

BEFORE THE MINNESOTA PUBLIC UTILITIES COMMISSION

Katie J. Sieben
Valerie Means
Matthew Schuerger
John A. Tuma

Chair
Commissioner
Commissioner
Commissioner

In the Matter of Updating the Generic Standards for the Interconnection and Operation of Distributed Generation Facilities Established Under Minn. Stat. § 216B.1611

ISSUE DATE: January 22, 2020

DOCKET NO. E-999/CI-16-521

DOCKET NO. E-999/CI-01-1023

In the Matter of Establishing Generic Standards for Utility Tariffs for Interconnection and Operation of Distributed Generation Facilities under Minnesota Laws 2001, Chapter 212

ORDER ESTABLISHING UPDATED TECHNICAL INTERCONNECTION AND INTEROPERABILITY REQUIREMENTS

PROCEDURAL HISTORY

I. Adoption of Existing Interconnection Standards

In 2001, the Legislature enacted Minn. Stat. § 216B.1611, requiring the Commission to establish generic standards for interconnection and operation of distributed generation (DG).

Following extensive stakeholder participation, the Commission issued its Order Establishing Standards in Docket No. E-999/CI-01-1023 on September 28, 2004. The September 2004 order included six attachments that formed the generic standards required by Minn. Stat. § 216B.1611, referred to in this order as the 2004 Interconnection Standards.

The 2004 Interconnection Standards contain the following sections:

- Interconnection Process (Attachment 1)
- Technical Requirements (Attachment 2)
- Application (Attachment 3)
- Engineering Data Submittal (Attachment 4)
- Interconnection Agreement (Attachment 5)
- Rates (Attachment 6)

II. Distributed-Generation Workgroup

On January 24, 2017, after receiving stakeholder input regarding revisions to the 2004 Interconnection Standards, the Commission issued an order establishing the Distributed Generation Workgroup (DG Workgroup) to update the 2004 Interconnection Standards. The January 2017 order initiated a two-phase process to update the 2004 Interconnection Standards:

- The first phase (Phase I) would update Minnesota's DG interconnection process based on the federal Small Generation Interconnection Procedures (SGIP) and Agreement (SGIA). This phase would involve Attachments 1, 3, 4, and 5 of the 2004 Interconnection Standards.
- The second phase (Phase II) would update the Minnesota DG Technical Interconnection and Interoperability Requirements (TIIR) and incorporate newly revised national technical standards. This phase would involve Attachment 2 of the 2004 Interconnection Standards.

On December 15, 2017, the Commission issued a notice seeking comments on the scope and process for updating the TIIR. In subsequent comments, rate-regulated electric utilities¹ jointly submitted an initial draft TIIR to serve as a starting point for discussion. The utilities also proposed that each utility would have a companion Technical Specifications Manual (TSM) containing utility-specific requirements.

Throughout 2018 and 2019, the Technical Subgroup (TSG) of the DG Workgroup met periodically to modify and update the TIIR. The TSG includes representatives of rate-regulated utilities, cooperatives, municipal utilities, and clean-energy advocacy groups. The TSG created a writing subgroup to draft the updates to the TIIR based on the feedback elicited at the TSG meetings.

On August 13, 2018, the Commission issued its order culminating Phase I.² In that order, the Commission established the Minnesota Distributed Energy Resources Interconnection Process (MN DIP) and the Minnesota Distributed Energy Resources Interconnection Agreement (MN DIA), and it referred certain issues to the DG Workgroup for further development.

On April 19, 2019, the Commission issued its order approving additional modifications to the MN DIP and MN DIA that resolved the outstanding issues from the August 2018 order. The MN DIP and MN DIA went into effect statewide on June 19, 2019.

III. Comments on Draft TIIR

On August 23, 2019, the Commission issued a notice requesting comments on the TSG's draft TIIR and associated implementation plan. The draft TIIR was attached to the notice.

¹ Minnesota's rate-regulated electric utilities are Dakota Electric Association, Minnesota Power, Otter Tail Power, and Xcel Energy.

² Order Establishing Updated Interconnection Process and Standard Interconnection Agreement (August 13, 2018).

On September 24, 2019, the following parties filed comments in response to the notice:

- Dakota Electric Association (DEA)
- Department of Commerce, Division of Energy Resources (the Department)
- Interstate Renewable Energy Council & Fresh Energy (IREC-FE)
- Minnesota Rural Electric Association (MREA)
- Minnesota Power
- Otter Tail Power (Otter Tail)
- Xcel Energy

On October 11, 2019, the following parties submitted reply comments:

- DEA
- The Department
- IREC-FE
- MREA
- Otter Tail
- Xcel Energy

On October 25, 2019, Xcel Energy submitted late-filed comments.

On November 11, 2019, MREA submitted a revised draft of the outline for the utility-specific TSMs.

On November 13, 2019, DEA filed a letter proposing an additional decision option for the Commission's consideration.

On November 14, 2019, the Commission met to consider the matter.

FINDINGS AND CONCLUSIONS

I. Summary of Commission Action

The Commission is grateful to the DG Workgroup, and particularly the TSG, for their diligent efforts to update the Minnesota Technical Requirements. In this order, the Commission will take the following actions:

- Approve the draft TIIR with modifications;
- Establish a process for submitting, approving, and updating the rate-regulated utility TSMs;
- Request that the DG Workgroup discuss and propose additional guidance for interim implementation of the TIIR; and
- Recommend additional topics of discussion for the DG Workgroup.

The Commission will set July 1, 2020, as the effective date for the TIIR and TSMs.

II. Background

A. Statutory Background

Minn. Stat. § 216B.1611 defines DG as an electric-generating facility with a capacity of ten megawatts (MW) or less, that uses natural gas, renewable, or other “clean fuel,” and that interconnects and operates in parallel with a Minnesota utility’s distribution grid.³ The statute requires the Commission to establish generic standards for utility tariffs governing the interconnection of DG, which the Commission fulfilled by adopting the 2004 Interconnection Standards and updating those standards through this proceeding.

Rate-regulated utilities are required to obtain Commission approval of a cogeneration and small power production tariff consistent with the adopted interconnection standards. Cooperatives and municipal utilities need only “adopt a distributed generation tariff that addresses the issues included in the commission’s order” adopting the standards.⁴

Commission rules describe the required contents of the cogeneration and small power production tariff, including Schedule E, which must contain “the utility’s safety standards, required operating procedures for interconnected operations, and the functions to be performed by any control and protective apparatus.”⁵ Minn. R. 7835.0300 requires utilities to file this information on an annual basis.

B. Minnesota Technical Requirements

The Minnesota Technical Requirements applicable to interconnection of DG comprise both the TIIR and TSMs. The purpose of the Minnesota Technical Requirements is to “provide consumers and installers with a clear set of technical requirements and guide the interconnection of DER systems with the local electrical distribution system using a safe, reliable, and cost-effective design.”⁶

The TIIR includes the technical requirements that apply across all utilities in Minnesota.⁷ Because of the differences among the utilities’ distribution systems, the TSMs allow for utility-specific requirements when needed. TSMs also provide further detail in the absence of a common statewide or national industry standard.

The TIIR and TSMs are based on the Institute of Electrical and Electronics Engineers (IEEE) 1547 standard for DG interconnection and other applicable national standards. In April 2018,

³ Minn. Stat. § 216B.1611, subd. 2.

⁴ *Id.*, subd. 3.

⁵ Minn. R. 7835.0800.

⁶ TIIR, at 1.1.

⁷ *See* Minn. Stat. § 216B.1611, subd. 3.

IEEE 1547-2018 was published, significantly revising the technical interconnection and interoperability requirements. A key component of Phase II has been aligning the TIIR with IEEE 1547-2018. However, these new standards require equipment that is still in the process of being certified by the relevant authorities. The draft TIIR provides that utilities “cannot require the use of certified equipment that meets the requirements of IEEE 1547-2018 until such time the equipment is readily available.”⁸ This order addresses interim implementation of the TIIR while this newly certified equipment becomes available.

III. Utilities’ Technical Specification Manuals

A. Parties’ Positions

In its comments, IREC-FE expressed concern that “very significant” technical specifications were being addressed in the TSMs rather than the TIIR, because having different standards for each utility would “complicate the interconnection process” and reduce scrutiny of these requirements.⁹ IREC-FE recommended that utilities should file redlined versions of any TSM changes and proposed a process allowing stakeholders to object to TSM provisions. IREC-FE also urged that “TSMs must neither conflict with the TIIR’s standards nor establish technical requirements that go beyond those in the TIIR.”¹⁰

The Department interpreted the relevant rules to require the annual filing of the TSM as part of a utility’s annual reporting under Minn. R. 7835.0300. The Department argued that the required contents of Schedule E encompasses the TSM.

Utilities generally opposed extensive regulatory review and oversight of TSMs, arguing that a long regulatory approval process would hinder their ability to update TSMs quickly and efficiently to adapt to new technologies. Utilities expressed concern that delaying implementation of TSM changes could hamper their efforts to address safety or reliability issues. Xcel in particular argued that the Commission should not require that TSMs be filed in Schedule E of the utilities’ annual tariff filing, and that the TSM should not be part of the utility’s tariff. DEA recommended an informational filing whenever a TSM is updated, and Otter Tail recommended that TSM changes occur no more than every six months. Finally, MREA submitted an updated outline of the topics that will be addressed in the TSMs.

B. Commission Action

The TSMs are an integral part of the Minnesota Technical Requirements and contain significant standards and requirements. The Commission therefore finds that it is necessary for potential interconnection customers to be able to access and voice concerns with a utility’s TSM. The Commission also recognizes that TSM updates may impact safety or reliability, and utilities must be able to act quickly to address those issues. Below the Commission adopts a process for updating and publicizing the TSMs that balances stakeholder interests in access and input with the utilities’ safety and reliability obligations.

⁸ TIIR, at 1.6.

⁹ IREC-FE comments, at 3.

¹⁰ *Id.* at 5.

The Commission will require each rate-regulated utility to make its draft TSM available to the DG Workgroup no later than April 1, 2020, for review and discussion. Each rate-regulated utility shall file its final TSM no later than May 1, 2020.

After the final TSMs and any subsequent updates are filed, objections may be filed with the Commission within a 30-day period. Any objections should clearly identify the challenged provisions, the basis for the objection, and a preferred alternative approach where possible. If no objections are received, the TSM shall automatically become effective 30 days after filing. If objections are received, the Commission will make a formal determination on the objections before the challenged TSM can become effective. However, if the utility represents that safety or reliability will be directly affected by delayed implementation, then the TSM will immediately become effective while the Commission makes a formal determination on the objections. The absence of objections to a TSM during the initial 30-day objection period does not waive or nullify future objections to any TSM provisions.

The Commission will require rate-regulated utilities to file an informational notice with the webpage link each time their TSM is updated, which will help keep stakeholders informed of any changes to the TSM.

The Commission will require rate-regulated utilities to file their TSMs as part of their annual reporting under Minn. R. 7835.0300. The filing shall include a red-line of any changes, but the TSM is not required to be included in the utility's tariff. This process will promote access to TSMs and ensure compliance with the requirement that a utility's safety standards and interconnection operating procedures be filed on an annual basis.¹¹ By not requiring the TSMs to be included in the tariffs, utilities will have more flexibility to update and refine the TSMs.

The following principles applicable to TSMs are drawn from Minn. R. 7835.0800:

- The standards and procedures contained in the TSM must not be more restrictive than the standards contained in the TIIR.
- The utility may include suggested types of equipment to perform the specified functions.
- No standard or procedure may be established to discourage cogeneration or small power production.

IV. Implementation of TIIR

A. Parties' Positions

IREC-FE expressed concern with some of the draft TIIR's provisions regarding interim implementation until equipment certified under IEEE 1547-2018 becomes available. In particular, IREC-FE argued that the term "readily available" is vague and needs clarification. IREC-FE instead recommended that newly certified equipment be required three months after

¹¹ See Minn. R. 7835.0300, .0800.

the UL 1741 future effective date for incorporating changes related to IEEE 1547-2018. IREC-FE also recommended that the DG Workgroup develop a guidance document to clarify which TIIR sections would become effective immediately, which sections would become effective three months after the effective date for incorporating changes related to IEEE 1547-2018, and which sections would continue the existing requirements until new equipment is available.

Xcel, DEA, and MREA suggested that the DG Workgroup discuss interim implementation, and Xcel noted issues with IREC-FE's recommendations for when newly certified equipment would be required.

B. Commission Action

The Commission agrees that the DG Workgroup should continue to meet to discuss interim implementation of the TIIR while the equipment-certification process is underway. The Commission will reconvene the DG Workgroup to draft a guidance document to accompany the TIIR that clarifies which provisions are in place in the interim period until newly certified equipment is available. The DG Workgroup should complete its work and finalize the document by the publication date of the TIIR.

The filing of the guidance document will depend upon whether utilities can reach a consensus on the contents of the guidance document. If a consensus is reached, the guidance document shall be filed in Docket No. E-999/CI-16-521 and published by the Executive Secretary along with the TIIR on the Commission's website. If no consensus is reached, each utility shall adopt their preferred version of the guidance document to be included with the utility's TSM.

The Commission also requests input from the TSG as to when IEEE 1547-2018 certified equipment is "readily available." The Commission delegates to the Executive Secretary the authority to issue a notice when the full TIIR goes into effect in consultation with the TSG.

V. Modifications to Draft TIIR

A. Parties' Positions

In its comments and late-filed comments, Xcel recommended a number of minor modifications to the TIIR, primarily clarifying edits. No parties objected to Xcel's proposed modifications.

IREC-FE proposed two additional minor edits, and also proposed to modify the definition of "readily available" as it pertained to newly certified equipment, as explained in Section IV.A. above. IREC-FE argued that its proposal would provide interconnection customers with a clear threshold for when newly certified equipment would be required.

B. Commission Action

The Commission agrees that most of Xcel's and IREC-FE's proposed minor modifications are reasonable edits that improve the clarity and accuracy of the TIIR, and will approve the changes shown below.

However, the Commission declines to adopt the following two changes to the TIIR: 1) the modification to the definition of Minnesota Technical Requirements in Section 3.2, and 2) the

replacement of the term “readily available” in Section 1.6. These modifications concern interim implementation of the TIIR while newly certified equipment becomes available. Interim implementation will instead be addressed by the DG Workgroup as discussed in Section III above.

The Commission also declines to adopt Xcel’s proposed modifications to its tariff concerning interim implementation, as these modifications are premature before the DG Workgroup addresses these issues.

The Commission delegates to its Executive Secretary the authority to issue by Notice a clean copy of the statewide TIIR reflecting the modifications approved in this order.

The Commission approves the following modifications to the draft TIIR:

- Section 1.4: Coordination with Area EPS Operator’s Specific Technical Standards

The following is a brief listing of some of the areas which further technical guidance is to be provided within the Area EPS Operator’s TSM. [insert footnote:] See Annex C for an anticipated list of additional topics in a TSM.

- Section 2: References

IEEE Std C62.92.2.-2017, IEEE Guide for the Application of Neutral Grounding in Electric Utility Systems, Part II – Grounding of Synchronous Generator Systems ~~and Part VI – Systems Supplied by Current Regulated Sources~~

IEEE Std C62.92.6-2017, IEEE Guide for the Application of Neutral Grounding in Electric Utility Systems, Part VI

- Section 3.2: Definition of ESS Control Mode

The function that manages the real and reactive power flow from or to a ~~DER~~ ESS in response to certain parameters, (such as time, price signals, frequency or external signals, etc.).

- Section 5.4: Title

Voltage and ~~Reactive~~ Active Power Control

- Section 7.2: Protection Requirements

All equipment providing relay functions shall meet or exceed ANSI/IEEE Standards for protective relays, or standards applicable for the installation voltage, unless otherwise specified by the Area EPS Operator’s TSM. [insert footnote:] Inverters certified to UL 1741 may contain protective functions that do not require equivalent external protective relays to meet IEEE 1547 requirements.

- Section 7.4: Additional Protection

Medium and large DER installations may require more sensitive and faster protection to minimize potential damage and ensure safety. [insert footnote:] Ride-through capabilities for bulk power system support should be considered before setting protective tripping times that conflict with BPS support.

- Add Annex C: Anticipated TSM Topics
 1. Introduction
 2. Abbreviations and Common Terms
 3. Performance Category Assignment
 4. Reactive Power Capability and Voltage/Power Control Performance
 5. Response to Abnormal Conditions
 6. Protection Requirements
 7. Operations
 8. Power Control Systems
 9. Interoperability
 10. Energy Storage Systems
 11. Metering Requirements
 12. Signage and Labeling
 13. Test and Verifications Requirements
 14. Sample Documents for Simplified Process
 15. Appendix

VI. Future of DG Workgroup

A. Parties' Positions

IREC-FE supported continuation of the DG workgroup and recommended a streamlined process for proposing TIIR changes, including a standardized comment form. IREC-FE also recommended a list of topics for future discussion and resolution in the DG Workgroup regarding energy storage systems, voltage regulation settings, and communications operating agreements.

Xcel opposed requiring a form for commenting on the TIIR and encouraged open discussion through the DG Workgroup as a better way to facilitate changes to the TIIR. Xcel maintained that the TIIR already provided for updates to the energy-storage provisions, and specific requirements were not needed in a Commission order.

DEA recommended a change-submittal process for updating the TIIR and a Standing Technical Committee to review proposed changes. DEA also encouraged that any provisions regarding energy storage should avoid hindering the development of emerging technology.

MREA and the Department supported a Standing Technical Committee to address emerging issues and recommend TIIR changes.

B. Commission Action

The Commission concludes that the DG Workgroup has proven to be an efficient and successful process for updating the 2004 Interconnection Standards, including the TIIR. The Commission believes that the outstanding technical issues should be addressed by the full DG Workgroup in order to allow for the broadest possible participation and input. The DG Workgroup can create subgroups as needed, as it previously has done with the TSG.

The Commission will therefore delegate to its Executive Secretary the authority to establish and maintain an ongoing DG Workgroup to meet annually, or more frequently as needed, to review implementation and technical issues that arise with implementation of the MN DIP, Minnesota DER Interconnection Agreement (MN DIA), TIIR, or emerging DER technology. Updates to the MN DIP, MN DIA, and/or TIIR may be accomplished by Commission order in response to a petition.

The Commission recommends the following items for discussion and eventual resolution through the DG Workgroup:

- Energy storage control modes and harmonization of the language and structure of the energy storage requirements in the operating agreements;
- Determination of explicit treatment of distributed energy resources (DER) using Power Control Systems for maximum capacity and export control in the MN DIP and the TIIR documents;
- Evaluation of Voltage-Reactive Power Regulation in the TIIR;
- Harmonization of the language and structure of voltage regulation considerations in the operating agreements to the extent possible;
- Harmonization of the language and structure of the communications operating agreements so as to not unduly burden DER operators; and
- Plan to reduce and/or track unintended curtailments due to Voltage – Active Power Control prior to implementation.

ORDER

1. The Commission adopts the State of Minnesota Technical Interconnection and Interoperability Requirements (TIIR) as filed on August 23, 2019, with the modifications contained in Section V.B. above.
2. The TIIR and TSMs shall be effective as of July 1, 2020.

3. The Commission requests input from the Technical Subgroup (TSG) of the Distributed Generation Workgroup (DG Workgroup) as to when IEEE 1547-2018 certified equipment is “readily available.” The Commission delegates to the Executive Secretary the authority to issue a notice when the full TIIR goes into effect in consultation with the TSG.
4. The Commission will reconvene the DG Workgroup to draft a guidance document to accompany the TIIR that clarifies which provisions are in place in the interim period until newly certified equipment is available. The DG Workgroup should complete its work and finalize the document by the publication date of the TIIR. The filing of the guidance document will depend upon whether utilities can reach a consensus on the contents of the document. If a consensus is reached, the guidance document shall be filed in Docket No. E-999/CI-16-521 and published by the Executive Secretary along with the TIIR on the Commission’s website. If no consensus is reached, each utility shall adopt their preferred version of the guidance document to be included with the utility’s Technical Specifications Manual (TSM).
5. Each rate-regulated utility shall make its draft TSM available to the DG Workgroup no later than April 1, 2020, for review and discussion.
6. Each rate-regulated utility shall file its final TSM no later than May 1, 2020.
7. After the final TSMs and any subsequent updates are filed, objections may be filed with the Commission within a 30-day period. Any objections should clearly identify the challenged provisions, the basis for the objection, and a preferred alternative approach where possible. If no objections are received, the TSM shall automatically become effective 30 days after filing. If objections are received, the Commission will make a formal determination on the objections before the challenged TSM can become effective. However, if the utility represents that safety or reliability will be directly affected by delayed implementation, then the TSM will immediately become effective while the Commission makes a formal determination on the objections. The absence of objections to a TSM during the initial 30-day objection period does not waive or nullify future objections to any TSM provisions.
8. Rate-regulated utilities shall file an informational notice with the webpage link each time their TSM is updated.
9. Rate-regulated utilities shall file their TSMs as part of their annual reporting under Minn. R. 7835.0300. The filing shall include a red-line of any changes, but the TSM is not required to be included in the utility’s tariff.
10. The Commission finds that it is necessary for potential interconnection customers to be able to access the utility’s TSM. These standards and procedures must not be more restrictive than the standards contained in the TIIR. The utility may include suggested types of equipment to perform the specified functions. No standard or procedure may be established to discourage cogeneration or small power production.

11. The Commission recommends the following items for discussion and eventual resolution through the DG Workgroup:
 - a. Energy storage control modes and harmonization of the language and structure of the energy storage requirements in the operating agreements;
 - b. Determination of explicit treatment of distributed energy resources (DER) using Power Control Systems for maximum capacity and export control in the Minnesota Distributed Energy Resources Interconnection Process (MN DIP) and the TIIR document;
 - c. Evaluation of Voltage-Reactive Power Regulation in the TIIR;
 - d. Harmonization of the language and structure of voltage regulation considerations in the operating agreements to the extent possible;
 - e. Harmonization of the language and structure of the communications operating agreements so as to not unduly burden DER operators; and
 - f. Plan to reduce and/or track unintended curtailments due to Voltage – Active Power Control prior to implementation.
12. The Commission delegates to its Executive Secretary the authority to issue by Notice a clean copy of the statewide TIIR reflecting the modifications approved in this order.
13. The Commission delegates to its Executive Secretary the authority to establish and maintain an ongoing DG Workgroup to meet annually, or more frequently as needed, to review implementation and technical issues that arise with implementation of the MN DIP, Minnesota DER Interconnection Agreement (MN DIA), TIIR, or emerging DER technology. Updates to the MN DIP, MN DIA, and/or TIIR may be accomplished by Commission order in response to a petition.
14. This order shall become effective immediately.

BY ORDER OF THE COMMISSION



Ryan Barlow
Acting Executive Secretary

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