

**BEFORE THE PUBLIC UTILITY COMMISSION  
OF OREGON**

**LC 80**

In the Matter of  
  
PORTLAND GENERAL ELECTRIC CO.,  
  
2023 Clean Energy Plan and Integrated  
Resource Plan.

COMMENTS OF GRID UNITED LLC  
ON PORTLAND GENERAL  
ELECTRIC CO.'s 2023 CLEAN  
ENERGY PLAN AND INTEGRATED  
RESOURCE PLAN

Grid United LLC (“Grid United”) is a transmission development company focusing on building infrastructure projects that will help modernize the U.S. electric grid. Grid United is developing a series of utility-scale, interregional transmission line projects to increase reliability and provide low-cost electricity to consumers. Grid United is backed by Centaurus Capital LP, which has an established track record of developing major energy infrastructure projects.

Among the transmission projects under development by Grid United, the North Plains Connector (“NPC”) project is a high-voltage direct current (“HVDC”) line bridging the Western and Eastern Interconnections and that is capable of bi-directional transport of up to 3,000 MW between Colstrip, Montana and Bismarck, North Dakota.

As further explained below, Grid United supports Portland General Electric Company’s (“PGE”) efforts to consider transmission, particularly given the increasingly constrained Pacific Northwest (“PNW”) transmission system, as part of its 2023 Clean Energy Plan and Integrated Resource Plan (“IRP”). While generally supportive of PGE’s general direction with respect to transmission in the IRP, these Comments propose a few improvements to PGE’s transmission modeling and analysis that Grid United hopes PGE will consider as it continues to refine its

approach and assumptions when modeling transmission in this and future integrated resource plans.

Grid United makes the following, specific requests of PGE, the Commission, and Commission Staff: (1) that the Commission and/or Commission Staff, as part of any future acknowledgement of the PGE IRP, specifically acknowledge that any effort by PGE to pursue large-scale transmission projects like the NPC would be consistent with the Commission's expectations for how PGE can meet its resource needs and manage potential transmission solutions; and (2) that PGE on its own, or at the direction of the Commission, add the NPC project to the list of potential proxy transmission resources PGE is considering as part of this IRP, and consider the benefits that the NPC project would provide to PGE's ratepayers (including access to the Midcontinent Independent System Operator ("MISO") and Southwest Power Pool ("SPP") markets). The NPC project would provide numerous benefits to PGE and its ratepayers, as explained in these Comments. Grid United is working with consultants on additional analysis and modeling that will further demonstrate the significant benefits a project like NPC would provide to a Pacific Northwest utility, including PGE. Grid United expects to have this additional analysis ready for its Round 1 Comments to be later-filed in this proceeding.

### **I. BACKGROUND ON NPC**

The NPC project will be an HVDC electrical transmission line capable of bi-directional transport of up to 3,000 MW between Colstrip, MT and Bismarck, ND, and operating at up to 525kV. On the western end, the NPC project will consist of a converter station that connects to an existing 500kV substation in Colstrip, MT, where two 500kV AC lines connect to the existing Colstrip power plant and where NorthWestern Energy's system connects at the 230kV level. From Colstrip, the planned project route continues east for approximately 380 miles to a single converter

station southwest of Bismarck, ND, with AC connections to both an existing substation in MISO and a new switchyard in the SPP footprint. Once constructed, the NPC project will bridge the Western and Eastern Interconnections, improve reliability and resiliency from expanded ties between meteorologically dissimilar grids, and expand market access for electricity generators and consumers on both ends of the new line.

## **II. GRID UNITED'S COMMENTS ON PGE'S 2023 IRP**

### **A. Grid United Supports PGE's Holistic Approach to Analyzing New Transmission Investments.**

Grid United strongly supports PGE's holistic approach to analyzing and modeling transmission as part of the 2023 IRP. A holistic approach to considering new transmission investments—like the one PGE is attempting, for the first time, in its IRP—is critical for the region to meet its various clean energy goals and integrate the new resources that will be needed in the next decade (and beyond) to meet those targets.

In Chapter 9.2.3 of its IRP, PGE explains the regional transmission planning environment in the West and the various studies underway by different organizations. PGE notes that “because new significant transmission projects can take 15-20 years to develop, PGE and other transmission providers in the west recognized that studying these scenarios now is necessary if the region is to meet the collective future resource targets.”<sup>1</sup> Grid United applauds PGE and other transmission providers actively studying regional transmission needs and solutions. As PGE notes in Chapter 9.3.1, the transmission system in the Pacific Northwest is fully subscribed and poses a tremendous challenge to PGE meeting its energy supply needs in a cost effective and reliable way. To ensure that transmission capacity is available when it is needed, transmission projects must be identified and developed well in advance of when that need becomes current, particularly in light of the long

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<sup>1</sup> IRP at 216.

lead-time required to permit and construct transmission in the West. Planning for new transmission, while acknowledging that the future is uncertain and also attempting to shield customers from excessive risk, requires that a utility focus on transmission projects that both serve a projected need and preserve flexibility in how they will ultimately be utilized. This proactive approach is needed both because the siting, permitting, and construction activities for transmission projects are long-lead activities and due to supply chain and labor constraints identified by PGE in Chapter 3.3.3.

While it appears PGE's attempts to model transmission investments and needs throughout the region are still somewhat nascent in the IRP, Grid United supports PGE's initial efforts to analyze transmission and commends PGE for being among the first-movers in the region to take a hard look at transmission constraints throughout the West. With the goal of supporting PGE in its efforts to properly model transmission needs throughout the West, the remainder of these Comments offer a few recommended improvements that will further refine PGE's analysis and provide a more robust look at the potential transmission solutions needed to deliver the enormous amount of clean energy resources anticipated to come online in the region over the next decade and beyond.

B. To Produce a More Robust Analysis of Regional Transmission Needs, PGE Should Include More Proxy Resources in its Analysis of Proxy Transmission Options.

While Grid United is supportive of PGE's efforts to model potential transmission proxy resources in its IRP, Grid United recommends that PGE model more than just three proxy resource options. For example, PGE identifies three transmission-based proxy resources in Chapter 9.4.1 (*see* Table 44):<sup>2</sup> (1) IRP proxy resources via a Pacific Northwest transmission upgrade (the South

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<sup>2</sup> Grid United notes that, while PGE describes two types of transmission proxy resources in the text of the IRP (a Northwest transmission upgrade and purchasing the rights on a transmission line to Wyoming or the Desert

of Allston upgrade); (2) Wyoming wind via generic proxy transmission; and (3) Desert Southwest solar via generic proxy transmission.<sup>3</sup> While these generic proxy resource areas are worth studying, they are not the only transmission-based proxy resource areas that could be available to PGE within the next decade and which should be included in the IRP.

Grid United suggests that, to produce a more robust and complete analysis of transmission solutions, PGE should consider additional proxy transmission resources in its evaluation, particularly to account for credible projects under development and the access they provide to diversified resources and regions (such as the NPC project). As shown in table 57, PGE estimates a transmission need of over 800 MW may arise as soon as 2030, suggesting a challenge in meeting capacity needs under PGE's current modeling framework. Because transmission development is such a lengthy activity, PGE should include more proxy resources representing projects already in development in its portfolio modeling so that projects with benefits to PGE's system can be recognized and further developed.

As requested throughout these Comments, Grid United specifically asks that PGE analyze the NPC project, with its attendant benefits described herein—including access to wide pools of diverse, high quality resources; connections to large, noncoincident, and liquid markets to manage oversupply and fill needs during critical periods; and controllable technology that allows better optimization of PGE's system— as part of the resources listed in Chapter 9 (and, more specifically, Table 44) of the IRP. Furthermore, Grid United requests that the Commission acknowledge that any effort by PGE to pursue large-scale transmission projects like the NPC project would be consistent with the Commission's expectations for how PGE can meet its resource needs and

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Southwest), Grid United views this as three separate proxies: (1) the Northwest upgrade; (2) Wyoming wind; and (3) Desert Southwest solar.

<sup>3</sup> IRP at 227.

manage potential transmission solutions. Grid United also requests that PGE expand the number of proxy resources it is considering the IRP to specifically include the NPC project. If PGE is unwilling to consider this request on its own accord, Grid United requests that the Commission, with potential support from Commission Staff, acknowledge that PGE's IRP should consider the NPC project in its current transmission analyses.

C. PGE's Analysis Should Also Consider Interregional Resource Diversity Achieved Through Interregional Transmission Projects, Rather than Focusing Only on Regional Proxy Resources.

PGE identifies geographic, technology, and resource diversity—accessed through regional integration and transmission—as key components to meet its resource and reliability needs. Grid United encourages PGE to consider the benefits of interregional diversity, in addition to regional diversity, when evaluating how to build out its transmission system, particularly as there are projects under active development that PGE could leverage to derive cost effective energy, capacity, and reliability benefits for its customers, including the NPC project (among others). As resource mixes change, and both supply and demand become more weather-dependent, having a grid larger than weather systems will be critical to maintaining energy and capacity adequacy. Projects such as Grid United's NPC would give PGE access to both SPP and MISO markets, each of which have deep pools of high-quality renewable resources. The benefits of a fully controllable connection—made possible via the type of HVDC technology NPC will use, as further explained below—to these markets are multifold.

i. *MISO and SPP Offer Access to a Diverse and Complementary Set of Resources.*

MISO and SPP respectively have over 190 and 105 GW of installed capacity comprising various generation types and spread across their wide, multi-state footprints.<sup>4</sup> There is inherent resource diversity built into these markets because of their geographic breadth and their physical distance from PGE's load, coupled with the vast resources available in these markets, accentuates the value that PGE could derive from tapping into this diversity. Additionally, SPP and MISO have a bevy of high-quality resources that could provide PGE with high-capacity factor resources with uncorrelated generation profiles to what PGE already has access to within the Pacific Northwest. Integrating resources with diverse generation profiles using a fully controllable, bidirectional HVDC line would allow PGE to maximize the utilization of its existing transmission rights and complement regional resources, while also providing PGE unmatched resource diversity that will aid PGE in complying with Oregon's clean energy mandates while maintaining a reliable, cost-effective system.

ii. *MISO and SPP Offer PGE Access to Regions with Non-Coincident Loads.*

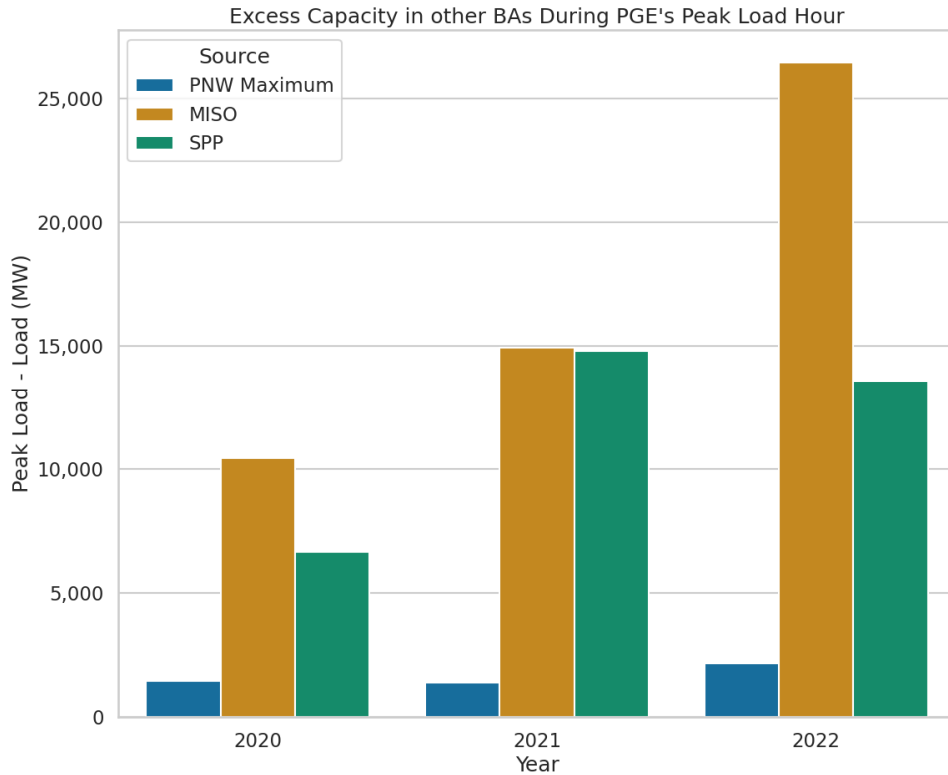
As a consequence of their size and distance from PGE, MISO and SPP have significantly different peak demand periods from PGE. Figure 1 below shows the difference between load and annual peak demand for SPP, MISO, and PNW BAs during PGE's peak demand hour in each of 2020, 2021, and 2022. While there is load diversity in the PNW, access to MISO and SPP would provide greater confidence that market access could be capitalized on when needed. MISO and

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<sup>4</sup> MISO Fact Sheet <https://www.misoenergy.org/about/media-center/corporate-fact-sheet/>; SPP Fast Facts <https://www.spp.org/about-us/fast-facts/>.

SPP have multiple times the number of MW available from the most diverse PNW BA during PGE’s peak load hour.

**Figure 1: Load “headroom” as MW delta from annual peak demand in various Balancing Authorities during PGE’s peak demand hour.<sup>5</sup>**



Grid United recognizes that a historical load coincidence analysis does not capture the full supply and demand diversity of the Eastern and Western Interconnections, but based on the initial results presented above, Grid United suggests that PGE fully evaluate the market capacity benefits that a connection across the interconnection seam could provide to PGE’s customers.

- iii. *A Project like NPC Provides Access to Additional, Liquid Markets that will Benefit PGE’s Local and Regional Generation Resources.*

Unlike the locations of many of the resources PGE analyzed in its IRP, MISO and SPP are organized, liquid markets that offer PGE access to unique, diverse resources with differing

<sup>5</sup> Source: EIA Hourly Electric Grid Monitor.



generation profiles from PGE's local and regional resources that will, accordingly, provide PGE the opportunity to maximize the value of its investments in new generation resources. In Appendix N, PGE notes that, after 2030, PGE begins to experience curtailment of Oregon and Washington wind and solar resources. This curtailment is significant—an amount up to 92% of monthly wind generation potential—and has a detrimental effect on resource values and, as a result, the investments paid for by PGE's customers. PGE's curtailment estimates are for all resources in Oregon and Washington, indicating a region-wide limitation in moving power to where it can be utilized during periods of oversupply. Interregional connections, particularly to centrally cleared markets like MISO and SPP, synthesize the diversity benefits described above and provide opportunities for otherwise curtailed oversupply in one region to be liquidated in another. Different weather conditions between the PNW and Midwest mean that both regions are unlikely to be oversupplied at the same time, meaning that the benefits of diversity for reliably delivering energy to load also apply to managing local oversupply conditions.

Likewise, scarcity conditions are unlikely to be coincident across regions. Table 1 below shows average prices at Mid-C, SPP, and MISO during the 800 highest priced hours of 2021 and 2022 at each location. Read row-wise, there is a clear difference between when the highest price hours occur in the PNW and the Midwest.

**Table 1: Coincident average prices during the 800 highest priced hours of 2021-2022 for each of Mid-C, SPP, and MISO**

		Average Price		
During 800 highest hours in:		Mid-C	SPP	MISO
Mid-C		\$275	\$81	\$62
SPP		\$91	\$259	\$90
MISO		\$102	\$162	\$157

The green-shaded cells in Table 1 above show the average price during the 800 highest priced hours for each of the Mid-C, SPP, and MISO markets for the 2021-2022 timeframe. When the green-shaded cells are compared with average prices in the other markets (by reading across the remainder of the row), it becomes clear that there is a lack of coincident scarcity conditions among the Mid-C, SPP, and MISO liquid markets. Therefore, modeling access to additional, liquid markets (via additional, proxy transmission resources such as the NPC) would provide PGE and its ratepayers significant additional benefits that are not currently reflected in the 2023 IRP.

iv. *Controllable HVDC Technology Would Allow PGE to Maximize its Existing Transmission Rights*

The choice of technology for the NPC project allows it to be redispatched at high frequency to respond to system needs, making it capable of maximizing the utilization of PGE's existing transmission capacity. Unlike AC transmission, Voltage Source Converter ("VSC") HVDC equipment, such as will be used in the NPC, is fully controllable and can be used to import or export power at specific levels. Because of the level of control these projects provide, an HVDC project like the NPC can also be used to provide ancillary services that can help balance and manage increasing amounts of variable renewable resources. This choice of technology, coupled with the NPC project's configuration connecting it to existing PGE transmission on the west and two large markets on the east, means that PGE could granularly manage its transmission system and respond to opportunities to import power, and needs to export it, as they arise. Dispatchability also means that PGE could use the NPC to import power on a schedule matching the output of any specific resources procured in SPP and MISO. As the generation mix in the PNW shifts away from dispatchable resources to weather-dependent ones with variable output, finding ways to cost-effectively maximize transmission utilization and deliver energy irrespective of local weather conditions will be critical. As PGE evaluates how to manage or expand scarce transmission capacity, projects that offer access to diverse of resources, weather regimes, and opportunities to maximize the value of existing transmission should be considered, and the multiple benefits they provide should be quantified.

Because of the numerous benefits a resource like the NPC can provide to a utility like PGE, Grid United specifically requests that the Commission, and potentially Commission Staff, provide PGE with further direction in any future acknowledgement of the IRP that these types of projects (including the NPC) are the type that the Commission supports and would expect PGE to

potentially pursue in an effort to meet clean energy goals and maintain a reliable, cost effective system for customers.

### **III. CONCLUSION**

Grid United applauds PGE's efforts—for the first time—to model transmission needs throughout the West as part of its 2023 IRP. Given Grid United's substantial experience developing large transmission projects, Grid United understands how difficult it is to accurately model transmission congestion and areas where transmission investment is needed. For this reason, PGE's efforts are commendable.

Grid United would also note for the Commission and Commission Staff that it is working with consultants on preparing additional studies and analysis of the benefits NPC would provide to PGE's system and PGE's ratepayers. Once available, this work will further quantify the benefits of NPC and should provide PGE with further support for considering NPC in this IRP. Grid United is hopeful that it will have the benefit of this additional analysis ready for its Round 1 comments to be later-filed in this proceeding.

While Grid United strongly supports the direction PGE is headed with respect to modeling transmission needs in the West, Grid United believes PGE's transmission modeling can be improved by considering additional proxy resources and transmission solutions that differ from those currently in the IRP, such as access to the MISO and SPP markets through transmission solutions like the NPC. Access to these robust, liquid markets would provide significant resource diversity to PGE and its ratepayers, which would have the added benefit of maximizing PGE's expected investment in significant resource additions over the next decade. By accessing resources that are geographically and operationally diverse (like those in MISO and SPP), Grid United

expects PGE could see less curtailment of its local and regional resources due to over-saturation in a geographically and climatologically similar area.

For the reasons set forth in these Comments, Grid United respectfully requests that PGE expand the number of proxy resources and transmission solutions being considered in the 2023 IRP to include, at minimum, proxy resources accessed from the MISO and SPP markets via a transmission solution like the NPC project, which connects the Western and Eastern Interconnections at a location in Eastern Montana where PGE already has generation and transmission assets.

More specifically, Grid United makes the following requests via these Comments: (1) that the Commission, as part of any future acknowledgement of the PGE IRP, recognize that any effort by PGE to pursue large-scale transmission projects (like the NPC) would be consistent with the Commission's expectations for how PGE can meet its resource needs and manage potential transmission solutions; and (2) that PGE on its own, or at the direction of the Commission, add the NPC project to the list of potential proxy transmission resources PGE is considering as part of this IRP (*see* Chapter 9 and, more specifically, Table 44), and study the numerous benefits a project like the NPC would provide to PGE customers, which benefits are explained throughout these Comments.

Please don't hesitate to contact the undersigned with any questions.

Dated: May 4, 2023.

/s/ Will Harrop  
Manager of Commercial Analytics  
Grid United LLC  
[will.harrop@gridunited.com](mailto:will.harrop@gridunited.com)  
with a copy to:  
[legal@gridunited.com](mailto:legal@gridunited.com)