October 31, 2023

Utah Public Service Commission
Heber M. Wells Building, 4th Floor
160 East 300 South
Salt Lake City, UT 84114

RE: Docket No: 23-R312-01
Investigation into Possible Amendment of Utah Admin. Code R746-312, Electrical Interconnection

1. Introduction

Vote Solar and Utah Clean Energy appreciate the Commission's interest in evaluating Utah's interconnection standards and the opportunity to provide comments. Our organizations support updating R746-312 of Utah Administrative Code, titled "Electrical Interconnection," to accommodate the current (2018) IEEE 1457 interconnection standard. We agree with the Commission's assessment, espoused in the Notice and Request for Comments issued September 8, 2023, that "considerable development in smart grid technologies and inverter capabilities has occurred since the current Rule 746-312 was adopted." It is in the best interest of Utah ratepayers, including those with and without solar, to ensure that interconnection rules facilitate the safe integration of distributed energy resources while also unlocking the flexibility and resiliency benefits they can offer. Revisions to R746-312 are necessary to ensure smart inverters are deployed in accordance with the IEEE 1547-2018 standard. We also recommend the consideration of other updates to R745-312 in this docket in order to keep pace with current best practices related to distributed energy interconnection and accommodate distributed energy storage. We recommend a process for reviewing and potentially updating R746-312 and describe opportunities to leverage technical assistance from experts in the field.

2. Background

The Utah Public Service Commission implemented Utah's interconnection rule, R746-312, in 2009. Docket No: 09-R312-01 provides a record of the Commission's proposed Rule and the public comments then received. As enacted, R746-312 governs requirements for interconnecting electrical generating facilities to public utilities under Commission's jurisdiction. The Rule covers application procedures, technical requirements, evaluations, inspections and maintenance requirements, and fees and timelines.

In 2009, Rocky Mountain Power's service territory included approximately 500 interconnected solar installations with a total capacity of 1,344 kilowatts, and an average system size of 2.7 kilowatts.[1] Despite substantial changes to distributed generation technology and growth of distributed energy resources in RMP's service territory since then, R746-312 has only been amended once. In 2016, the Commission amended R746-312 to make the terms "inverter" and "switchgear" consistent with amended definitions set forth in Utah Code Subsections 54-15-102(9) and (13). These changes in 2016 reflect that the

[1] Docket No. 23-035-32, Rocky Mountain Power's 2023 Net Metering and Interconnection Report, June 30, 2023, RMP Attachment A.

Legislature had itself recently amended 54-15(102)(9)(b) and (13)(b)(ii) to incorporate "the latest revision of IEEE 1547, as amended."[2]

Utah's once-nascent solar market has evolved significantly over the past fifteen years. Today, there are more than 30,000 distributed solar facilities with a total capacity of more than 253 megawatts.[3] An increasing number of these installations are equipped with customer-sited storage, a technology that was not readily available to consumers until recently. Considering the substantial technological changes over the last 13 years, it is appropriate to evaluate whether Utah's interconnection standards remain aligned with best practices. Up-to-date interconnection standards are important to facilitate the continued growth of distributed energy resources in a manner that provides significant value to the grid, optimizes the benefits of distributed energy resources, and maintains safety and reliability.

(a) Substantial revisions to the standard governing the interconnection of distributed energy resources were made in 2018.

In 2018, the Institute of Electrical and Electronics Engineers (IEEE) published a revision of the standard governing the interconnection of distributed energy resources (IEEE 1547-2018). The 2018 revision requires distributed energy resources to be capable of performing grid-supportive functions related to frequency and voltage. Specifically, IEEE 1547-2018 requires distributed solar to be equipped with "smart inverters" that can communicate with and receive signals from grid operators or third party aggregators. Since smart inverters are equipped with two-way communication, they can be programmed to respond flexibly to changing conditions on the grid which means they can mitigate power quality issues (even those not caused by distributed energy resources). The correct use of smart inverters may enable the interconnection of additional distributed generation in places where it could not be accommodated previously.

(b) Revisions to R746-312 are appropriate to reflect IEEE 1547-2018.

Utah's current interconnection rules do not reflect the capabilities and flexibility of distributed energy technology available today. Prior to the implementation of IEEE 1547-2018, inverters were designed to shut off if they detected any grid disturbance. The purpose of this function is to ensure that distributed generation does not back-feed power into the grid when linemen are working on the lines. However, minor fluctuations in voltage and frequency do not always indicate a serious problem on the grid. When many solar inverters respond to a small grid disturbance by tripping off at the same time, it can exacerbate a minor voltage instability that would have resolved without causing a blackout. To address this potential issue, R742-312 includes interconnection screens that limit the amount of distributed generation that can be interconnected at a given point on the grid. In contrast, smart inverters can monitor grid conditions and temporarily "ride-through" a minor voltage disturbance in order to avoid exacerbating the disturbance. Taking things one step further, smart inverters also have reactive power control functions that can be used

[2] "The proposed change to Rule R746-312 makes the definitions of 'inverter' and 'switchgear' consistent with those in Section 54-15-102. Particularly, the references to IEEE1547 in Subsections 54-15-102(9)(b) and (13)(b)(ii) now refer to 'IEEE1547, as amended.'" UT Pub. Serv. Comm. DAR File No. 40900 (2016).

[3] Docket No. 23-035-32, Rocky Mountain Power's 2023 Net Metering and Interconnection Report, June 30, 2023, RMP Attachment C.

to provide voltage regulation on the distribution system, which helps avoid the need to install separate voltage regulation hardware. Current interconnection screens do not reflect these capabilities.

(c) Stakeholder engagement should inform development of IEEE 1547-2018 preferred settings.

Appropriately leveraging the advanced capabilities of distributed generation benefits all utility customers. However, adopting IEEE 1547-2018 is not as simple as incorporating a single default set of distributed generation capabilities and settings. Rather, the revised standard provides a menu of features and requirements that may be used. To enable the benefits of smart inverters, regulators must proactively choose a set of protocols that will dictate how inverters react to voltage fluctuations, frequency deviations, and other grid disturbances. The specific settings that should be used depend on factors specific to the utility, their grid and the saturation of solar on the grid. Additionally, certain settings can have the effect of reducing a distributed generation system's output, which negatively impacts a solar customers' savings and return on investment. Implementation of smart inverter standards should consider and balance the needs of the grid and all affected stakeholders. Currently, Rocky Mountain Power has published a FAQ document that explains that smart inverters are an acceptable option for managing transient overvoltage conditions, but does not include information about preferred settings or a requirement that smart inverters be capable of other functions.[4]

3. Comments

Currently, UT Code Sec. 54-15-102 requires the state's interconnection rules (R746-312 *et seq*) to comply with "the latest revision of IEEE 1547, as amended."[5] The Utah Legislature last amended this section of the Code in 2014 to reflect amendments made to IEEE 1547 at that time. However, Utah's existing interconnection rules do not specify that smart inverters must be used, which smart inverter features should be enabled, or how smart inverter settings should be configured. We recommend that the Commission initiate a process to revise R742-312 to include guidance regarding the use of smart inverters. This will provide improved transparency for stakeholders navigating the interconnection process. As previously described, determining the best settings for smart inverters in Utah will require both technical expertise and decisions that balance the potentially competing interests of the utility and customers with and without solar.

Given the evolution of distributed generation technology since Utah's interconnection rules were created, we also ask the Commission to consider whether other changes to interconnection rules are necessary in order to better optimize the benefits of distributed energy resources. As stated, existing interconnection rules do not account for the capabilities of smart inverters, nor do they contemplate the functions and services that energy storage is capable of providing. We thus recommend that the Commission initiate a

[4] Rocky Mountain Power, "Frequently Asked Questions: Transient Overvoltage Management for Distributed Energy Resources." Updated 8/01/2018. *Available at:* *https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/savings-energy-choices/customer-generation/RMP_Interconnection_Transient_Overvoltage_Management_FAQs.pdf*

[5] Utah Code 54-15-102 (9)(b) and (13)(b).

rulemaking process focused on modernizing Utah's interconnection rules, including, but not limited to, incorporation of smart inverter standards.

To support an efficient rulemaking process, we recommend that the Commission proceed with technical conferences to provide clear understanding of the technical issues. We also suggest proceeding with working groups where interested parties may discuss changes and share redlines in order to reach consensus on the appropriate smart inverter settings and other issues to the extent possible.

Robust technical support and expertise is available to support this rulemaking process. The National Renewable Energy Laboratory (NREL) has published a step-by-step guide to support Commissions in updating interconnection standards and incorporating IEEE Standard 1547-2018 in their respective jurisdictions.[6] Further, the Interstate Renewable Energy Council (IREC) has recently published a review of state interconnection policies, including state-specific recommendations (www.freeingthegrid.org). Additionally, IREC recently published a 2023 edition of its Model Interconnection Procedures, and a checklist to help Commissions navigate adoption of IEEE 1547-2018.[7] Fortunately, Utah's interconnection policies currently meet some identified best practices, including incorporation of clear and efficient timelines. Several additional areas where it is worth exploring whether interconnection rules should be updated to meet best practices are identified below.

4. Process

To support an efficient rulemaking process, and in order to ensure that the Commission has access to sufficient information and technical expertise as well as the opportunity to consider stakeholder feedback, we suggest the following as an outline for a potential rulemaking process. This process is informed by the Oregon PUC's work to modernize interconnection standards.[8]

Phase I:

- Public Service Commission issues an Order to initiate an investigation of state interconnection rules led by the Division of Public Utilities.
- Technical Conference(s) on key issues
- Facilitated stakeholder meetings to develop recommendations related to modernizing interconnection standards, including:

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[6] NREL, "A Guide to Updating Interconnection Rules and Incorporating IEEE Std 1547-2018," *Available at: https://www.nrel.gov/grid/ieee-standard-1547/guide-to-updating-interconnection-rules.html*.

[7] IREC, "Model Interconnection Procedures, 2023 Edition." August 24, 2023. *Available at: https://irecusa.org/resources/irec-model-interconnection-procedures-2023/*.

IREC, "Decision Options Matrix for IEEE 1547-2018 Adoption," October 12, 2022. *Available at: https://irecusa.org/resources/decision-options-matrix-for-ieee-1547-2018-adoption-3/*.

[8] See Oregon UM 2111, Investigation into Interconnection Process and Policies, *Available at: https://apps.puc.state.or.us/edockets/docket.asp?DocketID=22475;*
Oregon AR 659, Interconnection Phase I Rules, *Available at: https://apps.puc.state.or.us/edockets/docket.asp?DocketID=23699*.

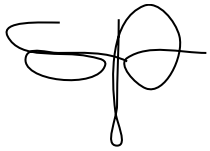
    - Incorporation of IEEE 1547-2018 and appropriate preferred smart inverter settings;
    - Clarify "generating facility" definition to incorporate energy storage;
    - Screening thresholds;
    - Incorporate guidance regarding export capacity and control;
    - Streamlining interconnection review;
    - Transparent data sharing and hosting capacity;
    - Other issues identified by the PSC or stakeholders.
- Summary report identifies areas of stakeholder consensus and key PSC decision points.

Phase II:

- PSC initiates rulemaking to update interconnection standards.
- Staff files proposal for updated interconnection standards.
- Technical conference to inform stakeholders about the details of Staff's proposal and provide the opportunity to ask questions.
- Stakeholders file initial and reply comments in response to Staff's proposal.
- PSC decision.

Vote Solar and Utah Clean Energy appreciate the Commission's attention to this important issue. We look forward to participating in future proceedings related to the modernization of interconnection rules and supporting the Commission in obtaining technical assistance and expertise from organizations like IREC, where appropriate.

Respectfully,



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CERTIFICATE OF SERVICE

I CERTIFY that on October 31, 2023, a true and correct copy of the foregoing was delivered upon the following as indicated below:

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