



School of Engineering

2115 Summit Avenue
Saint Paul, MN 55105

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Via Electronic Filing

Daniel P. Wolf
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East, Suite 350
St. Paul, MN 55101

**RE: In the Matter of Updating the Generic Standards for Interconnection and
Operation of Distributed Generation Facilities under Minnesota Statutes
§216B.1611.
Docket No. E999/CI-16-521**

Dear Mr. Wolf

We, Dr. Mahmoud Kabalan and Tam Kemabonta, respectfully submit comments regarding the prep work required before the first Technical Sub-group meeting on Friday 23, March.

Sincerely

/s/ Mahmoud Kabalan and Tam Kemabonta

STATE OF MINNESOTA
PUBLIC UTILITIES COMMISSION
Nancy Lange Chair
Dan Lipschultz Commissioner
Matt Schuerger Commissioner
John Tuma Commissioner
Katie Sieben Commissioner

In the Matter of Updating the Generic Standards for Interconnection and Operation of Distributed Generation Facilities under Minnesota Statutes §216B.1611. Docket No. E999/CI-16-521

A. Introduction

We would like the opportunity to provide preliminary comments with respect to certain topics raised, that seek to inform the technical subgroup meeting as advances are made on updating the statewide distributed energy resources interconnections procedures by the technical subgroup.

Our response to the issues that have been raised in the “prep work” document are as follows:

B. If you do not support the Regulated Utilities’ Draft Proposal, a proposed discussion topic outline or red-lined/track changes draft of Regulated Utilities’ TIIR proposal; Include a description of the purpose/role of the statewide technical requirements

We do support the Regulated Utilities Draft Proposal as a starting document, but we would like to note that the draft itself does not necessarily do justice to certain technical concepts and we would like this to be addressed by the subgroup.

Some of the concepts we believe need to be addressed include the following:

B.1. Intentional Area EPS Islanding¹: This topic was considered to be outside the scope of the TIIR. This brings up the topic of microgrids and their unique characteristics with respect to where they fall in this process. We believe that this should not be the case. While the full technical and economic benefits of a microgrid have not yet been fully explored in the state of Minnesota, it is important to create the necessary regulatory

¹Xcel Energy - Docket No. E002/CI-16-521, January 17, 2018 Comments, Attachment A - Page 21 of 35, State of Minnesota Distributed Energy Resources Technical Interconnection and Interoperability Requirements (MN DER “TIIR”)

framework that builds in the necessary capabilities prior to being utilized. This takes into consideration long term planning.

Moreover, although microgrids are mentioned and only in passing, but not explicitly defined in the Minnesota Statutes^{2,3}, a potential scenario for the control and operation of microgrids is implied.

Minnesota Statutes, 216B.02 Subd. 4, among other things states “No person shall be deemed to be a public utility if it produces or furnishes service to less than 25 persons.”⁴

In theory, this could mean that a microgrid by a private developer could provide electric service to more than 2 and less than 25 legal entities in a public utility’s service territory and not be considered utility. Such a microgrid could potentially have profound effects on the Area EPS since the statute does not limit the size in nameplate of such an asset or group of assets. While this might be unlikely, the provisions by law made for such an asset to exist and operate is possible. Hence it should be addressed in the technical requirements or elsewhere because due to the unique nature of microgrids and their ability to have a diverse set of DERs within an electrical boundary and their associated load.

It is possible for such an asset to encompass the area EPS. The IEEE Std 1547.4TM-2011 “covers intentional islands in electric power systems (EPSs) that contain distributed resources (DRs).” The document goes on to define and describe what is meant by intentional islands containing DRs.⁵

The term *DR island systems*, sometimes referred to as *microgrids*, is used for these intentional islands. DR island systems are EPSs that⁶:

1. have DR and load,
2. have the ability to disconnect from and parallel with the area EPS,
- 3. include the local EPS and may include portions of the area EPS**

² 2017 Minnesota Statutes, 216B.2425, Subd. 2(c)

³ 2017 Minnesota Statutes, 116C.779, Subd. 4

⁴ 2017 Minnesota Statutes, 216B.02 Subd. 4.

⁵ IEEE Std 1547.4-2011, IEEE Guide for Design, Operation, and Integration of Distributed Resource Island Systems with Electric Power Systems

⁶ Ibid

4. are intentionally planned. DR island systems can be either local EPS islands or area EPS islands.

Hence, we believe that that document should be considered in developing the Statewide Technical Interconnections Requirements for DERs.

While we understand that the complexities of “who owns what?” and “who pays for what?” when assets like microgrids are brought up are important issues, we do not believe those questions should be addressed in the technical requirement process. But the technicalities with respect to the control and dispatch of distributed assets within an electrical boundary that may or may not encompass an area EPS and potentially affect the performance of the area EPS are under the purview of this interconnection technical requirements and should thus be considered.

We believe that the transactive relationship between operators of microgrid assets, utilities and customers should be considered elsewhere, and soon.

B.2. Details of communication networks including architecture, technology and protocols, or other specifications related to interoperability⁷

While DERs can operate without the need for communications through local controls, basically monitoring the conditions of the grid and reacting appropriately depending on default parameters, we believe there is a need for DER communication architectures and devices to be considered in the State’s TIIR. Building the necessary capabilities irrespective of their utilization now into the technical requirements is important for long term planning. It would also help inform the Commission on the Grid Modernization Docket No. E999/CI-15-556.

B.3. Stiffness of the grid: While this was not included in the proposed TIIR, we believe the stiffness of an Area EPS’s grid should be considered in the Statewide Technical Requirements. This is very important especially on distribution systems that have very high DER penetrations, because increased DERs especially intermittent ones potentially increases the risk of failure and could affect the bulk power system.

⁷ Xcel Energy - Docket No. E002/CI-16-521, January 17, 2018 Comments, Attachment A - Page 21 of 35, State of Minnesota Distributed Energy Resources Technical Interconnection and Interoperability Requirements (MN DER “TIIR”)

Also known as stiffness ratio, It is can be “defined by the representation of the short-circuit KVA capacity of a power system SC_{SYS} and the KVA rating of the DER KVA_{DER} ” at the point of common coupling of the network.⁸

It could be represented by the following equation:

$$Stiffness\ Ratio = 1 + \frac{SC_{sys}}{KVA_{DER}}$$

Another way of access this is the short circuit ratio (SCR).

C. Rationale and list of topics with summary/examples of content considered in scope of a utility TSM

Due to the unique nature of different Area EPSs, we believe having a system-centric set of procedures that can quickly adapt to changes as the penetration of DERs on the system increases is important. This gives matured utilities like Xcel Energy the possibility to experiment with certain grid modernization technologies, with the permission of the Commission. This would advance our aging infrastructure, all the while maintaining the safety and reliability of the area EPS.

For example, the use of Closed Loop Volt-Var Optimization in collaboration with Advanced Distribution Management Systems (ADMS). This makes it possible for an area EPS to implement planned and economic peak load reduction, reduce system losses and postpone investment on more expensive power equipment.⁹

When mature utilities implement new technologies, lessons could be learned by the smaller utilities and these lessons learned could make their way into updated statewide interconnection standards. These TSMs should be reviewed and approved at regular intervals by the Commission. What these intervals should be we leave for the subgroup to decide.

D. List of definitions that need to be discussed

Some of the definitions we believe need to be discussed include

1. Microgrids

⁸ IEEE PES-TR22, Contribution to Bulk System Control and Stability by Distributed Energy Resources connected at Distribution Network, Jan 2017.

⁹ IEEE Power and Energy magazine, Volume 16, No. 2, March/April 2018

2. Authority having jurisdiction (AHJ): while this was defined as “*Authority having the rights to inspection and approval of the design and construction of Local EPS premise electrical systems.*” Our consternation lies in which legal entity or entities would be responsible for ensuring the inspection and approval of a local EPS in Minnesota. Another definition put forward in the ICAP Assessment of DER Interconnection Installation for conformance with IEEE Std 1547 defines the AHJ as “*An agency such as a Municipality, State Regulatory body, or other having jurisdiction over various aspects of a DER interconnection installations.*” One definition mentions DER and the other does not. How should this be resolved? Moreover, apart from being defined, the AHJ practically has no function in the proposed TIIR
3. Unintentional island

E. Conclusion

We appreciate the opportunity accorded to us by the Commission to provide these comments and we look forward to the various sessions by the working group.