

**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**

**REBUTTAL TESTIMONY**

**OF**

**THOMAS P. DUANE**

**January 13, 2020**

**NMPRC CASE NO. 19-00195-UT  
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THOMAS P. DUANE**

**WITNESS FOR  
PUBLIC SERVICE COMPANY OF NEW MEXICO**

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PNM Exhibit TPD-1 (Rebuttal)      Resume of Thomas P. Duane

AFFIDAVIT

**REBUTTAL TESTIMONY  
OF THOMAS P. DUANE  
NMPRC CASE NO. 19-00195-UT**

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**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME, POSITION AND BUSINESS ADDRESS**

**A.** My name is Thomas P. Duane. I am Manager of the Transmission Planning Department at Public Service Company of New Mexico (“PNM”). My business address is 2401 Aztec Road NE, Albuquerque, NM, 87107. A copy of my resume is attached as PNM Exhibit TPD-1 (Rebuttal). My department and I assisted in PNM’s bid evaluation process with respect to system transmission issues, capabilities and limitations.

**Q. HAVE YOU FILED OTHER TESTIMONY IN THIS PROCEEDING?**

**A.** Not initially. However, I have adopted the direct testimony of Jeff R. Mechenbier filed on July 1, 2019, due to his retirement from PNM.

**Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

**A.** I rebut the testimony of several witnesses that question PNM’s assumptions about system transmission limits. I respond to recommended alternatives to PNM’s proposed replacement resource scenarios that do not adequately address transmission-related concerns. I support the position that PNM’s Scenario 1 is the superior approach over the intervenors’ recommended alternatives to PNM’s acquisition of replacement resources from the perspective of transmission planning.

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1 **Q. WHOSE TESTIMONY ARE YOU REBUTTING?**

2 **A.** I rebut the direct testimonies of the following witnesses:

- 3           • Sierra Club witness Michael Goggin, who raises several questions about  
4 PNM’s assumptions about transmission limits at pages 28 – 29 of his  
5 testimony and the suggested alternative Scenario (Exhibit MG-2), which  
6 does not take into account the limited transmission capabilities from the  
7 Four Corners/San Juan area to PNM’s Albuquerque load center.
- 8           • Coalition for Clean Affordable Energy (“CCAЕ”) witness Tyler Comings,  
9 who discusses CCAЕ’s alternative resource portfolios without addressing  
10 the implications of locating resources remote from the Albuquerque load  
11 center.
- 12           • Southwest Generation Operating Company (“SWG”) witness William  
13 Babcock, who asserts on pages 6, 26 and 36 of his testimony that PNM did  
14 not give sufficient consideration to new transmission in eastern New  
15 Mexico and to the use of power purchases from generation facilities in  
16 southern New Mexico and western Arizona.

17

18 **II. REBUTTAL REGARDING TESTIMONY OF SIERRA CLUB WITNESS**  
19 **MICHAEL GOGGIN**

20 **Q. SIERRA CLUB WITNESS GOGGIN, AT PAGE 28 OF HIS TESTIMONY,**  
21 **QUESTIONS PNM’S ASSUMPTIONS REGARDING TRANSMISSION**  
22 **IMPORT LIMITS FOR MARKET PURCHASES. WHAT IS YOUR**  
23 **RESPONSE?**

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1    **A.**    Sierra Club witness Goggin is incorrect on the amount of transmission capacity  
2           with Southwestern Public Service Company (“SPS”). Mr. Goggin is also wrong  
3           to assume that since most of the eastern New Mexico generation is wind  
4           resources, the transmission is not fully scheduled during peak load hours. Mr.  
5           Goggin is suggesting that PNM should acquire resources that would not have firm  
6           transmission availability, which is problematic on several levels. While wind  
7           generation may average lower output during peak summer hours, at times  
8           generation during these hours would still utilize most, if not all, of the  
9           transmission capacity on PNM’s tie to SPS in northern New Mexico. In southern  
10          New Mexico, the 200 MW tie with SPS is only one-third owned by PNM, so  
11          stating that this capacity is PNM’s is incorrect. In addition, PNM does not have  
12          transmission to deliver power imported from SPS on the tie in southern New  
13          Mexico to PNM’s load center in northern New Mexico. Therefore, point-to-point  
14          wheeling would need to be obtained from El Paso Electric Company (“EPE”) and  
15          Tucson Electric Power (“TEP”) at an added transmission cost. EPE would first  
16          need to perform a study to determine whether wheeling could be provided without  
17          EPE system improvements. In addition, a determination would need to be made  
18          if capacity is available on SPS’s system to get power to the ties with PNM. Mr.  
19          Goggin’s description of transmission availability is, therefore, misinformed and  
20          too simplistic.

21

22    **Q.**    **AT PAGE 29 OF HIS TESTIMONY, SIERRA CLUB WITNESS GOGGIN**  
23    **USES AN EXAMPLE OF TRANSMISSION CAPACITY ON THE TIE**

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1       **BETWEEN SOUTHWESTERN COLORADO AND NEW MEXICO AND**  
2       **ARIZONA TO SUPPORT HIS CLAIM THAT PNM’S ASSUMPTIONS ON**  
3       **IMPORT LIMITS WERE FLAWED. WHAT IS YOUR RESPONSE?**

4    **A.**   Sierra Club Witness Goggin’s approach is once again too simplistic. A  
5       transmission path’s capacity is not representative of the amount of capacity that is  
6       available for a particular purpose. PNM used transmission capacity estimates in  
7       the SERVUM model based on what might be typically available for deliveries to  
8       PNM on a non-firm basis, not the physical transfer capability of the transmission  
9       path. Furthermore, as discussed by PNM Witness Maestas in his Rebuttal  
10      Testimony, PNM does not typically secure resources from Colorado because it  
11      cannot be reliably delivered to PNM’s load.

12  
13   **Q.**   **SIERRA CLUB HAS PROPOSED REPLACEMENT RESOURCE**  
14      **PORTFOLIOS AS AN ALTERNATIVE TO PNM’S SCENARIO 1. WHAT**  
15      **CONCERNS DO YOU HAVE WITH THE PROPOSED ALTERNATIVES**  
16      **WITH RESPECT TO TRANSMISSION?**

17   **A.**   The transmission capacity that would be utilized for the Sierra Club replacement  
18      resource portfolios (Tier 1-13 or SC 12-1/122) would require between 750 MW  
19      and 800 MW of transmission capacity from the Four Corners/San Juan area to the  
20      Albuquerque load center as listed below:

- 21           • Tier 1-13: 200 MW for the Cabezon battery; 150 MW associated with
- 22           Hybrid Project #1 located at Jicarilla (which includes a 40 MW battery
- 23           energy storage facility but will be limited to 150 MW export capability);

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1           50 MW associated with Jicarilla Solar 1 or referenced as Primary Energy  
2           (which includes a 20 MW battery energy storage facility but will be  
3           limited to 50 MW export capability); 300 MW associated with Arroyo  
4           Solar or referenced as Clenera (which includes a 150 MW battery energy  
5           storage facility but will be limited to 300 MW export capability), and 50  
6           MW associated with Jicarilla Solar 2 for PNM Solar Direct<sup>1</sup>.

- 7
- 8           • SC 12-1/122: 200 MW for the Cabezon battery; 150 MW associated with  
9           Hybrid Project #1 located at Jicarilla (which includes a 40 MW battery  
10          energy storage facility but will be limited to 150 MW export capability);  
11          100 MW associated with Bidder 5 (which includes a 30 MW battery  
12          energy storage facility but will be limited to 100 MW export capability)  
13          located at San Juan; 300 MW associated with Bidder 4 (which includes a  
14          40 MW battery energy storage facility but will be limited to 300 MW  
15          export capability) located at Four Corners, and 50 MW associated with  
16          Jicarilla Solar 2 for PNM Solar Direct<sup>2</sup>.

17

18          This allocation of transmission capacity for the Sierra Club replacement resource  
19          portfolios would utilize between 70 MW and 120 MW more transmission  
20          capacity when compared to PNM's Scenario 1 assuming all generators operated at  
21          full capacity simultaneously. The scenarios reduce and relocate the total batteries

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<sup>1</sup> NMPRC Case No. 19-00158-UT

<sup>2</sup> NMPRC Case No. 19-00158-UT

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1 in the Albuquerque area and would, therefore, not provide the full benefits  
2 identified on pages 32 and 35 of PNM Exhibit TGF-3 in the Direct Testimony of  
3 Thomas Fallgren for the Sandia and Zamora locations.

4  
5 **III. REBUTTAL TO CCAE WITNESS TYLER COMINGS**

6 **Q. CCAE WITNESS COMINGS DESCRIBES, AT PAGES 6 TO 8 OF HIS**  
7 **TESTIMONY, CCAE'S TWO ALTERNATIVE PORTFOLIOS. CCAE**  
8 **SCENARIO 1 WOULD INCLUDE 150 MW OF BATTERY STORAGE AT**  
9 **THE ARROYO SOLAR FACILITY AND WOULD ELIMINATE**  
10 **BATTERIES AT SANDIA AND ZAMORA. WHAT CONCERNS DO YOU**  
11 **HAVE ABOUT CCAE'S PROPOSAL?**

12 **A.** I am concerned that CCAE's proposal does not appreciate the implications of  
13 locating resources remote from the Albuquerque load center. Reliability and  
14 system benefits increase by locating a resource close to the Albuquerque load  
15 center. This is discussed in PNM Exhibit TGF-3 on pages 18 and 19 and  
16 Appendix A in the Direct Testimony of PNM Witness Thomas Fallgren. Load-  
17 side batteries can help reduce the flow on the transmission system when  
18 transmission limits are reached. In order to maintain flows within transmission  
19 limits, load-side generation is required during peak summer load hours and  
20 particularly during many hours where a key transmission line or transformer is not  
21 in-service. In addition, PNM Exhibit TGF-3 noted that the Zamora battery can



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1 provide operational benefits to the east mountain area by enabling black start  
2 capabilities when the only transmission line serving the area is de-energized.

3  
4 **IV. REBUTTAL TO SWG WITNESS WILLIAM BABCOCK**

5 **Q. SWG WITNESS BABCOCK, AT PAGES 26 TO 27 OF HIS TESTIMONY,**  
6 **CLAIMS THAT PNM DOES NOT CONSIDER POWER QUALITY**  
7 **IMPACTS TIED TO TRANSMISSION ADDITIONS IN EASTERN NEW**  
8 **MEXICO. WHAT IS YOUR RESPONSE?**

9 **A.** As a preliminary matter, I find Mr. Babcock’s use of the term “power quality” to  
10 be confusing. But to the extent that Mr. Babcock believes “power quality” means  
11 reactive power flow (or voltage regulation) and frequency regulation, I can  
12 respond. As PNM Witness Nick Wintermantel discusses in his rebuttal  
13 testimony, the EnCompass, PowerSimm, and SERVVM models that SWG Witness  
14 Babcock is critiquing are not designed to address reactive power flow or  
15 frequency, and information on these items would therefore not be expected in a  
16 discussion of the models or results. Rather, voltage and frequency regulation  
17 requirements are addressed separately in interconnection studies for the proposed  
18 resources. The eastern New Mexico transmission additions were appropriately  
19 analyzed by the transmission planning department in accordance with the FERC  
20 required transmission and interconnection processes. PNM completed technical  
21 studies that evaluated the transmission system for both the BB2 and Western  
22 Spirit transmission projects. These studies confirmed that reliability concerns

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1 around voltage and frequency regulation were adequately addressed via the  
2 required network upgrades associated with these transmission projects.<sup>3</sup> The  
3 studies considered the appropriate set of issues needed to ensure system reliability  
4 with full consideration of the transmission additions in eastern New Mexico. In  
5 addition, SWG Witness Babcock's testimony on page 27 lines 1 thorough 5 does  
6 not identify any issues that need to be resolved or requirements that are not being  
7 met by PNM's preferred Scenario 1 portfolio.

8  
9 **Q. SWG WITNESS BABCOCK SUGGESTS PNM SHOULD HAVE**  
10 **CONSIDERED THE LUNA ENERGY FACILITY NEAR DEMING AS A**  
11 **SHORTER-TERM SOLUTION. AT PAGE 36, HE SAYS THAT**  
12 **TRANSMISSION CONSTRAINTS ON PNM USING LUNA**  
13 **GENERATION ARE NOT A SIGNIFICANT CONCERN. HOW DO YOU**  
14 **RESPOND?**

15 **A.** PNM does not have firm transmission to deliver power from Luna in southern  
16 New Mexico to PNM's load center in northern New Mexico. Therefore, point-to-  
17 point wheeling would need to be obtained from EPE and TEP at an added  
18 transmission cost of \$59/kw-year. If 100 MW of transmission service were  
19 required from TEP and EPE, the cost would be approximately \$5.9 million  
20 annually. Mr. Babcock fails to account for these facts.

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<sup>3</sup> [https://www.oasis.oati.com/woa/docs/PNM/PNMdocs/2nd\\_BB\\_Line\\_SIS\\_Final.pdf](https://www.oasis.oati.com/woa/docs/PNM/PNMdocs/2nd_BB_Line_SIS_Final.pdf)  
[https://www.oasis.oati.com/woa/docs/PNM/PNMdocs/Eastern\\_New\\_Mexico\\_Transmission\\_Non\\_Tariff\\_Study\\_Report.pdf](https://www.oasis.oati.com/woa/docs/PNM/PNMdocs/Eastern_New_Mexico_Transmission_Non_Tariff_Study_Report.pdf)

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1 **Q. SWG WITNESS BABCOCK ALSO DISCUSSES THREE SHORT-TERM**  
2 **THERMAL GENERATING RESOURCES IN ARIZONA THAT HE SAYS**  
3 **PNM SHOULD HAVE MODELED. HE SAYS THAT WITH FIRM**  
4 **TRANSMISSION SERVICE, THOSE RESOURCES COULD ENSURE**  
5 **RELIABILITY IN THE SHORT-TERM. HOW DO YOU RESPOND?**

6 **A.** Mr. Babcock again fails to account for important facts. PNM does not have firm  
7 transmission rights to deliver power to its load from western Arizona power  
8 plants. Therefore, point-to-point wheeling would need to be obtained to make  
9 deliveries to PNM that will significantly increase the delivery cost. In the best  
10 scenario, this would involve a wheeling cost of at least \$38/kw-year. If 100 MW  
11 of transmission service were required from APS, the cost would be approximately  
12 \$3.8 million annually. Mr. Babcock fails to account for these facts. Depending  
13 on the transmission provider(s) and number of providers needed to get from the  
14 resource to PNM's system, the added cost could be much higher. Any  
15 transmission providers wheeling the power would need to determine whether  
16 capacity is available and, if not, the associated cost and time to make system  
17 improvements to provide the wheeling service. It should also be noted that, as  
18 discussed in the rebuttal testimony of PNM Witness Fallgren, no bids based on  
19 the Arizona resources that Mr. Babcock mentions were provided in response to  
20 PNM's All Source RFP.

21

22 **Q. ON PAGE 23, SWG WITNESS BABCOCK STATES THAT PNM'S**  
23 **MODELS ARE DEFICIENT BECAUSE THEY DO NOT ACCOUNT FOR**

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1 **REACTIVE POWER FLOW AND VOLTAGE SUPPORT. WHAT IS**  
2 **YOUR RESPONSE?**

3 A. As PNM Witness Nick Wintermantel discusses in his rebuttal testimony, the  
4 EnCompass, PowerSimm and SERVVM models are not designed to address  
5 reactive power flow, voltage sags/spikes, system inertia, or system frequency and  
6 phase angle. The assessments of these items are covered in the studies required to  
7 interconnect generation facilities to the transmission system. For example, the  
8 studies for the Pinon gas plant were completed and did not identify any reliability  
9 issues tied to voltage support or reactive power. Interconnection studies of the  
10 other resources are in progress or planned and will address any needs around  
11 voltage support and reactive power. The resources proposed in PNM Scenario 1  
12 do not create transmission loadings that differ significantly from past utilization  
13 and all provide voltage control and reactive power. It is expected, therefore, that  
14 like the Pinon gas plant studies, no deficiencies will be identified.

15  
16 **V. CONCLUSION**

17 **Q. DO YOU HAVE ANY CONCLUDING OBSERVATIONS?**

18 A. PNM has confirmed the availability and cost of necessary transmission and  
19 interconnection for the portfolio of resources in PNM Scenario 1. The  
20 alternatives discussed above by certain intervenors are either mistaken as to the  
21 availability of transmission capacity or failed to account for the added cost of

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1 transmission, or both. None of the proposed alternatives displace PNM Scenario  
2 1 as the optimal choice as replacement resources.

3

4 **Q. DOES THIS CONCLUDE YOUR TESTIMONY?**

5 **A.** Yes, it does.

*GCG#526579*

Resume of Thomas P. Duane

# PNM Exhibit TPD-1 (Rebuttal)

Is contained in the following 1 page.

**THOMAS P. DUANE**

**EDUCATIONAL AND PROFESSIONAL SUMMARY**

**Name:** Thomas P Duane

**Address:** Public Service Company of New Mexico  
414 Silver Ave SW  
Albuquerque, New Mexico 87102

**Position:** Manager, Transmission Planning

**Education:** Bachelor of Science in Electrical Engineering,  
University of Colorado, Boulder, Colorado 1980

Master of Science in Electrical Engineering,  
Electric Utility Management Program,  
New Mexico State University, Las Cruces, New Mexico 1998

**Employment:** Public Service Company of New Mexico, Albuquerque, New Mexico

Transmission Planning Engineer, Manager Transmission Planning (10 Years)  
1984-1996, 2006-Present

Manager, Production Modeling 1996-2005

Operations Engineer, Wholesale Power Marketing Analyst  
1981-1984, 2005

**Licensure:** Licensed Professional Engineer in the State of New Mexico

**Professional Affiliations:** Member of Institute of Electrical and Electronic Engineers  
("IEEE") Power Engineering Society and Computer Society

**Experience**

- Power System Analysis and Operations – Steady State, Dynamic Stability, Transient, Short Circuit, Power Operations, Production Costs, Generation Dispatch
- Committee Representation – over 25 years in inter-utility coordination groups, WECC and ERCOT reliability committees, RTO Tariff negotiations, stakeholder groups and industry organizations.

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AFFIDAVIT

STATE OF NEW MEXICO )  
 ) ss  
COUNTY OF BERNALILLO )

**THOMAS P. DUANE, Manager, Transmission Planning Department at Public Service Company of New Mexico**, upon being duly sworn according to law, under oath, deposes and states: I have read the foregoing **Rebuttal Testimony of Thomas P. Duane** and it is true and accurate based on my own personal knowledge and belief.



SIGNED this 2<sup>nd</sup> day of January, 2020.

Thomas P. Duane  
THOMAS P. DUANE

SUBSCRIBED AND SWORN to before me this 2<sup>nd</sup> day of January 2020.

Fernando Vigil  
NOTARY PUBLIC IN AND FOR  
THE STATE OF NEW MEXICO

My Commission Expires:

4-27-22

