sup> Goggin Supp. Reb. 6.

<sup>196</sup> Sommer Dir. 4, Table 1.

<sup>197</sup> *Id.*

<sup>198</sup> *Id.*

The extension of the bid for the Arroyo project is expected to cost an additional \$500,000. But, given the magnitude of the NPVs illustrated above, the additional cost will not have a significant impact on the NPV rankings illustrated above.

The significance of the 20-year NPV calculations and the differences between the portfolios, however, is not immediately clear. How meaningful, for example, are the NPV results calculated by the various models? And how meaningful, for example, are \$44 and \$72 million differences in 20-year NPV calculations?

The first important point is that the absolute values of the NPVs and their differences are not of primary significance. As explained under Section IV.A.4 above, the various models calculate different measures. The calculations are intended for different purposes. And the models have different limitations. The EnCompass model attempts to calculate revenue requirements for PNM's entire system, but it does not reflect the sub-hourly dynamics calculated by SERVM and PowerSimm that are important to evaluating the intermittency of renewable resources. SERVM and PowerSimm calculate sub-hourly dynamics, but they also measure PNM's reliance on neighboring utility systems (which EnCompass does not do), and SERVM and PowerSimm measure reliance on different parts of neighboring systems (i.e., balancing areas of neighboring states versus the Western EIM). They also focus on different elements of system costs, not the entirety of PNM's system.

The primary value of the models' varying results, therefore, is to show in relative terms which portfolios are less costly than others.<sup>199</sup>

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<sup>199</sup> See e.g., Phillips Dir. 33 (Corrected); Tr. (Dorris) 828-829; Tr. (Phillips) 1305.

PNM witness Nicholas Phillips calculated the following differences in PNM's average annual revenue requirement that would result from selecting a portfolio other than PNM Scenario 1:

<b>Portfolio</b>	<b>Resources</b>	<b>Avg. Ann. Difference (\$M) (Calculated with EnCompass)</b>	<b>Avg. Ann. Difference (\$M) (Calculated with SERVM)</b>
PNM Scenario 1 (20% Four Corners EFOR)	350 MW solar 280 MW gas (7 units) 130 MW battery	--	--
PNM Scenario 2 (20% Four Corners EFOR)	100 MW solar 440 MW gas (11 units) 0 MW battery	\$12 NPV difference \$0.9 Annual difference	\$44 NPV difference \$4.6 Annual difference
WRA 1-A (20% Four Corners EFOR)	450 MW solar 240 MW gas (6 units) 160 MW battery	\$23 NPV difference \$2.1 Annual difference	\$38 NPV difference \$3.5 Annual difference
WRA 1-B (20% Four Corners EFOR)	450 MW solar 200 MW gas (5 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$27 NPV difference \$1.6 Annual difference	\$48 NPV difference \$3.0 Annual difference
Sierra Club 15-1 (20% Four Corners EFOR)	500 MW solar 0 MW gas (0 units) 450 MW battery	\$14 NPV difference \$2.7 Annual difference	\$91 NPV difference \$12.0 Annual difference

Commission Exh. 11, p. 4.

NM AREA witness James Dauphinais calculated the following differences in levelized annual revenue requirements that would result from selecting a portfolio other than PNM Scenario 1:

<b>Portfolio</b>	<b>Resources</b>	<b>Avg. Ann. Difference (\$M) (Calculated with EnCompass)</b>	<b>Avg. Ann. Difference (\$M) (Calculated with SERVM)</b>
PNM Scenario 1 (20% Four Corners EFOR)	350 MW solar 280 MW gas (7 units) 130 MW battery	--	--
PNM Scenario 2 (20% Four Corners EFOR)	100 MW solar 440 MW gas (11 units) 0 MW battery	\$12 NPV difference \$1.0 Annual difference	\$43 NPV difference \$3.9 Annual difference
WRA 1-A (20% Four Corners EFOR)	450 MW solar 240 MW gas (6 units) 160 MW battery	\$23 NPV difference \$2.1 Annual difference	\$38 NPV difference \$3.4 Annual difference
WRA 1-B (20% Four Corners EFOR)	450 MW solar 200 MW gas (5 units) 160 MW battery 15 MW energy efficiency 28 MW demand response	\$27 NPV difference \$2.4 Annual difference	\$48 NPV difference \$4.3 Annual difference
Sierra Club 15-1 (20% Four Corners EFOR)	500 MW solar 0 MW gas (0 units) 450 MW battery	\$14 NPV difference \$1.3 Annual difference	\$90 NPV difference \$8.1 Annual difference

Commission Exh. 12, pp. 3-5.

Staff witness Beverly Eschberger testified that, based upon PNM's estimates, the \$44 million difference in 20-year NPVs between PNM Scenarios 1 and 2 would translate into a \$0.32 increase in the monthly bill of an average residential customer using 600 kWh per month.<sup>200</sup>

CCAE witness Anna Sommer testified that the \$72 million difference in NPVs between the CCAE 1 portfolio and PNM Scenario 1 translates into an average annual difference in PNM's total revenue requirement of \$8.344 million and that the \$149 million difference in NPVs between the CCAE 2 portfolio and PNM Scenario 1 translates into an average annual revenue requirement difference of \$17.063 million.<sup>201</sup> Sommer said the \$8.344 million difference amounts to 0.8% of PNM's total revenue requirement, such that, if the difference were to be applied pro rata to all customer classes, the increase under CCAE 1 (over PNM Scenario 1) would be approximately \$0.56 cents more per month for a residential customer paying \$70 per month.<sup>202</sup>

NMRA witness James Dauphinais however, noted that the apparently minimal increases to residential customers' monthly bills could translate into significant increases for industrial customers. Dauphinais said a per kWh rate that results in a \$0.32 increase in the average monthly residential bill could translate into a \$107,000 per month increase for an industrial customer with a 35,000-kW demand and a 70% load factor. He said NPV differences between portfolios in the order of \$1 to \$2 million represent essentially the same number. Dauphinais, thus, would draw the line at an approximately \$35 to \$40 million difference in NPVs. He figured that at somewhere between no difference and a \$35 million increase it becomes acceptable to take on some additional

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<sup>200</sup> Staff Exh. 8 (Eschberger Dir.) 8, Table BSE-2, *citing* Darnell Dir. 11, Table RND-1 (Corrected).

<sup>201</sup> Tr. (Sommer) 1507.

<sup>202</sup> Tr. (Sommer) 1518-19.



NPV revenue requirement to satisfy the other concerns of the ETA, such as the number of gas plants added and locating additional assets in the CCSD.<sup>203</sup>

In addition, cost is only one of several criteria to be evaluated under the ETA. A higher cost portfolio might be approved if the Commission determines that other factors, such as reliability, environmental impacts, and location outweigh the higher costs.

#### **d. Environmental Impacts**

Section 3(B) of the ETA specifies three types of resources that should receive preference in determining whether the Commission should approve replacement resources, one of which favors resources with the least environmental impacts. The No Gas portfolios have a smaller environmental impact than the portfolios that include some or mostly gas resources, given that they lack CO<sub>2</sub> emissions and emissions of other air pollutants.

Ms. Sommer testified that the 280 MW of gas generation PNM proposes in its Scenario 1 is expected to emit 1.5 million tons of CO<sub>2</sub> more than CCAE's portfolio 1 over the period of 2022-2038.<sup>204</sup> The gas generation will also produce Nitrogen oxide (NO<sub>x</sub>) and Sulphur oxide (SO<sub>x</sub>) emissions and require gas production that will result in methane emissions to the atmosphere. CCAE witness Jason Schwartz<sup>205</sup> noted that upstream emissions – especially methane and carbon dioxide emissions from the production, processing, and transportation of natural gas – can also be significant.<sup>206</sup>

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<sup>203</sup> NM AREA Exh. 7 (Dauphinais Reb.) 12-13; Tr. (Dauphinais) 1673-75.

<sup>204</sup> Sommer Dir. 4, Table 1.

<sup>205</sup> Professor Schwartz is the Legal Director of the Institute for Policy Integrity. He has provided testimony and comments on states' use of the social cost of greenhouse gases in energy planning decisions to the Colorado Public Utilities Commission, the Colorado legislature, the Virginia State Corporation Commission, and the New York Public Service Commission. See CCAE Exh. 8 (Schwartz Dir.) 2.

<sup>206</sup> Schwartz Dir. 28.

Adella Begaye, the Board President of Diné C.A.R.E. and a former official with the Indian Health Service, testified that the burning of fossil fuels has harmful consequences on the human respiratory system, cardiovascular system, and nervous system, which have contributed to cases of heart disease, cancer, stroke, and chronic lower respiratory diseases, including asthma. Nitrous oxide and particulate matter 2.5 adversely affect lung development, reducing forced expiratory volume among children. Ms. Begaye also said health disparities exist among the Native American population in comparison to the U.S. general population, particularly with childhood asthma. She cited poverty, limited access to specialty care, environmental challenges, and high levels of indoor and outdoor air pollution exacerbate asthma rates. Begaye said approximately 13.0% of American Indian/Alaskan Native children have asthma, as compared with 8.6% of children in the U.S. general population.<sup>207</sup>

In addition to the costs borne directly by PNM customers in their utility bills, CCAE quantified a social cost of \$75 million as the impact from the carbon dioxide emissions. The social cost (i.e., external costs) includes the costs to society of carbon dioxide emissions that are not included in electric rates.

Professor Schwartz opined that the avoidance of the social costs of the carbon dioxide emissions from the gas units in PNM Scenario 1 could largely offset the higher direct costs in customer bills predicted by the EnCompass modeling to result from the No Gas CCAE 1 portfolio. He calculated the social cost based on the central estimate of \$50 per ton of carbon dioxide of the federal Interagency Working Group on the Social Cost of Greenhouse Gases and its application to

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<sup>207</sup> SJCA-Diné C.A.R.E. Exh. 2 (Begaye Dir.) 3.

the 1.5 million tons of CO<sub>2</sub> that would be avoided by implementing CCAE 1 rather than PNM Scenario 1.<sup>208</sup> The social costs included in the Working Group's cost per ton include the following:

- Changes in energy demand, from temperature-related changes to the demand for cooling and heating;
- Lost productivity and other impacts to agriculture, forestry, and fisheries, due to alterations in temperature, precipitation, C) 2 fertilization, and other climate effects;
- Human health impacts, including cardiovascular and respiratory mortality from heat-related illnesses, changing disease vectors like malaria and dengue fever, increased diarrhea, and changes in associated pollution;
- Property lost or damaged by inland and coastal flooding, storms, other extreme weather events, as well as the cost of protecting vulnerable property and the cost of resettlement following property losses;
- Changes in fresh water availability;
- Ecosystem service impacts;
- Impacts to outdoor recreation and other non-market amenities; and
- Catastrophic impacts, including damages at very high temperatures<sup>209</sup>

NEE witness Dahr Jamail, the author of *The End of Ice*,<sup>210</sup> described in detail the problem of climate change and the role of CO<sub>2</sub> emissions from electric generating resources as major contributors to the climate change problem. Mr. Jamail said the climate crisis is the single largest existential threat of our time and that fossil fuel use is the leading cause of the climate crisis. He urges the Commission to establish a moratorium on the approval of any new natural gas resources.

Jamail said that the conservative International Energy Agency has predicted a possible worst-case scenario of a 3.5°C increase by 2035, which would be a 412 percent temperature

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<sup>208</sup> Schwartz Dir. 5.

<sup>209</sup> Schwartz Dir. 18-19.

<sup>210</sup> *The End of Ice* was listed as one of the top 10 Best Science Books for 2019 by the Smithsonian Institute. It focuses on the accelerating environmental effects of anthropogenic climate disruption. NEE Exh. 33 (Jamail Dir.) 1.

increase in less than two decades. A World Bank-commissioned report warned that we are on “track to a ‘4°C world’ marked by extreme heat waves and life-threatening sea level rise.” According to Jamail, leading climate researchers believe there is a possibility that the world will even see a more than 6°C temperature increase by 2100, which would lead to “cataclysmic changes” and “unimaginable consequences” for human civilization. He said Dr. Dan Fagre, USGS research ecologist and director of the Climate Change in Mountain Ecosystems Project, explained to Jamail during research for his book that the changes caused by climate change are “nonlinear changes that aren’t based on a simple proportional relationship between cause and effect; they are usually abrupt, unexpected, and challenging to predict.”<sup>211</sup> Mr. Jamail said the Paris Agreement is a nonbinding agreement signed by 195 member countries of the United Nations Framework Convention on Climate Change with the goal of limiting planetary warming to below 2°C above preindustrial levels, with an effort to limit the increase to 1.5°C.<sup>212</sup>

Jamail also said investment in new fossil fuel extraction and infrastructure projects is a commitment to future emissions, because companies are “locked in” to trying to extract profits from their investments. Every decision around a new fossil fuel lease or fossil fuel energy generation is an opportunity for politicians and regulators to stop fossil fuel expansion and champion a just transition to an economy powered by clean energy. By allowing continued expansion of the fossil fuel economy, governments not only enable new pollution, they also entangle more workers and communities in an industry that has no viable future on a livable planet.<sup>213</sup>

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<sup>211</sup> Jamail Dir. 7.

<sup>212</sup> *Id.*

<sup>213</sup> Jamail Dir. 12.

Further, Jamail noted at least one utility commission has actually established a moratorium. In 2018, the Arizona Corporation Commission (ACC) voted against the 2017 IRP proposed by Arizona Public Service Company (APS) and Tucson Electric Power that was recommended a portfolio comprised mostly of gas and nuclear. Jamail said the ACC rejected the IRP and issued an Order that created a moratorium on gas plants because renewables plus storage reduce “potential unnecessary capital improvements in the near future and stranded asset costs in the long-term.”<sup>214</sup>

Mr. Jamail summarized his testimony during cross-examination, rejecting suggestions that the CO<sub>2</sub> emissions from the proposed natural gas units will be minimal<sup>215</sup> and that the potential future reconfiguration of the gas units to burn methane could reduce greenhouse gas emissions:

And even an improvement of going from a coal plant to a gas plant, we’re still going to be adding methane to the atmosphere full stop. Even if it’s a significantly smaller amount. And it makes no sense to do that when we already have existing technology like wind and solar, especially in a state like New Mexico to transition over, on top of the fact that even economically, the stranded assets of burning a new natural gas plant with a fossil fuel industry that is on the way out, it has to be phased out if we’re going to meet any global climate goals whatsoever, or national.

So it makes no sense, environmentally or economically, to build any kind of new fossil fuel-based plant when we have all the technology we need

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<sup>214</sup> Jamail Dir. 13 *citing* Order, ACC Docket No. E-00000V-15-0094 (Mar. 13, 2018) attached as Exhibit DJ-02 to Jamail’s testimony. The Hearing Examiners note, however, that the Arizona moratorium was *temporary* (from March 12, 2018 through January 1, 2019). A utility could also, during the moratorium, seek approval to build natural gas units subject to conditions stated in the Commission’s order:

IT IS FURTHER ORDERED that a Load Serving Entity may not procure by purchase, acquisition, or construction a generating facility of natural gas energy of 150 MW of capacity or more unless all of the following conditions are met: (a) all ordering paragraphs, conditions, and additional compliance items required by this Decision have been fully satisfied, as determined by a future order of the Commission; (b) the Load Serving Entity has conducted an independent analysis comparing the present and future costs between the specific natural gas procurement and alternative energy storage options and Staff reviewed that analysis; and (c) the Load Serving Entity filed a petition under R14-2-704(E) that seeks approval for the specific procurement, and the Commission approved the petition. This ordering paragraph and the requirements it establishes shall expire automatically on January 1, 2019.

*See* Order, Jamail Dir., Exh. DJ-2 (emphasis added).

<sup>215</sup> Dr. Dorris estimated that the LM6000 natural gas units are anticipated to operate relatively infrequently, with a capacity factor in the low single digits. Dorris Dir. 32.

already. And we would have to – we’re going to have to transition over to that in the long run.

So why not start now? Why are we kicking the can down the road when we’ve long since passed the point of no return of how deep into the crisis we are?<sup>216</sup>

PNM, on the other hand, emphasized the benefit in CO<sub>2</sub> emission reductions resulting from the abandonment of the four units of the San Juan Generating Station and the reductions that will result in the future under the ETA. Ronald Darnell, PNM’s Senior Vice President for Public Policy, testified that the San Juan coal plant retirement is just a first step on a longer carbon-free path for New Mexico and that PNM is working hard, in response to the ETA, to become the nation’s first investor-owned utility to achieve a zero-emission goal by 2040. Mr. Darnell said Scenario 1 will accelerate the deployment of renewable resources and battery storage in PNM’s resource mix while saving customers’ money and providing significant economic support to the sovereign tribal and other communities in the San Juan area.<sup>217</sup>

PNM witness Fallgren said the No Gas parties want to greatly accelerate the timeframe under the ETA for utilities to attain 100% carbon-free energy, but he said all parties are moving in the same direction. He said Scenario 1 allows the transition to occur in a controlled manner that considers both customer costs and system reliability and preserves system flexibility while anticipating future technological improvements. He said taking advantage of efficient, flexible and low-cost natural gas technology in the early phase of the energy transition provides planning opportunities and room for improved technologies in later phases and increases the likelihood that a carbon-free portfolio is in place by 2040.<sup>218</sup> Mr. Kemp added that a flexible multi-unit gas unit

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<sup>216</sup> Tr. (Jamail) 2220-21.

<sup>217</sup> PNM Exh. 2 (Darnell Dir.) 2-3.

<sup>218</sup> Fallgren Reb. 39-40.

will be an inexpensive reliability insurance policy to smooth the transition of PNM's grid to net zero carbon.<sup>219</sup>

Other PNM witnesses cited the possibility that the LM6000 gas units could be adapted in the future to burn a fuel, such as hydrogen, which would not emit CO<sub>2</sub>, or a “recycled” natural gas. Dr. Dorris and Mr. Kemp theorized that the excess generation that occurs intermittently from renewables could be used to power an electrolysis process that converts water to hydrogen that could be used as a fuel in a reconfigured natural gas turbine. Methane from landfills and livestock could also be converted for use in natural gas turbines, resulting in a net greenhouse gas emissions benefit by converting methane emissions into CO<sub>2</sub> emissions. Dr. Dorris said some utilities are making plans for such uses, but they are not yet economical. He also said there is currently no source of hydrogen near the proposed Piñon gas plant and he has not considered the cost of adapting natural gas turbines for such uses.<sup>220</sup>

Still, as Kemp noted, PNM has not defined its plans for the proposed natural gas units after 2040.<sup>221</sup> Fallgren testified in the December 2019 hearings in Case No. 19-00018-UT that PNM has been discussing its options and keeping them open to protect its customers. He said the highest potential is for the options discussed by Mr. Kemp and Dr. Dorris. But Fallgren also negotiated a “put-back clause” with the supplier of the turbines that enables PNM to force the supplier to buy them back after 18 years for “roughly like \$10 million.” He indicated that PNM has also been discussing the possibility of selling the unit to an independent power producer, but he considers it a “very low possibility.” Fallgren also asserted that independent power producers recognize the

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<sup>219</sup> Kemp Reb. 35.

<sup>220</sup> Tr. (Kemp), 609-11; PNM Exh. 35 (Dorris Reb.) 18-20; Tr. (Dorris), 774-86, 810-11.

<sup>221</sup> Tr. (Kemp) 607.

movement of the industry to carbon-free resources, and that the turbines would potentially be a liability that they would not have an interest in longer term.<sup>222</sup>

**e. Fixed costs vs. fuel costs favor batteries**

The second preference stated in Section 3(B) of the ETA is for resources with higher ratios of capital costs to fuel costs. This preference favors renewable resources over fossil fuel resources, given that renewable resources use no fuel.

If the capital or fixed cost preference is applied to portfolios of resources, the No Gas portfolios will also be favored over the portfolios that include natural gas capacity for the same reason, as the following table illustrates.

Portfolio	Est. Capital Investment (\$M)	Est. \$NPV of Fuel (\$M)	Ratio Cap. Investment to Fuel
PNM Scenario 1	\$680 to \$760	\$1,185	0.57 to 0.64
PNM Scenario 2	\$425 to \$485	\$1,265	0.34 to 0.38

Eschberger Dir., 14, Table BSE-7, *citing* PNM's response to a Staff discovery request (Exh. BSE-2).

**f. Reclamation costs**

The third preference stated in Section 3(B) of the ETA is for resources able to reduce the cost of reclamation and use for lands previously mined within the county of the qualifying generating facility. None of the proposed resources or portfolios satisfies this preference.

**g. Reliability**

Subsection 3(F) of the ETA establishes reliability as a potentially limiting factor in the amount of resources required to be located in the CCSD.<sup>223</sup> Reliability is also one of the primary factors considered in the traditional reviews of proposed resources for the issuance of CCNs.<sup>224</sup>

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<sup>222</sup> Tr. (Fallgren) (Case No. 19-00018-UT) 446-47.

<sup>223</sup> NMSA 1978, § 62-18-3(F) (“ . . . provided that such resources are located in the school district in New Mexico where the abandoned facility is located, are necessary to maintain *reliable* service and are in the public interest as determined by the commission.”) (emphasis added).

<sup>224</sup> See Section V.A.2 above.



The reliability of the various portfolios was evaluated quantitatively and qualitatively. The quantitative evaluations involved the LOLE calculations performed in the parties' resource modeling. The qualitative evaluations focused primarily on the reliability of battery storage resources – in terms of technological maturity and PNM's inexperience with the technology.

**i. Quantitative evaluations**

As addressed in Section IV.A.4.a above, the portfolios' reliability was evaluated based upon the traditional reserve margin standard and the LOLE standard gaining increasing prominence with the introduction of the intermittent generation of renewable resources.

All of the portfolios recommended by the parties satisfy the 0.2 LOLE standard discussed in Section IV.A.4.a, depending upon the assumptions used in each parties' modeling. The disagreements on the assumptions, however, had a significant effect on the calculated LOLE results. CCAE's recommended portfolios generated a .63 LOLE under PNM's assumptions (i.e., 6.3 LOLE events in a ten-year period), greater than the 0.2 LOLE standard (2 LOLE events in a ten-year period). Yet, CCAE's portfolios satisfied the 0.2 LOLE standard under its own assumptions.

Similarly, at WRA's request, PNM re-ran its SERVIM model with CCAE's 8.9% EFOR and the 16% EFOR used in PNM's 2017 IRP. In addition to the 5 natural gas unit portfolio in WRA 1-B, two WRA portfolios with 5 natural gas units satisfied the 0.2 LOLE standard with NPVs \$16.4 and \$13.8 million greater than PNM Scenario 1 using the 16% and 8.9% EFORs. And one of the WRA portfolios with 4 natural gas units satisfied the 0.2 LOLE standard with an NPV actually \$10 million less than PNM Scenario 1 using the 8.9% EFOR.<sup>225</sup>

Most of the portfolios appear to have satisfied the 13% reserve margin standard established in Case No. 08-00305-UT. The exceptions were the 4 and 5 natural gas unit portfolios proposed by

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<sup>225</sup> WRA Exh. 5, p. 6 of 9.

WRA. PNM Scenario 1 produced a 14.07% reserve margin. WRA's 4 and 5 natural gas turbine portfolios produced 10.39% and 12.25% reserve margins.<sup>226</sup>

The parties' disagreements focused primarily on the EFOR to be incorporated into the model for the Four Corners Power Plant. Sierra Club witness Michael Goggin argued that the 20% EFOR rate was unrealistically high. Mr. Goggin observed that during the time period PNM used to calculate the 20% EFOR, both Four Corners units were undergoing an extended outage to install pollution control equipment and one of the units was undergoing a steam turbine replacement. He said coal plants in the Western Interconnect typically have a forced outage rate of 5-10% and that PNM actually used a forced outage rate of 12% for the plant in its 2017 IRP.<sup>227</sup>

NM AREA witness Dauphinais agreed, recommending that the appropriate EFOR for the Four Corners Plant should be 8.9%. He said the sample period used by PNM to develop the 20% EFOR was unusual and does not necessarily reflect the expected future performance of the plant.<sup>228</sup>

Mr. Phillips disagreed with the EFOR assumptions used by CCAE for the Four Corners Power Plant. He said the 8.9% EFOR for generic coal units of similar size and disregarding actual plant operating data does not reflect the expected operation of the plant going forward. He said the 16% EFOR for Four Corners from 2019 is also not a reasonable expectation for the plant from 2019 through the end of its life in 2031. He said, as a plant approaches its end of life, less maintenance capital will be invested in the plant and performance will degrade. He also cited the actual EFOR for Four Corners of 28.45%, 30.41% and 25.48% for Unit 4 and 26.46%, 34.13% and 28.2% for Unit 5 for the years 2016 through 2018.<sup>229</sup>

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<sup>226</sup> *Id.*

<sup>227</sup> Goggin Dir. 19-20.

<sup>228</sup> Dauphinais Reb. 23.

<sup>229</sup> WRA Exh. 5, p. 4 of 9; Tr. (Fallgren) 134.

The years 2016 through 2018, however, also marked a period of major construction at Four Corners. The construction activities impacted the plant's availability during 2016 through 2018 and were intended to improve its performance thereafter. The installation of Selective Catalytic Reduction technology during that time period to comply with the Clean Air Act's requirements to mitigate regional haze negatively impacted the plant's availability. And the operator of the plant, Arizona Public Service Company, engaged in a System Health Process that included construction activities designed, in part, to improve the plant's performance.<sup>230</sup>

PNM explained, in response to a discovery request, that the relatively high EFOR measured during 2016-2018 was due to the SCR and System Health Process activities and that the System Health Process has improved the plant's reliability:

The availability of each resource is highly dependent on the current and future activities on the site. Changing conditions associated with the BART determination and BART [SCR] project completion impacted availability

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<sup>230</sup> See CCAE Exh. 6 (Olson Dir., Case No. 16-00276-UT) 41-49. PNM's 13% ownership share of the plant cost it \$90.1 million for the SCR work and \$58 million of the System Health Process costs. Assuming PNM's 13% share, the total costs of the capital expenditures related to the System Health Project amounted to \$446 million (\$58 million ÷ 13% = \$446 million). Mr. Olson's testimony described the capital expenditures related to the System Health Project as follows:

The System Health Process analyzes the different process areas and systems at Four Corners. Subject matter experts (SMEs) or process teams are assigned to review and analyze the system's performance and health based on equipment condition and performance parameters. The SME team reviews and evaluates system issues including equipment reliability issues, forced outage related information, corrective maintenance history, work order backlog, vendor bulletins, etc. Based on this evaluation, the SME team assigns a health color (Green = acceptable, White = monitor, Yellow = marginal or Red = unacceptable) to the system. Systems or process areas with yellow or red colors require a system health plan designed to move the system back to white or green. The plan may include capital projects to address the system health. The Plant Health Committee conducts full evaluations annually while system colors and plans are evaluated at least quarterly. This Tier 1 capital project addresses the capital projects identified as part of the System Health Process. The estimated capital cost for the 'Four Corners Facility Improvements (ID#71519210)' project during the Capital Investment Period is \$41.0 million.

For the Facility Improvement Project (ID#71519017), APS bundled multiple projects focusing on safety requirements, maintaining NERC and environmental compliance, improving reliability of the units, and reducing overall maintenance costs. Key work in this Tier 1 capital project includes generator rewinds, boiler component replacements, ash handling equipment replacement, and baghouse component replacements. The estimated capital cost for the 'Four Corners Facility Improvements (ID# 71519017)' is \$17.0 million.

*Id.* 47-48.

during this time period. Following resolution of these changing circumstances APS instituted a System Health Process increasing FCPP's [Four Corners Power Plant's] reliability. 2019 Year to Date [Equivalent Availability Factor] for FCPP is 81% with summer 2019 [Equivalent Availability Factor] greater than 90%.<sup>231</sup>

The parties also disagreed on the amount of generating capacity that should be assumed in the modeling as being available from neighboring utilities.

CCAE witness Dr. Michael Milligan testified that, in its SERVIM modeling, PNM assumed that its import capability was 5,000 MW most of the year, but in its modeling, imports were constrained randomly within a range between 150 MW to 300 MW during the top 15% of load hours. Dr. Milligan pointed out that PNM's discovery responses indicate that the import limit should be set at 300 MW.<sup>232</sup> He noted Mr. Wintermantel's testimony describing PNM's assumptions that 150 MW could be purchased from the day ahead market and 150 MW from hourly non-firm market purchases:

After discussions with Wholesale Marketing and analysis of recent historical purchases during peak conditions the external assistance into the PNM balancing areas was capped at 300 MW. It was assumed that 150 MW could be purchased from the day ahead market and the hourly non-firm market purchases were limited to 150 MW.<sup>233</sup>

Dr. Milligan also noted PNM's explanation in a discovery response on how PNM's import limit was developed:

Historical sales data from 2017 and 2018 during high priced periods was analyzed along with input from Wholesale Power Marketing ("WPM") to determine the 300 MW limit as reasonable and appropriate. Based on historical data and an understanding of the current market, PNM perceives the liquidity in the market as well as entities to contract with are declining,

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<sup>231</sup> Tr. (Fallgren) 130.

<sup>232</sup> CCAE Exh. 20 (Milligan Dir.) 6.

<sup>233</sup> Milligan Dir. 6 (*citing* Wintermantel Dir. Exh. NW-2 at 18).

and that it is not prudent to assume more than 300 MW could be imported during peak net load conditions.<sup>234</sup>

Dr. Milligan stated that PNM's response justifies limiting imports to no more than 300 MW. He asserted that it does not justify limiting the imports to less than that.<sup>235</sup>

Mr. Dauphinais concurred. He stated the import limit should be set at no less than 300 MW throughout the year. Dauphinais found it compelling that for all seven hours of the period between January 2017 and June 2018 in which PNM's load was in excess of 1,850 MW and the market price was in excess of \$100 per MWh, PNM purchased no less than 352 MW. He added that the data only indicates the amount PNM purchased and that the amount that was available to PNM for purchase would have been greater than or equal to the purchased amount. Thus, in Dauphinais' view, PNM may be overstating the amount of capacity it needs to be added following the San Juan abandonment.<sup>236</sup>

Finally, Dr. Milligan stated that PNM used a 9% Effective Load Carrying Capability (ELCC),<sup>237</sup> which underestimates the actual capacity of wind resources, thus requiring additional resources on the system. Milligan used PNM's SERVIM model to derive the more accurate 22% ELCC for wind. He said PNM used a 9% ELCC for new wind in its 2017 IRP that was "accepted" by the Commission. But he said the only "precedential" effect of the IRP at the time was that it "will constitute prima facie evidence that the resource type, but not the particular resource being proposed, is required by the public convenience and necessity."<sup>238</sup> Hence,

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<sup>234</sup> *Id.* (citing PNM response to Sierra Club Interrogatory 2012).

<sup>235</sup> *Id.*

<sup>236</sup> Dauphinais Reb., 20-21.

<sup>237</sup> The ELCC of a generator represents its ability to provide full capacity at all times, including a utility system's peak. Dispatchable generators such as gas turbines or combined cycles have higher ELCC values than renewable resources which produce intermittent energy and are not dispatchable.

<sup>238</sup> Milligan Dir., 8-9, *citing* 17.7.3.12 NMAC (2017). The Commission subsequently amended the IRP rule to remove even this limited finding of an IRP's precedential effect.

Milligan insisted that the IRP Rule does not preclude CCAE's modelers from using the SERVIM model to determine a more accurate ELCC for wind.

**ii. PNM's qualitative analysis of battery storage**

In addition to PNM's quantitative review of the bids received in the RFP process, PNM conducted a qualitative review of the battery storage proposals selected in PNM's resource modeling. The principal concern was the 150 MW battery storage project proposed in conjunction with the 300 MW Arroyo solar project.

**(a) Limits on initial battery deployments**

PNM witness William Kemp, a strategic management consultant with experience advising utilities on the deployment of battery storage technologies, recommended that PNM take a gradual and measured approach in its initial deployment of battery storage technologies. Kemp considered battery storage technologies immature in terms of safety, technological evolution, and costs. He also cited the need for PNM to gain operational experience to take advantage of the full value of the technologies. He said PNM's system currently has a limited need for utility-scale storage and recommended limited deployments – no more than 40 MW for an individual facility and the total of the initial deployment to between 2% and 5% of system peak.<sup>239</sup>

Mr. Kemp's recommended 40 MW limit for an individual project was based upon the largest battery storage facility operating in the U.S. at the time he filed his direct testimony on July 1, 2019 – the 40 MW Vista Energy Storage facility connected to the San Diego Gas & Electric Company (SDG&E) grid in California.<sup>240</sup> Kemp did acknowledge, however, the more than a dozen examples of larger planned (but not yet in service) battery projects described by Sierra Club and CCAE but discounted their relevance. He said most involve utilities with significant previous

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<sup>239</sup> Kemp Dir., 26-28.

<sup>240</sup> Kemp Dir. 23-24.

experience in storage, states where there is a strong and specific policy mandate or goal for storage, and states that have completed an energy storage study.<sup>241</sup>

He said the developers of the 200 MW Western Farmers Coop project in Oklahoma and the 250 MW Salt River Project in Arizona have different governance and financial structures than an investor-owned utility and may not be a good comparison. He also said the 409 MW Florida Power & Light Company (FPL) project in Florida involves one of the largest utilities in the U.S., and its unregulated arm (NextEra Resources) has substantial storage experience with at least 140 MW of storage systems in operation.<sup>242</sup>

He also said that, although the FPL and APS projects are large individually compared to the 40 MW limit recommended for PNM, they are relatively small, when compared to their relationship to each utility's peak demand:

Utility	Facility Size (MW)	Peak Demand (2018) <sup>243</sup>	Facility Size (% of Peak)
PNM	40	1,956	2.0%
FPL	409	25,173	1.6%
APS	100	7,253	1.4%

Kemp Reb. 14, PNM Table WK-2 (Rebuttal).

The limit Mr. Kemp recommended for PNM's entire system (i.e., the recommended limit per PNM's system peak) was based upon deployments and goals of other utilities. Kemp prepared a table, presented atop the next page, detailing battery storage penetration as a percentage of 2018 peak load for the 10 utility operating companies with the highest battery penetration, while also noting that the battery storage industry is in the very early stages of growth in the industry and has not yet reached maturity.

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<sup>241</sup> Kemp Reb. 12-13. He cited New York as having a mandate to deploy up to 3.0 GW of energy storage by 2030 with a near-term goal of 1.5 GW by 2025. Massachusetts has a different goal – 200 MWh by 2020 – while California has a statewide mandate to install 1.825 GW by 2024. Kemp said New York, with its Energy Storage Roadmap, and Massachusetts, with its State of Charge Report, also conducted intensive analyses with stakeholder input to evaluate the optimal amount, location, and timing of energy storage resources in their respective states. Kemp Reb. 7-8.

<sup>242</sup> Kemp Reb. 12, citing <http://www.nexteraenergy.com/company/work/battery-storage.html>.

<sup>243</sup> Source: Actual retail peak demands as reported to U.S. EIA.

<b>Utility Operating Company</b>	<b>Battery Storage Operating or in Development (MW)</b>	<b>2018 Peak Load (MW)</b>	<b>% Penetration</b>
Pacific Gas and Electric Company	449.5	17,263	2.60%
San Diego Gas & Electric Company	81.0	4,377	1.85%
Monongahela Power Company	31.5	2,090	1.51%
Southern California Edison Company	332.5	23,460	1.42%
Jersey Central Power & Light Company	39.8	5,977	0.67%
New York State Electric & Gas Corp.	20.0	3,061	0.65%
Commonwealth Edison Company	115.4	21,349	0.54%
Duke Energy Ohio, Inc.	4.0	1,062	0.38%
Arizona Public Service Company	10.0	7,253	0.14%
Portland General Electric Company	5.0	3,816	0.13%

Kemp Dir. 13, PNM Table WK-1.

Kemp said utilities have also set battery penetration goals that exceed these rates. He cited Arizona Public Service's goal of 850 MW by 2025 or approximately 10% of its peak load. Also, NV Energy recently announced intention to build 560 MW by 2023 or approximately 7.5% of its load.<sup>244</sup> He also cited the following state and utility targets:

#### **State and Utility Storage Penetration Targets**

##### **State Targets**

<b>State</b>	<b>Target (MW)</b>	<b>IOU 2018 Peak Load (MW)</b>	<b>Target (% of IOU Peak)</b>	<b>Target Date</b>
NY	3,000	34,673	8.7%	2030
NY	1,500	34,673	4.3%	2025
NJ	2,000	12,428	16.1%	2030
NJ	600	12,428	4.8%	2021
CA	1,825	45,202	4.0%	2020
MA	50 (200 MWh)	4,693	1.1%	2020

##### **Utility Targets**

<b>Utility</b>	<b>Target (MW)</b>	<b>IOU 2018 Peak Load (MW)</b>	<b>Target (% of IOU Peak)</b>	<b>Target Date</b>
PNM	130	1,956	6.6%	2023
APS	850	7,253	11.7%	2025
NV Energy	590	7,831	7.5%	2023
Pacificorp	1,407	10,551	13.3%	2036-2038
Xcel (CO)	275	6,649	4.1%	2025
Consumers Energy	450	7,513	6.0%	2040

Kemp Reb. 10, PNM Table WK-1 Rebuttal.

<sup>244</sup> Kemp Dir. 13-14.



In regard to the Arroyo battery storage project, Kemp said that its maximum potential size of 150 MW is substantially greater than the 40 MW Vista Energy Storage facility connected to the SDG&E grid in California and that Clenera, the project's developer, has never constructed a battery energy storage facility before. He stated that such a large facility constructed far from the Albuquerque load center would lock PNM into existing technology for over 5% of its balancing area peak capacity. PNM would be less able to take advantage of projected declines in battery storage prices as well as future technological innovations. And PNM would likely be forgoing other advantages of ownership discussed below.<sup>245</sup>

Mr. Kemp emphasized, however, that his battery limits apply only to the initial storage procurement associated with San Juan replacement resources, i.e. for replacement resources beginning operations by 2023. He acknowledged that PNM expects that substantially more storage capacity (not necessarily all batteries or all lithium ion batteries) will be added in the medium and long term to meet resource needs for load growth or replacement of other existing generation resources to meet ETA goals. Moreover, the study commissioned by PNM with The Brattle Group found that the benefits to PNM's system could be maximized with the eventual addition of approximately 200 MW of 2-hour to 4-hour battery storage, or 10% of PNM's system peak.<sup>246</sup> Kemp recommended that decisions on storage project size, cumulative portfolio size, technology and location should be made in the context of those future resource procurement processes.<sup>247</sup>

PNM's witnesses confirmed that PNM will need additional battery resources in the future to back-up the renewable resources required to meet the RPS increases mandated by the REA

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<sup>245</sup> Kemp Dir. 23-25.

<sup>246</sup> Fallgren Dir., Exh. TGF-3, "The Value of Energy Storage to the PNM System," The Brattle Group (June 6, 2019), p. 11 of 45.

<sup>247</sup> Kemp Reb. 4-5.

amendments in Senate Bill 489 and to replace retiring natural gas units, such as the expiration of the 150 MW PPA for the Valencia gas plant in 2028 and the expected retirement of the 154 MW Reeves plant in 2030.<sup>248</sup> Mr. Phillips presented tentative resource expansion plans for PNM's EnCompass modeling of PNM Scenarios 1, 2 and 3, all of which included large additions of battery storage through 2038. Even in PNM Scenario 3, which included all renewables and 410 MW of batteries (and which PNM did not recommend) for 2022, PNM projected the need for an additional 580 MW of battery storage by 2038 (60 MW in 2023-2025, 240 MW in 2026-2030, 250 MW in 2031-2035, and 30 MW in 2036-2038).<sup>249</sup> Similar amounts were projected for these same time frames for PNM Scenario 1 (600 MW) and PNM Scenario 2 (560 MW).<sup>250</sup>

**(b) Safety**

Mr. Kemp testified that over 80% of utility-scale battery storage system capacity is provided by lithium-ion batteries. Despite these numbers, Kemp cautioned that lithium-ion chemistries, such as the battery storage projects proposed in response to PNM's RFP, have operational risks.<sup>251</sup>

Kemp explained that the most significant risk of lithium-ion battery chemistries is thermal runaway. Manufacturing defects or internal failures due to structural or operational stress can cause an internal short circuit that suddenly releases the energy stored in one or more battery cells. The temperature rises rapidly (within fractions of a second), creating temperatures of around

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<sup>248</sup> Tr. (Fallgren, Case 19-00018-UT) 442-44.

<sup>249</sup> Phillips Dir. 20, Table NLP-B (Corrected).

<sup>250</sup> Phillips Dir. 20, Tables NLP-A & NLP-B (Corrected).

<sup>251</sup> Kemp Dir. 9-10.

400°C. The battery cell becomes gaseous, and a fire erupts. If not isolated, this fire can spread quickly to adjacent cells, initiating a cascading chain reaction.<sup>252</sup>

Kemp noted there have been at least two well-publicized fires at utility-scale battery energy storage systems in the United States. In August 2012, a 15 MW battery installed by Xtreme Power on the Hawaiian island of Oahu burned for seven hours before firefighters could extinguish it. More recently, a battery fire at a 2 MW Phoenix-area project owned by Arizona Public Service sent several emergency responders to the hospital after suffering chemical burns. He said there have been at least 15 fires in battery energy storage systems in Korea so far in 2019, and there was a fire at a lithium-ion battery energy storage system in Belgium in November 2018.<sup>253</sup>

Kemp conceded, however, that battery technology is not unsafe, and “it is obviously an important part of the future of energy systems.”<sup>254</sup> He opined that, as the industry matures, risks from deficiencies in design and manufacturing will be reduced and operations and maintenance performance will be improved. Kemp, thus, recommends that PNM enter the market on a measured basis to allow it to understand better the technology risks and how to manage them, and to take advantage of the expected advancements in the storage technology’s safety and dependability rather than lock in existing technology that rapidly becomes obsolete.<sup>255</sup>

### **(c) Technological evolution**

Mr. Kemp stated that a variety of other energy storage technologies are on the horizon, including lithium metal, lithium sulfur, zinc, high temperature, flow batteries and high-power technologies. While they are not yet fully commercialized, Kemp said these technologies have

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<sup>252</sup> *Id.*

<sup>253</sup> Kemp Dir. 10-11.

<sup>254</sup> Kemp Dir. 11-12.

<sup>255</sup> Kemp Dir. 12.

potentially useful attributes, such as an increased number of charge/discharge cycles over the life of the system, the calendar life of the equipment, energy density, power density, cost, and relative safety.<sup>256</sup> He added that emerging lithium metal and zinc technologies include solid state battery technologies that are safer, more durable, and longer lasting than existing technologies on the market today.<sup>257</sup>

#### **(d) Cost**

Mr. Kemp also recommended a gradual approach in view of the price declines for battery storage his firm anticipates. With the sponsorship and participation of the investment bank, Lazard Freres, Kemp's firm prepares an annual Lazard Levelized Cost of Storage (LCOS) study, which incorporates data from over 300 interviews with storage manufacturers, engineering companies, and storage buyers.<sup>258</sup> He said the November 2018 study showed that the industry expects lithium-ion battery storage costs to decline at a rate of 8% per year through 2022. He noted that the anticipated declines are similar to the rapid drops in cost recently experienced by the PV solar and wind industries.<sup>259</sup>

Dr. Dorris stated that the National Renewable Energy Lab, Bloomberg New Energy Finance, and others are projecting steep declines in battery storage costs through 2025 and continued moderate declines through 2030. He said limiting battery procurement to 60 MW of 4-hour duration battery and 70 MW of 2-hour duration batteries strikes a reasonable balance between

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<sup>256</sup> Kemp. Reb. 17.

<sup>257</sup> Kemp Reb. 17-18.

<sup>258</sup> Kemp Dir. 17.

<sup>259</sup> Kemp Dir. 21-22.

the desire to avoid out-of-the-money investments in a declining cost technology while still taking a substantial step towards building the clean energy system of the future.<sup>260</sup>

**(e) Location**

Mr. Kemp said, as the electricity industry has become more sophisticated in its understanding of how the speed of response and flexibility of electrochemical storage can be used, locational optimization has become more important. Storage can deliver much more value than merely the arbitrage gains of shifting energy delivery by a few hours. Costs of new transmission and distribution (T&D) facilities can be deferred. Valuable ancillary services can be provided, such as spinning reserves, voltage support, frequency regulation, black start, congestion relief and resource adequacy. But to harvest fully these types of value, storage facilities should be located close to major load centers – ideally adjacent to transmission substations with multiple distribution interconnections.<sup>261</sup>

Mr. Kemp said co-locating with solar farms allows developers to take immediate advantage of the Investment Tax Credit of up to 30% of the total capital cost as well as accelerated depreciation. The primary disadvantages are location and limited control and operational ability. Since the batteries are being co-located with solar facilities, they are located in areas with lower land costs away from the Albuquerque load center where they will provide limited reliability and system benefits. Another disadvantage is the fact that they are co-located with the solar facility and will rely on upon solar charging for the first five years in order to qualify for the Investment Tax Credit. While solar charging has a cost advantage, the solar plus storage facilities will be

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<sup>260</sup> Dorris Dir. 27.

<sup>261</sup> Kemp Dir. 27.

prevented by the Investment Tax Credit rules from recharging with cheap excess wind energy from the grid at night and will therefore be unable to support the morning load ramp.<sup>262</sup>

In Mr. Kemp's opinion, it does not make sense to locate the bulk of PNM's storage capacity in a far corner of its system on the other side of a transmission constraint, as proposed in the Arroyo project. Kemp advised that PNM take on smaller facilities in multiple locations over a reasonable period of time. He said that approach would allow PNM to gain the valuable knowledge and experience related to both the operating control and maintenance of battery facilities as well as their locational value to the grid and to system reliability.<sup>263</sup>

#### **(f) Ownership**

Mr. Kemp identified three benefits of ownership. First, the proportion of storage value derived from short-duration, fast-reaction services is increasing. To harvest that value, Kemp explained the electric system operator (or balancing authority in organized markets) must have full automated control over storage dispatch. Dispatch through manual, discrete transactions is too slow.<sup>264</sup>

Second, Kemp stated that ownership could provide PNM with control over the optimal siting of batteries, to achieve the maximum benefits to the grid. Ownership can provide more location-specific benefits such as voltage control, reactive power response, T&D infrastructure deferral, and outage mitigation.<sup>265</sup>

Third, Kemp said utility ownership of some battery storage facilities will be critical for PNM gaining valuable knowledge and experience related to operating control and maintenance, the

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<sup>262</sup> Kemp Dir. 22-23.

<sup>263</sup> Kemp Dir. 25, 29.

<sup>264</sup> Kemp Dir. 28.

<sup>265</sup> Kemp Reb. 29-30.

locational value to the grid and system reliability, and future storage program expansion.<sup>266</sup> In particular, utility ownership will be important in gaining knowledge of the control systems that both protect the battery systems and allow for the maximum value of battery system to be realized across the PNM system.<sup>267</sup>

Mr. Kemp said that several intervenor witnesses have asserted that PPA contracts can give PNM “operational control” of a battery storage project, but the control given is provided within prescribed operational envelopes so as to ensure the maintenance expense does not exceed the amounts baked into the PPA price. Ownership and control by PNM will remove these constraints and allow PNM to test boundaries of storage operations patterns to maximize benefits to the grid, while assessing the impact on the battery systems.<sup>268</sup>

He also said the cost savings in the PPA model (vs. the EPC model) are small and could be outweighed by the reduced benefits caused by transaction inefficiency in dispatch and misalignment of asset management priorities.<sup>269</sup>

Thus, to Mr. Kemp reasoned that the best solution for customers is to allow PNM to own a substantial portion of the ultimate storage asset portfolio – while requiring price-competitive storage development costs.<sup>270</sup>

Dr. Dorris stated that, under utility ownership, PNM system operators will have complete flexibility to maximize battery storage across several value streams, including ancillary services, minimizing renewable curtailment, and capturing the value of price volatility in the EIM. He said

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<sup>266</sup> Kemp Dir. 28.

<sup>267</sup> Kemp Dir. 26.

<sup>268</sup> Kemp Reb. 29-30.

<sup>269</sup> Kemp Dir. 29.

<sup>270</sup> *Id.*

ownership provides system operators with the organizational learning needed to take on increasing amounts of battery capacity onto the system over time.<sup>271</sup>

Dr. Dorris further said that ownership eliminates the charging limits on combined solar and battery storage projects operated by third-party ESAs required to capture the full value of the investment tax credits. The credits are maximized by charging from the solar unit during the first five years of operation, instead of the grid. He said a stand-alone battery owned by the utility cannot take advantage of the tax credits, but it provides more operational flexibility and capacity contribution with full grid charging and no stranded state of charge limitations during events where the battery would be needed for reliability to provide energy.<sup>272</sup>

PNM also hired The Brattle Group to study the potential benefits of energy storage additions to PNM's system and to compare the advantages of a stand-alone utility-owned energy storage project to a PPA contract structure for storage that is co-located with a solar photovoltaic (PV) facility and owned by a third party. The Brattle study found that PNM's knowledge of its own transmission and distribution system would allow the company to site utility-owned storage in the most beneficial locations on the power grid, irrespective of whether that location is suitable for co-location with solar generation. Second, utility ownership of the battery storage would give PNM greater operational capabilities, including the flexibility to mitigate off-peak wind curtailments. The study found that a stand-alone energy storage system could charge during any hour of the day, rather than being constrained to charging from the output of the solar PV facility. The study also found that direct ownership would also provide PNM with options to modify the

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<sup>271</sup> Dorris Dir. 25.

<sup>272</sup> *Id.*



use of the storage device as operational experience is gained and market conditions change over time.<sup>273</sup>

**(g) PNM's inexperience with battery storage**

Steven Maestas, PNM's Director of Wholesale Power Marketing group, the unit responsible for all purchases and sales of electricity for PNM's balancing authority, for generation dispatch, for acquiring ancillary services for the balancing authority, and for complying with all North American Electric Reliability Corporation (NERC) requirements, said batteries appear to be evolving as part of the long-term solution to achieve a carbon-free generation fleet. But he cautioned that the initial phase of the introduction of the new technology requires additional time and planning to understand how batteries will integrate into the overall plan of operations to ensure reliability and to optimize its total value. Maestas stressed that utility-scale battery storage technology is entirely new to PNM and will require operational transformation. He claimed that relying on it as a replacement resource this soon or on the scale upwards of 450 MW is unreasonable at this time, given that the technology is relatively new to the industry and "very new to PNM."<sup>274</sup>

Mr. Maestas said PNM relies on the flexibility of its current three LM6000 natural gas units at Lordsburg and La Luz to manage the variability created by its wind and solar resources, but there are times in the year when the gas units may not provide the needed flexibility. Batteries can be part of the solution, Maestas allowed, but PNM's schedulers and traders need time and experience to best use the batteries to manage the reliability needs of the PNM system. Maestas

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<sup>273</sup> Fallgren Dir., Exh. TGF-3, The Value of Energy Storage to the PNM System, The Brattle Group (June 6, 2019), p. 2 of 45.

<sup>274</sup> PNM Exh. 42 (Maestas Reb.) 7.

posited that it does not make sense to place PNM in a “learn as you go” operating condition with such a large amount of battery storage as a percentage of the system.<sup>275</sup>

In addition to integrating batteries into the grid, Maestas said PNM needs to understand how they should be operated to preserve their longevity without forcing serious damage to them or reducing their useful life due to suboptimal use. He said PNM needs to work with software developers to establish protocols and strategies on how to cycle, charge, and discharge the battery banks. He said it is also necessary to account for and ensure proper use of the cycling patterns enforced by the battery manufacturers and contractual terms of the ESAs.<sup>276</sup>

Mr. Maestas agreed that the introduction of 130 MW of total battery capacity and the 40 MW limit at any single location is prudent. He also agreed that the first 70 MW of fully controlled utility-owned battery storage provides a high value for ancillary services as required in NERC and Western Electricity Coordinating Council (WECC) standards.<sup>277</sup>

### **iii. Responses to PNM’s qualitative analysis**

#### **(a) Limits on initial battery deployments**

The parties supportive of large initial battery deployments (and opposing PNM’s initial battery constraints) point out that the engineering firm hired by PNM to review the resource proposals received in response to PNM’s RFP selected the 150 MW battery storage component of the Arroyo solar/battery project as a Best in Class proposal to be included in PNM’s modeling.<sup>278</sup> HDR Engineering, Inc.’s Power Generation Practice conducted a methodical and detailed review

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<sup>275</sup> Maestas Reb. 8-9.

<sup>276</sup> Maestas Reb. 19-20.

<sup>277</sup> Maestas Reb. 22.

<sup>278</sup> See, e.g., CCAE BIC 36-39.

of the proposals over more than a year. HDR's review included quantitative and qualitative reviews and interviews and site visits.

The leader of the HDR group, Roger Nagel, is a Registered Professional Engineer with a degree in Mechanical Engineering. He has more than 27 years of experience in the power generation industry, including 17 years with HDR serving as an Owner's Engineer and power generation consultant engaging with coal, natural gas, biomass, biogas, solar, wind, waste-to-energy, geothermal power generation technologies, and various forms of energy storage including batteries, compressed air energy storage, and pumped hydro energy storage.<sup>279</sup>

HDR's designation of the Arroyo project as the "best in class bid" was based on an evaluation of bids providing both the lowest total evaluated delivered cost of energy and presenting the lowest risk to the timely and successful execution of the project. "Project characteristics and risks associated with technology, permitting, land acquisition and transmission interconnection and network upgrades were considered for this best-in-class characterization."<sup>280</sup>

In addition, the initial SERVVM modeling conducted without battery size constraints subsequently performed by Astrapé on the Best in Class Tier 1 resources selected as the least cost portfolio a group of resources that included the full Arroyo project with the 150 MW of battery storage. The portfolio also included seven gas turbines and the Jicarilla project (50 MW solar, 20 MW battery). Mr. Wintermantel found that, "[b]ased on the HDR analysis and pricing, the 300 MW solar/150 MW battery offer was the lowest cost battery option."<sup>281</sup>

The SERVVM modeling conducted on the Tier 2 RFP responses, again without battery constraints, also indicated that the full Arroyo project with the 150 MW of battery resources was

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<sup>279</sup> PNM Exh. 29 (Nagel Dir.) 1-2.

<sup>280</sup> Nagel Dir. 18.

<sup>281</sup> Wintermantel Dir., Exh. NW-2, p. 52.

part of the least cost portfolio. This portfolio included six gas turbines, the full Arroyo and Jicarilla projects and an additional 20 MW of battery storage.<sup>282</sup>

Mr. Kemp's battery constraints appear to be unprecedented in utility resource planning. None of the witnesses for any party, including PNM's engineering and modeling witnesses, were aware of any other utility that has used constraints on battery size.<sup>283</sup> In response to discovery requests, PNM and Mr. Kemp also said they are not aware of any other utility that has limited individual battery projects to 40 MW or aggregate battery capacity to 5% of peak load.<sup>284</sup>

PNM admitted that it did not perform any cost-benefit analysis of the battery constraints and that Mr. Kemp's concerns regarding battery storage are not based on analysis or surveys of utility best practices. Mr. Kemp also acknowledged that he did not rely upon a comprehensive survey of the detailed procurement or resource planning processes of U.S. utilities or other state commissions.<sup>285</sup>

CCAE witness Mihir Desu provided two examples of currently operating battery systems that exceed 40 MW. The first is the 100 MW Hornsdale Power Reserve battery storage system co-located with the Hornsdale Wind Farm in South Australia which has been operational since 2017. Desu said a 50 MW expansion was announced in November 2019 and was expected to be complete in the first half of 2020.<sup>286</sup>

The second is the 48 MW EnspireME battery storage project, a joint venture between Eneco, a Netherlands-based renewable energy company and Mitsubishi Corporation, located in

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<sup>282</sup> Wintermantel Dir. 21-22.

<sup>283</sup> See e.g., Tr. (Maestas) 1703; Tr. (Wintermantel) 917-19.

<sup>284</sup> Goggin Dir. 54-55.

<sup>285</sup> Goggin Dir. 52.

<sup>286</sup> CCAE Exh. 10 (Desu Dir.) 24.

Jardelund, Germany. He said NEC Energy Solutions (NEC) completed and commissioned the project in June 2018.<sup>287</sup>

Mr. Desu and Sierra Club witness Michael Goggin also listed examples of utilities with battery projects larger than 40 MW under construction or in advanced development. The projects Mr. Goggin identified are listed in the following table.

Size of battery project	Utility or Developer	Location
409 MW	Florida Power & Light	Florida
316 MW	LS Power	Queens, New York
300 MW	Vistra	Moss Landing, CA
300 MW	8minute Solar Energy	Los Angeles, CA
250 MW	Salt River Project	Arizona
200 MW	Western Farmers Electric Coop	Oklahoma
182.5 MW	Tesla	Moss Landing, CA
100 MW	APS and AES	Arizona
100 MW	8minute Solar Energy	Oxnard, CA
100 MW	8minute Solar Energy	Alamitos, CA
60 MW	8minute Solar Energy	Goleta, CA

Goggin Dir., 53, Table 3: U.S. Battery Projects Larger Than 40 MW Maximum PNM Used in Modeling.

Mr. Desu's additional examples include:<sup>288</sup>

- 400 MW battery for the Anbaric Renewable Energy Center in Massachusetts announced by Commercial Development Company, Inc. (CDC)'s Brayton Point LLC and Anbaric
- 380 MW battery for the Gemini Solar + Battery Storage Project owned by Solar Partners XI, LLC and contracted with NV Energy

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<sup>287</sup> Mr. Desu also cited four 40 MW projects in operation at the time of his testimony:

- 40 MW commercial-scale pilot project at Tohoku Electric's Nishisendai transmission substation in Japan, constructed by the Toshiba Corporation and commissioned in February 2015
- 40 MW battery system in the Minami-Soma Substation Project, Japan, constructed by the Toshiba Corporation and operated by Tohoku Electric Power Company started operations in early 2016
- 40 MW facility in Glassenbury in Kent, United Kingdom was connected to National Grid in August 2016, constructed by VLC Energy, and became operational by the end of 2017
- 40 MW Vista Energy battery storage system in California completed in summer 2018, owned by LS Power Development LLC and operated by Vista Energy within CAISO

Desu Dir. 23-25.

<sup>288</sup> Information collected through the S&P Global Market Intelligence Platform.

- 135 MW battery for the Southern Bighorn Solar & Storage Center owned by 8minute Solar Energy LLC, and contracted with NV Energy
- 75 MW battery in the Arrow Canyon Solar Project owned by EDF Renewables Inc. and contracted with NV Energy

Mr. Desu said the 300 MW and 182.5 MW Moss Landing projects are expected to come online in 2020, and the 409 MW FPL and 316 MW Ravenswood projects are expected to come online in 2021. The others are expected to be operational in 2022 and 2023.<sup>289</sup> Several of these plants (e.g., Moss Landing, Ravenswood, Salt River, and the southern California projects) will replace fossil-fuel generating stations.<sup>290</sup>

Mr. Desu and Mr. Goggin also provided examples of systems and regions that are planning storage deployment higher than 2-5% of their system peak. Arizona Public Service, for example has stated a goal of 850 MW by 2025 or approximately 10% of its peak load. NV Energy recently announced intention to build 560 MW by 2023 or approximately 7.5% of its load. Mr. Goggin emphasized these are not caps.<sup>291</sup> Hawaii regulators have already approved 262 MW, 1053 MWh of battery storage to come online by the end of 2021, equal to approximately 15% of its system peak on an islanded system with no access to imports. In addition to that, another 15 MW project has already been proposed and is awaiting approval from the Hawaii Public Utility Commission.<sup>292</sup>

### **(b) Safety**

Addressing Mr. Kemp's concern about safety, Mr. Desu stated that the risk of thermal runaway cited by Mr. Kemp is overstated. Desu testified that lithium-ion technology is an advanced technology. He said all energy technologies have safety risks, citing a 2010 explosion at

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<sup>289</sup> Desu Dir. 21-23.

<sup>290</sup> Desu Dir. 14-19.

<sup>291</sup> Goggin Dir. 58.

<sup>292</sup> Desu Dir. 20-21.

a combined cycle gas plant in Connecticut.<sup>293</sup> He acknowledged that safety is a priority, and the risks can be best addressed by adherence to established standards and codes.<sup>294</sup> He also noted that the Arroyo ESA shifts the technological risk of thermal runaway or other problems from PNM to the project owner.<sup>295</sup>

Mr. Desu said the isolated problems cited by Mr. Kemp have occurred with older battery technology. Advances in technology and in the various electrical and fire prevention codes that apply to stationary batteries have addressed those concerns.<sup>296</sup> He said, despite the Arizona fire cited by Kemp, APS is moving ahead with a large-scale 100 MW battery procurement, and another Arizona utility, Salt River Project, is pursuing an even larger, 250 MW project.<sup>297</sup>

Mr. Goggin also stated that the potential loss of an entire large battery facility is not a sufficient risk to justify limiting the size of battery projects. Goggin said he is not aware of a thermal event at a lithium ion battery installation that has resulted in the loss of more than a single battery container. He said large battery facilities are comprised of many compartmentalized battery containers that are typically spaced out from each other. The individual containers, and even the modules within them, are designed to extinguish and contain any thermal events. The National Fire Protection Association, the entity that sets fire protection standards, has confirmed that in tests

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<sup>293</sup> Desu Dir. 33-34. NEE also cited the 2000 explosion of an El Paso Natural Gas pipeline, the supplier chosen by PNM for the Piñon gas plant, that killed 12 people. NEE BIC 30.

<sup>294</sup> NEE BIC 30.

<sup>295</sup> NEE BIC 35.

<sup>296</sup> Goggin Dir. 55, *citing* Sarah Van Cleve, “Tesla Response to Commissioner Kennedy’s August 2<sup>nd</sup> Letter Regarding Lithium-Ion Battery Safety/Docket No. E-01345A-19-0076,” (Aug. 19, 2019), *available at* <https://docket.images.azcc.gov/E000002454.pdf>, and APS, “An investigation with APS, first-responder representatives and third-party engineering and safety experts is under way into April 19 equipment failure at McMicken battery facility in Surprise,” (Apr. 25, 2019), *available at* <https://www.aps.com/mcmicken>.

<sup>297</sup> Goggin Dir. 55-56, *citing* Tim Sylvia, “SRP Joins the Big Boys of Battery Storage,” (Nov. 15, 2019), *available at* <https://pv-magazine-usa.com/2019/11/15/srp-joins-the-big-boys-of-battery-storage/>; and Julian Spector, “The Biggest Batteries Coming Soon to a Grid Near You,” (Sept. 3, 2019), *available at* <https://www.greentechmedia.com/articles/read/the-biggest-batteries-coming-soon-to-a-grid-near-you>.

of stationary battery containers in which it deliberately started fires inside individual battery modules: “Thermal runaway did not spread outside the initiator pod” and the surrounding battery modules inside the same container even remained functional.<sup>298</sup> Desu also cited a comprehensive body of codes, standards, and best practices relating to energy storage in general and battery-based systems.<sup>299</sup>

Mr. Goggin said there is no compelling evidence that smaller battery sites offer lower safety risk than larger battery sites. He said large battery installations are just comprised of more of the same compartmentalized containers that make up small and medium-size installations, such that the risk of failure of a container should be unaffected by project size.<sup>300</sup>

Mr. Goggin also presented examples of gas pipeline supply interruptions, such as the 2011 interruption in New Mexico and the rest of the Southwest, causing plant outages. Goggin said NERC has specifically identified the region that includes New Mexico as being at risk of electric reliability problems if gas supply interruptions occur, in large part because gas accounts for more than half of the Southwest Reserve Sharing Group’s generating capacity.<sup>301</sup>

### **(c) Technological evolution**

Mr. Desu testified that utility-scale battery storage has been deployed successfully and received significant support from regulators, utilities, developers, and other stakeholders. By the time the San Juan Generating Station retires, the utility-scale battery power capacity installed in the U.S. will have nearly tripled and installations significantly larger than 40 MW will be operating.

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<sup>298</sup> Goggin Dir., 57, *citing* Andrew Blum and R. Thomas Long Jr., “Lithium Ion Battery Energy Storage System Fires,” at 61, (Mar. 2, 2016), *available at* <https://www.nfpa.org/-/media/Files/News-and-Research/Resources/Research-Foundation/Symposia/2016-SUPDET/2016-Papers/SUPDET2016BlumLong.ashx?la=en>.

<sup>299</sup> Desu Dir. 34.

<sup>300</sup> Goggin Dir. 57-58.

<sup>301</sup> Goggin Dir. 41-44.



Desu said lithium-ion batteries are not a technology in its early generations. He asserted that energy storage has received a vote of confidence by policy makers, regulators, analysts, investors, utilities, non-governmental organizations, and international institutions through tangible projects, significant financial commitments, legislation, and policies.<sup>302</sup>

**(d) Cost**

Mr. Desu also testified that while costs are expected to decline, the system modeling shows a need now, not in the future. He also stated that it is cost-effective to add the storage resources now, when it is needed, regardless of future cost decreases.<sup>303</sup> Mr. Goggin agreed. He reasoned that if batteries are the most cost-effective option for meeting PNM's current need for capacity and other services, as PNM's analysis indicates, it would be irrational to deploy a more expensive resource now to wait to deploy batteries in the future. If batteries become even more cost-effective in the future, then PNM can evaluate procuring more batteries at that point in time.<sup>304</sup>

Desu and Goggin also said several factors may counteract the expected battery cost declines expected by Mr. Kemp. First, the availability of the federal Investment Tax Credit for batteries co-located at solar sites begins to phase down from 30% at the end of 2019 to 10% by 2022. Kemp cites expectations that batteries will see 8% per year cost declines through 2022, which is roughly comparable to the 7% per year drop from the 30% ITC to the 10% ITC. Rapid demand growth for lithium-ion batteries for plug-in vehicles, as well as economic factors ranging from potential tariffs to potential shortages of raw materials like cobalt, could also offset the expected price reductions.<sup>305</sup>

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<sup>302</sup> Desu Dir. 32-33.

<sup>303</sup> Desu Dir. 42.

<sup>304</sup> Goggin Dir. 60-61.

<sup>305</sup> Goggin Dir. 61.

They also note PNM's acknowledgment in its briefs of the special cost advantage available now for the Arroyo project, which made it the preferred choice in the portfolios recommended by PNM and other parties in this case: "PNM received a low cost bid from Clenera which included a combined 300 MW PV facility coupled with a single 150 MW battery storage facility. The favorable cost of this project is largely attributable to the ability of the combined battery storage to take advantage of investment tax credits associated with solar PV."<sup>306</sup> Indeed, Mr. Kemp admitted that he could not say, when the tax credits are considered, whether the future total cost of batteries will be cheaper or more expensive than current battery prices.<sup>307</sup>

Mr. Goggin stated that PNM's artificial limits on the size of battery projects made batteries more expensive by reducing economies of scale.<sup>308</sup> He noted that PNM concedes that its battery limits impose a real cost on ratepayers, and when the battery limits are removed, there are portfolios with a NPV lower than Scenario 1.<sup>309</sup> Goggin estimated that the battery limits would cost PNM's ratepayers between \$25 million and \$100 million on a NPV basis.<sup>310</sup>

#### **(e) Location**

While the location of most of the replacement resources may not be ideal from a resource planning perspective, the ETA clearly favors maximization of resources located in Northwest New Mexico. In addition, CCAE witness Tyler Comings points out that the location of the resources in

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<sup>306</sup> PNM BIC 54.

<sup>307</sup> Tr. (Kemp) 671.

<sup>308</sup> Tr. (Kemp) 633-34.

<sup>309</sup> Phillips Reb. 46; Wintermantel Dir. 20; Wintermantel Reb. 24; Tr. (Kemp) 655.

<sup>310</sup> Goggin Dir. 49, 52.

CCAE 1 in the Northwest part of the state approximates PNM's current location for its San Juan plant, of which PNM owns almost 500 MW, and which will be abandoned.<sup>311</sup>

**(f) Ownership**

CCAE and Sierra Club witnesses testified that third parties can build and sell battery storage services to PNM through Energy Storage Agreements in a manner that enables PNM to operate the battery units as if the units are owned by PNM.

WRA witness O'Connell said that while he can understand PNM's rationale that only a company-owned battery resource can provide PNM the flexibility and operational discretion it needs, it is still possible that a non-owned resource could meet those needs. He asserted that a stand-alone battery storage RFP or bid refresh that permitted ESAs which provided operational discretion to PNM should have been undertaken after the ETA was passed, because of the ETA's provisions supporting stand-alone battery storage. O'Connell said it is likely that utility ownership would be the best option to provide PNM the operational flexibility needed to maximize stand-alone battery benefits, but that should be confirmed by a robust competitive bidding process. He also said an ESA provider would not likely be willing to allow the utility's unconstrained use of the facility, or the provider would ask for a higher price to cover the risk associated with allowing the utility the full discretionary use of the battery as contemplated by the ETA. Nevertheless, he said his assumptions should be tested with an additional RFP process.<sup>312</sup>

In fact, the ESAs for the Arroyo and Jicarilla projects provide PNM with the right to control the battery system via Automatic Generation Control<sup>313</sup> "to its fullest capability," except

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<sup>311</sup> CCAE Exh. 17 (Comings Dir.) 6.

<sup>312</sup> O'Connell Dir. 27.

<sup>313</sup> Automatic Generation Control is defined as energy management system equipment that automatically adjusts the quantity of charging and discharging energy to and from the batteries. *See, e.g.*, Fallgren Dir., Exh. TGF-10, p. 9 of 100.

that during the first five years of the ESA the batteries must be charged exclusively from the associated solar facilities (to remain eligible for the tax credits for solar/battery hybrid facilities).<sup>314</sup> The PPAs provide for the establishment of an operating committee of PNM and battery owner representatives to develop mutually agreeable written operating procedure to integrate the batteries into PNM's system, including methods of day-to-day communications; operations and maintenance scheduling and reporting; scheduling and forecasting practices; and daily capacity, charging energy and discharging energy reports.<sup>315</sup> The PPAs also include a list of typical dispatch scenarios to be anticipated by the parties.<sup>316</sup>

Mr. Desu said the authorized rate of return on capital invested in rate base creates an underlying bias that can affect PNM's selection of an optimal resource portfolio. For PNM, advocating for utility ownership of energy storage resources is logical, rather than allowing a third party to own an energy storage resource and provide its services to PNM.<sup>317</sup>

Mr. Desu agreed with Mr. Kemp that utility control over stand-alone battery systems can be valuable in order to fully capture the value of storage. But Desu said the necessary control can be provided through an ESA. He said PNM can issue an RFP communicating preferred battery locations and outlining a contract structure that allows for utility control strategies. He said most utilities and Independent System Operators simply send control signals to the battery unit's Automated Generation Control system to charge and discharge each battery.<sup>318</sup> He also cited three

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<sup>314</sup> See, e.g., Fallgren Dir., Exh. TGF-10, ¶ 4.1(B), p. 30 of 100.

<sup>315</sup> See, e.g., Fallgren Dir., Exh. TGF-10, ¶ 10.5(A), p. 42 of 100.

<sup>316</sup> See, e.g., Fallgren Dir., Exh. TGF-10, Exhibit H, p. 86 of 100.

<sup>317</sup> Desu Dir. 35-36.

<sup>318</sup> Desu Dir. 36-37.

examples of ESAs (involving Consolidated Edison, NV Energy, and Los Angeles Department of Water and Power) that provide the utilities with such controls.<sup>319</sup>

**(g) PNM's inexperience with battery storage**

Despite PNM's lack of experience operating batteries on its system, Mr. Kemp conceded that, during the two years before the batteries proposed here would come online in 2022, PNM's lack of experience could be cured by hiring an experienced operator from another state.<sup>320</sup> Mr. Maestas acknowledged that others inside PNM may have more familiarity with PNM's ability to integrate batteries. He said he was not involved in the RFP discussions regarding how batteries would be used on PNM's system or any discussions about adapting PNM's software.<sup>321</sup> Maestas said that, during the RFP process, there had been numerous site visits to California and Nevada that coworkers, as well others in his department, had attended, and that others are reaching out to other utilities in the U.S. to understand the challenges they have faced and the types of batteries they are using. He also said there is a department within PNM that is responsible for innovation and the development of the software needed to assist with the integration. Maestas said they are in contact with software developers to understand the capabilities of their systems. So, as PNM heads down the path toward using batteries, his group will get more involved and reach out to other utilities.<sup>322</sup>

Goggin stated that PNM's lack of experience creates more of an economic risk more than a reliability risk. He said, as an example, PNM may not be able to fully use some of the extremely fast response capabilities to provide primary frequency response.<sup>323</sup>

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<sup>319</sup> Desu Dir. 39-40.

<sup>320</sup> Tr. (Kemp) 628.

<sup>321</sup> Tr. (Maestas) 1729-32.

<sup>322</sup> Tr. (Maestas) 1725-27. Mr. Maestas said the innovation group is more involved in reaching out on an ongoing basis to other utilities to gain experience about operating batteries. He said the group does a lot of research on batteries and software and is actively keeping an eye on the market. Tr. (Maestas) 1758-59.

<sup>323</sup> Tr. (Goggin) 2022-23.

Goggin testified that he is not aware of a reliability risk with large battery deployments. As noted above in the discussion on safety, he said the modular and compartmentalized configurations of batteries at the battery sites, mean that the reliability risk of large deployments is no greater than the risks associated with small or medium-size installations.<sup>324</sup>

Goggin also said the batteries at issue in this case are at least 2 ½ years away from deployment. In his opinion, PNM has sufficient time to bring in consultants, learn best practices from other utilities that have experience operating with more batteries and develop software, and train staff and operators.<sup>325</sup>

#### **h. Public interest**

In addition to “reliability,” Subsection 3(F) of the ETA establishes the “public interest” as a potential limiting factor on the amount of replacement resources to be located in the CCSD.<sup>326</sup> Section 3 prescribes factors that, when balanced by the Commission, can likely be interpreted as serving the public interest. One issue, however, that does not fall squarely within the explicitly named factors is the potential for any natural gas turbines to become “stranded assets.” PNM’s proposed addition of natural gas resources raises an obvious and significant question that PNM and other natural gas supporters sidestep and defer to the future. But it deserves attention here.

PNM says it will stop burning natural gas as a fuel for its proposed LM6000 turbines in 2040 – some 22 years before the end of the units’ 40-year useful lives. And the turbines could be recommended and approved for retirement even before 2040 if prices for renewables continue to

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<sup>324</sup> Goggin Dir. 56-58; Tr. (Goggin) 2023.

<sup>325</sup> Tr. (Goggin) 2023-24.

<sup>326</sup> NMSA 1978, § 62-18-3(F) (“ . . . provided that such resources are located in the school district in New Mexico where the abandoned facility is located, are necessary to maintain reliable service and *are in the public interest* as determined by the commission.”) (emphasis added).

decline or if additional renewable resources are needed to satisfy the increased RPS standards and the capacity provided by the gas units is no longer needed.<sup>327</sup>

As expounded above, PNM witnesses said it might be possible to convert the units to burn hydrogen or recycled natural gas. Or PNM also has the option to sell the units back to the supplier.

PNM's witnesses suggest that, in the rate case in which PNM seeks to start recovering the units' costs, PNM may seek an 18-year depreciation schedule to fully recover the costs before 2040. The suggestion is that an accelerated recovery might be reasonable, given that PNM's modeling includes an 18-year recovery period and still produces the 20-year NPV values that PNM is relying upon to support its replacement resource portfolio. But, still, would that be fair to PNM ratepayers if the units' service lives are, in fact, longer and if PNM or a successor is able to receive additional value from the units after 2040? Also, if the units can be converted to different fuels, what will be the capital costs required for the conversions and what will the future variable costs be?

Furthermore, if the units are returned to the supplier, presumably for future use by another entity, will the CO<sub>2</sub> emission reductions sought to be achieved by the ETA and Senate Bill 489 be thwarted?

### **C. Recommended Resource Portfolios Based on Analyses of Relevant Balancing Factors**

The balancing of the factors in Section 3 of the ETA is a policy decision for the Commission. The Hearing Examiners respect that prerogative and do not aim or intend to make that decision for them.

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<sup>327</sup> See, e.g., Tr. (Fallgren) 182-86; Tr. (Darnell) 985-89.

Assuming, however, that the Commissioners look to the Hearing Examiners for guidance on the interpretation of the ETA and any intent expressed in the ETA on how the Commissioners should balance the relevant factors, the Hearing Examiners provide the following analysis.

### **1. Balancing the preferences in the ETA**

The ETA highlights the factors that should receive preference. Most prominent is the legislature's intent to locate resources in the CCSD to replace the abandoned resources at San Juan. That intent is made clear in Section 3 of the ETA. The parties disagree on the exact amount of resources Section 3(F) requires to be located in the CCSD (e.g., up to 450 MW, at least 450 MW, etc.), but there is no doubt that the legislature intended the location of resources in the CCSD to be a priority, and potentially the highest priority. Section 3(A) also indicates that the Commission should consider the economic development opportunities provided by the replacement resources and their ability to provide jobs with comparable pay and benefits to the jobs lost due to the abandonment of San Juan.

Beyond location, Section 3(B) also prominently states that projects with the least environmental impacts should receive preference. Indeed, a consistent and, to most parties' view, dominant theme of Senate Bill 489 has been the creation of an ambitious energy policy which transitions PNM's system away from fossil fuels to renewable resources and reduces CO<sub>2</sub> emissions. The ETA facilitates the retirement of coal-fire facilities, and the REA amendments in Senate Bill 489 require increased deployments of renewable resources and, ultimately, a carbon-free system by 2045.<sup>328</sup> PNM seeks to achieve a carbon free system even sooner, by 2040. Senate

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<sup>328</sup> NMSA 1978, § 62-16-4.



Bill 489 also provides for the establishment of strict limits on CO<sub>2</sub> emissions for any coal-fired generating plants that continue to operate after January 1, 2023.<sup>329</sup>

Reliability is also identified, but it is listed as a limiting factor on the amount of replacement resources to be included in the CCSD. The public interest is similarly mentioned in Section 4(F), again as a limiting factor to be “determined by” and, thus, in the Commission’s discretion.

Significantly, cost and any preference for the lowest cost replacement resources are not explicitly mentioned as factors to be preferred. Cost is included as a factor for PNM in ranking the proposals it receives. But nothing more is said. Traditional ratemaking standards require the Commission to consider cost, but the structure of Section 3 of the ETA suggests that cost need not be the primary factor and that the other more prominently specified factors may outweigh cost in the balancing process.

Applying the framework of the ETA to the evidence, the Hearing Examiners find the No Gas portfolio in CCAE 1 is the preferred choice. CCAE 1 and PNM Scenario 2 would locate 430 MW and 570 MW in the CCSD respectively. CCAE 1 and PNM Scenario 2 would also place the largest dollar amount of resources in the CCSD and provide the largest replacement to the CCSD’s tax base. The dollar amounts are similar: CCAE 1’s \$447 million compared to PNM Scenario 2’s \$425 to \$485 million.

But CCAE 1 would also provide an additional \$430 million of capital investment and an additional 700 construction jobs in nearby McKinley County and the Jicarilla Apache reservation in Rio Arriba County. Because PNM Scenario 2 does not include the Arroyo and Jicarilla projects, it would provide no capital investment in McKinley County and the Jicarilla Apache reservation.

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<sup>329</sup> NMSA 1978, § 74-2-5(B)(1)(b).

PNM's other proposed scenario, Scenario 1, would only locate 280 MW in the CCSD. PNM Scenario 1 would also provide only \$210 capital investment in the CCSD, although it would provide the \$430 million in capital investment it estimates from the Arroyo and Jicarilla projects in McKinley County and the Jicarilla Apache reservation.

The environmental preference also clearly favors CCAE 1. CCAE 1's solar and battery units would emit no CO<sub>2</sub> or other air pollutants. Since the resources in CCAE 1 use no fuel, they also have the highest possible ratio of capital costs to fuel costs. PNM Scenario 2, however, would install 11 new natural gas turbines, an approach that is inconsistent with the ETA's and REA's joint policy of transitioning away from fossil fuel resources and reducing CO<sub>2</sub> emissions. The 11 natural gas units would also not satisfy the preferences in Section 3(B) for resources with the least environmental impacts and with higher ratios of capital costs to fuel costs.<sup>330</sup>

Moreover, the uncertainties associated with the future of the proposed natural gas units weigh negatively in the balancing of the factors required to select a suitable replacement portfolio. The addition of 440 MW of natural gas turbines in PNM Scenario 2 poses a substantial and large risk of stranded costs. It also poses the risk of continued CO<sub>2</sub> emissions even after 2040 if the units, with their 22 remaining years of service life, are transferred to another owner.

Both CCAE 1 and PNM Scenario 2 are reliable. PNM disputes the assumptions on which the quantitative modeling for CCAE 1 achieves the LOLE reliability standard. But the evidence credibly presented by Dr. Milligan and others shows that the assumptions underlying CCAE's modeling for the CCAE 1 portfolio (i.e., for the Four Corners EFOR and the 300 MW import limits), while less conservative than PNM's proposals, are still reasonable.

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<sup>330</sup> Section 3(B) states that in determining whether to approve replacement resources, the commission shall prefer resources with the least environmental impacts, those with higher ratios of capital costs to fuel costs and those able to reduce the cost of reclamation and use for lands previously mined within the county of the qualifying generating facility. NMSA 1978, § 62-18-3(B).

Mr. Kemp's qualitative recommendation for a more gradual initial procurement of batteries, with specified battery limits, is a cautious approach that a utility might reasonably follow in the abstract, but it is also an approach that is unnecessarily conservative, especially in view of the express mandate in Senate Bill 489 that electric utilities rapidly transition away from the use of fossil fuels. The examples provided by Mr. Desu and Mr. Goggin of utilities' plans for more and larger battery deployments demonstrate that the industry is moving swiftly toward the increased use of battery storage. They confirm that Mr. Kemp's approach is overly constrained.

Similarly, Mr. Kemp's concerns about safety appear to be exaggerated. He cites two incidents in the U.S. in recent years, but the battery storage industry has developed and implemented safety codes to address the risks. And the electric industry is proceeding at full pace to use lithium-ion batteries. As a matter of fact, the large planned projects cited by Mr. Desu and Mr. Goggin are all expected to use lithium-ion batteries. For additional perspective, evidence was presented of the risks and accidents associated with the natural gas generation process.

While storage technology may evolve and improve in the longer term, PNM has a current need for the technology that currently exists, and PNM's planning shows it will have further substantial needs for storage in the longer-term. PNM will be able to take advantage of the anticipated improvements in storage technology in the near future as it adds renewable resources to comply with increasing RPS requirements and as it retires gas plants and replaces them with a combination of renewable and storage resources.

Although the costs of the technologies may decline over the next few years, the countervailing reduction of tax credits may offset those declines. Most significant, PNM needs to add resources now, and the record indicates that it has received advantageous pricing for batteries in this RFP, partly due to the tax credits associated with the hybrid solar/battery storage facilities. Significantly, one of the reasons given by Mr. Fallgren for not wanting to reissue the all source

RFP after the enactment of the ETA is the “extremely low priced solar PPAs” of the Arroyo and Jicarilla projects in PNM Scenario 1. He said the low prices were partly the result of the declining tax credits and that the low prices may no longer be available with a newly-issued RFP.<sup>331</sup>

The cost to ratepayers under CCAE 1 is higher than under PNM Scenario 2 – \$77 million NPV greater over 20 years, requiring an additional annual revenue requirement of approximately \$8.344 million. Nevertheless, the ETA places a preference for portfolios with the desired location and lesser environmental impacts. The difference, moreover, may be substantially less and may be reversed if the Commission considers the social costs of the CO<sub>2</sub> emissions that would be incurred with the 11 new natural gas units in PNM Scenario 2 or any of the other portfolios that incorporate natural gas turbines. The potential waiver of Paragraph 40 of the Modified Stipulation from Case No. 13-00390-UT (addressed in Section V.G below) would also save ratepayers \$17.5 million of costs for REC purchases previously committed to be acquired by PNM and to be recovered from ratepayers.

PNM can also gain the experience to deploy the batteries in the next two years before their full deployment. Indeed, Mr. Maestas said others within PNM are currently and actively pursuing the implementation of battery storage technology.<sup>332</sup>

Moreover, the approval of CCAE 1 would accelerate PNM’s progress toward satisfying the increased RPS established in the 2019 Renewable Energy Act Amendments in Senate Bill 489. Mr. Fallgren testified that the 350 MW of renewables in PNM Scenario 1 would likely provide 34% of PNM’s retail sales with renewables.<sup>333</sup> The 650 MW of solar resources added in 2022 with CCAE 1 would more than double PNM’s existing and approved renewable resources and might

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<sup>331</sup> Fallgren Dir. 18-19 (Corrected).

<sup>332</sup> Tr. (Maestas) 1725-32, 1758-59.

<sup>333</sup> Fallgren Dir. 9-10, Table TGF-1.

satisfy the 40% RPS for 2025 without the need and cost required to procure additional renewable resources after this case.<sup>334</sup> The other portfolios, especially PNM Scenario 2, would require the addition of substantial amounts of renewable resources after 2022 to meet the 2025 RPS.<sup>335</sup>

## **2. Balancing under the least cost preference in traditional resource decision-making**

If, however, the Commission prefers a different balance, i.e., a balance that elevates the Commission's traditional focus on lowest costs to ratepayers over the maximum amount of resources to be located in the CCSD, the Hearing Examiners recommend the lowest cost portfolios with minimal amounts of natural gas turbines. These would include Sierra Club Tier 2-4 with five

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<sup>334</sup> Mr. Fallgren did not show the details of his 34% calculation. But in very approximate terms, if the addition of 350 MW of renewable energy is expected to produce 34% of PNM's retail sales by 2023 and if Mr. Fallgren used a 33% solar capacity factor, the addition of 350 MW of renewable resources should generate 1,011,780 MWh of renewable energy (350 MW × 8,760 hours & 33%). If the 1,011,780 MWh is added to the 1,918,398 MWh PNM estimated in Case No. 19-00159-UT to be generated from renewable energy in 2021, the total renewable energy generated from PNM Scenario 1 would be 2,930,178 MWh. If 2,930,178 MWh is 34% of PNM's total retail sales, PNM's total 2023 retail sales that are the basis for the RPS calculation would total 8,618,171 MWh. Similarly, if PNM were to add 650 MW of renewable resources in CCAE 1, the 650 MW would generate 1,879,020 MWh of renewable energy. PNM's total renewable portfolio would then generate 3,797,418 MWh of renewable energy, which would be 44% of PNM's 8,618,171 MWh of retail sales.

<sup>335</sup> According to the record in PNM's 2020 Renewable Energy Plan case, PNM's existing and approved renewable resources include 157 MW of solar PV, 442 MW of wind, and 14 MW of geothermal resources. Case No. 19-00159-UT, Recommended Decision (Dec. 2, 2019) at 19-23, *approved* by Final Order Adopting Recommended Decision, (Jan. 29, 2020).

It is not clear, however, whether CCAE 1's satisfaction of the 2025 RPS early in 2022 will produce any NPV savings over another portfolio, such as PNM Scenario 2, that adds resources after 2022 to satisfy the 2025 RPS in 2024. It depends upon the model used to calculate the NPVs.

The EnCompass model determines resource portfolios that will meet the 2025 RPS regardless of the timing in which the resources are added (i.e., in 2022, 2023 or 2024) so long as the portfolios satisfy the 2025 RPS in 2025. The EnCompass model produces portfolios with sufficient resources to satisfy the 2025 RPS, such that no additional resources will need to be added for that purpose. *See* Phillips Dir., NLP 1-B; Tr. (Phillips) 1196-98.

The SERVIM model is different. It calculates NPVs based upon the resources that are input into the model and the timing of their introduction. SERVIM results do not necessarily reflect a portfolio that complies with the 2025 RPS, such that additional resources, beyond the resources specified in the modeled portfolios, may need to be added to satisfy the 2025 RPS. *See* Wintermantel Dir., Exh. NW-2, p. 15, Table 1; Tr. (Wintermantel) 888-89.

As a result, NPVs of the various portfolios calculated with EnCompass reflect the NPV of resources required to satisfy the 2025 RPS regardless of when they are installed. NPVs of portfolios calculated with SERVIM may require additional renewable resources to satisfy the 2025 RPS. Thus, the NPV differences between CCAE 1 and PNM Scenario 2 include the costs to satisfy the 2025 RPS under either portfolio, although CCAE 1 adds its solar renewables in 2022 and PNM Scenario 2 adds the required solar resources later. *See* Phillips Dir. 20, NLP 1-B (Corrected); Tr. (Phillips) 1196-98.

natural gas units or WRA's four natural gas unit proposal. Sierra Club Tier 2-4 is the lowest cost portfolio that satisfies reliability standards with a 20-year NPV of costs \$25 million less than PNM Scenario 1 (calculated with SERVVM). WRA's four natural gas unit proposal has 20-year NPV of costs \$10-\$13 million less than PNM Scenario 1.

The five natural gas unit proposal of Sierra Club Tier 2-4 would locate 200 MW and \$156 million of resources in the CCSD (\$33 million less than PNM Scenario 1). WRA's four natural gas unit proposal would locate 330 MW and \$268 million of resources in the CCSD (\$79 million more than PNM Scenario 1).

Sierra Club Tier 2-4 would add 520 MW and substantially more than \$430 million of resources in McKinley County and the Jicarilla Apache Reservation. WRA's four natural gas unit proposal would add 410 MW and approximately \$430 million in those areas.

Sierra Club Tier 2-4 (with its five natural gas units) would emit less CO<sub>2</sub> emissions than PNM Scenario 1's 7 natural gas units. WRA's 4 natural gas unit proposal would have the least CO<sub>2</sub> emissions of the Gas portfolios.

Sierra Club Tier 2-4 would satisfy the 0.2 LOLE reliability standard under PNM's assumptions for the Four Corners EFOR and external import limits. WRA's four natural gas unit proposal would satisfy the quantitative measures under the assumptions proposed by WRA and CCAE, and it would satisfy all parties' qualitative analyses.

Sierra Club Tier 2-4's inclusion of the 150 MW Arroyo battery, the 20 MW Jicarilla battery and the 40 MW stand-alone battery in Bernalillo County (with a total of 210 MW of battery storage) would fail Mr. Kemp's 40 MW battery limit for an individual battery and his 130 MW limit for PNM's entire system. WRA's portfolio with four natural gas units would satisfy those limits.

#### **D. Carbon capture**

The SJC Entities presented the testimony of Roger Schiffman, an energy consultant with Navigant Consulting, Inc. Navigant is performing the economic feasibility review of the CCUS project in the FEED study funded by the U.S. Department of Energy for the Enchant project. Mr. Schiffman suggested the CCUS project could satisfy the role PNM intends for the natural gas units it proposes at the San Juan site.

Mr. Schiffman testified that Enchant, in partnership with Farmington, is moving forward to acquire the San Juan Generating Station upon the exit by PNM and the other owners. Schiffman said, as a 5% owner, Farmington has the right to negotiate the acquisition of the plant with control transferring when PNM and the other joint owners exit on July 1, 2022. He said Enchant's business plan is to invest over \$1 billion to install the CCUS retrofit. Upon completion, Enchant would provide power to Farmington as an owner of the plant, would sell CO<sub>2</sub> to the Permian Basin, delivered via an existing CO<sub>2</sub> pipeline, and would sell electric energy and capacity through a combination of purchase power agreements and merchant energy sales.<sup>336</sup>

Mr. Schiffman indicated that the complete final FEED study evaluating the feasibility of the project is not due to be finished until April 2021. But he said the economic feasibility portion of the study should be substantially finished by late spring 2020 and the technical portion should be finished by September 2020.<sup>337</sup> Enchant hopes to obtain project financing by the end of 2020.<sup>338</sup> Commercial operation is expected between January and June of 2023, potentially a year after the need created by the exit of PNM and the other owners.<sup>339</sup>

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<sup>336</sup> Schiffman Dir. 4.

<sup>337</sup> Tr. (Schiffman) 1457, 1466-68, 1472.

<sup>338</sup> Tr. (Schiffman) 1473.

<sup>339</sup> Tr. (Schiffman) 1460.

He said it would take approximately 18 to 24 months to develop the new gas units in PNM Scenario 1, but that PNM could start the initial development of permitting and design as early as the summer of 2020 but at least by the end of 2020.<sup>340</sup>

Mr. Schiffman stated that the economic feasibility of the CCUS project will depend on four sources of revenue – the energy and capacity needs of Farmington, the sale of CO<sub>2</sub>, the market and/or contract energy and capacity sales, and the generation of investment tax credits. He said the project's fuel and operating costs can be allocated across these multiple revenue streams, including revenue from sales of non-power items, such as the CO<sub>2</sub> and tax credits.<sup>341</sup>

Mr. Schiffman further testified that, based on initial assessment, there is a strong potential that the project can structure a PPA that has price and non-price terms that are favorable to PNM and other utility systems and their ratepayers. After the CCUS retrofit, the project would have approximately 626 MW of available capacity. He recognized that large capacity steam generation is not typically viewed as the resource of choice to perform renewable integration services. But, the fact that Enchant would have over 600 MW of controllable capacity, compared to PNM's identified need of 269 MW of controllable thermal capacity, suggests that there is potential to fit at least a portion of output from the CCUS project into PNM's resource portfolio, both for clean

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<sup>340</sup> Tr. (Schiffman) 1474-75.

<sup>341</sup> Schiffman Dir. 4-5. The 45Q tax credit makes money available to companies willing to capture and store carbon in geologic formations or to use the CO<sub>2</sub> for enhanced oil recovery (EOR). Under Section 45Q of the Internal Revenue Code, a generator that captures and uses CO<sub>2</sub> for enhanced oil or natural gas recovery can earn tax credits for 12 years: \$27.61 per ton of captured CO<sub>2</sub> in 2023, increasing to \$35/ton in 2026 and growing by inflation afterwards. Projects that store CO<sub>2</sub> in geologic formations can earn a \$50/ton tax credit. To qualify, the plant's construction must begin before 2024. The tax credit savings can reduce the need for revenues to pay the normal capital charges for return on and of the San Juan coal plant and its CCUS. PNM Exh. 9 (Graves Reb.) 34-35.

Revenue from the sale of CO<sub>2</sub> for the purpose of EOR can also bring additional benefits that help offset its costs. Specifically, the San Juan coal plant can supply the captured CO<sub>2</sub> to the Permian Basin oil fields through the nearby Cortez compressed CO<sub>2</sub> pipeline. The 2019 S&L study estimates that the facility could then earn \$15-\$20 per ton of compressed and purified CO<sub>2</sub>. If a facility the size of the San Juan coal plant were to operate essentially around the clock at an 85% capacity factor, it could potentially capture about 6 million tons of CO<sub>2</sub> per year. The revenues from these two benefits (45Q tax credits and EOR payments) could be very significant, perhaps hundreds of millions dollar per year to offset some of the incremental costs from CCUS retrofit. Graves Reb. 35.



energy production, and to provide controllable generation and firming services for renewable resources.<sup>342</sup>

Mr. Schiffman said Enchant's engineering consultant, Sargent & Lundy, projects a 90% reduction in CO<sub>2</sub> emissions from SJ Unit 4. The projected CO<sub>2</sub> emissions rate is 249 lbs./MMBtu, which is about 23 percent of the comparable emissions rate from a gas peaking resource, such as an LM6000 resource.<sup>343</sup>

Mr. Schiffman acknowledged there is still uncertainty about the viability and concreteness of the project, but he believed the project has a strong potential to succeed and an ability to offer attractive pricing terms to PNM once it is further along in its development. He also acknowledged that Enchant has not provided any EnCompass or SERVVM modeling for the CCUS project and that there would be a need to consider the cost of bridge resources on a short term contract to bridge the gap between the San Juan Units' abandonment and the start of the CCUS project.<sup>344</sup> Schiffman recommended that the Commission build sufficient flexibility into PNM's procurement plan for replacement resources, so that there is opportunity to consider and evaluate concrete PPA proposals from Enchant.<sup>345</sup>

Mr. Schiffman noted that replacement capacity is not needed until 2022. He said PNM could pursue design and environmental development activities for the gas capacity but build in a later trigger point before actually procuring the resources. He said, for over a decade, there has been substantial excess natural gas fueled combined cycle capacity in the Palo Verde region, and if short-term reliability concerns arise, PNM could explore bridge capacity contracts from those types

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<sup>342</sup> Schiffman Dir. 5-6.

<sup>343</sup> Schiffman Dir. 7.

<sup>344</sup> Tr. (Schiffman) 1478-80.

<sup>345</sup> Schiffman Dir. 7.

of resources as a means to hedge against uncertainty while the resource procurement plan is finalized.<sup>346</sup>

Mr. Schiffman, however, acknowledged that a PPA with PNM is not a make or break necessity for the project to succeed.<sup>347</sup> He said there may be other opportunities with PNM resource changes going forward that could provide an opportunity for Enchant to sell power to PNM.<sup>348</sup>

Westmoreland witness, Charles Griffey, a consultant for the electric and natural gas industries, also recommended that the Commission delay a decision on the natural gas turbines proposed by PNM. He asserted PNM cannot rely solely on batteries and renewable generation to replace the San Juan capacity because of the reduced credit awarded to non-dispatchable resources in satisfying installed capacity requirements. He said the LM6000 gas turbines are relatively lower in capital costs than other gas alternatives, but have higher heat rates (i.e., they are less efficient than other gas turbines) and have higher fuel costs on a dollars per MWh basis because of their poorer heat rates. He estimated that an LM6000 will emit approximately 1,100 pounds per MWh of CO<sub>2</sub> when operated.<sup>349</sup>

Mr. Griffey asserted that the CCUS project is a better dispatchable alternative than LM6000 gas turbines. He also claimed that the CCUS would provide greater economic development opportunities for the local area by keeping the plant and Westmoreland's associated mine in service, would have much lower CO<sub>2</sub> emissions per MWh, have a higher ratio of capital to fuel cost on a production unit basis, would preserve considerably more jobs at the plant and mine,

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<sup>346</sup> Schiffman Dir. 8.

<sup>347</sup> Tr. (Schiffman) 1491.

<sup>348</sup> Tr. (Schiffman) 1495.

<sup>349</sup> Westmoreland Exh. 1 (Griffey Dir.) 5.

would lower the present value of reclamation costs, and would provide CO<sub>2</sub> to the Permian Basin, further enhancing oil production and severance taxes for New Mexico.<sup>350</sup>

Mr. Griffey counseled that the Commission does not have to approve the gas resources today even if the CCUS technology does not materialize. He said LM6000 resources are “off-the-shelf” and modular and have a short lead-time of approximately eight to twelve months. Mr. Griffey said PNM does not need approval for the LM6000 units until approximately July 2021, when PNM when need to start installing the natural gas capacity for the summer peak in 2022. He asked that the Commission order PNM to negotiate with Enchant in good faith to determine whether CCUS is a superior replacement option under the requirements of the ETA.<sup>351</sup>

PNM and other parties opposing the CCUS proposal argue that the CCUS technology is not feasible technologically or economically, that the project will take too long to develop to satisfy PNM’s needs, and that, even if feasible, the project will not produce the flexible energy PNM needs.

The witness most critical of the CCUS project was Sierra Club witness David Schlissel. Mr. Schlissel asserted that the Commission should reject the recommendations of Mr. Schiffman and Mr. Griffey. He maintained there is no evidence that a PPA from Enchant and Farmington would be economically competitive. He said the project is unlikely to be financially feasible and is unlikely to be built and come online before 2024. And, even if Enchant submitted a bid that looked good on paper, Schlissel said there is a significant risk that Enchant will not be able to meet the pricing and/or the delivery date in any PPA bid it would submit.<sup>352</sup>

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<sup>350</sup> Griffey Dir. 5-6.

<sup>351</sup> Griffey Dir. 6-7.

<sup>352</sup> Sierra Club Exh. 8 (Schlissel Reb.) 85.

Mr. Schlissel asserted the CCUS project relies on a series of wishful assumptions, such as the assumption that the retrofitted facility would be able to capture 6 million metric tonnes of carbon annually. He estimated the facility would need to capture 90% of the CO<sub>2</sub> it produces and operate at an annual capacity factor of at least 85% for twelve years, both of which are unrealistic. He said the only two existing power plants in the world that capture CO<sub>2</sub> have not captured 90% of their CO<sub>2</sub> emissions for any extended period of time, and it is unrealistic to expect that carbon capture at San Juan could do so either. He said it is also unrealistic to assume that the retrofitted San Juan facility would be able to achieve an annual capacity factor of at least 85% for the first 12 years of its operation when neither of the two units at the plant have hit that level since 2011. Age-related reliability issues and competition from renewable energy resources are almost certain to prevent the plant from operating anywhere near the 85% level assumed by Enchant.<sup>353</sup>

Mr. Schlissel stated further that a baseload coal plant like San Juan could not be considered a flexible resource. A retrofitted San Juan would be a must-run unit as the new owner(s) would feel pressure to run the units as much as they could in order to produce as much CO<sub>2</sub> as possible.<sup>354</sup>

Further, Mr. Schlissel said that using the CO<sub>2</sub> captured at San Juan for Enhanced Oil Recovery (EOR) is unlikely to bring about any meaningful reduction in net CO<sub>2</sub> emissions into the atmosphere. He said when captured CO<sub>2</sub> is used for EOR, additional oil is produced and that oil, in turn, emits CO<sub>2</sub> into the atmosphere when burned or used as a chemical feedstock. As an example, he cited the finding in the LANL Preliminary Assessment of the CCUS project that, even with conservative assumptions, one tonne of the CO<sub>2</sub> captured at San Juan would lead to 0.90 tonnes of new CO<sub>2</sub> emissions into the atmosphere. And, even under Enchant's assumptions, at

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<sup>353</sup> Schlissel Reb. 86-87.

<sup>354</sup> Schlissel Reb. 88.

least 10% of the CO<sub>2</sub> that would be produced at San Juan would not be captured and would instead be emitted directly into the atmosphere.<sup>355</sup>

Finally and notably, he cited the risk that the market for CO<sub>2</sub> will not materialize because the demand for oil from the Permian Basin is not as substantial as the developers anticipate; the producers in the Permian Basin may be satisfied with the amounts of oil they are producing without using the captured CO<sub>2</sub> from San Juan; and/or the price of oil from the Permian may be too low to make using EOR economic.<sup>356</sup>

WRA witness Patrick O'Connell, formerly PNM's Director of Resource Planning, took a different perspective on why the Commission should not delay its approvals in this case to wait for a CCUS proposal from Enchant. He said until this case is decided and the replacement portfolio determined, it is unknown how much property PNM will need to retain to serve its customers' needs.<sup>357</sup> He reasoned that a final approval now of a portfolio of replacement resources will provide the CCUS project the certainty it needs to evaluate its feasibility.<sup>358</sup> Mr. O'Connell thought Enchant needs certainty regarding PNM's future use of the site. He said the certainty will affect the quality of the FEED study's assumptions on equipment siting, operations and financial responsibility, and the City of Farmington's negotiation of a transfer agreement with the other exiting owners at San Juan.

Mr. O'Connell also believed a CCUS proposal will not be available soon enough to meet PNM's needs. He said the FEED study is needed to secure project funding, and until the funding is secured, a bid from Enchant cannot be responsibly presented by PNM to the Commission for

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<sup>355</sup> Schlissel Reb. 89.

<sup>356</sup> Schlissel Reb. 71.

<sup>357</sup> O'Connell Reb. 14-15.

<sup>358</sup> O'Connell Reb. 12.

approval. He estimated the soonest such a bid could be proposed for approval would be nine months from the January 2020 hearing. There would then be a need for a Commission approval process that would take another six to nine months, so a final determination on PNM's replacement portfolio would be delayed at least a year after the expected resolution of this case. In the meantime, market dynamics and a constrained time frame could reduce the availability of low cost, reliable replacement resources, which would be contrary to PNM customer interests. He pointed out that San Juan is not the only large power plant shutting down in the region in the next several years. Competition for replacement resources could drive up the price in the future.<sup>359</sup>

Mr. O'Connell also could not envision a PPA proposal that would suit PNM's needs. He said an Enchant PPA has not been characterized to the point where he could understand what it is or what it could be. He said he could not equate it to a service that would be provided by the LM6000 units.<sup>360</sup> He said PNM needs flexible resources, which the baseload nature of the CCUS project would not provide. He said PNM is planning to use the Piñon gas plant to meet capacity needs, operating at a capacity factor of 10% or less. He said Enchant needs to sell the energy it generates at an 85% or higher capacity factor.<sup>361</sup>

Further, Mr. O'Connell said that a capacity agreement from PNM is not necessary for the success of the CCUS project. He said the CCUS opportunity will succeed with or without PNM. He said he can understand Enchant's interest in nailing down at least some revenue from this process. But the revenue that is available from this process is not the make or break contract for the project. On the other hand, the FEED study is a make or break element of Enchant's success. So, the better the feed study is, the better the project will be. He said delaying the process to hope

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<sup>359</sup> O'Connell Reb. 13.

<sup>360</sup> Tr. (O'Connell) 1831.

<sup>361</sup> O'Connell Reb. 14.

that the Enchant project succeeds may end up with the San Juan area receiving less than what is on the table now.<sup>362</sup>

For PNM's part, Mr. Maestas said it is not possible to operate San Juan in the same way as an LM6000 unit. He said it is comparing apples to oranges. He said San Juan is not capable of providing the same flexibility that the LM6000 provides. He explained that the LM6000s are able to start and stop and ramp up and down much more quickly than San Juan. He said San Juan has a minimum loading point and a maximum range, and its ramping capability is nowhere near what an LM6000 can do. An LM6000 can go from zero to full load in under 10 minutes, as well as back down to zero in that same timeframe.<sup>363</sup>

Mr. Maestas also said if PNM were offered a PPA that were intended to mimic the operation of the Piñon gas plant, he would have concerns about the owners' ability to move the energy to other parties intra-hour. He asserted the bilateral markets for the intra-hour transactions to take the excess power that PNM would not need do not exist. He said the CCUS project would have to ramp down and curtail output.<sup>364</sup>

The County of Los Alamos and M-S-R Public Power Agency presented no witnesses, but, in their joint brief, they argue it is premature to consider the CCUS project as a replacement resource in this proceeding. Los Alamos has a current ownership share in the San Juan Generating Station and is pursuing the exit of its participation. M-S-R is a former owner that still has potential liabilities for the plant's closure.

They note that numerous agreements have to be negotiated between the project developers (i.e., the City of Farmington and Enchant) and the current and former owners of the plant. These

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<sup>362</sup> Tr. (O'Connell) 1840-41.

<sup>363</sup> Tr. (Maestas) 1694-95.

<sup>364</sup> Tr. (Maestas) 1717.

include agreements regarding future responsibility for decommissioning of the plant site and reclamation of the coal mine and the financial security for those responsibilities. They say that only after the pending FEED Study has been completed, liability for future operations has been assumed by COF/Enchant with adequate financial security, and comprehensive agreements have been completed, will the Commission be able to determine if PNM's customers are adequately protected from future liability and if a retrofitted SJGS is a viable replacement resource.<sup>365</sup>

They also cite testimony regarding the potential timing of the project (i.e., completion approximately one year after PNM's abandonment), testimony questioning the project's feasibility and testimony questioning the project's suitability as a resource for PNM's needs. Their ultimate point is that the CCUS project is not ready for consideration in this case and that it should be considered instead in PNM's 2020 IRP proceeding.<sup>366</sup>

The Hearing Examiners recommend that the Commission's decisions on replacement resources in this case not be delayed for the potential receipt of a proposal from Enchant. The timing of such a proposal is uncertain. The delay the SJC Entities seek, potentially to June 2021, would risk PNM's access to the favorable pricing that has been received for the projects to date and would risk PNM's ability to acquire the resources needed to replace the San Juan units in the summer of 2022. Moreover, the implementation risks associated with any such proposal, including Enchant's ability to sell CO<sub>2</sub> for EOR in the Permian Basin are significant.

Perhaps most significant, no witness has been able to describe a purchase arrangement that might meet PNM's needs for flexible capacity. The baseload capacity that would be provided by the reconfigured plant would not meet PNM's needs. And, even under Enchant's optimistic

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<sup>365</sup> Los Alamos and M-S-R Jt. BIC 4-5.

<sup>366</sup> Los Alamos and M-S-R Jt. BIC 5-8.



timeline, the reconfigured CCUS plant would not be available until between January and June 2023, up to a year after the plant's abandonment in July 2022. In addition, the 45Q tax credits upon which the project's success depends, expire in 2034, leaving PNM with the need to acquire a further replacement resource.<sup>367</sup>

Furthermore, no party suggests that a PPA with PNM is needed for the success of the CCUS project. The amount of capacity that the SJC Entities suggest might be available for PNM is small relative to the capacity Enchant needs to sell to make the project successful. The success of the project depends primarily on the project's ability to secure three other revenue streams – the sale of the plant's baseload capacity and energy, the demand for CO<sub>2</sub> for EOR in the Permian Basin, and the demand for the 45Q tax credits.

#### **E. Issues with PNM's RFP Process**

##### **1. Manipulation of the timing of the RFP process to favor utility-owned resources**

NEE, CFRE, and SWG argue the RFP process was manipulated to promote and restrict the Commission's consideration to the utility-owned resources proposed by PNM.

NEE alleges that PNM manipulated the procedural process to include utility-owned capital investment proposals and drive earnings growth and dividends for its shareholders by increasing rate base recovery from its captive customers. NEE contends that PNM avoided its legal obligations pursuant to ¶ 19 of the Modified Stipulation in Case No. 13-00390-UT and avoided Commission oversight with its legal maneuvering and proffering false statements to the Commission and to the New Mexico Supreme Court. NEE maintains that PNM tried unsuccessfully in the 2018 Legislature to pass S.B. 47 of 2018 that would have allowed it to own

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<sup>367</sup> Because the term of the 45Q tax credits is twelve years, Mr. Griffey said if Enchant is going to be able to come forward with a PPA offer under current law, he would expect that it would extend no further than 2034. Tr. (Griffey) 1059-60.

all replacement resources and to insulate itself with 100% recovery for undepreciated investments. NEE then cites PNM's December 31, 2018 filing in Case No. 13-00390-UT where PNM said it had not yet decided if it was going to abandon the remaining San Juan units – even though it admitted that there were no contractual agreements in place that would allow it to continue. NEE also cited PNM's claim that it had not finalized replacement power choices – even though its expert stated that PNM had done so. Further, NEE alleges that PNM co-authored the ETA for its unique benefit and delayed its abandonment filing to ensure that the ETA would be applied, all to the detriment of the public interest.<sup>368</sup>

NEE argues that PNM also manipulated the RFP process and timeline to ensure that only its preferred bids remain viable alternatives. NEE states that PNM is boxing the Commission, the parties, and the public into a corner, especially with respect to replacement power alternatives and their associated impact on rates.<sup>369</sup>

Based upon the alleged manipulations, NEE supports any wholly renewable and storage portfolio, such as that proposed by CCAE, as the only way to move forward responsibly under these circumstances. In the alternative, NEE requests approval for the Arroyo and Jicarilla PPAs and rejection of the remaining resources in PNM Scenario 1 (i.e., the PNM-owned Piñon gas plant and the PNM-owned Affordable Solar Sandia and Zamora battery units).<sup>370</sup>

CFRE, too, argues that PNM manipulated the timing of its abandonment and replacement resource applications to limit the Commission's consideration of replacement resources to utility-owned and other resources proposed by PNM. CFRE contrasts PNM's delay of the abandonment and replacement resource proceedings in December 2018 when it claimed there was no need to

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<sup>368</sup> NEE BIC 8-10.

<sup>369</sup> NEE BIC 10-11.

<sup>370</sup> NEE BIC 43.

unnecessarily hasten an abandonment filing with its claim after the ETA was passed in March 2019 that there was a need for urgent action.<sup>371</sup> CFRE asks the Commission to approve the Arroyo and Jicarilla projects and require PNM to immediately issue another RFP for additional replacement resources, allowing for both PPAs and PNM ownership options and allowing for placement of resources wherever power generation and/or reduction of transmission losses will make the resources productive or most cost-effective for ratepayers. CFRE contends that, if there is not enough time for a new RFP process prior to the abandonment of the remaining San Juan units, PNM should bear financial responsibility for the delay and the additional cost of any short-term PPAs or purchased power on the open market.<sup>372</sup>

In response, PNM argues that the assertions that PNM delayed filing its Consolidated Application or acted in bad faith during the RFP review process or in proceedings before the Commission or New Mexico Supreme Court are unfounded. PNM points to its lengthy, detailed evaluation process to determine the optimal portfolio as proof that PNM was, in fact, genuinely considering projects and various resource combinations right up until it filed the Application on July 1, 2019. PNM notes also that the contracts for the proposed replacement resources were not signed until June 2019 and that PNM amended its application on September 20, 2019 to add the seventh gas unit to its contract for the LM6000 resources.<sup>373</sup>

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<sup>371</sup> CFRE states that Mr. Fallgren's December 31, 2018 claim that "[t]here is no need to unnecessarily hasten any abandonment filing" changed as soon as the ETA was passed. CFRE notes that Mr. Fallgren stated in testimony filed with PNM's July 1, 2019 Application that there is a need to act quickly to take advantage of expiring tax credits and that Mr. Darnell described in a June 5, 2019 letter to stakeholders "a confluence of event that has created a narrow window . . . to ensure that full use of the renewable tax credits may be utilized." CFRE BIC 17.

<sup>372</sup> CFRE BIC 16-20.

<sup>373</sup> PNM Resp. Br. 34-35.

## **2. Manipulation of the RFP process to favor utility-owned resources**

SWG agrees with NEE and CFRE that PNM manipulated the timing of its abandonment and replacement resource filings to limit the Commission's consideration of potential non-utility owned resources.<sup>374</sup> SWG, however, also argues that PNM's RFP process included numerous RFP provisions and practices that were designed or had the effect of preferring the selection of utility-owned resources. SWG claims that PNM did not evaluate all of the resource proposals it received on a consistent basis that was competitively fair to all bidders.

The most significant of the problems alleged by SWG relate to PNM's April 2019 supplemental RFP:

- PNM's April 2019 RFP excluded PPA and ESA proposals for battery storage resources that might have provided PNM with more of the discretion and control over those resources than were offered by PPA and ESA bidders in response to PNM's 2017 RFP.<sup>375</sup>
- PNM's April 2019 RFP did not allow PPA and ESA bidders from PNM's 2017 RFP to refresh the prices and terms and conditions in May 2019.<sup>376</sup>
- PNM's April 2019 RFP allowed EPC bidders, whose proposals in the 2017 RFP had not been disqualified due to their failure to have a required New Mexico contractor's license, to nevertheless have a "second bite of the apple" in May 2019.<sup>377</sup>
- PNM's April 2019 RFP Instructions required that bidders quote battery storage projects with a minimum "base proposal" of 50 MW (AC) capacity "with pricing for additional 50 MW (AC) increments, up to a total of 450 MW. But the RFP Instructions did not inform bidders of any "technology risk" perceived by PNM with respect to the "up to" 450 MW of battery storage resources requested nor of any proposed or potential limit on the total capacity of battery storage additions PNM might apply.<sup>378</sup>

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<sup>374</sup> SWG BIC 25-32.

<sup>375</sup> SWG BIC 30.

<sup>376</sup> SWG BIC 30-31.

<sup>377</sup> SWG BIC 31.

<sup>378</sup> SWG BIC 33.

- Unlike PNM’s 2017 RFP, which required that all proposals and pricing “must remain valid and binding through at least December 31, 2019,” PNM’s April 2019 RFP Instructions required that all proposals and pricing “must remain valid and binding through at least June 30, 2020” – a substantially shorter time period.
- Unlike PNM’s 2017 RFP Instructions (§ 5.3) which specified that “[p]roposals and pricing must be provided for a planned project in-service date of no later than June 1, 2023,” Section 4.3 of PNM’s April 2019 RFP Instructions provided that “[p]roposals and pricing must be provided for a target in-service date of March 31, 2022” – approximately fourteen months earlier.<sup>379</sup>
- PNM completed its evaluation of the EPC proposals it received in response to its April 2019 RFP in less than five weeks--much faster than it took PNM to complete its “final short list” of proposals submitted in response to its 2017 RFP.<sup>380</sup>

SWG also cited PNM’s attempt immediately prior to the January 2020 hearings to encourage certain bidders to extend the already expired effective dates of their bids (and the Hearing Examiners allowance of evidence of such extensions) to avoid the potential that the Commission might cite the expired bids as a reason to order a new RFP process.<sup>381</sup>

To address the competitive unfairness of PNM’s April 2019 RFP to bidders that had submitted battery storage proposals structured as PPAs or ESAs in response to PNM’s 2017 RFP and to address the newly-established location criteria in the ETA, SWG witness William Babcock recommended that the Commission promptly order PNM to issue a new RFP for battery storage resources located in the CCSD that are not limited to EPC or other PNM-owned projects located at sites designated or controlled by PNM. Babcock recommended that PNM provide the Commission the results of that RFP by no later than June 2, 2020 as part of its proceedings in this case.<sup>382</sup>

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<sup>379</sup> SWG BIC 34.

<sup>380</sup> SWG BIC 35.

<sup>381</sup> SWG BIC 36.

<sup>382</sup> SWG BIC 35.

SWG ultimately recommends, however, that the Commission approve the “no new gas” portfolios proposed by CCAE, either CCAE 1 or CCAE 2 as a “no regrets” regulatory approach for PNM’s “first step” toward procuring the resources needed to satisfy the ETA’s longer-term RPS and “zero carbon requirements.” SWG points out that PNM will be addressing the next step soon, in its 2020 IRP expected in July.<sup>383</sup>

Greg Sonnenfeld, a *pro se* intervenor, notes that the projects included in PNM’s review were only those from the 2017 bidding process and the restrictive April 2019 energy storage RFP for projects located on PNM land. Mr. Sonnenfeld says the 2017 bids were prepared to meet lowest cost portfolio standards, not the specific standards described in the ETA. He also states that the projects from the 2017 RFP are now approximately 3 years old. He said the energy industry is in a disruptive phase, with new entrants and technologies each year. Thus, Sonnenfeld thinks the three-year-old projects, not scheduled for deployment for another 2½ years, do not represent competitively procured replacement resources.<sup>384</sup> Sonnenfeld asks the Commission to order PNM to evaluate the Energy Vault storage proposal that he promotes and that he alleges was precluded by PNM’s non-competitive RFP process. He asks the Commission to authorize PNM to procure a 5 MW or 10 MW Energy Vault system; if the system ranks well under ETA preferences it would be beneficial to the public and a feasible project, according to Sonnenfeld.<sup>385</sup>

PNM claims there is no evidence of an ownership preference or “anti-competitiveness.” PNM posits that SWG and Sonnenfeld participated in the proceeding to promote their own

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<sup>383</sup> SWG Resp. Br. 2-5.

<sup>384</sup> Sonnenfeld BIC 3-4.

<sup>385</sup> Sonnenfeld BIC 9.

resources, which were not selected as part of the RFP process. PNM alleges that they advocate for a new RFP out of their own self-interest in hopes that they may be successful with a “do over.”<sup>386</sup>

PNM responds further that none of the intervenors alleges that the All Resources RFP violated a Commission standard applicable to RFPs or that the projects contained in Scenario 1 are not the most cost-effective options among feasible alternatives. PNM contends there is no legal requirement that a utility permit PPA or ESA bids in response to an RFP, that a utility make its sites available to an ESA bidder, or that a utility otherwise structure an RFP in a particular way. PNM cites the Commission’s decision in Case No. 17-00129-UT where the Commission overruled the Hearing Examiner and found that an RFP process PNM used to select a 50 MW solar facility provided PPA bidders a fair opportunity to participate.<sup>387</sup> PNM also points to the New Mexico Supreme Court’s affirmance of the Commission’s factual findings in the case as supported by substantial evidence.<sup>388</sup>

PNM argues that its RFP process, including the supplemental storage RFP issued in April 2019, was reasonable and fair to all bidders, allowing, over the course of the RFP process, all bidders of energy storage projects to bid either utility-owned or ESA projects. PNM asserts that its proposed PPAs for 350 MW of solar energy and ESAs for 60 MW of battery storage capacity from the Jicarilla and Arroyo facilities belie the claims that PNM is biased or “rigged” the process against PPAs and ESAs.<sup>389</sup>

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<sup>386</sup> PNM Resp. Br. 36-37.

<sup>387</sup> Case No. 17-00129-UT, Order Partially Adopting Recommended Decision (Nov. 15, 2017) at 9-10.

<sup>388</sup> PNM Resp. Br. 26-29, *citing N.M. Indus. Energy Consumers v. N.M. Pub. Regulation Comm’n*, 2019-NMSC-015, ¶ 12.

<sup>389</sup> PNM Resp. Br. 29.

PNM maintains that no party has offered any evidence that there are specific, lower-cost projects that would be available if the RFP were reissued. PNM notes that the RFP produced 390 bids for a variety of resource types, including wind, solar, energy storage, and natural gas fueled technologies. The parties had access to detailed information regarding each of the bids, including full access to the bidder website and all of its information and data, as well as PNM's modeling analyses and bid comparisons. PNM propounds that the complaining parties' requests are based on speculation and create the risk of increased costs and the potential that adequate resources may not be available when PNM abandons the San Juan units at the end of June 2022.<sup>390</sup>

PNM argues that there is no reason to believe a bid refresh or the reissuance of an all resources RFP would result in lower prices. The in-service date has not changed, and bidders had the opportunity to incorporate the expectation of decreased resource prices by the in-service date in their initial bids. PNM fears that refreshing bids or issuing a new RFP may result in higher prices, citing the fact that some bidders were not willing to accept the increased cost and risks of extending their bids. Others would only extend to June 1, 2020 and another would only extend if PNM paid an extension fee.<sup>391</sup>

PNM argues further that the complaining parties raise the issue of unfairness only in regard to the projects they do not favor. PNM points out that the two projects they support – the Arroyo and Jicarilla PPAs – resulted from the same process they claim was unfair. PNM asserts that the parties' selective approach suggests that they simply oppose PNM ownership of any replacement resources.<sup>392</sup>

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<sup>390</sup> PNM Resp. Br. 33.

<sup>391</sup> PNM Resp. Br. 32-33.

<sup>392</sup> PNM Resp. Br. 33-34.



### 3. Requests to re-bid the utility-owned Sandia and Zamora projects

WRA recommends that the Commission approve the size and interconnection location of PNM's stand-alone Sandia and Zamora storage projects. But WRA submits that the Commission should not approve PNM's self-ownership proposal at this time. WRA asks that PNM be required to issue a new RFP that allows ESAs to compete with utility ownership proposals and provides for full operational control of the serving facilities, including the facilities providing service under the ESAs. WRA witness O'Connell contended PNM's April 2019 RFP was not fully competitive, because PNM only solicited turn-key proposals for its stand-alone battery projects. He said it is possible that a non-owned resource could meet PNM's needs for flexibility and operational discretion as well as a company-owned resource.<sup>393</sup>

Mr. O'Connell asserted a stand-alone battery storage RFP or bid refresh that permitted ESAs which provided operational discretion to PNM should have been undertaken after the ETA was passed, because of the ETA's provisions supporting stand-alone battery storage. O'Connell hypothesized that it is likely that utility ownership would still be the best option to provide PNM the operational flexibility needed to maximize stand-alone battery benefits. He also postulated that it is likely that an ESA provider would not allow the utility's unconstrained use of the facility or would ask for a higher price to cover the unknown risk associated with allowing the utility such full discretionary use. But he allowed that his assumptions should be tested by a robust competitive bidding process in an additional limited RFP.<sup>394</sup>

Mr. O'Connell posited that re-bidding for a stand-alone battery project is more feasible than re-bidding for other resources. He noted that other technologies have longer project development

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<sup>393</sup> O'Connell Dir. 27.

<sup>394</sup> *Id.*

or procurement lead times and may be dependent upon federal tax credits for the most favorable pricing.<sup>395</sup>

PNM argues that the decision to issue the April 2019 supplemental battery storage RFP for additional utility-owned proposals was reasonable – (1) to address specific requirements of the ETA related to utility-owned energy storage systems; and (2) to provide a fair opportunity for bidders of utility-owned resources, many of whom were initially eliminated because they were required to have a New Mexico contractor’s license from the New Mexico Construction Industries Division at the time of bid submission. PNM states that the supplemental RFP ensured that PNM would be able to fully consider all battery options, as the resulting combination of third-party and utility-owned battery systems in PNM Scenario 1 demonstrates.<sup>396</sup>

PNM asserts that the supplemental RFP allowed PNM to consider all of the benefits of adding batteries to the system, including benefits that PNM says cannot be realized through ESAs. PNM cites the testimony of Mr. Fallgren that batteries can perform complex supporting functions referred to as ancillary services that include such items as spinning reserves, frequency response, and ramp control. Fallgren expressed that, unlike ESA contracts, utility ownership provides the full range of unrestricted utilization of these ancillary services benefits. He observed that ESA projects may have attractive pricing, but the pricing is generally the result of the third-party owner’s ability to limit charges and discharges, which may be further restricted when combined with a renewable energy resource so as not to jeopardize associated tax credits.<sup>397</sup>

PNM also contends that the proposition that reissuing an energy storage RFP could result in lower costs is pure speculation. Continuing to issue RFPs could lead to “bidder fatigue,” causing

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<sup>395</sup> O’Connell Dir. 28.

<sup>396</sup> PNM Resp. Br. 29-30.

<sup>397</sup> PNM Resp. Br. 30, *citing* Fallgren Reb. 24-25.

bidders to not want to incur the additional cost of submitting new bids. Further, the installation date for batteries (prior to June 30, 2022) has not changed throughout the RFP process. Mr. Kemp said most developers develop their prices with a forward-look on prices, and they enter that into their pricing. PNM witness Nagel also pointed out that in his experience a rebid could also result in increased prices.<sup>398</sup>

#### **4. Recommendations**

The Hearing Examiners acknowledge the merit of several of the intervenors' complaints but find that the portfolios of replacement resources proposed by the parties in this case provide a sufficient basis to approve a set of resources that satisfies the requirements and intent of the ETA.

PNM's timing of the abandonment and replacement resource proceedings succeeded with the acquiescence and implicit assistance of the New Mexico Supreme Court and the Legislature. PNM's plans were sufficiently advanced by December 31, 2018 to have filed an application with the Commission to abandon San Juan Units 1 and 4. PNM had the motive to do so – the prospect of the passage of legislation in the upcoming 2019 legislative session that would ensure PNM's full recovery of the unrecovered costs of the San Juan units and the potential that the Legislature would approve a requirement that the replacement resources be utility-owned (as had been proposed in S.B. 47 of 2018).

It is less clear that PNM was fully prepared in December 2018 to file an application for approval of replacement resources, but it is clear that PNM's review of the replacement resource proposals received in January 2018 had not been conducted on an expedited basis. PNM's review was extremely methodical, but, by December 31, 2018, PNM and its consultants had been reviewing responses for 11 months, and they did not complete their review until June 2019 – 17

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<sup>398</sup> PNM Resp. Br. 31-32, *citing* Tr. (Kemp) 642-43, Tr. (Nagel) 559-60, Tr. (Fallgren) 372-73.

months after they received the proposals, three months after the ETA was passed, and two weeks after the ETA became effective.

PNM was successful in putting the Commission in the “box” that NEE, CFRE and others refer to. The Commission suspected the manipulation of the timing of PNM’s abandonment application after receiving PNM’s December 31, 2018 filing in Case No. 13-00390-UT.<sup>399</sup> The Commission found on January 10, 2019 that PNM’s December 31, 2018 filing confirmed that PNM had committed to abandon the San Juan station over the six months prior and was taking the necessary steps under its agreement with its co-owners to proceed with an orderly closure.<sup>400</sup> And it issued an order on January 30, 2019 requiring PNM to file an application to abandon the units by March 1, 2019.<sup>401</sup>

As summarized above in the Statement of the Case, on March 1, 2019, however, at PNM’s request, the New Mexico Supreme Court issued a stay of the Commission’s January 30, 2019 order. The Legislature subsequently approved the ETA in its 2019 session. The Governor signed the ETA on March 22, 2019, and it became effective on June 14, 2019.

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<sup>399</sup> In its December 31, 2018 filing, PNM stated that all co-owner participants in SJGS, including PNM, but excluding the City of Farmington, had provided the formal written notice to the other co-owners that after reviewing post-2022 coal pricing information, they did not intend to renew the existing participation and coal agreements for the San Juan station. PNM said it would continue to negotiate with Farmington to acquire PNM’s interests in the San Juan station, but it was obligated under the partners’ ownership agreement to begin taking steps toward an orderly closure of the station. PNM said that, as the result of the co-owners’ notice that they will not continue with San Juan, PNM had given notice to San Juan Coal Company/Westmoreland that it would not extend or negotiate an extension of the Coal Supply Agreement. PNM stated it was in the final stages of reviewing 345 bid proposals for replacement power projects received in response to a request for proposals issued on October 30, 2017. PNM stated that it planned to make a filing in the second quarter of 2019 requesting Commission approval to abandon SJGS Units 1 and 4 and for approval of specific replacement resources. *See* Verified Compliance Filing Concerning Continued Use of San Juan Generating station to Serve New Mexico Customers Pursuant to Paragraph 19 of the Modified Stipulation, Case No. 13-00390-UT (Dec. 31, 2018).

<sup>400</sup> Order Requesting Response to PNM’s December 31, 2018 Verified Compliance Filing Concerning Continued Use of San Juan Generating station to Serve New Mexico Customers Pursuant to Paragraph 19 of the Modified Stipulation, Case Nos. 13-00390-UT and 19-00018-UT (Jan. 10, 2019) ¶¶ 10-11.

<sup>401</sup> Order Initiating Proceeding on PNM’s December 31, 2018 Verified Compliance Filing Concerning Continued Use of and Abandonment of San Juan Generating Station, Case No. 19-00018-UT (Jan 30, 2019), Ordering ¶ B.

After the ETA became effective, the Supreme Court, on June 26, 2019, lifted its March 1, 2019 stay of the January 30, 2019 Order. And, on July 1, 2019, PNM filed its Consolidated Application seeking approval for the abandonment of Units 1 and 4, the recovery of the units' unrecovered costs, securitization for the recovery of the costs and the acquisition of replacement resources. In addition, the Court, on January 29, 2020, ordered the Commission to apply the ETA to PNM's July 1, 2019 Application.

With the implicit approval of PNM's timing by the Court and the Legislature, the Commission should not rely on a claim of PNM manipulation as the basis to reject PNM's requests for the approval of the utility-owned Piñon, Sandia, and Zamora projects.

Still, the requests of NEE and CFRE to reject PNM's proposed utility-owned projects (i.e., the Piñon gas project and the Sandia and Zamora projects) and to approve the Arroyo and Jicarilla projects and any other combination of solar and battery projects equate to the end result recommended by the Hearing Examiners. The Hearing Examiners, however, do not base their decision to omit the PNM-owned resources on PNM's manipulation of the timing of the RFP process. They recommend a portfolio of resources that best achieves the purposes of the ETA – a portfolio that includes the solar/battery hybrid resources located in and near the CCSD. In short, the recommended portfolio does not include the utility-owned resources proposed by PNM, because the Hearing Examiners recommend CCAE 1.

The Hearing Examiners also do not recommend a potential option that would approve the Arroyo and Jicarilla projects and order PNM to conduct a further RFP in this docket for further proposals, *while attempting to retain the ability to approve any of the other RFP proposals that have been submitted*. There is insufficient time remaining in this docket to conduct any further RFPs and reach a final decision on both the new and previously-submitted proposals to avoid the

automatic approval of PNM's CCN requests for the Piñon, Sandia, and Zamora projects that will occur on October 1, 2020 absent a final order on those requests by that date.

The review period for PNM's replacement resource requests established in the Commission's Corrected Order on Consolidated Application of July 10, 2019 has already taken advantage of the maximum time period (nine months plus an optional additional six months) allowed the Commission to act on PNM's CCN requests under Section 62-9-1(C) of the Public Utility Act.<sup>402</sup> The automatic approval of PNM's CCN requests that will occur on October 1, 2020 absent a Commission order denying them will also result in the automatic rejection of the other RFP proposals.

Mr. Nagel stated that a new all resource RFP similar to the 2017 RFP would take approximately three months to issue, about 100 days for responses and "several" months to review the results.<sup>403</sup> Nagel explained the expedited April 2019 RFP was possible because of the one-technology, one-contract structure. He said a two-month time frame for responses to an RFP is not realistic for a more complex RFP with different technologies, different contract structures, bidders having to acquire land, and bidders have to pursue electrical interconnections.<sup>404</sup>

Mr. Nagel testified that, even a narrowly-drafted RFP would take several months to prepare, receive results, and review. Further time would then be required for the filing of testimony and hearings on the ultimate proposals to the Commission. The various proposals submitted by NEE, Sonnenfeld, and WRA could be pursued, but they would need to be pursued in a new Application filed by PNM, likely with other new proposals.

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<sup>402</sup> Section 62-9-1(C) requires the Commission to issue its order granting or denying a CCN application within nine months from the date the application is filed with the Commission. It also states that failure to issue its order within nine months is deemed to be approval and final disposition of the application; provided, however, that the commission may extend the time for granting approval for an additional six months for good cause shown. NMSA 1978, § 62-9-1(C).

<sup>403</sup> Tr. (Nagel) 497-98.

<sup>404</sup> Tr. (Nagel) 465-66.

If the Commission wants to require PNM to conduct any further RFPs, it needs to approve by October 1, 2020 any currently-submitted projects it considers appropriate, deny the remainder of the projects, and require PNM to file a new application based on a new RFP that will result in a new time period for the Commission's review.

The Hearing Examiners do not recommend this approach. Issuing an order now requiring PNM to restart the entire RFP process from a new beginning creates risks in a palpably uncertain economic climate. PNM may not be able to conduct the RFP process in sufficient time to acquire the replacement resources before PNM abandons the units. And a large question exists whether the results of the new RFP would be better than the responses currently before the Commission. The tax credits available for wind and solar projects are gradually expiring, and the Coronavirus disease (COVID-19) pandemic creates a risk for future pricing that is impossible to determine at this date.

PNM and other parties state that there are sufficient proposals in the record now from which the Commission can and should issue an approval. Indeed, the pricing for the Arroyo and Jicarilla projects is especially advantageous.<sup>405</sup> PNM received 345 bids in response to the initial RFP and 45 bids for the Supplemental RFP.<sup>406</sup> Mr. Nagel said PNM did not do a supplemental RFP for the narrow purpose of locating more resources in the CCSD after the enactment of the ETA because the PNM team believed it already had a sufficient number of bids for that location.<sup>407</sup> Mr.

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<sup>405</sup> Although he expressed reservations about the exclusion of ESA proposals in the April 2019 RFP, CCAE witness Tyler Comings said PNM's RFP process led to a robust sample of low-cost bids:

While I have some concerns with PNM's RFP process and its evaluation of those bids, I generally find the supply-resource RFP to be encouraging of competition and variety of resources. This is shown in the results of the RFP. PNM received 345 bids for a wide variety of supply-side resources – including engineering, procurement and construction (EPC), build-transfer (BT) and power purchase agreement (PPA) options. Most notably, some of the bids received for solar and battery hybrid projects were among the lowest values in the U.S. of which I am aware.

Comings Dir. 10.

<sup>406</sup> Nagel Dir. 10-11, Table RWN-2.

<sup>407</sup> Tr. (Nagel) 463.

Fallgren testified that PNM received 104 bids for resources in the CCSD representing approximately 12,000 MW and that the eventual short list included 2,100 MW of CCSD resources.<sup>408</sup>

The Hearing Examiners acknowledge the potential that better proposals might be obtained from a new RFP, but they also acknowledge that the risks and uncertainties created with the delay outweigh the likelihood of the benefits. Attempting to hold PNM responsible for the additional costs of the results of a new application is potentially a possibility, but it would involve extensive litigation and appeals and no assurance of success.

For similar reasons, despite the merit of some of their arguments,<sup>409</sup> the Hearing Examiners do not recommend SWG's and WRA's proposals for re-bidding.

Mr. Kemp said the best solution for customers is to allow PNM to own a substantial portion of the ultimate storage asset portfolio, as long as the costs are price-competitive.<sup>410</sup> But PNM has not shown that the costs of the utility-owned Sandia and Zamora battery projects resulting from the April 2019 RFP are price-competitive with the costs that could be received for stand-alone projects in those locations through ESAs. Indeed, the record shows that the costs of the Sandia and Zamora projects are more expensive than the other battery storage proposals received from the initial 2017 RFP.<sup>411</sup>

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<sup>408</sup> Tr. (Fallgren) 94-95.

<sup>409</sup> The concern expressed by the Hearing Examiner in Case No. 17-00129-UT also applies here:

In the utility resource procurement process a bias exists that favors utility ownership of generation assets over PPAs with third parties. *In re Investigation of Competitive Bidding*, Docket No. UM 1182, 2014 WL 1826055, at \*1 (Or. PUC 4-30-14). Therefore, procurements that include utility self-build proposals inevitably pose special regulatory challenges to ensure that the process is designed and implemented to be fair and objective.

Recommended Decision, Case No. 17-00129-UT (Oct. 17, 2017) at 77.

<sup>410</sup> Kemp Dir. 29.

<sup>411</sup> The non-utility-owned Arroyo and Jicarilla projects provided the most cost-effective resources, and Mr. Kemp admitted that the cost of utility-owned battery projects were likely to exceed the costs of ESAs. Tr. (Kemp) 713-15.



The Hearing Examiners acknowledge that these and other problems with PNM's RFP process may have affected the nature of the proposals that were submitted. But the Commission has not established any meaningful rules on how RFPs should be conducted. And there has not been any testimony of any better proposals that would have been submitted had the RFP process been done differently. In the end, the Hearing Examiners find that the proposals received and reviewed were sufficient for the Commission to approve a portfolio of replacement resources that is consistent with the ETA.

The Hearing Examiners do not agree with PNM's argument that the Commission's decision in Case No. 17-00129-UT and the New Mexico Supreme Court's affirmance of that decision preclude the Commission from reviewing the reasonableness of RFPs conducted by public utilities. The issue in the appeal concerned the reasonableness of the particular RFP process used by PNM in that case. NEE argued that the 31-day response deadline in PNM's RFP was unfair to bidders proposing PPA agreements because the RFP required these proposals to contain interconnection and transmission cost information. The Commission determined that, based upon the facts of record, PNM's RFP process was reasonable, and the Court determined that the record contained sufficient evidence to support the Commission's finding.<sup>412</sup> Neither the Commission nor the Court

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<sup>412</sup> The Court held as follows:

We conclude that NEE did not meet its burden of proving that the Commission's approval of the solar energy procurement was unreasonable or unlawful because evidence in the record supports the Commission's determination that the challenged provisions of the RFP were reasonable under the facts and circumstances of this case.

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NEE's arguments about the unfairness of PNM's RFP are contradicted by evidence in the record, which demonstrates that the RFP was similar to prior RFPs issued by PNM and other utilities. We highlight four pieces of evidence that belie the notion that PNM's RFP was unfair. First, PNM introduced evidence that three other utilities issued renewable resource RFPs in 2017 with response deadlines of thirty days, twenty-two days, and twenty days – all shorter than PNM's thirty-one-day response deadline. Second, witnesses testified in the proceeding below that developers commonly have renewable energy projects "on the shelf," which means that they are sufficiently developed to provide credible information about project costs and implementation quickly when an RFP is issued. Third, PNM's RFP offered prospective bidders a medium to communicate with PNM regarding the provisions

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held that the Commission lacked the authority to review the reasonableness of PNM's RFP process for achieving the purpose of the RFP.<sup>413</sup>

Considering both the 2017 RFP and the April 2019 supplemental RFP (including the deficiencies of the April 2019 RFP), the record as a whole is sufficient to recommend a portfolio that satisfies the purposes of the ETA. PNM's RFP process invited resource proposals that were utility-owned and not utility-owned, and PNM received numerous proposals for both types of proposals. PNM's consultants and review team evaluated both types of proposals, and PNM's Application included a mix of both types of proposals. Moreover, in the end, the Hearing Examiners do not recommend the Sandia and Zamora projects developed in the April 2019 RFP in either of the options put forward in Section V.C above.

In addition, there is insufficient time in this docket for a revised RFP and Commission approval of any projects that result from the revised RFP. And, if further bids are to be sought, the scope of the WRA proposal might actually be too narrow. If re-bidding is to be done, a fairer and

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of the RFP, including extension of deadlines, and no PPA bidder used this medium to request additional time beyond the thirty-one-day deadline. Fourth, PNM's RFP was based on PNM's standard competitive bidding practices that it has used and developed over time.

*N.M. Industrial Energy Consumers v. N.M. Public Regulation Commission*, 2019-NMSC-015, ¶¶ 3, 11.

<sup>413</sup> The Commission in Case No. 17-00129-UT concluded that, based on the facts in that case, the RFP was reasonable. The Commission found that, in the absence of complaints from bidders, the 31-day deadline for RFP responses was reasonable and that a first-time requirement that a utility proposing to construct either a generating facility on a PNM-owned site demonstrate what the cost would be if the facility were instead owned by a developer and located on the same site in order to show that its proposed facility is the least cost alternative might violate the longstanding prohibition of *Hobbs Gas Co. v. N.M. Pub. Serv. Comm'n*, 115 N.M. 678, 858 P.2d 54 (1993) that the Commission could not apply a new methodology to a utility without notice of the new methodology. Final Order Partially Adopting Recommended Decision, Case No. 17-00129-UT (Nov. 15, 2017) at 10-11, ¶¶ 12.D, E. The Supreme Court did not independently analyze the reasonableness of the RFP or the Commission's authority to do so. The Court deferred to the Commission's factual findings and held only that there was substantial evidence in the record to support the findings:

It is not this Court's role to reweigh the evidence or determine the credibility of conflicting testimony. See *Gonzales v. N.M. Bd. of Chiropractic Exam'rs*, 1998-NMSC-021, ¶ 23, 125 N.M. 418, 962 P.2d 1253. Since evidence was presented before the Commission that is sufficient for a reasonable mind to accept the Commission's decision to approve the Affordable Solar project, we affirm the Commission's final order approving the project.

*N.M. Industrial Energy Consumers v. N.M. Public Regulation Commission*, 2019-NMSC-015, ¶ 13.

more appropriate scope of bids might include both utility-owned and non-utility battery projects with, as SWG witness Babcock proposed, encouragement for projects located in the CCSD.

Finally, the Hearing Examiners' approach is consistent with the final recommendations of SWG. Despite SWG's claims about the anti-competitive nature of both segments of PNM's RFP process, SWG recommends that the Commission approve portfolios proposed by non-PNM parties, including CCAE 1 as its first preference. SWG credibly shows that this portfolio will satisfy PNM's reliability needs through 2023 and that further reviews and potentially further resources should be studied in PNM's upcoming 2020 IRP process.

#### **F. PNM's failure to rank the proposals received in the RFP**

The SJC Entities argue that Section 3 of the ETA requires the Commission to evaluate multiple factors beyond simply selecting the lowest cost portfolio. They cite the requirement in Section 3(A) that projects "shall be ranked based on their cost, economic development opportunity and ability to provide jobs with comparable pay and benefits to those lost due to the abandonment of a qualifying generating facility."<sup>414</sup> They also cite Section 3(F), which requires the Commission to determine whether the proposed portfolio of replacement resources includes up to 450 MW of nameplate capacity located in the CCSD.<sup>415</sup> They also contend that the more general Public Utility Act's provisions on CCNs require that abandonment and new construction be consistent with the "public convenience and necessity."<sup>416</sup>

The SJC Entities allege that PNM's RFP process was flawed, because PNM failed to conduct the ranking of factors in Section 3(A) intended to address the severe economic impact to the CCSD and the local Farmington and San Juan County communities of abandoning the San

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<sup>414</sup> NMSA 1978, § 62-18-3(A).

<sup>415</sup> NMSA 1978, § 62-18-3(F).

<sup>416</sup> NMSA 1978, §§ 62-9-1, 62-9-5.

Juan units. The SJC Entities believe the entire RFP process had been completed before the enactment of the ETA provision requiring the rankings. Despite having received several initial bids for projects located in the CCSD, no projects, except ones to be owned by PNM, made it into PNM's Tier 1 or Tier 2 selections. They say the reason so few CCSD projects made it to Tier 1 and Tier 2 was because the "initial bid screening process was structured to screen RFP responses for fatal flaws and for factors that did not comply with the intent of the RFP" rather than screening for projects that did not comply with the ETA. PNM also failed to consider economic development opportunities in its initial bid evaluation.<sup>417</sup>

The SJC Entities maintain PNM had every opportunity to conduct supplemental RFPs for generating resources after the passage of the ETA, as it did for the purpose of obtaining bids for utility owned storage projects, but it did not conduct a supplemental RFP attempting to place resources within the CCSD. They insist that nothing required PNM to rush head-long into submitting a replacement resources application by July 1, 2019 and that PNM actually has a year after abandonment approval, which still has not even occurred, to submit an application for replacement resources approval.<sup>418</sup>

The SJC Entities, thus, urge the Commission to reject PNM Scenario 1 and order PNM to (1) prepare a new all resources RFP which requires bidders to supply information needed to conduct the mandatory ranking under the Section 62-18-3(A), and (2) to refile an application for replacement resources approval based on the results of that properly-performed RFP process.<sup>419</sup>

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<sup>417</sup> SJC Entities BIC 5-6.

<sup>418</sup> NMSA 1978, § 62-18-3(A).

<sup>419</sup> SJC Entities BIC 2-7.

But if the Commission decides to move forward with an order approving replacement resources at this time, they ask the Commission to approve PNM Scenario 2.<sup>420</sup>

PNM, for its part, asserts that the ETA does not require any specific format for the ranking of the proposals or that the rankings be provided to the Commission. Subsection 3(A) states only that the qualitative and quantitative data used in rankings need to be made available for review by the parties to the Commission proceeding.<sup>421</sup>

PNM's RFP process culminated in the presentation of four different scenarios that gave different weights to the various criteria under the ETA. PNM Scenario 2 maximizes economic development opportunity by locating all resources in the CCSD. PNM Scenarios 3 and 4 are weighted more heavily toward resource portfolios with the least environmental impacts with higher ratios of capital costs to fuel costs. PNM Scenario 1, in the company's judgment, represents the most balanced mix of the factors.<sup>422</sup>

PNM cites the direct testimonies of its witnesses as providing the qualitative and quantitative assessments of each scenario, including cost, environmental impacts (i.e., carbon emission reductions), customer bill impacts, and reliability metrics. PNM witness Fallgren also estimated job creation, capital investment, and property tax revenues for PNM Scenario 1. PNM also made available all of the data underlying PNM's analyses to the parties through the discovery process.<sup>423</sup> The Commission's requirement that PNM's resource modeling be made available for all parties' use gave the parties the opportunity to assess which resource replacement proposals to develop or support.<sup>424</sup>

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<sup>420</sup> SJC Entities BIC 14.

<sup>421</sup> PNM Resp. Br. 17-18, *citing* NMSA 1978, § 62-18-3(A).

<sup>422</sup> PNM BIC 5.

<sup>423</sup> *Id.*

<sup>424</sup> PNM Resp. Br. 18.

The Hearing Examiners acknowledge that PNM did not prepare a ranking of bids in a format that focuses singularly on the factors in Subsection 3(A). The Hearing Examiners find, however, that the information PNM has presented the parties and the Commission is sufficient to satisfy the requirement of Subsection 3(A). The Hearing Examiners further find that the evidentiary record as a whole is sufficient to enable the Commission to evaluate and make decisions under the standards of the ETA, the Public Utility Act, and the Commission's rule on long-term purchased power agreements (LTPPAs) with respect to selecting the resources to replace the capacity to be abandoned in San Juan Units 1 and 4.

**G. Waiver of Modified Stipulation, Case No. 13-00390-UT, Paragraph 40**

In the Modified Stipulation approved in Case No. 13-00390-UT, the Signatories agreed that PNM could acquire an additional 197 MW of San Juan Unit 4, 65 MW of which would be operated as merchant plant. But there was concern regarding the impact of the additional ownership interest on the environment, especially if the remaining two San Juan units continued to operate for many years. As a result, the signatories agreed to require PNM to offset the environmental impacts of the additional 197 MW of capacity if the plant was still operating in 2020.

Paragraph 40 of the stipulation obligates PNM to match the generation of 197 MW of SJGS with solar or wind credits or allowances beginning on January 1, 2020.<sup>425</sup> The stipulation

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<sup>425</sup> Paragraph 40 of the Modified Stipulation approved in Case No. 13-00390-UT states as follows;

40. Beginning January 1, 2020, for every MWh produced by 197 MW of SJGS, PNM will acquire one MWh of solar or wind credits or allowances. This acquisition requirement does not require PNM to acquire associated energy.

a) The renewable acquisitions shall be emission rate credits ('ERCs') or allowances that can be used for compliance with EPA's final Clean Power Plan ('CPP'), initially released August 3, 2015, and implementing state regulations in effect at the time, or renewable energy credits ("RECs") as defined by New Mexico's Renewable Energy Act ('REA') if permitted as described in sub-paragraph 40(d). PNM shall acquire these renewable resource instruments from New Mexico sited sources if it can do so at no greater cost than the cost of ERCs, allowances or RECs from out-of-state sources.

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spells out two alternatives to obtain the credits. One is Emission Reduction Credits, or ERCs, as identified by the federal Clean Power Plan, which was eliminated under the current federal administration. The other option is Renewable Energy Certificates (RECs) as defined by the Renewable Energy Act.

Under Paragraph 40, credits or RECs are to be procured up to a cap of \$7 million per year (which translates to roughly \$5/MWh-REC). With the Commission's approval of PNM's abandonment request, the cap would apply to two-and-a-half years of operation, or approximately \$17.5 million.

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b) The acquisitions pursuant to this paragraph shall be in addition to and separate from what is required to meet the renewable portfolio standard applicable to PNM pursuant to the REA. The REA does not apply to this acquisition.

c) In calendar years 2020 and 2021, the acquired ERCs or allowances shall meet the eligibility requirements for incentive awards set forth in the Clean Energy Incentive Program ('CEIP') within the CPP, § 60.5737.

d) If EPA's CPP or CEIP is not in effect in New Mexico in 2020 or any subsequent year, or if after 2021 PNM demonstrates that it can comply with the emission reduction requirements of EPA's CPP with its own resources on a stand-alone basis through 2030, then in those years PNM shall be excused from the acquisition of ERCs or allowances but shall nevertheless acquire and retire additional wind or solar RECs as defined by the REA, either in the matching MWh amounts required by this paragraph, or in amounts that allow bundled RECs plus energy (owned or purchased) to be acquired up to the \$7 million per year limit described in sub-paragraph 40(e). In the event PNM can demonstrate the compliance set forth above, the Signatories shall convene to determine whether bundled or unbundled RECs provide the best environmental and customer outcome.

e) PNM shall not be required in any year to incur total costs in excess of \$7 million, including any net carrying costs or savings booked at a short-term debt rate of return, to comply with the acquisitions required by this paragraph 40. The costs shall be recovered in PNM's rates either by including \$7 million per year in base rates subject to true-up and refund should PNM not be required to spend \$7 million in any year to achieve compliance with this paragraph, or through another recovery method agreed upon by all of the Signatories. PNM shall be allowed to book a regulatory asset in the event that PNM must incur these costs prior to the effective date of new rates after January 1, 2020. Any regulatory asset not requested for inclusion in PNM rates within 24 months from the date the regulatory asset is recorded will be deemed recovered.

f) If after January 1, 2018, PNM divests some or all of its SJGS capacity, PNM's obligation to acquire ERCs, allowances or RECs under this paragraph shall be reduced by the amount of capacity divested, up to 197 MW in which case this requirement shall terminate.

Case No. 13-00390-UT, Modified Stipulation, Attachment B to Certification of Stipulation (Nov. 16, 2015), *approved in* Final Order (Dec. 16, 2015) (emphasis added).

Paragraph 40 also provides that if the Clean Power Plan is not in effect, which is the case, the parties to the Stipulation in 13-00390-UT can propose an alternative of developing bundled renewables rather than purchasing RECs. PNM initially suggested in this case a further alternative: that the Signatories might agree, and the Commission might approve a 20 MW solar unit to be located at the San Juan site as an alternative to PNM's compliance with Paragraph 40. PNM's cost estimate for that Piñon Solar Project, to be procured pursuant to an EPC agreement, was approximately \$24 million or \$1,200 per kW.<sup>426</sup> Mr. Fallgren said if the parties reached a consensus that the solar project should be pursued in lieu of the purchase of unbundled RECs, PNM would supplement its filing in this case, or file a separate case, to specially request CCN approval.<sup>427</sup>

WRA initially supported PNM's alternative approach. Mr. O'Connell estimated that applying PNM's obligation to pay up to \$17.5 million in credits to the \$24 million cost of this project would reduce the effective cost for an additional 20 MW of solar in the CCSD to as low as \$6.5 million or \$325 per kW. He said it would be the least expensive solar project in PNM's replacement portfolio for PNM's customers while also providing the full value of the solar project to the tax base in the affected community.<sup>428</sup>

New Mexico Attorney General witness Andrea Crane, however, said the Piñon solar facility is uneconomic. Ms. Crane said PNM attempts to justify the plant with an artificially low cost for the Piñon solar facility, reducing the actual projected cost of the facility from of \$24 million to \$6.5 million (or \$21.28/MWh), on the contrivance that the remaining \$17.5 million has already been "committed" by customers. She said if the actual \$24 million cost of the facility is used in the

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<sup>426</sup> Fallgren Dir. 90 and Exh. TGF-16 (Piñon Solar Facility EPC Agreement).

<sup>427</sup> Fallgren Dir. 88-90; Crane Dir. 26; O'Connell Dir. 25.

<sup>428</sup> O'Connell Dir. 25-26.



model, as it should be, then the MWh cost is almost triple in the first year, increasing to \$61.86/MWh. On a levelized basis, the cost of the Piñon solar facility is approximately \$45.23/MWh over its assumed thirty-year life.<sup>429</sup>

Ms. Crane asserted it also fails to achieve the goal of Paragraph 40, i.e., the acquisition of 3 million additional RECs to offset the emissions from the additional 197 MW of San Juan Unit 4. Based on the plant's estimated output of 55,000 MWh per year at an assumed capacity factor of 31% and a 30-year life, the Piñon solar facility can only offset 1.65 million MWh, or 55% of the requirements under Paragraph 40.<sup>430</sup>

Ms. Crane added that the facility was never a consideration as a replacement asset. It was proposed solely as a means to comply with Paragraph 40, and it was not included in any of PNM's modeling.<sup>431</sup>

Ms. Crane said the best outcome for ratepayers would be if the requirements of Paragraph 40 are waived by the signatories. Given the passage of the ETA, which was not envisioned when Paragraph 40 was executed, PNM will be adding significant additional renewable resources over the coming years and may be carbon-free by 2040. The parties should be focusing their efforts on the best way to go forward to meet that goal in a comprehensive approach that results in cost-effective, reliable energy for New Mexico ratepayers. Paragraph 40 was included in the Modified Stipulation in order to give PNM an incentive to reduce its carbon emissions, but that incentive is no longer necessary.<sup>432</sup>

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<sup>429</sup> Crane Dir. 26-28.

<sup>430</sup> Crane Dir. 27-28.

<sup>431</sup> Crane Dir. 29.

<sup>432</sup> Crane Dir. 32.

She said if the parties do not agree to waive the requirements of Paragraph 40, then the parties should explore retiring RECs from PNM's own renewable portfolio in order to meet the requirements of Paragraph 40. Beginning in 2022 PNM forecasts a 29% REC attainment versus a 20% RPS requirement, which Crane estimated would produce approximately 3.1 million RECs in excess of its RPS. The excess RECs from 2022-2024 should be nearly sufficient in Crane's estimation to meet the Paragraph 40 requirement, without an incremental cost to New Mexico ratepayers. She said applying the excess RECs in 2022-2024 to satisfy Paragraph 40 would have the added benefit of ensuring that incremental new renewable resources are brought online as soon as possible, consistent with the intent of Paragraph 40 to support the growth in renewable resources.<sup>433</sup>

But Crane observed there may be other good alternatives to meet the requirements of Paragraph 40. She said other parties may propose other options that provide even more environmental benefits, at lower costs to ratepayers. She stated that the Attorney General is open to considering other proposals and looks forward to continued dialogue among the signatories of the Modified Stipulation regarding compliance with Paragraph 40.<sup>434</sup>

Based in part on Ms. Crane's testimony, Mr. Fallgren concluded there is not sufficient consensus to move forward with PNM's 20 MW solar proposal and encouraged further discussions among the Signatories.<sup>435</sup>

In rebuttal testimony, WRA's Mr. O'Connell supported a further alternative – the location of a 100 MW solar/30 MW battery project in the CCSD. He said the project will provide more economic transition assistance to the affected community and a cost-effective resource that

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<sup>433</sup> Crane Dir. 32-33.

<sup>434</sup> Crane Dir. 34.

<sup>435</sup> Fallgren Reb. 58.

includes renewable energy to offset the emissions from the portion of Unit 4 added in Case No. 13-00390-UT.<sup>436</sup> The 100 MW solar/30 MW battery project in the CCSD had been identified as Bidder 5 and was included in the modeling for several portfolios, including PNM Scenario 2, CCAE 1 and two Sierra Club portfolios. And PNM agreed to include it in the modeling WRA requested for the five natural gas unit portfolio of WRA 1-B and a four natural gas unit variant of WRA 1-B.

Mr. O’Connell estimated that the project would result in a \$190 million investment in the CCSD (similar to the cost of PNM’s proposed seven unit gas plant).<sup>437</sup> He said the cost of the solar energy, without the battery component, nets to \$31.41 per MWh and that the crediting of the \$17.5 million capped purchase obligation in Paragraph 40 equates to \$5.02 per MWh. Crediting the \$5.02 per MWh against the \$31.41 per MWh cost of the solar energy results in a solar cost of \$26.39 per MWh. O’Connell concluded that repurposing the value of Paragraph 40 to the renewable project makes sense and can help to mitigate the additional economic cost of the locational preference.<sup>438</sup>

In view of the parties’ various and changing proposals, the Hearing Examiners issued a Briefing Order after the close of hearings asking the Signatories participating in the case to state their willingness to waive the requirement of Paragraph 40 and the terms they require to do so.<sup>439</sup> Seven of the eight Signatories to the Stipulation in Case No. 13-00390-UT participated in this proceeding: PNM, Staff, the Attorney General, CCAE, Interwest, NM AREA, and WRA. The

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<sup>436</sup> O’Connell Reb. 10-11,

<sup>437</sup> O’Connell Reb. 8.

<sup>438</sup> O’Connell Reb., 10-11.

<sup>439</sup> Briefing Order (Feb. 5, 2020) ¶ 5.

New Mexico Independent Power Producers (NMIPP) was a Signatory in Case No. 13-00390-UT, but it did not participate in this case.

PNM states without conditions that it agrees to waive the Paragraph 40 requirement.<sup>440</sup> The Attorney General is also willing, provided other Signatories agree.<sup>441</sup> Staff believes it makes sense to eliminate Paragraph 40.<sup>442</sup> Interwest, WRA, CCAE, and NM AREA state they will waive the requirement so long as their respective resource choices are approved.<sup>443</sup>

NEE states it does not waive the Paragraph 40 requirements unless PNM agrees to support community solar legislation in the next legislative session.<sup>444</sup> NEE, however, was not a Signatory to the stipulation.

The Hearing Examiners recommend that the requirement of Paragraph 40 be waived. Its purpose is to encourage the development of additional renewables to offset in some measure PNM's increased responsibility for the CO<sub>2</sub> emissions associated with PNM's increased responsibility for the 197 MW of Unit 4 that it acquired in that case. The purchase of the additional RECs or ERCs was expected to cost up to \$7.5 million per year as long as Unit 4 continued to operate.

The additional renewable resources recommended for approval in this case will serve the purpose of Paragraph 40. The 650 MW of renewable resources in the CCAE 1 portfolio are more than the 420 MW of renewable resources in PNM Scenario 1. They will constitute more than a doubling of PNM's 613 MW of existing and approved renewable capacity.

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<sup>440</sup> PNM Resp. Br. 52.

<sup>441</sup> Attorney General BIC 2.

<sup>442</sup> Staff BIC 10.

<sup>443</sup> Interwest BIC 22; WRA BIC 32; CCAE BIC 46; NM AREA BIC 6, 22.

<sup>444</sup> NEE BIC 41.

Moreover, the \$17.5 million in savings from the foregone purchases of RECs and ERCs will offset to some extent the additional annual revenue requirement associated with CCAE 1 or any other portfolio the Commission approves.

The conditions stated by several of the Signatories for their waivers, i.e., that the waivers are contingent upon the Commission's approval of their recommended portfolios, make the extent of their waivers unclear. The solar/battery project proposed by WRA is an element in CCAE 1. It is also an element in WRA's proposed portfolios, but the resources in the remainder of WRA's proposed portfolios are different from those included in CCAE 1. Further, while other parties stating conditional waivers have not included the solar/battery project proposed by WRA in their preferred portfolios, they might not object to CCAE 1 and the inclusion in CCAE 1 of the solar/battery project.

To gain clarity on the extent of the Signatories' waivers, the Hearing Examiners recommend that the Signatories indicate, at the time exceptions are due, whether they are willing to waive the requirement of Paragraph 40 under any terms or with the inclusion of the 100 MW solar/30 MW battery project of Bidder 5 in CCAE 1 or in any other portfolio adopted by the Commission.

Further, recognizing that the lone remaining signatory to the Modified Stipulation who may be interested in or affected by the result was not a party to the case, the Hearing Examiners find that NMIPP should be afforded notice of their recommended waiver of the Paragraph 40 requirement in line with the other Signatories. Therefore, they will add NMIPP to the Certificate of Service and provide it this Recommended Decision accordingly. Assuming its interest remains, NMIPP would be expected to provide its response by the time exceptions are due to this decision.

Accordingly, the Notice and Order issued concurrently on this date requires the Signatories to the Modified Stipulation to state any objection to the rescission of Paragraph 40 by July 7, 2020.

## H. Ratemaking Treatments

PNM proposes that the energy costs under the Arroyo and Jicarilla PPAs be recovered through PNM's fuel and purchased power cost adjustment clause (FPPCAC). PNM proposes that the demand charges under the PPAs, initially flow through PNM's FPPCAC, until such time that PNM reflects the abandonment of the San Juan units in its base rates. At that time, PNM proposes the demand charges of the PPAs will be recovered through its base rates and not through its FPPCAC.<sup>445</sup>

PNM estimates the 2023 retail revenue requirement for the Arroyo 300 MW PPA solar generation paired with 40 MW of battery storage to be \$18.8 million – \$15.2 million for the Purchased Power Agreement and \$3.6 million for the Battery Energy Storage Agreement.<sup>446</sup> The price for the energy from the solar developer is \$18.65/MWh, and the price for the capacity payment for the battery storage is \$7.46/kW-month.<sup>447</sup>

PNM estimates the 2023 retail revenue requirement for the Jicarilla 50 MW PPA solar generation paired with 20 MW of battery storage to be \$5.1 million – \$2.7 million for the Purchased Power Agreement and \$2.4 million for the Battery Energy Storage Agreement.<sup>448</sup> The price for the energy from the solar developer is \$19.73/MWh, and the price for the capacity payment for the battery storage is \$9.97/kW-month.<sup>449</sup>

NM AREA opposes the recovery of the capacity payments for the battery storage contracts through PNM's FPPCAC. NM AREA notes the magnitude of the capacity payments and objects to

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<sup>445</sup> PNM Exh. 13 (Monroy Dir. (Corrected)) 62.

<sup>446</sup> Monroy Dir., Exh. HEM-19.

<sup>447</sup> Monroy Dir. 60. PNM estimates it will also need to construct transmission network upgrades, estimated at \$20 million, for the Arroyo project. The 2023 retail revenue requirement for these upgrades is estimated to be \$1.3 million. PNM will seek recovery of these costs in an appropriate rate case. Monroy Dir., 61.

<sup>448</sup> Monroy Dir., Exh. HEM-21.

<sup>449</sup> Monroy Dir. 62.

their recovery through the per kWh rate in the FPPCAC. NM AREA maintains that the issue of the proper ratemaking methodology to recover the capacity costs in base rates should be addressed in PNM's upcoming rate case. Recovery should not be allowed to collect the capacity costs through the FPPCAC rate, NM AREA contends, until the date of the abandonment of San Juan Units 1 and 4.<sup>450</sup>

The Hearing Examiners recommend that PNM's ratemaking requests to recover the energy costs associated with the Arroyo and Jicarilla PPAs through PNM's FPPCAC be approved. However, PNM's request to recover the capacity costs associated with the Arroyo and Jicarilla ESAs should be denied.

The Commission's rule on LTPPAs states that an electric utility may include in an application for approval of an LTPPA a request that the commission determine other ratemaking principles and treatment that will apply to the LTPPA.<sup>451</sup> The rule also states that if a request for a determination of other ratemaking principles and treatment is made, the Commission shall determine the appropriate ratemaking treatment and principles that will apply to the LTPPA during its term and include that determination in the order granting approval of the LTPPA.<sup>452</sup>

The rule also establishes the following ratemaking treatment unless otherwise authorized by the Commission. The energy costs are recoverable through the FPPCAC. Capacity costs and fixed costs may be recoverable through base rates when the Commission issues an order authorizing a change in base rates that includes recovery of the capacity costs and fixed costs.<sup>453</sup>

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<sup>450</sup> NM AREA BIC 26.

<sup>451</sup> 17.9.551.9(B) NMAC.

<sup>452</sup> 17.9.551.9(C) NMAC.

<sup>453</sup> 17.9.551.9(A) NMAC.

PNM's request to recover the energy charges associated with the PPAs through the FPPCAC is consistent with the LTPPA rule. PNM's request to recover the capacity charges associated with the ESAs is not consistent with the LTPPA rule. PNM should seek the recovery of the capacity charges in PNM's next base rate case.

The Hearing Examiners will likely recommend the same ratemaking treatment for the energy and capacity costs that will be included in the further solar and battery PPAs and ESAs to implement the remainder of the replacement portfolios recommended here.

The denial of PNM's request in this case should not cause PNM significant harm. During the January 2020 hearings, PNM indicated its intention to file a base rate case in the second quarter of this year and in the summer of 2021. PNM's plan for the 2020 rate case appears to have changed, but the facts remains that PNM controls the timing of its base rate increase requests, such that the timing of the recovery of the capacity costs is within PNM's control.

## **I. Further Proceedings**

PNM has submitted proposed agreements for most of the resources in its preferred Scenario 1. The agreements include:

- PPA for the 300 MW Arroyo solar project
- ESA for a 40 MW Arroyo battery project
- PPA for the 50 MW Jicarilla solar project
- ESA for the 20 MW Jicarilla battery project
- EPC for a 280 MW natural gas project
- EPC for the 40 MW Sandia battery project
- EPC for the 30 MW Zamora battery project

The other parties have proposed portfolios that include some of the projects for which PNM has submitted agreements, but other projects are based simply on proposals received by



PNM in its RFP process. No agreements have been negotiated or submitted to the Commission for these latter proposals. PPAs and ESAs need to be approved under the Commission's Rule 551, but no specific statutory or regulatory requirement provides that the Commission need approve the construction contract for a utility-owned facility for which the utility seeks a CCN.

As addressed above, the Hearing Examiners' primary recommendation is that the Commission approve CCAE 1. The Hearing Examiners therefore recommend that the Commission approve in the final order in this case the PPA for the 300 MW Arroyo solar project, the PPA for the 50 MW Jicarilla solar project, and the 20 MW ESA for the Jicarilla battery project.

The Hearing Examiners are also recommending approval in a new docket of the following projects in CCAE 1 for which agreements still need to be submitted and approved: a PPA for a 150 MW Arroyo battery project; PPA and/or ESA agreements for the 200 MW solar/100 MW battery project of Bidder #2; and the 100 MW solar/30 MW battery project of Bidder #5. The Hearing Examiners recommend an expedited period for PNM to negotiate agreements for the projects and to file the agreements for approval under Rule 551. PNM should negotiate and file the necessary agreements within 30 days after the issuance of the final order in this case. The review of the agreements should be expedited.

The Hearing Examiners recommend further that PNM should file in the same new docket within 30 days of entry of the final order in this case a proposal to develop and implement the 24 MW Demand Response (DR) program included in CCAE 1. The proposal should outline the contours of the DR program, the method of recovery of program costs, and the proceeding in which PNM will request Commission approval, whether it be: (i) as a modification to PNM's 2021 Energy Efficiency and Load Management Plan in pending Case No. 20-00087-UT, (ii) as a

tariff or rider proposal in PNM's next base rate case along the lines suggested by NM AREA witness Dauphinais,<sup>454</sup> or (iii) in some other proceeding.

If, however, the Commission determines that the Hearing Examiners' secondary recommendation should be adopted or decides to approve any other portfolio for which necessary agreements have not been filed with the Commission, a similar process should be adopted. For the Hearing Examiners' secondary recommendation to adopt Sierra Club Tier 2-4, the Commission could again approve the agreements PNM has submitted for the 300 MW Arroyo solar project, the 50 MW Jicarilla solar project, and the 20 MW Jicarilla solar project. Agreements would need to be negotiated and filed for the 150 MW Arroyo battery project and the 40 MW battery project submitted by Bidder #12. And PNM would need to submit a proposed certification of estimated cost for the five LM6000 Piñon natural gas units it seeks to build and own. Again, the issues to be reviewed in the further proceedings shall be expedited.

## **J. Other Issues**

In addition to the enactment of the ETA, the REA Amendments and the other changes discussed above, Senate Bill 489 of 2019 added a new section requiring PNM's use of apprenticeship programs for the construction of electric generating facilities commencing after July 1, 2020:

### **62-13-16. Requiring the hiring of apprentices for the construction of facilities that generate electricity.**

A. The construction of New Mexico facilities that generate electricity for New Mexico retail customers, and that are not located on the customer side of an electricity meter, shall be subject to the requirements provided in Subsection B of this section if the facilities are built as a result of competitive solicitations issued after July 1, 2020.

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<sup>454</sup> Dauphinais Reb. 46.

B. Subject to availability of qualified applicants, the construction of facilities that generate electricity for New Mexico retail customers shall employ apprentices from an apprenticeship program during the construction phase of a project at a minimum level of the following percentages of all persons employed for the project:

(1) ten percent for projects for which on-site construction commences beginning January 1, 2020, and prior to January 1, 2024;

(2) seventeen and one-half percent for projects for which on-site construction commences beginning January 1, 2024, and prior to January 1, 2026; and

(3) twenty-five percent for projects for which on-site construction commences beginning January 1, 2026.<sup>455</sup>

The IBEW Local 611 suggests in its post-hearing brief that, because the section was enacted in the same legislation that pertains to the abandonment of San Juan, it would be “in the public interest,” as a condition implemented under Section 62-18-3(F) to condition the Commission’s approval of replacement resources in this case on PNM agreeing to require its contractors to comply with the apprenticeship requirement of Section 62-13-16(B)(1), notwithstanding the conflicting provision of Section 62-13-16(A) that limits the section’s applicability to construction resulting from competitive solicitations issued after July 1, 2020. The IBEW also requests that the Commission require the application of this provision in the event the Commission orders PNM to conduct a further RFP.<sup>456</sup>

PNM maintains that Section 62-13-16 applies to all new construction generally for all electric utilities and was not intended to apply specifically to the replacement resources that result from PNM’s abandonment of San Juan. But PNM also argues more generally that a new RFP is not justified.<sup>457</sup>

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<sup>455</sup> NMSA 1978, §§ 62-13-16(A), (B) (emphasis added).

<sup>456</sup> IBEW BIC 4.

<sup>457</sup> PNM Resp. Br. 23-24.

The Hearing Examiners recommend that IBEW's request not be approved. The IBEW presented no testimony on this issue at the hearing and conducted no cross-examination on the subject. Section 62-13-16 is clear. In addition, the requirement IBEW asks the Commission to impose now on the bidders of the projects currently in play was not included in PNM's RFP and was not presumably factored into the costs bid for the projects.

## **VI. FINDINGS OF FACT AND CONCLUSIONS OF LAW**

The Statement of the Case, Discussion, and all findings and conclusions therein, whether or not separately stated, numbered, or designated as findings and conclusions, are incorporated by reference herein as findings and conclusions. Based on the foregoing Statement of the Case and Discussion, the Hearing Examiners recommend that the Commission further **FIND** and **CONCLUDE** as follows:

1. PNM provides retail electric utility service to members of the public within the State of New Mexico, and therefore PNM is a public utility subject to the jurisdiction of the Commission under the Public Utility Act. As a public utility, PNM is required to furnish adequate, efficient, and reasonable service at just and reasonable rates in conformity with NMSA 1978, §§ 62-8-1 and 62-8-2.
2. The Commission has jurisdiction over the parties and the subject matter of this case.
3. Reasonable, proper, and adequate notice of this case has been given.
4. PNM's requests for approval of the 300 MW Arroyo PPA, 50 MW Jicarilla PPA and 20 MW Jicarilla ESA satisfy the standards in the Public Utility Act, the Commission's LTPPA rule, and the ETA and should be granted.
5. PNM should negotiate and file for Commission approval in a new docket proposed agreements for the 150 MW Arroyo battery project, the 200 MW solar/100 MW battery project of Bidder #2, and the 100 MW solar/30 MW battery project of Bidder #5. PNM should also file in

the same new docket a proposal for the Commission's approval of the 24 MW addition to its Demand Response program consistent with the guidance set forth in Section V.I above. All of these further filings should be made within 30 days after issuance of the final order in this case.

6. PNM's requests to recover the energy charges of the 300 MW Arroyo PPA and the 50 MW Jicarilla PPA through PNM's FPPCAC satisfy the standards of the Commission's LTTPA rule and should be granted.

7. PNM's request to recover the capacity charges of the 20 MW Jicarilla ESA through PNM's FPPCAC does not satisfy the standards in the Commission's LTTPA rule and should be denied. Recovery of the capacity charges should be addressed in PNM's next base rate case. Recovery of the capacity charges of any other energy storage agreement the Commission approves in this case should also be deferred to PNM's next base rate case.

8. A similar procedure for filing of heretofore unfiled agreements and proposed estimates of certificated cost should be followed for the secondary recommended portfolio or any different portfolio the Commission adopts.

9. Paragraph 40 of the Modified Stipulation in Case No. 13-00390-UT should be waived to mitigate the cost of the recommended replacement resource portfolio.

## **VII. DECRETAL PARAGRAPHS**

Based upon the record, the Findings of Fact and Conclusions of Law set forth herein and, or the reasons stated above, the Hearing Examiners recommend that the Commission **ORDER** as follows:

A. The findings, conclusions, decisions, rulings, and determinations made and construed herein are hereby adopted and approved as the findings, conclusions, rulings, and determinations of the Commission.

B. PNM's requests for approval of the 300 MW Arroyo PPA, 40 MW Arroyo ESA, 50 MW Jicarilla PPA, and 20 MW Jicarilla ESA are **GRANTED**.

C. PNM shall negotiate and file agreements with the Commission in a new docket for the following projects: a 150 MW Arroyo battery project; the 200 MW solar/100 MW battery project of Bidder #2; and the 100 MW solar/30 MW battery project of Bidder #5. PNM shall also file in the same new docket a plan for the Commission's approval of the 24 MW addition to its Demand Response program consistent with the guidance set forth in Section V.I above. All of these further filings shall be made within 30 days after the issuance of the final order in this case.

D. PNM's requests for the issuance of CCNs for the Piñon gas plant, the Sandia battery project and the Zamora battery project are **DENIED**.

E. PNM's requests to recover the energy charges of the 300 MW Arroyo PPA and the 50 MW Jicarilla PPA through PNM's FPPCAC are **GRANTED**.

F. PNM's requests to recover the capacity charges of the 40 MW Arroyo ESA and the 20 MW Jicarilla ESA through PNM's FPPCAC are **DENIED**. Recovery of the capacity charges shall be addressed in PNM's next base rate case.

G. Paragraph 40 of the Modified Stipulation in Case No. 13-00390-UT is hereby rescinded, subject to confirming the Signatories' waiver of the subject requirement.

H. PNM shall comply with all requirements established in this Order, including but not limited to, matters involving related future cases before the Commission.

I. In accordance with 1.2.2.35(D) NMAC, the Commission has taken administrative notice of all Commission orders, rules, decisions, and other relevant materials in all Commission proceedings cited in this Order.

J. Any matter not specifically ruled on during the course of this proceeding or in this Order is disposed of consistent with this Order and the Commission's Rules.

K. This Order is effective immediately.

L. A copy of this Order shall be served on NMIPP and all parties listed on the official service list for this case.

M. This docket is closed.

**ISSUED** at Santa Fe, New Mexico this **24<sup>th</sup>** day of **June 2020**.

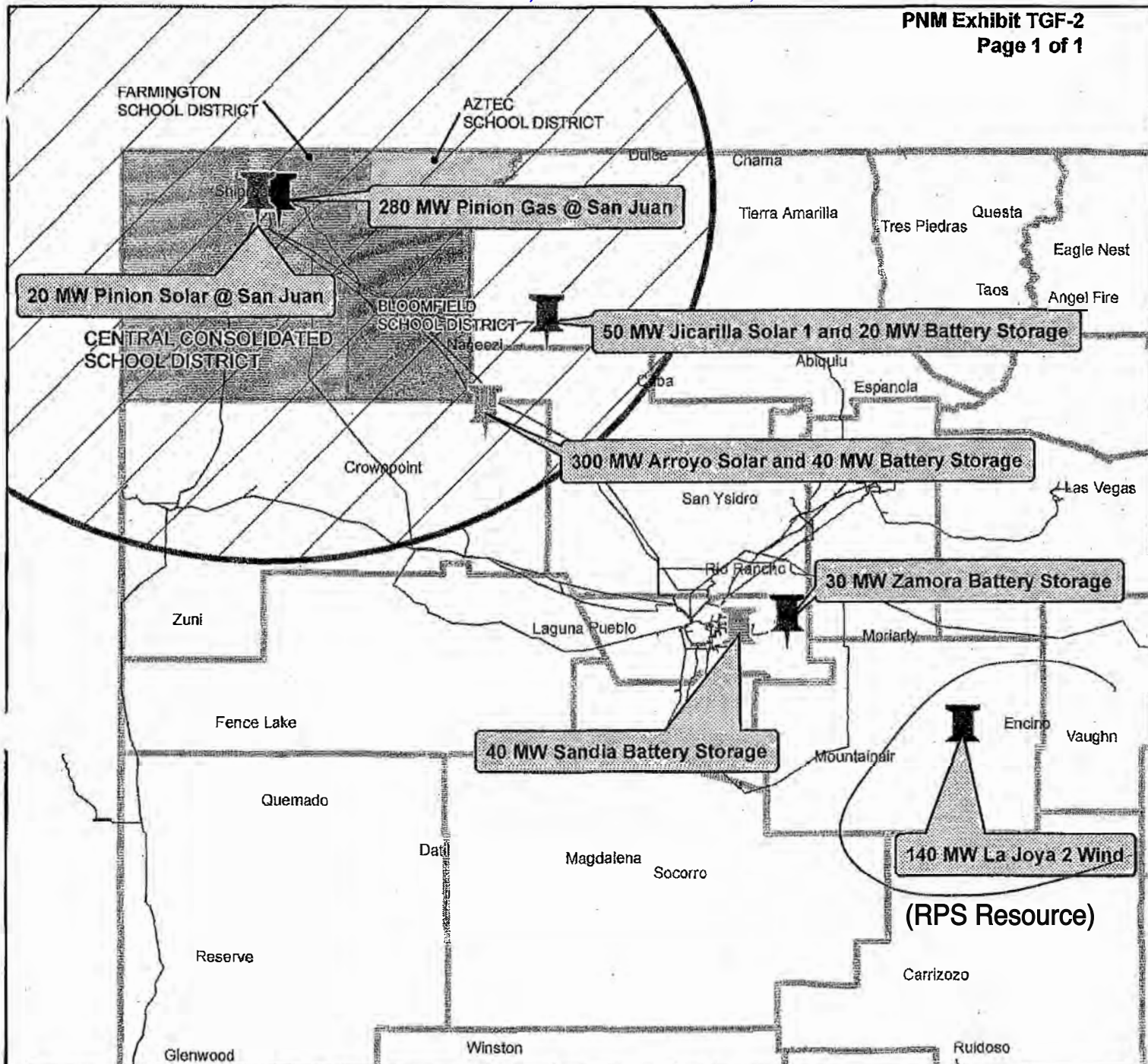
**NEW MEXICO PUBLIC REGULATION COMMISSION**

/s/ Anthony F. Medeiros

**Anthony F. Medeiros**  
**Hearing Examiner**

/s/ Ashley C. Schannauer

**Ashley C. Schannauer**  
**Hearing Examiner**



## Scenario One

### Replacement Resources

- 30 MW Zamora Battery Storage
- 40 MW Sandia Battery Storage
- 20 MW Pinion Solar @ San Juan
- 140 MW La Joya 2 Wind
- 300 MW Arroyo Solar and 40 MW Battery Storage
- 50 MW Jicarilla Solar 1 and 20 MW Battery Storage
- 280 MW Pinion Gas @ San Juan

### San Juan School Districts

- AZTEC
- BLOOMFIELD
- CENTRAL CONSOLIDATED SCHOOL DISTRICT
- FARMINGTON

### 100 Mile Buffer from San Juan Generating Station





**BEFORE THE NEW MEXICO PUBLIC REGULATION COMMISSION**

**IN THE MATTER OF PUBLIC SERVICE )  
COMPANY OF NEW MEXICO'S )  
CONSOLIDATED APPLICATION FOR )  
APPROVALS FOR THE ABANDONMENT, )  
FINANCING, AND RESOURCE REPLACEMENT )  
FOR SAN JUAN GENERATING STATION )  
PURSUANT TO THE ENERGY TRANSITION ACT )**

**Case No. 19-00195-UT**

**CERTIFICATE OF SERVICE**

I HEREBY CERTIFY that on this date I caused to be sent to the individuals listed below,  
via e-mail only, a true and correct copy of the *Recommended Decision on Replacement Resources*,

*Part II* issued on this date.

Stacey Goodwin	<a href="mailto:Stacey.Goodwin@pnmresources.com">Stacey.Goodwin@pnmresources.com</a> ;	Anna Sommer	<a href="mailto:ASommer@energyfuturesgroup.com">ASommer@energyfuturesgroup.com</a> ;
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**DATED** this 24<sup>th</sup> day of **June 2020**.

**NEW MEXICO PUBLIC REGULATION COMMISSION**

*/s/ Anthony F. Medeiros*

**Anthony F. Medeiros, Hearing Examiner**