Regulatory Perspective: IEEE 1547 Revision and DER Interconnection Standards

Spring 2018 Joint CREPC-WIRAB Meeting (April 20, 2018)

MINNESOTA
PUBLIC UTILITIES COMMISSION

https://mn.gov/puc

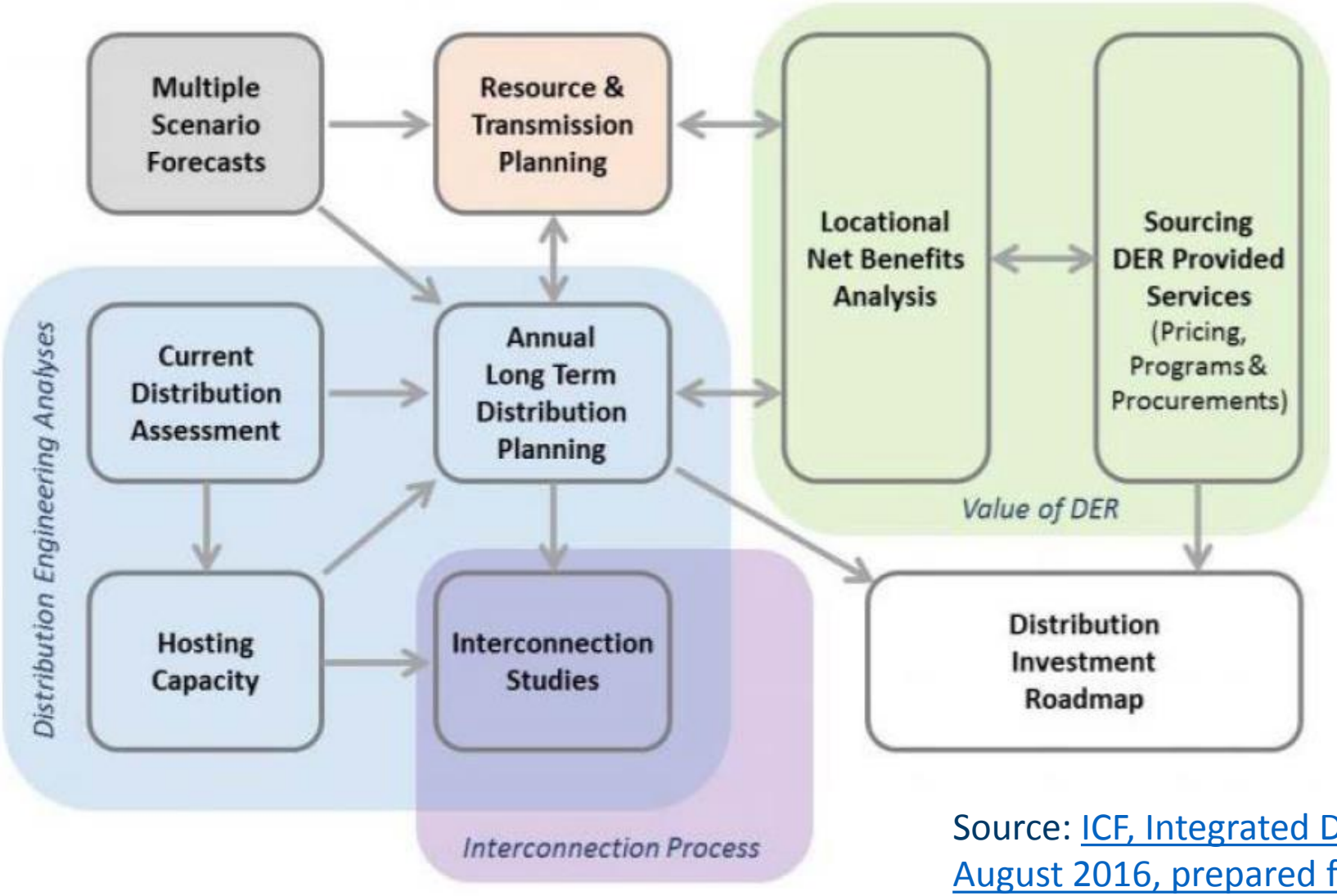
Disclaimer

The ideas expressed are the views of the presenter, and not the Minnesota Public Utilities Commission.

Interconnection Update Takeaways

- Identify a well-balanced workgroup or informal group of individuals from utilities, DER industry, and consumer advocates.
- Establish a clear process (scope and timeframe) that grounds recommendations in guiding principles and facts.
- Encourage shared learning and include Commission.
- Keep in mind future proofing versus driving specific outcomes.
- Engage outside expertise in a transparent way.

Future Proofing and Grid Modernization



Source: [ICF, Integrated Distribution Planning, August 2016, prepared for MN PUC]

Commission Order

January 24, 2017

- The Commission hereby delegates authority to the Executive Secretary to issue Notice(s), set schedules, and designate comment periods for the scope outlined in paragraphs 2 – 3 below. The Executive Secretary will, in cooperation with the Department of Commerce, convene a work group of appropriate size and composition, and may select a facilitator, to **develop the record more fully.**
- **The Commission will transition the Minnesota Interconnection Process to one based on the FERC SGIP and SGIA**. The Executive Secretary will set schedules and take comments. It is anticipated that the Commission will consider the record and comments within 18 months of this order, to replace Attachments 1, 3, 4, and 5 to its 2004 Interconnection Standards in this Docket. The Executive Secretary will **use the Joint Movants' May 12, 2016 filing, generally, as the starting point for comments.**
- In the longer-term (nine to twenty-two months), the Executive Secretary will set schedules and take comments on updating the Minnesota interconnection technical standards. It is anticipated that the Commission will consider the record and comments within 24 months of this Order, to replace Attachment 2 to the Commission's 2004 Interconnection Standards. **This stage of work would incorporate newly revised national technical standards, and other issues identified as areas in need of updating.**
- The Commission hereby designates Commissioner Matthew Schuerger as lead commissioner pursuant to Minn. Stat. § 216A.03, Subd. 9, with authority to **help develop the record necessary for resolution of the issues, and to develop recommendations to the Commission in this docket.**

Minnesota Interconnection Update

Phase I

Interconnection Process, Applications, Agreements

Phase II

Technical Requirements consistent with newly revised IEEE 1547 (Published April 6, 2018)

?

Phase III?

Compensation?

Rate Design?

Incentive for the utility?

Phase I	Phase II
3 initial documents (FERC SGIP/SGIA, Joint Movants' Red-line of FERC; Dakota Electric Red-line of MN existing stds)	1 initial document (Regulated Utilities' Technical Interconnection and Interoperability Requirements Proposal)
15 organizations (engineers, regulatory staff, lawyers, advocates)	9 organizations (engineers, technical experts)
5 full day In Person meetings – 1 year	7 half day web meetings – 7 months; 2 full day In Person mtgs
Draft staff recommendations (4 rounds of comments)	Edits as we go (~2 rounds of comments)

Workgroup Topics & Timeline

2017	PHASE I In-Person Topics
June 2	Pre-app report; Application requirements; Queue type & process; Material Modification Definition; Fast Track; Site Control
July 28	Definitions; Transmission Provider's role; Engineering screens; Study process; process timelines/extensions; dispute resolution
Sept 15	Insurance; Disconnect Switch; metering; Commissioning/inspection, testing, authorization; Design, procure, install, construct facilities/upgrades; advanced inverters
Nov 3	Interconnection Agreement; process for updating; Transition issues; any outstanding issues

2018	PHASE II Web Meeting Topics
March 23	Scope/Overview; Inventory of Definitions to Discuss
April 13	Performance Categories; Response in Normal and Abnormal Conditions; MISO Bulk Power System
May 18	Reactive Power and Voltage/Power Control Performance; Protection Requirements
June 8	Energy Storage; Non-export; Inadvertent export; Limited export
July 20	Interoperability (Monitor and Control Criteria); Metering; Cyber security
Aug 10	Test and Verification; Witness Test Protocol
Sept 14	References; Definitions; 1-line diagram requirements; Agreements

Phase II Preliminary Take Aways

1. Familiarize yourself with IEEE 1547.
2. Establish a technical subgroup with utility and DER expertise.
3. Work with your RTO/ISO and neighboring states.
4. Recognize the elephant in the room (may not be in scope) and frame your process appropriately.
5. Work with technical experts in a transparent way.
6. Interim implementation requires consideration

1. Familiarize yourself with IEEE 1547

- Authority Governing Interconnection Requirements:

  authority governing interconnection requirements (AGIR): A cognizant and responsible entity that defines, codifies, communicates, administers, and enforces the policies and procedures for allowing electrical interconnection of DER to the Area EPS. This may be a regulatory agency, public utility commission, municipality, cooperative board of directors, etc. The degree of AGIR involvement will vary in scope of application and level of enforcement across jurisdictional boundaries. This authority may be delegated by the cognizant and responsible entity to the Area EPS operator or *bulk power system* operator.

  NOTE—Decisions made by an authority governing interconnection requirements should consider various stakeholder interests, including but not limited to Load Customers, Area EPS Operators, DER Operators, and *bulk power system* Operator.

- Capabilities → Enabling Capabilities → Utilization → Reporting
- Annex B is an informational guide for setting performance categories
- Provide engineering support to your staff.
- IEEE 1547 available for purchase: https://standards.ieee.org/findstds/standard/1547-2018.html

2. Establish a Technical Subgroup w/ Utility & DER Expertise

- 6 utility representatives (IOU, cooperative, municipal) and 5 non-utility representatives (DER, customers, etc.)
- Green formed "Regulated Utilities" and submitted a draft MN Technical Interconnection and Interoperability Requirements proposal that serves as the working document for edits.
- 3 representatives participated in IEEE 1547 revision (including 2 from "Regulated Utilities").
- EPRI and NREL participate as technical assistance with goal of creating a road map for other utilities and states going through this update.

Jeff Schoenecker/Craig Turner, Dakota Electric Assn. (Rate-regulated cooperative)	Robert Jagusch, MN Municipal Utilities Assn	Patrick Dalton/John Harlander/Alan Urban, Xcel Energy
Lise Trudeau, Dept of Commerce	Kevin McLean/Jenna Warmuth, MN Power	Tam Kemabonta/Professor Mahmoud Kabalan, Academic/unaffiliated
Mike McCarty/Katie Bell, Energy Freedom Coalition of America	Kristi Robinson, MN Rural Electric Cooperative Assn.	John Dunlop/Chris Jarosch, MN Solar Energy Industry Assn.
Brian Lydic/Sky Stanfield/Laura Hannah – Interstate Renewable Energy Council, Fresh Energy, Environmental Law & Policy Center (Joint Movants)	Dean Pawlowski, Otter Tail Power	Commissioner Matt Schuerger; Staff: Michelle Rosier; Cezar Panait.

3. Work with your RTO/ISO, NERC Reliability Coordinators and neighboring states

- Some confusion if IEEE 1547 Regional Reliability Coordinator role is RTO, ISO, or NERC Reliability Coordinators.
- Establish contact early and identify the right people.
- Ask for an update on: 1) DER impact analysis efforts, and 2) Existing Bulk Power System voltage and frequency concerns and causes.
- If possible, work collaboratively with respect for each other's roles.

4. Capabilities vs. Utilization and State Requirements

- Utilization of IEEE 1547 required capabilities brings questions re: compensation; visibility; dispute resolution.
- How do you address the gap between setting a performance category (re: capability) and the Area EPS utilizing those capabilities?
  - FERC Order 842: Frequency Response
    - "While we are requiring newly interconnecting generating facilities to install equipment capable of providing frequency response and adhere to specified operating requirements, we are not mandating headroom, which is a necessary component for the provision of primary frequency response service."
  - Utilization can have impacts on DER owners (active power curtailment, reactive power exchange, head room) and distribution utilities (voltage or frequency ridethrough with extended trip settings)
  - What should the role of statewide technical requirements be?

5. Work w/ Technical Experts in Transparent Way

- National Renewable Energy Laboratory (NREL) and Electric Power Research Institute (EPRI) have provided significant technical assistance to our process.
  - They listen in, when able, to workgroup discussions, answer staff questions, and provide feedback on the issues to be discussed.
- Check IEEE 1547 list to see who participated in the revision.
  - MN PUC is fortunate to have a Lead Commissioner and engaged utility and DER representatives who participated in the IEEE 1547 revision. They help provide additional insights into what is meant by IEEE 1547 and suggestions on how to work through the state requirements.
- If possible, offer shared learning opportunities.
  - IEEE has hosted 3 full day trainings on IEEE 1547 in the US; including one MN PUC and Organization for MISO states jointly hosted. IEEE also has a webinar series.
  - EPRI has a number of white papers and webinar content.
  - NREL has the Distributed Generation Interconnection Collaborative (white papers, webinars) and lessons learned from other states.
  - Our local experts provided their insights during the drafting and helped identify areas of crossover with Phase I update.

Interim Implementation?

Step	Timeline
IEEE 1547 2nd Edition (2018) Published	April 6, 2018
MN Statewide Technical Requirements Approved	*1Q 2019*
UL 1741 Interim SRD for IEEE 1547 2nd Edition (2018)	*TBD. Expected to address about 85% of 1547 2nd Edition.*
IEEE 1547.1 Published	*Mid-to-late 2019*
UL 1741 Certified Products Available on Market	*18 months after IEEE 1547.1 Published (~2020)*

- Some areas (CA, HI, ISO-NE) are developing interim implementation using UL 1741SA (contains some, but not all of the functionality required in IEEE 1547-2018.) If this approach, TSG must discuss the Source Requirements Document (SRD):

Location	SRD
California	Rule 21
Hawaii	14H
ISO-NE	1547-2018

Resources

- FERC Small Generator Interconnection Process (SGIP) & Interconnection Agreement (SGIA):

https://www.ferc.gov/industries/electric/indus-act/gi/small-gen.asp

- NREL Distributed Generation Interconnection Collaborative:

https://www.nrel.gov/dgic/

- Database of State Incentives Renewable Energy (DSIRE) Interconnection Pages:

http://programs.dsireusa.org/system/program?type=14&

- IEEE 1547 available for purchase:

https://standards.ieee.org/findstds/standard/1547-2018.html

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Thank You!

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