INTERWEST ENERGY ALLIANCE

September 7, 2022
Electronically Submitted to IRP@pnm.com

Nick Phillips
Director, Integrated Resource Planning
Public Service Company of New Mexico
Albuquerque, NM

Dear Nick:

Interwest Energy Alliance submits the attached comments in response to your request for input on issues involved in PNM's integrated resource planning process.

Interwest appreciates PNM's interest in hearing from its IRP participants on issues raised in its public advisory meetings. Interwest has been an active participant in the IRP public advisory process and looks forward to upcoming meetings on key issues. Our previous verbal and written comments have focused on correlated generator outages and transmission expansion.

Our attached written comments focus on the benefits of transmission expansion for PNM and its customers. That point is emphasized by our understanding that PNM was able to sell into the western market this week at favorable prices benefiting PNM's customers, which helped California meet its customers' peak power needs during the unprecedented heat event which struck California this week. This mirrors the benefits PNM's customers received from PNM's ability to obtain limited amounts of power from other western regions during New Mexico's heat and power peak in July this year. Transmission expansion to enhance regional marketing opportunities to realize financial and reliability benefits is clearly of value to PNM and its customers, and should play an important part in PNM's resource planning process.

We understand the upcoming September 13 IRP public advisory meeting on will focus on transmission planning, and we look forward to participating. We hope PNM will take our comments into consideration, post them on PNM's IRP webpage, and circulate them to other participants for their consideration in advance of the September 13 meeting.

Thank you again for your outreach efforts in your IRP planning process and willingness to consider participant input. We welcome the opportunity to engage in discussions on these and other key IRP issues to assist PNM in developing a strong and well supported IRP.

Sincerely,

Rikki Seguin
Executive Director

Attachment

Comments of the Interwest Energy Alliance

Public Stakeholder Process

Public Service Company of New Mexico 2023 IRP Process

September 7, 2022

Introduction

The Interwest Energy Alliance fully participates in many state and regional forums to provide input related to generation and transmission resource planning, including throughout WestConnect, and also actively supports transmission expansion in CPCN approval dockets throughout the Rocky Mountain West and Southwest. Interwest sees firsthand the benefits of transmission expansion and the real and specific opportunity costs that exist from lack of access to diverse generation resources. Interwest consistently recommends that resource planning be fully integrated, to include generation and transmission planning, and has done so in the rulemakings in New Mexico as well as several rounds of resource planning by PNM and other utilities across the region. Interwest submits these comments as a reminder that increasing regional coordination and integrated planning will decrease costs, increase reliability, and increase benefits to the people of New Mexico for generations. Interwest looks forward to helping to support any transmission expansion which will provide these benefits when PNM moves to obtain approval from regulating bodies with jurisdiction over these applications when these benefits and the costs can be appropriately recognized.

These comments do not encompass the full view of Interwest on every issue touched upon by this IRP process but are the issues that Interwest believes should be addressed at this stage.

Prior IRP Docket

In PNM's 2021 IRP, docket 21-00033-UT, Interwest, jointly with NMAREA, submitted a whitepaper in September 2021 authored by Michael Goggin of Grid Strategies, LLC, addressing the reliability and economic inputs and outputs of the IRP process. PNM has capably addressed several of our concerns in this IRP iteration, but there are still areas of concern that Interwest believes should be addressed.

In the Final Order dated July 13, 2022, the Commission states at paragraphs 22 and 23:

> *22. However, the Commission also concurs with NMAREA and Interwest that PNM should address distribution and transmission planning in a meaningful way in its upcoming 2023 IRP filing because while PNM's April 27th Update expressly acknowledged that transmission constraints limit its resource adequacy and availability, PNM's current 2020 IRP fails to even start to address the issue in a meaningful way. The Commission finds that PNM's continuing delay in even starting to address them will result in further prolonging these constraints on PNM's resource and reliability options. The Commission finds PNM's 2023 IRP Action Plan should include an action item that identifies and analyzes distribution and transmission constraints and opportunities.*

23. For this reason, the Commission finds that PNM should include, in its future 2023 IRP filing a meaningful analysis of transmission and distribution constraints and opportunities to increase resource availability and flexibility. The Integrated Resource Planning statute Section 62-17-10 NMSA 1878 specifically requires that the Commission can require utilities include, in their IRPs to address load management and there is no way to plan for load management without looking at transmission and distribution. Further, given that transmission and distribution are significant capital expenditures going forward and presently, these costs make up a large part of an IRP that need to plan for the "most cost-effective portfolio" of resources.

It is in these areas that we focus our comments today.

PNM must account for the benefits of new transmission

Increased transmission, when planned correctly, can provide multiple benefits and lower costs, including during those periods when natural gas supply is most at risk. Traditional transmission planning often under-values the benefits of transmission to provide resilience and recovery during extreme weather events. Portions of these benefits are shown below:

Extreme conditions and high-value periods, which are difficult to model, play an outsized role in the value of transmission

- 50% of transmission's congestion value comes from only 5% of hours.
- Existing transmission planning approaches run the risk of understating the economic value of new transmission infrastructure by inadequately modeling such periods.
- These findings are driven not only by historical weather events but also 'normal' market occurrences such as infrastructure outages, fuel price volatility, forecast errors, and electric demand volatility.

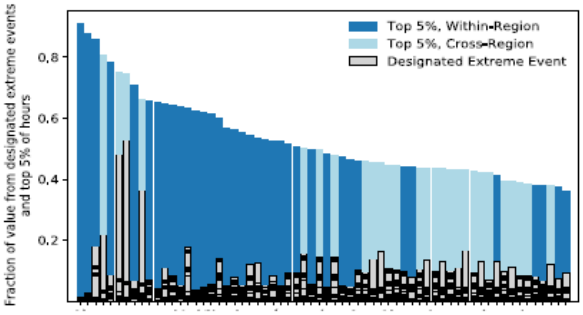

Figure 3: Fraction of marginal congestion relief value in top 5% of hours and during designated extreme events from 2012 through 2021. Each bar represents a different link represented in Figure 1. The specific path labels of the transmission links are found on slide 28.

[1]

The lack of integration between transmission planning and resource planning increases costs and decreases regional reliability. Although FERC is currently addressing some of these concerns through ongoing Notices of Proposed Rulemaking (NOPRs) related to transmission planning, generator interconnection, and accounting for severe weather in transmission planning, PNM has

[1]D. Millstein, R. Wiser, W. Gorman, S. Jeong, J. Kim, A. Ancell, Empirical Estimates of Transmission Value
using Locational Marginal Prices, Lawrence Berkeley National Laboratory, 2022. Available at https://eta-publications.lbl.gov/sites/default/files/lbnl-empirical_transmission_value_study-august_2022.pdf.

the opportunity, and the obligation, to increase this integration and provide the maximum benefits to New Mexico ratepayers in its resource planning.

Recently, FERC Chairman Glick and Commissioner Clements issued a joint statement to this effect:

> *[W]e are also concerned that the current approach to transmission planning and cost allocation is failing to adequately identify the benefits and allocate the costs of new transmission infrastructure. […] As a result, the status quo may be disproportionately producing transmission facilities that address a narrow set of needs, providing comparatively modest benefits, but at a still-substantial total cost instead of developing the type of transmission infrastructure that could provide the most significant benefits for customers*.[2]

Additionally, in the ongoing NOPR on transmission planning (RM21-17), FERC has recently elucidated 12 categories of transmission benefits that should be included in transmission planning, and Interwest believes that they would be equally valuable to consider in the resource planning process. These are:

- Avoided or deferred reliability transmission projects and aging infrastructure replacement
- Either reduced loss of load probability or reduced planning reserve margin
- Production cost savings
- Reduced transmission energy losses
- Reduced congestion due to transmission outages
- Mitigation of extreme events and system contingencies
- Mitigation of weather and load uncertainty
- Capacity cost benefits from reduced peak energy losses
- Deferred generation capacity investments
- Access to lower cost energy
- Increased competition
- Increased market liquidity

These factors are just as vital when making decisions about intrastate transmission needs as they are for more regional decision-making. By addressing all or most of these categories of benefits in both transmission planning and resource planning, PNM would be able to create a paradigm wherein these planning processes would complement each other and create robust evidence for projects that provide the greatest benefits. Portions of these benefits are shown below:

[2] Joint Statement from Chairman Glick & Commissioner Clements on Building Transmission for the Future, Federal Energy Regulatory Commission, July 2021, available at https://www.ferc.gov/newsevents/news/joint-statement-chairman-glick-commissioner-clements-building-transmission-future.

Transmission Links Have Significant Economic Value

- Interregional and regional transmission links reduce congestion and expand opportunities for trade.
- Nodal real-time wholesale power prices exhibit stark geographic differences that are, in many cases, stable overtime and can be used to estimate transmission value.
- Many links have hourly average pricing differences that exceed $15/MWh – equivalent to $130 million per year for a 1000 MW link.
- Interregional links ($24/MWh in the median case in 2021) have greater value than regional links ($11/MWh in the median case in 2021) – though many high-value regional links exist.

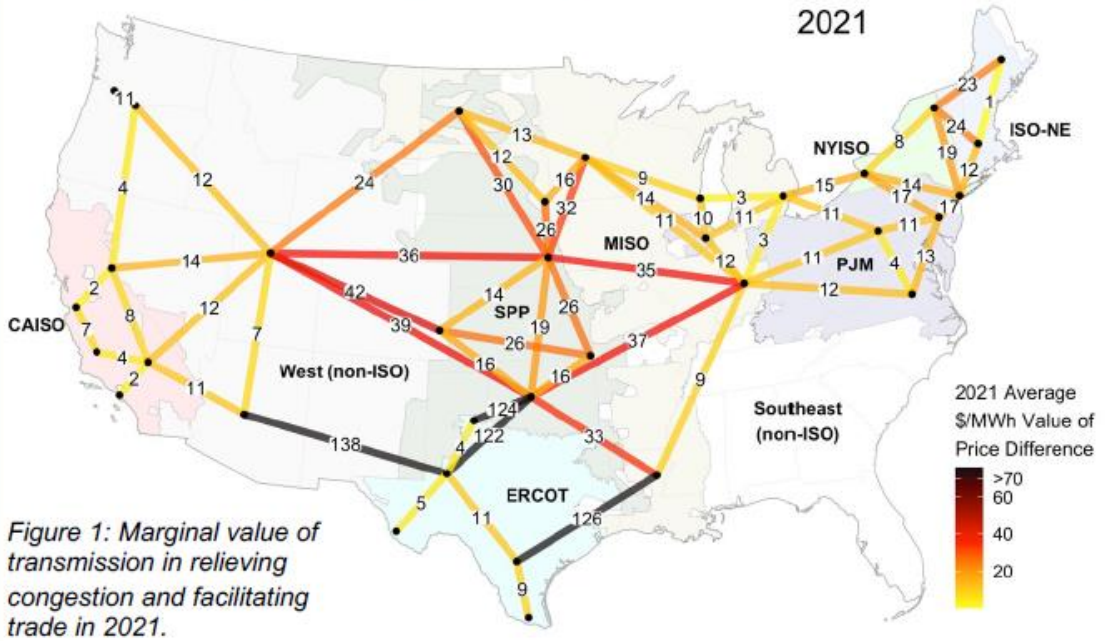

Figure 1: Marginal value of transmission in relieving congestion and facilitating trade in 2021.

[3]

PNM should allow new wind in its modeling

It is not reasonable to put forth the chicken-or-the-egg argument that new wind resources are not economic due to the need for additional transmission to access those resources, while also not including a robust transmission plan that could access these resources and assign accurate costs. Allowing the model to pick both wind resources and transmission is the only way to accurately understand the relationship between these costs and benefits. Transmission, if planned

[3] D. Millstein, R. Wiser, W. Gorman, S. Jeong, J. Kim, A. Ancell, Empirical Estimates of Transmission Value using Locational Marginal Prices, Lawrence Berkeley National Laboratory, 2022. Available at https://eta-publications.lbl.gov/sites/default/files/lbnl-empirical_transmission_value_study-august_2022.pdf.

holistically, could access cost-effective New Mexico wind resources and provide multiple benefits for the cost.

Additional wind resources, even with associated transmission costs, are quite likely to be economic. This is borne out by the understanding that hundreds or even thousands of megawatts of New Mexico wind are currently being planned and built for Arizona and California access. If New Mexico wind is an economic resource for utilities and customers hundreds of miles away, it is exceedingly likely that the same would be true for customers in the PNM service territory. PNM should appropriately include this opportunity in modeling.

Multiple Benefits of Transmission

1. Reliability

Expanding the transmission system provides substantial benefits to PNM by accessing geographically diverse sources of electricity supply and demand. First, a more geographically diverse fleet of renewable resources reduces their variability and delivers a more consistent energy output, increasing their capacity value. PNM can achieve this both by building transmission to access diverse renewable resources on its own system and increasing ties to neighboring power systems to increase transfer capacity for market imports and exports. As our 2021 IRP comments explained, NREL and other experts have found that greatly expanded transmission ties are essential for cost-effective decarbonization because they tap into the geographic diversity of renewable output across larger regions. Even a relatively small amount of geographic distance between two renewable plants is enough for the output profiles of wind[4] or solar plants[5] to be less than perfectly correlated, as local weather phenomena no longer affect both plants simultaneously. These diversity benefits reduce the cost of operating the power system, as lower variability reduces the need for additional flexible resources to quickly change their level of output.[6]

Second, expanded ties to neighboring power systems reduce PNM's exposure to correlated conventional generator outages on its own system, particularly those caused by localized severe weather events. In particular this reduces the likelihood of catastrophic results from correlated gas unit outages, as discussed by Michael Goggin at the PNM IRP meeting on August 17, 2022. As Winter Storm Uri demonstrated, the lack of interconnections doomed ERCOT to blackouts while MISO and SPP, both experiencing the same weather conditions, were able to rely on imports from their neighbors to prevent large-scale rolling blackouts.[7] Recent analysis by Lawrence Berkeley National Laboratory found that "roughly half of the marginal value of

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[4] H. Holttinen, et al., Design and Operation of Power Systems with Large Amounts of Wind Power, 2009, available at https://community.ieawind.org/HigherLogic/System/DownloadDocumentFile.ashx?DocumentFileKey=c7a0f97c-b01c-713b-b51a-46f33d62b5db&forceDialog=0.

[5] A. Mills, R. Wiser, Implications of Wide-Area geographic Diversity of Short-Term Variability of Solar Power, Lawrence Berkeley National Laboratory, September 2010, available at: https://emp.lbl.gov/sites/all/files/presentation-lbnl-3884e-ppt.pdf.

[6] K. Van Horn, J. Pfeifenberger, P. Ruiz, The Value of Diversifying Uncertain Renewable Generation through the Transmission System. Boston University Institute for Sustainable Energy, 2020. Available at https://www.bu.edu/ise/files/2020/09/value-of-diversifying-uncertain-renewable-generation-through-the-transmission-system-093020-final.pdf.

[7] M. Goggin, Transmission Makes the Power System Resilient to Extreme Weather, July 2021, available at https://acore.org/wp-content/uploads/2021/07/GS_Resilient-Transmission_proof.pdf.

transmission in providing congestion relief occurs during extreme grid conditions and high-value periods that account for only five percent of hours but are challenging to model and so are often not fully considered in transmission planning."[8]

Third, and potentially most importantly, larger interconnections to other utility systems tap into geographic diversity in electricity demand, reducing capacity needs because across a region, utilities experience peak demand at different times, mostly due to geographic diversity in weather and climate.

Grid Strategies, LLC recently quantified renewable and load diversity across the Southwestern U.S. using publicly available Energy Information Administration (EIA) data. By comparing stand-alone versus regionally aggregated 2021 EIA hourly load and renewable generation data for Balancing Authorities across the Southwest,[9] the analysis shows a large reduction in peak capacity needs from aggregating diverse loads and renewable resources across the region. Specifically, the Southwest could see a reduction in peak net load of over 8% or 8,500 MW, with adequate transmission and a regional resource adequacy construct like the one being developed by the Western Power Pool.[10] This translates to $7 billion in savings if the benefit were realized through a reduced need for new gas combustion turbine capacity.[11] Aggregating across the entire U.S. portion of the Western Interconnect reduces peak net load by 14% or 19,400 MW, which could displace $16 billion in costs for generating capacity. Notably, this analysis does not account for the additional benefit from how weather and climate diversity reduce correlations in conventional generator outages and derates across large areas, as the hourly generator outage and derate data needed to quantify that benefit is not publicly available. Portions of these benefits are shown below:

Transmission value is correlated with energy prices and varies by region and year

- Congestion has gotten worse for links connected to SPP and ERCOT.
- Value of transmission is variable overtime, and often spikes in the event of extreme conditions like the 2012 Polar Vortex and 2021 Winter Storm Uri.

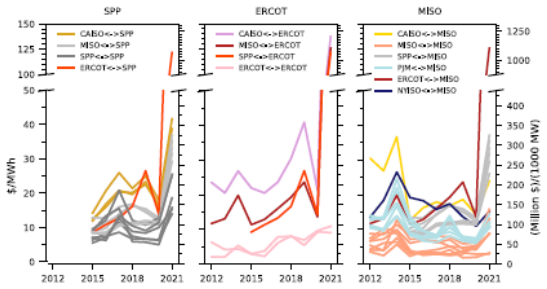

Figure 2: Marginal value of transmission overtime for links across a subset of ISOs/RTOs.

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[8] https://emp.lbl.gov/news/regional-and-interregional-transmission-have.
[9] Data available at https://www.eia.gov/electricity/gridmonitor/sixMonthFiles/EIA930_BALANCE_2021_Jan_Jun.csv, https://www.eia.gov/electricity/gridmonitor/sixMonthFiles/EIA930_BALANCE_2021_Jul_Dec.csv.
[10] https://www.westernpowerpool.org/about/programs/western-resource-adequacy-program
[11] Conservatively using an assumed $785/kW cost of a frame combustion turbine from U.S. Energy. Info. Admin., *Cost and Performance Characteristics of New Generating Technologies, Annual Energy Outlook 2022* (Mar. 2021), *available at* https://www.eia.gov/outlooks/aeo/assumptions/pdf/table_8.2.pdf, and the conservative assumption that a new combustion turbine offers 95% of its nameplate capacity as dependable capacity value.

[12] D. Millstein, R. Wiser, W. Gorman, S. Jeong, J. Kim, A. Ancell, Empirical Estimates of Transmission Value

The Western Flexibility Assessment[13] (WIEB Study) similarly demonstrated that system flexibility can be achieved by integrating several strategies to include resource mix diversity, additional transmission, storage, load management, and enhanced market co-ordination.

2. Markets

Finally, access to markets is a natural extension of the more and larger interconnection opportunities discussed above. The WIEB Study also shows that if a regionally coordinated market, supported by enhanced transmission, is not developed then there could be severe consequences over the next decade. More specifically, curtailments would double, there would be an increase in production costs by $1.3 billion per year, and an increase in CO2 emissions.[14] A recent study from Boston University showed that when two regional systems/submarkets with different renewable resource production profiles are interconnected there can be a reduction in annual production costs between 2% to 23% and a decline in annual renewable curtailments between 45% to 90%.[15]

Utilities in the Western Interconnect are pursuing markets in a way that has never been seen before, and PNM must, like all western utilities, adapt to this changing environment. Real-time markets, both the EIM and WEIS, have almost universal coverage of the Western Interconnect at this point. Day-ahead markets may be available for PNM to join soon. PNM has not made public statements or been actively engaged in the development of SPP's Markets + or the CAISO EDAM based on a high-level review of submitted comments. If PNM has been engaged, it would be helpful to stakeholders to understand how planning may be affected by the increased access to new sources of generation and diverse load to be served by PNM. Similarly, PNM should participate in the Western Power Pool's Western Resource Adequacy Program. PNM, like all western utilities, is at somewhat of a crossroads to begin the process of choosing between regional wholesale markets, the boundaries of which may determine substantial costs and benefits. Increased access to low-cost western resources could lower costs overall and Interwest and other stakeholders would appreciate more information on PNM's endeavors so that we can support PNM's efforts in this regard.

Thank you for accepting these written comments and Interwest looks forward to discussing these issues at the scheduled September 13, 2022 IRP public stakeholder meeting and continuing these discussions going forward.

Interwest Energy Alliance

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using Locational Marginal Prices, Lawrence Berkeley National Laboratory, 2022. Available at https://eta-publications.lbl.gov/sites/default/files/lbnl-empirical_transmission_value_study-august_2022.pdf.

[14] B. Brownlee, G. Simonson, K. Fraser, D. Ramirez, C. Liotiris, K. Moyer, Western Flexibility Assessment: Investigating the West's Changing Resource Mix and Implications for System Flexibility, Energy Strategies, 2019. Commissioned by the Western Interstate Energy Board. Available at https://westernenergyboard.org/wp-content/uploads/2019/12/12-10-19-ES-WIEB-Western-Flexibility-Assessment-Final-Report.pdf.

[15] K. Van Horn, J. Pfeifenberger, P. Ruiz, The Value of Diversifying Uncertain Renewable Generation through the Transmission System. Boston University Institute for Sustainable Energy, 2020. Available at https://www.bu.edu/ise/files/2020/09/value-of-diversifying-uncertain-renewable-generation-through-the-transmission-system-093020-final.pdf.