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TECHNICAL REQUIREMENTS AND INTERCONNECTION PROCESSES FOR DISTRIBUTED ENERGY RESOURCES (DERS)	**§ § § §**	**PUBLIC UTILITY COMMISSION OF TEXAS**

COMMENTS OF OCTOPUS ENERGY ON STAFF DRAFT LANGUAGE DISCUSSED AT JULY 14, 2023 WORKSHOP

Octopus Energy, REP License #10262, files these Comments regarding the Staff's Discussion Draft language for P.U.C. Subst. R. 25.212 discussed at the public workshop held in this Project on July 14, 2023. To ensure reliable operation of the electric grid and maximize interoperability for customers, Octopus Energy strongly urges the Commission to require full compliance with the most recent standards, in their entirety, including IEEE 1547-2018 and UL 1741 SB, and include a mechanism in the rule to automatically adopt newer versions of these standards, as they become available, allowing for a transition period. The following sections elaborate in more detail on these recommendations.

COMPLIANCE WITH IEEE 1547-2018 SHOULD BE REQUIRED TO ENSURE DER REACTIVE POWER CAPABILITIES AND INTEROPERABILITY

Octopus Energy appreciates that the Staff included on its agenda for the July 14 workshop a discussion of 4-quadrant inverters. Unfortunately, Octopus Energy was unable to attend the workshop to participate in that discussion, and therefore comments here to clarify how operational capabilities of 4-quadrant inverters are relevant to reliable operation of the grid. It is our understanding that during that part of the workshop, utilities stated in response to questioning from Staff that they believe that there is not a need for 4-quadrant inverters to be explicitly called out as a technical requirement, as IEEE 1547 includes requirements for 4-quadrant inverters. Octopus Energy agrees with that basic premise, as inverter manufacturers have used 4-quadrant inverters for some time. In the

past, this functionality has been used primarily to adjust power factor during the charge cycle to significantly improve charge efficiency and reduce losses. However, the most recent iteration of IEEE 1547 provides for additional capabilities using 4-quadrant functionality. Specifically, IEEE 1547-2018 requires manufacturers to allow industry access to the control mechanisms of the inverter to allow for absorbing or injecting reactive power to the grid.[1] Therefore, while it is not necessary to specify that inverters must be 4-quadrant inverters, it is essential for reliability of the grid that the Commission clearly specify that the standard to be applied is "IEEE 1547-2018" rather than simply "IEEE 1547." To do otherwise would create the opportunity for DER providers to use equipment that would not provide the reactive power functionality required by the most recent version of the standard.

Another key operational feature included in IEEE 1547-2018 that is not addressed by older versions of IEEE 1547 is interoperability. Octopus Energy supports adoption of communications protocols related to open access to DERs by providers other than the equipment manufacturer. "Walled gardens (private controlled assets)" can reduce competition for customers and slow the growth of DERs. These open-access standards should be more broadly applied to other technologies as well for the benefit of consumers. Requiring open access would also better protect the long-term value of these assets: as observed in a variety of different contexts, if any one hardware vendor no longer operates in the future, the open access capability ensures that the asset will continue to provide value in the wholesale market, thereby mitigating the risk of stranded assets. In short,

[1] For more details on the differences between IEEE 1547-2018 and prior versions of the standard, see IEEE Power and Energy Society's Technical Report PES-TR67.r1, *Impact of IEEE 1547 Standard on Smart Inverters and the Applications in Power Systems* (August 2020).

mandating open communication standards, by explicitly requiring compliance with IEEE 1547-2018 in its entirety would provide a multitude of benefits, ranging from improved grid stability and resilience to empowering consumers and driving innovation, including the following:

1. **Interoperability and Integration**: Open communication standards ensure that various distributed energy resources from different manufacturers and vendors can seamlessly communicate and work together within the energy grid. This interoperability fosters a more integrated and efficient energy ecosystem, allowing for better coordination and optimization of DERs.
2. **Grid Stability and Resilience**: With open communication standards, grid operators can access real-time data and control capabilities for DERs, allowing them to respond quickly to fluctuations in energy supply and demand. This enhanced grid visibility enhances stability and resilience, especially during emergencies or unexpected events.
3. **Market Competition and Innovation**: Implementing open standards encourages healthy market competition. Manufacturers and developers must adhere to the established protocols, promoting innovation and cost-effective solutions to meet the standards' requirements. This can lead to advancements in DER technologies and drive down costs for consumers. Open communication standards also empower consumers by providing them with more choices and control over their energy resources.
4. **Data Security and Privacy**: A regulatory requirement for open communication standards can include provisions for robust data security and privacy measures.

Requiring adherence to standardized protocols would ensure that sensitive information is protected, reducing the risk of cyberattacks and unauthorized access to energy consumption data.

5. **Future-proofing the Grid**: Requiring open communication standards would help future-proof the grid against technological advancements and changes. As new DER technologies emerge, open standards ensure that they can easily be integrated into existing infrastructure, avoiding the need for costly and disruptive grid upgrades.
6. **Enhanced Demand-Side Management**: Open communication standards enable better demand-side management, enabling all REPs and consumers to communicate and respond efficiently to real-time pricing signals. This fosters more efficient energy use, reduces peak demand, and lowers overall energy costs.

STANDARDS SHOULD BE ADOPTED IN THEIR ENTIRETY, WITH FUTURE ITERATIONS AUTOMATICALLY INCORPORATED AS A GENERAL PRACTICE

Octopus Energy further notes that in addition to not requiring compliance with the most recent version of IEEE 1547 (i.e., IEEE 1547-2018), the draft rule also does not state that inverters must be compliant with IEEE 1547-2018 in its entirety. Subsection (f)(4) of the July 14 workshop draft language refers to systems needing to comply with the "applicable portion" of IEEE 1547, but does not state what the applicable portions are; this is overly vague and does not provide clarity for DERs to know what they must comply with, nor does it provide assurance that certain standards will be met, such as the reactive power and interoperability capabilities discussed previously. Standards bodies spend years working with industry participants and power engineering experts to develop standards that are made to fit together as a comprehensive whole, and it is generally not

good practice to allow market participants to pick and choose portions of a standard with which to comply. The same concept applies to the UL standards referenced in the draft rule. Referring simply to "UL 1741" could either mean complying with the most recent version or it could allow equipment to be compliant only with older, more basic versions of the standard. For these reasons, we strongly recommend that the Commission be clear that the applicable standards are the most recent versions, in their entirety, including "IEEE 1547-2018" and "UL 1741 SB." We recommend that paragraph (f)(4) be revised to the following, and additionally that the term "NRTL" [2] be included in the definitions subsection of the rule:

> *(f)(4) Certification of DER equipment occurs when systems have been tested and certified by an NRTL as complying with UL-I741-SB and IEEE-1547-2018 standards.*

A related issue that has come up periodically throughout this rulemaking is that standards change over time, and therefore the rule will become obsolete quickly unless provisions are made to incorporate future standards updates automatically. For example, it is important for grid reliability that IEEE 1547-2018 be adopted immediately, but IEEE 1547-2022 is already in the ratification phase now. To address this problem, Octopus Energy recommends that as subsequent versions of adopted standards are ratified by their governing bodies (such as IEEE or UL), the Commission's rules should automatically incorporate these updated standards, and DERs should have 12 months to comply with the new standard. During that 12-month period, a DER could apply to the Commission to appeal adoption of a new standard if they believe it should not be adopted. This allows

[2] NRTL = Nationally Recognized Testing Facility, should be included in the definitions subsection of the rule.

the rule to evolve with current best practices without requiring repeated rulemakings, and instead triggering a rulemaking (or potentially a waiver) only in limited, exceptional circumstances.

CONCLUSION

Octopus Energy appreciates the opportunity to provide these Comments and looks forward to working with the Commission and other interested parties on these issues.

Respectfully submitted,

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