MINNESOTA
PUBLIC UTILITIES COMMISSION

Distributed Generation Workgroup (DGWG)
DRAFT Meeting Summary #7

Docket No. E-999/CI-16-521

Friday, November 09, 2018

1. Welcome and Introductions

Commissioner Schuerger opened the meeting with appreciation for the DGWG's collaborative effort to update Minnesota's statewide interconnection standards; including the work to resolve the outstanding issues identified at the Commission's May 24th Agenda meeting approving, in **near-final** form, the MN Distributed Energy Resource Interconnection Process (MN DIP) and Agreement (MN DIA).[1]

DGWG Participants generally thought the process was in a good place and acknowledged the MN DIP and MN DIA would be living documents with ongoing updates. Participants also requested process details for incorporating the outstanding issues on today's agenda and Commission approval of the updated MN DIP and MN DIA. Commission staff will file a notice by November 30th with red-lined edits to the versions of the MN DIP and MN DIA approved by the Commission's August 13, 2018. This will mean going from MN DIP and MN DIA versions 2.2 to 2.3. Since the edits are not contested the Commission will approve the final documents with the approval of the utility tariffs in 1Q 2019. Participants also flagged interim implementation considerations given the change to anticipated timing of updated Minnesota Technical Requirements (16-521 Phase II), and when to consider further revisions of the MN DIP.

2. Technical Subgroup (TSG) Update and Timing

Commission staff provided an overview of the progress made and some of the unresolved issues in seven TSG meetings between March – October 2018 (see slides 5-7)[2]. Topics included DER capacity, energy storage, non-exporting DER, default DER voltage regulation and when volt-var DER voltage regulation may be desired. intentional Local EPS islanding, certification in the interim of UL 1741 catching up to IEEE 1547-2018, and outlines of what is in a utility-specific Technical Standards manual were also discussed (see slides 5-7). The TSG recommends moving Commission Action on

[1] MN PUC ORDER ESTABLISHING UPDATED INTERCONNECTION PROCESS AND STANDARD INTERCONNECTION AGREEMENT (August 13, 2018), DIP and DIA Attachments.

[2] Slides are included in DGWG Meeting #7 Packet, p. 35-54

Phase II from Feb 2019 to not later than 4Q 2019 due to outstanding questions on testing, verification (IEEE 1547.1 updates), certification (UL 1741 updates) and DER interconnection process.

Capacity

Participants confirmed the TSG resolution of the definition of Capacity in MN DIP 5.14.3 had full support, and the edits in the TSG Meeting In-Person 9/21 Summary should be incorporated in MN DIP 5.14.3:[3]

> ~~The Interconnection Application shall use the maximum AC capacity, that the DER(s) is capable of injecting into the Area EPS Operator's electric system over a sustained time which may be limited.~~ If the maximum capacity of the ~~that the~~ DER~~(s) is capable of injecting into the Area EPS Operator's electric system~~ is limited (e.g., through use of a control system, power relay(s), or other similar device settings or adjustments), then the Interconnection Customer must obtain the Area EPS Operator's agreement that the manner in which the Interconnection Customer proposes to implement such a limit will effectively limit active power output so as to not adversely affect the safety and reliability of the Area EPS Operator's system. Such agreement shall not to be unreasonably withheld. If the Area EPS Operator does not so agree, then the Interconnection Application must be withdrawn or revised. ~~to specify the maximum capacity that the DER is capable of injecting into the Area EPS Operator's electric system without such limitations.~~ Nothing in this section shall prevent an Area EPS Operator from considering an output higher than the limited output (e.g. ~~a~~ Aggregate Nameplate Rating), if the limitations do not provide adequate assurance, when evaluating system impacts. See Minnesota Technical Requirements for more detail.

Further, the additional specificity the TSG agrees to should be included in the Phase II Technical Interconnection and Interoperability Requirements (TIIR)[4] TSG has discussed:

> The limit referenced in 5.14.1 and 5.14.3 shall be the nameplate alternative configuration setting, alternate certification or mutual agreement as provided in the Interconnection Agreement.

[3] DGWG Meeting #7 Packet, p. 16-18; red-lined edits in the box on pg. 18

[4] *IBID*, p. 18

- The aggregate nameplate rating will be used for process track eligibility and short circuit current analysis.

- The limit will be used for steady state aspects of technical review.

Example Single-Line Diagrams

The DGWG also confirmed utilities would include example single-line (also known as one-line) diagrams in their Technical Standards Manual because the one-line diagrams were an ongoing area for process efficiency for both utilities and the customers. The TIIR will include an outline of topics for the TSM; including one-line diagrams.

Writing Subgroup Update

Dakota Electric Association, IREC, Fresh Energy, MREA, and Xcel Energy staff are contributing to the writing subgroup established by the TSG to attempt to reconcile the outstanding Draft TIIR edits after the TSG discussed each topic over the past 7 web meetings and in-person on September 21st. The writing group has met three times since September, and IREC is taking the lead on drafting the schedule of topics for the remaining 20 planned meetings by April 2019. The Writing Subgroup will try to share sections of the Draft TIIR as progress is made, and has determined that if they are not able to reach agreement they will capture in comments the areas of disagreement. Storage was identified as a likely topic that would need additional vetting by the larger TSG. Not unlike the DGWG broadly, the writing group is thinking about how to update more expeditiously going forward.

The Commission's August 13, 2018 Order recognized the Commission would "… maintain a DGWG to meet annually, or more frequently as needed, to review implementation and technical issues that arise with implementation of the MN DIP, MN DIA, or emerging DER technology. Updates to the MN DIP and/or MN DIA may be accomplished by Commission order in response to a petition."[5]

3. Department of Commerce and Subgroup Report

At the May 24, 2018 Agenda Meeting, the Commission requested Commission staff develop, with the Distributed Generation Workgroup input, several outstanding topics from Phase I. Lise Trudeau from the Department of Commerce convened subgroups identified at DGWG Meeting #6 (June 1, 2018), this summer to resolve the issues and provided a report (see Slides 9-15) and updated materials[6] resolving 7 of the 10 issues the Commission identified. Below captures the discussion and proposed changes at the

[5] MN PUC ORDER ESTABLISHING UPDATED INTERCONNECTION PROCESS AND STANDARD INTERCONNECTION AGREEMENT (Aug. 13, 2018), p. 32

[6] DGWG Meeting #7 Packet, p. 22-34

DGWG meeting:

a. Pre-Application Report Request Form

Standardized, fillable Pre-Application Report Request Form per MN DIP 1.4 is based on forms from other states and then restructured and simplified. DGWG accepted edit: Replace "Exiting" DER with "Existing" DER.

b. Simplified Timeframe to sign Interconnection Agreement

The subgroup reviewed and revised the Joint Movants' proposal on the Simplified Timeframe at MN DIP 2.3.1 to: 1) incorporate the 30-day timeframe for a customer to sign their interconnection agreement (MN DIP 5.1.2); 2) removed MN DIP 2.3.1.1 as duplicative to MN DIP 5.1.2; and 3) added language for appropriate sequencing on construction of Area EPS facilities (per MN DIP 2.2.3) and removed language on metering (covered in MN DIP 2.3.2).

c. Certificate of Completion Template Form

Standardized, fillable Certificate of Completion per MN DIP 2.3.2 and Att. 2 Simplified Application. Subgroup restructured and simplified the Joint Movants' template. DGWG accepted edit: Clarify the Certificate of Completion is for electrical.

STAFF NOTE AFTER MEETING: Changed "Generating Facility" to "Distributed Energy Resource" or "DER" for MN DIP consistency.

d. MN DIP Attachment 5: Certification of DER Equipment

Both Xcel Energy and the Joint Movants' provided edits to the MN DIP Attachment 5 to attempt to make it compatible with IEEE 1547-2018 and the expected updates to IEEE 1547.1 and the subgroup reviewed. DGWG accepted edit: Change "Minnesota Technical Interconnection and Interoperability Requirements" to "Minnesota Technical Requirements" to address interim application of this Attachment consistent with the glossary of the MN DIP.

e. MN DIP Attachment 8: Flow Charts

Xcel Energy created five flow charts with feedback from the subgroup to help visualize the interconnection process for the customer, DER developer/installer and utility personnel: 1) high-level MN DIP workflow;

2) Simplified Process; 3) Fast Track Process; 4) Study Process; and 5) Dispute Process. DGWG accepted edit: Change "MDIP" to "MN DIP."

f. MN DIA Edits proposed by Xcel Energy

Xcel briefly summarized the intent of the proposed language at DGWG Meeting 6 (June 1, 2018):

- **NEW MN DIA 3.4.6** – Currently, the disconnection process is very different for a DER customer compared to a retail customer. It can be cumbersome for the utility to disconnect the DER when there is a power quality or safety concern. The language proposes one process regardless of whether load-only or also generator.

- **NEW MN DIA 3.4.7**- Provides timeframe clarification with a 60 day written notice for disconnection due to default. Staff added the SGIA language currently in the MN DIA only allows for termination of Interconnection Agreement, not disconnection, and doesn't provide a timeframe or process.

- **NEW MN DIA 5.2.1.2**- Clarifies the utility is not required to pay an interconnection customer back for network upgrades the customer pays for, but subsequently does not use (due to not reaching operation) until another DER customer utilizes and pays for the upgrades. Dakota Electric requested setting a timeframe for how long the utility would need to track such accounting (5 years is standard, but perhaps longer is warranted, but it does get difficult to track.)

Subgroup approved changes with one edit to MN DIA 5.2.1.2 to set a five year time limit on the refund to the customer who pays for network upgrades but does not use them when another DER later constructed uses the upgrades. There was initially some confusion about whether the full MN DIA terms and conditions applied to a Simplified customer who elected to use the Simplified application and USC option. The DGWG discussed that the terms and conditions from the Simplified Application and the Uniform Statewide Contract (USC) replaced the MN DIA (MN DIP 1.1.5), so for these provisions to apply to Simplified customers they should be added to the terms and conditions on the Simplified Application. DGWG accepted edit: Include the language from the new MN DIA 3.4.6 and 3.4.7 in the terms and conditions of the Simplified Application (MN DIP Att. 2).

g. Assignment Form

The Assignment Form was inadvertently omitted by Staff for consideration in the Updated Staff Recommendations for the MN DIP and MN DIA. DGWG is generally supportive of including the form, but staff will follow up internally regarding use with the Uniform Statewide Contract. TruNorth asked if the Assignment Form applied to just the interconnection agreement or also related incentive contracts.

STAFF NOTE: The above are notes from the June 1 DGWG meeting #6. The Assignment Form was not discussed at the Nov. 9 DGWG Meeting #7; however, staff will include it in the edited MN DIP/MN DIA attached to the Nov. 30th Notice based on the June 1 conversation.

Commission staff provided draft fillable PDF forms of applications and agreements.[7]

4. Implementation Update from Utilities

Minnesota Power

In the early phases with internal meetings to address process application, screening and study, if needed. Minnesota Power will have a public queue, so working on that transition. Looking at how the updated interconnection process will impact customer information system (CIS), metering and the Kayak refund system for system upgrade/sharing costs.

Otter Tail Power

Established an internal group to look at better workflow and who is on point for which steps. It takes a fair amount of time to incorporate new CIS codes. Developing a new webpage with new forms by early 2019. Internal engineers are learning about the new technical review, studies and changes. On target for June 2019 implementation.

Dakota Electric Association

Goal is best positive experience for members. Online application/submittal could be helpful for customers and internal processing. Star Consulting developed an online system that cooperatives can use. Filed a tariff, but expect to update with the changes from today's meeting. Will update webpage when final forms of the update are available. Working on a Frequently Asked Questions and other materials to help customers; such as, simplified flowcharts. Current focus is internal processes because

[7] DGWG Meeting #7 Packet with forms (e-mailed version), p. 36

MN DIP has more process tracks (Simplified, Fast Track, Study Process) and more steps, so working on how to make it simple for members. Dakota Electric raised a number of questions they are contemplating: 1) Queue position is important for assigning capacity (and potentially costs for upgrades), what happens to timelines if a smaller DER applies for interconnection on a substation with a larger DER application? 2) How should a distribution utility address possible backflow to the transmission system, which the utility is not compensated for, when allowing for 100% daily minimum load when in future due to efficiency load could be reduced? Dakota Electric estimates 10% of their substations could be in this position. 3) Hearing from national sources, including EPRI, that inverters may produce more fault current (up to 200% of the rating) than expected and that is not captured in a specification sheet. IREC reported this is on IEEE 1547.1 revision agenda to address measuring and reporting of fault current, and that standardizing before 1547.1 is updated is not advised. 4) Dakota Electric is considering merging the study agreement templates into one document. Commission staff offered the utility could propose such a change in their tariff filing and the Commission would consider after public comment.

Minnesota Rural Electric Cooperative Association, Minnesota Municipal Utilities Association and Missouri River Energy Services

MREA established a workgroup of 30 utility personnel from cooperative and municipal utilities to develop the C-MIP and M-MIP which achieves the same principles and details, but in a more user-friendly format (see Slides 20-24). Created a Supplemental Review form to make it easier for utility personnel to complete Fast Track review. Cooperatives and Municipal utilities will have a different dispute resolution process and some other differences with respect tothe MN DIA. In additional review, MREA identified two logistical issues: 1) the need for a separate system impact study agreement for Transmission providers and the impact on timeline if the MISO queue is backed up; 2) the Fast Track Process seems shorter than the Simplified Process. The C-MIP adds 10 days; rather than 5 when missing information is provided for the Fast Track. MRES did not have additional updates.

Xcel Energy

Xcel held stakeholder input session and have incorporated feedback in revised tariff proposal to be filed soon (see slides 26-34). Biggest changes are updating the online application portal and aligning program tariffs with MN DIP, new timelines and timelines on the customers, and addressing steps and processes in existing tariffs that conflict with MN DIP. Some changes in the Community Solar Garden program tariff: Changing the construction deadline (currently, begins at application received for Expedited Ready projects) to when the MN DIA is signed. Initially, Xcel proposed 18 months from when the MN DIA is signed, but based on stakeholder feedback will keep the 24 months. Also amending late fees, annual reports and a few corrections. Have begun to test the initial review and supplemental review technical screens. Working on a number of other

business practice changes: new facilities study process, modifications to the pre-application report information, company point of contact for all DER, Process track eligibility sorting, updating information on website, and queue management adoption. There are a number of cases where serial review is in the best interest of the DER customer/developer whether there are upgrades or not. Xcel Energy intends to process in parallel if applications are not going to impact another in the queue.

5. DISCUSSION: How Commission and stakeholders can assist in Phase I Implementation

Commission staff provided optional fillable PDF forms for utilities for MN DIP and MN DIA implementation. Otter Tail Power is interested in the forms. MREA is offering fillable forms to cooperatives as well. TruNorth offered to test forms and provide feedback. Commission staff accepted the offer.

Customer friendly materials is a priority given the format of the MN DIP and MN DIA. Customer facing documents mentioned include: example one-lines, guidelines, flow charts and checklists. Some encouraged all utilities to put all interconnection-related materials on their webpages. Department of Commerce encouraged utilities to consider the recommendations from the EPRI study with Minnesota utilities on ways to streamline utility interconnection processes. Dakota Electric mentioned an interest to use the Star Energy online portal, but thought it would require being able to use some of the process differences the cooperatives are adopting with the C-MIP.

There was discussion regarding whether submission or response dates for timelines were based on post marks. There was agreement that post mark is typical, and when possible electronic communication can reduce time.

Early engagement by interested parties has resulted in some utilities being able to incorporate feedback in their tariff filing. Utilities were encouraged to use their developer distribution list to get the word out about the upcoming changes.

6. Observer/Public Comment

Ralph Jacobson (IPS Solar) offered the MNSEIA conference (11/12-13) would be an opportunity to set some expectations for installers and developers. He added that the Certificate of Completion form in the meeting packet is not clear on whether it is an electrical or general contractor who signs. Xcel Energy has a general contractor licensing requirement for Solar*Rewards because structural issues are not covered by an electrical inspector. Suggested having both a general and electrical inspector sign off. Finally, he supported replacing the need to list equipment in the application with specification sheets.

Several DGWG Participants responded on the Certificate of Completion to clarify the intent is for electrical inspector and suggested editing the document to make that clear.

7. Outstanding Issues, Evaluation and Next Steps

Commission staff will incorporate all the materials the Department of Commerce and DGWG subgroups created with the feedback from today's meeting as red-lines to the MN DIP and MN DIA v. 2.2 (approved with the Commission's August 13, 2018 Order) and file it in a notice with the announcement of the individual dockets for rate-regulated utilities' tariffs by the end of the month.

Nov. 13	Utility tariff filings – opening new dockets
Dec. 28	Xcel Energy tariff filing – open in a new docket
~Feb – March 2019	Commission Action: Utility tariff filings and Clean MN DIP with DOC subgroups contributions
~1Q 2019	Commission Consideration re: Attachment 6 Review and/or Revision Process
~April 2019	TSG Writing Group Updated Draft Technical Interconnection and Interoperability Requirements (TIIR) document
June 17, 2019	Effective Date of the MN DIP and MN DIA
Not later than 4Q 2019	Commission Action on Phase II Technical Requirements

8. Attendance

First	Last	Organization		11/9 DGWG 7
Craig	Turner	Dakota Electric	Participant/TSG	X
Lise	Trudeau	Department of Commerce	Participant/TSG	X
Sue	Peirce	Department of Commerce	Participant	
Katie	Bell (formerly Sheldon)	Energy Freedom Coalition	Participant	
Laura	Hannah	Fresh Energy	Participant	X
Donna	Pickard	Genie Solar Support/Tru North	Participant	X
Sky	Stanfield	Interstate Renewable Energy Council	Participant	Alternate/P
Kevin	McLean	Minnesota Power	Participant/TSG	Alternate
Jeff	Peters	Missouri River Energy Services	Participant	Alternate/P
Robert	Jagusch	MN Municipal Utilities Association	Participant/TSG	X
~~Christine~~	~~Andrews~~	~~MN Energy Storage Alliance~~	~~Participant~~	
David	Shaffer	MN Solar Industries Association	Participant	TSG rep
~~Jim~~	~~Horan~~	MN Rural Electric Association	Participant	Alternate
Dean	Pawlowski	Otter Tail Power	Participant/TSG	X
~~Natalie~~	~~McIntire~~	~~Wind on the Wires~~	~~Participant~~	
Patrick	Dalton	Xcel Energy	Participant/TSG	X

Chris	Jarosch	Carr Creek Electric	Observer/TSG	
Mike	Bull	Center for Energy and Environment	Observer	
Annie	Levenson-Falk	Citizens Utility Board	Observer	
Logan	O'Grady	Clean Energy Economy MN	Observer	
Lily	Osborne	Clean Energy Economy MN	Observer	
Tom	Guttormson	Connexus Energy	Observer	
Mike	Murtaugh	Freeborn-Mower Cooperative Services	Observer	
Mark	Rathbun	Great River Energy	Observer	
Mike	Steckelberg	Great River Energy	Observer	
Patrick	Quinn	Great River Energy	Observer	
John	Farrell	Institute for Local Self Reliance	Observer	
Karlee	Weinmann	Institute for Local Self Reliance	Observer	
Ralph	Jacobson	Innovative Power Systems	Observer	X
Lynn	Hinkle	Innovative Power Systems	Observer	
Ted	Kjos	MiEnergy Cooperative	Observer	
Curtis	Cordt	Minnesota Valley Electric Cooperative	Observer	
Will	Lovelace	Minnkota Power Cooperative	Observer	
Mike	Franklin	MN Conservative Energy Forum	Observer	
David	Strom	MN Conservative Energy Forum	Observer	
Soria	Talbot	NextEra Energy Resources	Observer	
Carrie	Hitt	NextEra Energy Resources	Observer	
Rich	Macke	Power System Engineering, Inc.	Observer	
Jon	Kramer	Sundial Solar	Observer	
Burnell	Lauer	Sundial Solar	Observer	
Donald	Hanson	Witwright Institute LLC	Observer	
Bryant	Tauer	Wright-Hennepin, CEA	Observer	
Nadav	Enbar	Electric Power Research Institute	Observer/TSG Technical Assistance	
Tom	Key	Electric Power Research Institute	Observer/TSG Technical Assistance	
Alex	Magerko	Electric Power Research Institute	Observer	
David	Freestate	Electric Power Research Institute	Observer	
Glen	Skarbakka		Observer	
Patrick	*Hughes*	Dakota Electric		X
Doug	Larson	Dakota Electric	Alternate	
Danielle	Winner	Department of Commerce	Alternate	
Stacy	Miller	Department of Commerce		
Bradley	Klein	Environmental Law and Policy Center	Alternate	
~~Michael~~	~~McCarty~~	~~Energy Freedom Coalition~~	~~Alternate~~	

~~Sarah~~	~~Walinga~~	~~Energy Freedom Coalition~~	~~Alternate~~	
Jacob	Schlesinger	Energy Freedom Coalition	Alternate	
Allen	Gleckner	Fresh Energy	Alternate	
Laura	Beaton	Interstate Renewable Energy Council	Alternate	
Erika	McConnell	Interstate Renewable Energy Council	Alternate	
Brian	Lydic	Interstate Renewable Energy Council	Alternate/TSG	P
Katelyn	Frye	Minnesota Power	Alternate	
Frank	Kornbaum	Minnesota Power	Alternate	X
Derek	Bertsch	Missouri River Energy Services	Alternate	
Elizabeth	Wefel	Missouri River Energy Services	Alternate	
Rob	Scott-Hovland	Missouri River Energy Services	Alternate	
Terry	Wolf	Missouri River Energy Services	Alternate	
Wes	Plaff	Missouri River Energy Service	Alternate	P
Brian	Zavesky	Missouri River Energy Service	Alternate	P
Bill	Black	MN Municipal Utilities Association	Alternate	X
~~Barb~~	~~Jacobs~~	~~MN Energy Storage Alliance~~	~~Alternate~~	
Liz	Lucente	MN Solar Industries Association	Alternate	
Kristi	Robinson	MN Rural Electric Association	Alternate/TSG	X
Jeff	Triplett	MN Rural Electric Association	Alternate	
Darrick	Moe	MN Rural Electric Association	Alternate	
David	Prazak	Otter Tail Power	Alternate	
John	Harlander	Xcel Energy	Alternate	X
Alan	Urban	Xcel Energy	Alternate	
~~Tam~~	~~Kembonta~~	~~Citizen~~	~~TSG~~	
John	Dunlop	MN Solar Energy Industry Assn	TSG	X
Jenna	Warmuth	Minnesota Power	TSG Alternate	X
Hilal	*Katmale*	*Microgrid Energy Solutions/RAP*	*TSG Technical Assistance*	X
Elie	*DeBlieck*	*Geronimo Energy*	*Public*	X
Matt	Schuerger	MN Public Utilities Commission	Lead Commissioner	X
Carl	Linvill	Regulatory Assistance Project	Facilitator	X
Michelle	Rosier	MN Public Utilities Commission	Staff	X
Michelle	Rebholz	MN Public Utilities Commission	Staff	
Susan	Mackenzie	MN Public Utilities Commission	Staff	X
Hanna	Terwilliger	MN Public Utilities Commission	Staff	X
Cezar	Panait	MN Public Utilities Commission	Staff	X
Pam	Johnson	Solar Energy Innovator Fellow	Fellow	X

X = in-person attendance; p= by phone. *Italic=new.*

MINNESOTA
PUBLIC UTILITIES COMMISSION

Minnesota Distributed Generation Workgroup Meeting #7

Friday, November 9, 9:30 – 2:30pm, MPUC Large Hearing Room

Packet Contents:

Access the Aug. 13, 2018 Order MN DIP and MN DIA in Docket. No. E999/CI-16-521.

Agenda

Meeting Facilitator: Carl Linvill, Regulatory Assistance Project

9:30 Welcome, Introductions and Check in

9:45 Overview of Agenda

9:50 Technical Subgroup Update and final feedback on 9/21 Meeting Summary
- Updated timeline
- Capacity
- Storage
- Non-exporting
- Advanced inverter functions
- Certification?

10:20 DOC and subgroups report on Phase I follow up topics:
- Pre-application report form
- Attachment 5: Certification
- Simplified Timeline
- Treatment of USC and Simplified Application as MN DIA substitute
- MN DIA amendments
- Certificate of Completion
- Flowcharts
- PDF fillable forms

11:25 Implementation updates from Utilities [~15 minute presentations/each]
- Minnesota Power
- Otter Tail Power
- Dakota Electric
- MREA and MMUA presenting together?

12:25 Lunch Break

1:00 Implementation updates for Utilities continued
- Xcel Energy

1:15 How can the Commission and stakeholders assist in smooth Phase I implementation?

2:00 Observer/Public Comment

2:20 Wrap Up and Next Steps
- Feedback/evaluation

2:30 Adjourn

MINNESOTA
PUBLIC UTILITIES COMMISSION

Distributed Generation Workgroup
Meeting Summary #6

Docket No. E-999/CI-16-521

Friday, June 01, 2018

1. Welcome and Introductions

Commissioner Schuerger opened the meeting with congratulations and appreciation for the DGWG's collaborative effort and the Commission's action on Phase I at the May 24 Agenda meeting. He also noted a number of changes in participation, and welcomed new representatives to the table.

2. Technical Subgroup Update and Discussion of Upcoming Topics/Agendas

The DGWG and Technical Subgroup members present discussed the Phase II process and upcoming meetings. It was suggested to add an additional meeting to address the capacity, storage, exporting, non-exporting topics; including the capacity definition in MN DIP 5.14.3. Microgrids that operate in parallel will also be added to the July 20th or newly proposed August 3rd meetings. Four other topics were proposed for TSG discussion:

a. power quality (staff will find a place in the schedule);

b. Single Phase Anti-Island Testing could be an operational example, but limit time given not relevant across all utilities, for the Sept 14th meeting which covers testing more broadly; and

c. modeling (e.g. possible power quality challenges). Model details in a statewide standard is challenging given unique utility systems (internal systems, available data) and should be considered out of scope and possibly discuss it in the future. Another option is to include model details in the utility technical standard manuals.

d. Implementation Timeline – circle back on the discussion from April 13, 2018 TSG meeting on how, and if, to implement new statewide technical requirements consistent with IEEE 1547-2018 while the testing procedures (IEEE 1547.1) are still being revised and certification of equipment requires finalize testing procedures.

In general, the Technical Subgroup thought the Phase II process was going well, and appreciated the web-based meetings; however, it was requested to host in-person meetings as well. Staff will add an in-person meeting to the calendar. TSG members appreciated bringing the Midcontinent Independent Service Operator (MISO) into the process early for longer term items which should be beneficial for the entire region.

3. Action Plan for Follow Ups for Phase I Commission Action

At the May 24, 2018 Agenda Meeting, the Commission requested Commission staff develop, with the Distributed Generation Workgroup input, several outstanding topics from Phase I. The outstanding topics were included in the meeting packet for this meeting. The Distributed Generation Workgroup created a subgroup for each of the outstanding issues discussed below. The list of participants for each subgroup and the meeting packet is attached to this meeting summary. Lise Trudeau from the Department of Commerce is coordinating the subgroups.

a. Pre-Application Report Request Form

The Commission approved language at MN DIP 1.4.1 outlines what information and payment must be provided by the Customer to the utility to request a pre-application report. IREC provided a model template at the DGWG meeting to serve as a starting point to create a standardized pre-application request form as ordered by the Commission (Order forthcoming.) The following agreed to be on the subgroup which will begin with edits on the IREC model by email: Xcel Energy, Department of Commerce, Fresh Energy, Dakota Electric Association and Otter Tail Power.

b. Simplified Timeframe to sign Interconnection Agreement

The language at MN DIP 2.3.1 addresses how to incorporate the Uniform Statewide Contract as Interconnection Agreement into the Simplified Process timeframe. There were several proposals leading up to the Commission Agenda meeting, and the Updated Staff Recommendation is problematic to some because the 30 business days (6 weeks) from the in-service date is a minimum timeframe; rather than maximum and could slow down the Simplified Process unnecessarily. Joint Movants' Alternative Decision Option 6 proposes uses the Customer's receipt of the contract as the start of either a timeframe that is: 1)10 Business Days; or 2) unspecified. Joint Movants view this as a compromise because it acknowledges the utility request for a signed interconnection agreement (and uniform statewide contract) before certificate of completion or permission to operate. The Department of Commerce is comfortable with the 10 Business Days proposal, but not the unspecified timeframe in Joint Movants' proposed 2.3.1.1-2.3.1.2. Both the MN DIP 2.3.1.1 (delay to PTO because delay in customer agreement) and 5.1.2 (customer has 30 days to sign interconnection agreement) are related to MN DIP 2.3.1 and the interaction between these sections should be considered. Additionally, MN DIP 3.2.2.2 ("any construction of facilities" language in initial review) would impact this section when upgrades are required (beyond metering.) Ensure MN DIP is consistent across these sections. Such upgrades for under 20 kW DER are somewhat rare, but can come up

due to voltage issues. The existing experience from an installer is that utilities are not uniform in what is required currently – some allow interconnection agreement signed at time of meter install; others require interconnection agreement a few days before. Subgroup will discuss further and report back a recommendation to the full DGWG. Subgroup volunteers: MNSEIA, Otter Tail Power, Xcel Energy, Department of Commerce, Fresh Energy, Otter Tail Power, TruNorth Solar (Donna Pickard), and Minnesota Power.

c. Certificate of Completion Template Form

Certificate of Completion is only used in the MN DIP Simplified Process to communicate the electrical inspector has successfully inspected the equipment. Xcel Energy is comfortable with the Joint Movant's proposed form if it is edited to remove the approval to energize and requirement for a Company signatures. Utilities currently approach the permission to operate (PTO) step differently. Some send a PTO confirmation (via email); others use the interconnection agreement and something from the electrical inspector (e.g. photo of the sticker.) Most utilities agreed that once the DER commissioning and witness test iss successfully completed, the customer can leave the DER energized prior to the paperwork PTO follow up. It was suggested to allow flexibility in the Certificate of Completion to combine it with a PTO, but not require it to be combined. Utilities would then include their preference in their tariff filing. Subgroup will start with red-lines on the Joint Movants' template. Subgroup includes: Xcel Energy, Fresh Energy, Tru North, Energy Freedom Coalition of America, Minnesota Power and Otter Tail Power.

d. MN DIP Attachment 5: Certification of DER Equipment

Both Xcel Energy and the Joint Movants' provided edits to the MN DIP Attachment 5 to attempt to make it compatible with IEEE 1547-2018 and the expected updates to 1547.1; however, more work is needed. Additionally, it was requested by Dakota Electric to eliminate 7.0 which allows for the state to maintain its own certification list which Minnesota does not currently do. Subgroup will start with email and then do a call to try to resolve. Subgroup includes: Xcel Energy, Department of Commerce, Dakota Electric Association, Otter Tail Power and Interstate Renewable Energy Council. Xcel Energy and IREC will work together to try to resolve or explain the rationale for the differences between their proposals as a first step.

e. MN DIP Attachment 8: Flow Charts

Xcel Energy has offered to do updated flow charts based on the approved version of the MN DIP, and requested feedback from the DGWG on the draft versions provided during the comment period. Commission staff highlighted previous DGWG suggestions: 1) Identify where in the MN DIP the step is discussed; 2) Show timeframes; and 3) Show who is responsible for that step. Could use different shaped boxes or layout to clarify if customer or utility is responsible. It was also suggested to create two types of flow charts: 1) Public version to explain the simple, common interconnection process; and 2) Internal version for staff trainings and

unique situations. It was also suggested utilities provide more detail in their flow chart for the utility's process for > 10 MW DER not covered in the MN DIP standard process. Xcel will update formatting for one flow chart and circulate for input from the subgroup and then narrow in on details (Thanks to John Harlander/Xcel for volunteering!) Subgroup includes: Xcel Energy, Department of Commerce, Fresh Energy, Otter Tail Power, and Dakota Electric Association.

f. MN DIA Edits proposed by Xcel Energy

Xcel Energy proposed a number of edits to the MN DIA that the DGWG requested additional time to consider, and the Commission requested Commission staff to develop, with DGWG input, a proposed resolution. Xcel briefly summarized the intent of the proposed language:

- **NEW MN DIA 3.4.6** – Currently, the disconnection process is very different for a DER customer compared to a retail customer. It can be cumbersome for the utility to disconnect the DER when there is a power quality or safety concern. The language proposes one process regardless of whether load-only or also generator

- **NEW MN DIA 3.4.7**- Provides timeframe clarification with a 60 day written notice for disconnection due to default. Staff added the SGIA language currently in the MN DIA only allows for termination of Interconnection Agreement, not disconnection, and doesn't provide a timeframe or process.

- **NEW MN DIA 5.2.1.2**- Clarifies the utility is not required to pay an interconnection customer back for network upgrades the customer pays for, but subsequently does use (due to not reaching operation) until another DER customer utilizes and pays for the upgrades. Dakota Electric requested setting a timeframe for how long the utility would need to track such accounting (5 years is standard, but perhaps longer is warranted, but it does get difficult to track.)

  Subgroup will start over email and includes: MNSEIA, Xcel Energy, Fresh Energy, Minnesota Power, Otter Tail Power, Dakota Electric Association, Department of Commerce.

g. Assignment Form

The Assignment Form was inadvertently omitted by Staff for consideration in the Updated Staff Recommendations for the MN DIP and MN DIA. DGWG is generally supportive of including the form, but staff will follow up internally regarding use with the Uniform Statewide Contract. TruNorth asked if the Assignment Form applied to just the interconnection agreement or also related incentive contracts.

h. Reporting

Hanna Terwilliger, PUC Staff, is convening a subgroup of the Distributed Generation Advisory Group to consider improvements to reporting, and invited DGWG

participants to join as we consider how to incorporate the reporting approved in Phase I.

For the follow ups below, Commission staff will take the lead and provide drafts for review to the full DGWG:

i. Turn forms into fillable PDF forms.

j. Edit MN DIP, MN DIA and glossary of terms for consistency with May 24th decisions. Staff will use a clean version of the Updated Staff Recommendations (as attached to the 5/16/18 Briefing Papers) and red-line edit consistent with the Commission's decisions at the May 24, 2018 Agenda meeting (Order forthcoming.)

4. Implementation Update from Utilities

Minnesota Power

Beginning to evaluate changes necessary in two areas: 1) Information Technology (IT)-related (databases, tracking software); and 2) more internal training for staff on the new process. Completed an extensive review of interconnection as it goes through Minnesota Power's current process.

Otter Tail Power

In early stages of looking at implementation, more detailed review requires the Commission Order. Otter Tail Power will attach the updated standards to the DG tariff. Using the next year for learning ground on what is effective – looking at some process changes; such as email notifications and doing dry runs internally.

Xcel Energy

Two main items: 1) IT project – overhauling the Company's Salesforce platform to develop a single stream system; rather than individual program-specific systems. Xcel will look at automation as practical to streamline the system during this rebuild; 2) Updating tariffs which have different processes (e.g. CSG independent engineer review and statewide interconnection standard's dispute resolution process), requirements, fees. Opportunity to clean up is good, but a lot of work.

Dakota Electric Association

Has not deviated from the 2004 interconnection standards. Focus will be on education of cooperative members and internal education (including working with Great River Energy as the G&T.) DEA is creating companion document and focusing on where the customer can benefit. May try to roll some of the benefits out earlier than the effective date; such as, queue, pre-application report.

Minnesota Rural Electric Cooperative Association
Proceeding with development of comparable standards for cooperatives, and working

with MMUA to come up with that language in effort for consistency. Revising readability of the document for the customer, adding cooperatives' dispute resolution language, recognizing smaller staff constraints and role of Great River Energy. Goal is to accomplish this by the January 2019 deadline dependent on budgets. Anticipate the cooperative standards being quite comparable to the rate-regulated: include the multiple tracks, queues, application screens and fees. Each board takes action to establish that cooperative's interconnection standards, but MREA is working with the coops ad hope to have engineering work and process done early and largely consistent, but can't make that commitment for the Boards.

Minnesota Municipal Utilities Association and Missouri River Energy Services

MMUA has been very optimistic about how the process has gone and the flexibility. Vast majority of the statewide standards will work for municipal utilities, and goal is to minimize the differences statewide for simplicity of utilities and customers. Goal is a standardized process across the consumer-owned and close to the state rules for simplicity. Currently, in discussions at staff and Board levels in organizations and power agencies. Will eventually offer Board training across membership.

MRES has a Distribution Generation workbook that is 164 pg. guideline for municipals served by MRES; but, it's strictly up to the municipal utility to adopt whatever they want. MRES will review and perhaps update its interconnection process proposal to address technical changes; however, it is voluntary and many MRES municipal utilities will look at adopting a process for distributed generation interconnection when they get their first interconnection request.

A non-utility Participant asked utilities about external training with developers (e.x. San Diego Gas & Electric engaged developers in testing new platforms before the formal rollout). Another asked if utilities were considering any of the internal operation and automation streamlining identified/discussed in the DOC EPRI Solar Pathways Report.[1] Several utilities are looking at the low hanging fruit steps identified.

5. How Commission can assist in Phase I Implementation

Priority is a clear, defined written Commission Order on Phase I action (May 24, 2018 Agenda Meeting). Need the details of the order to make progress and scheduling of tariff filings. Some utilities are ready to use pieces of the Phase I update prior to the effective date, which is in height of install season, so may be valuable to roll out new process earlier. One Participant suggested the Commission could track the new implementation if in advance of the effective date.

[1] Department of Commerce, Division of Energy Resources, Report – Assessing Opportunities and Challenges for Streamlining Interconnection Processes, (e-filed February 20, 2018): https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={9050B561-0000-C012-AABF-7DEC907C6ADA}&documentTitle=20182-140315-01

6. Process, Scope, Timing of update or replacement of Att. 6 Rates/DG Tariff

On March 23, 2018, MNSEIA et al. filed comments[2] in this docket requesting a process to update the existing Attachment 6 Rates/DG Tariff from the existing interconnection standards established in 2004. This attachment is not included in the January 24, 2017 Order outlining the update to the process, applications, agreements and technical requirements (Att. 1- 5, existing interconnection standards). The Phase I update of the Minnesota DER Interconnection Process includes reference to Att. 6 which remains in effect until updated or replaced (MN DIP Foreword.)

MNSEIA offered an overview and some updated thoughts on what they filed; including suggesting starting a review and revision of Att. 6 Rates/DG Tariff in January 2019 and covering DG rates broadly (avoided costs, DG tariff, other values and attributes from Value of Solar tariff, revising the Uniform Statewide Contract, consideration of statutes and rules on DG rates and utility incentives for encouraging DG.

Other participants were not convinced a review and revision was necessary. To the extent there was a review, one Participant suggested using an advisory group discussion to attempt to streamline the written comments, start earlier, and use the MNSEIA red-line and address the rates for DG that fit in the existing Att. 6 categories. Several participants also were not convinced a review and update was necessary raised concern that the Distributed Generation Workgroup did not have the right representation, and recommended a notice of comment on need, process, scope and timing. Another participant flagged FERC dockets discussing similar issues; such as, DER participation in the wholesale market, and offered informal, periodic discussions could be useful. Several other participants found the topic timely and wanted to participate. Commission staff thanked the DGWG for their input, and clarified that staff does not see this as a small task, and will issue a notice on need, process, scope and timing.

7. Observer/Public Comment

One member of the public spoke in support taking a look at the rates/DG tariff whether through a working group or the Commission-at-large, and asked for it to apply broad DER applications (eg. combined heat and power, etc. not just solar.)

8. Outstanding Issues, Evaluation and Next Steps

a. Department of Commerce will convene subgroups on Phase I follow up actions. Staff will provide a list of participants and topics to address. (See attached.)

b. Staff will add the topics and meetings discussed to the Technical Subgroup calendar.

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[2] MNSEIA, ELPC, CEEM, MCEA, MNSEIP, ILSR & MN Brownfields, Motion to Reopen and Amend the Distributed Generation Tariff, March 23, 2018 (e-filed March 29, 2018), Docket No. E999/CI-16-521: https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={908B6762-0000-CB18-953F-860396DAD814}&documentTitle=20183-141398-01

See updated calendar:

March 23	Scope/Overview; Inventory of Definitions to Discuss
April 13	Performance Categories; Response in Normal and Abnormal Conditions; MISO Bulk Power System
June 8	Reactive Power and Voltage/Power Control Performance; Protection Requirements
July 20	Energy Storage; Non-export; Inadvertent export; Limited export, Capacity
Aug 3	*July 20 topics continued*
Aug 10	Interoperability (Monitor and Control Criteria); Metering; Cyber security
Sept 14	Test and Verification; Witness Test Protocol
Sept 21	In-Person TSG: Follow up items; TIIR edits discussion
Oct 19	References; Definitions; 1-line diagram requirements; Agreements, Frequency Ride-Through
Nov 9	Full DGWG Meeting # 7

9. Attendance

First	Last	Organization		6/1 DGWG 6
Jeff	Schoenecker	Dakota Electric	Participant/TSG	X
Lise	Trudeau	Department of Commerce	Participant/TSG	X
Sue	Peirce	Department of Commerce	Participant	
Katie	*Bell (*formerly Sheldon)	Energy Freedom Coalition	Participant	X
Laura	Hannah	Fresh Energy	Participant	X
Donna	Pickard	Genie Solar Support	Participant	X
Sky	Stanfield	Interstate Renewable Energy Council	Participant	Alternate/P
Kevin	McLean	Minnesota Power	Participant/TSG	X
Jeff	Peters	Missouri River Energy Services	Participant	Alternate/P
Robert	Jagusch	MN Municipal Utilities Association	Participant/TSG	Alternate
~~Christine~~	~~Andrews~~	~~MN Energy Storage Alliance~~	~~Participant~~	
David	Shaffer	MN Solar Industries Association	Participant	X
~~Jim~~	~~Horan~~	MN Rural Electric Association	Participant	Alternate
Dean	Pawlowski	Otter Tail Power	Participant/TSG	X
Natalie	McIntire	Wind on the Wires	Participant	
Patrick	Dalton	Xcel Energy	Participant/TSG	X
Chris	Jarosch	Carr Creek Electric	Observer/TSG	X
Mike	Bull	Center for Energy and Environment	Observer	

Annie	Levenson-Falk	Citizens Utility Board	Observer	
Logan	O'Grady	Clean Energy Economy MN	Observer	
Lily	Osborne	Clean Energy Economy MN	Observer	
Tom	Guttormson	Connexus Energy	Observer	X
Mike	Murtaugh	Freeborn-Mower Coop. Services	Observer	
Mark	Rathbun	Great River Energy	Observer	
Mike	Steckelberg	Great River Energy	Observer	
Patrick	Quinn	Great River Energy	Observer	
John	Farrell	Institute for Local Self Reliance	Observer	
Karlee	Weinmann	Institute for Local Self Reliance	Observer	
Ralph	Jacobson	Innovative Power Systems	Observer	
Lynn	Hinkle	Innovative Power Systems	Observer	
Ted	Kjos	MiEnergy Cooperative	Observer	
Curtis	Cordt	Minnesota Valley Electric Coop.	Observer	
Will	Lovelace	Minnkota Power Cooperative	Observer	
Mike	Franklin	MN Conservative Energy Forum	Observer	
David	Strom	MN Conservative Energy Forum	Observer	
Soria	Talbot	NextEra Energy Resources	Observer	
Carrie	Hitt	NextEra Energy Resources	Observer	
Rich	Macke	Power System Engineering, Inc.	Observer	
Jon	Kramer	Sundial Solar	Observer	
Burnell	Lauer	Sundial Solar	Observer	
Donald	Hanson	Witwright Institute LLC	Observer	
Bryant	Tauer	Wright-Hennepin, CEA	Observer	
Nadav	Enbar	Electric Power Research Institute	Observer/TSG Technical Assistance	
Tom	Key	Electric Power Research Institute	Observer/TSG Technical Assistance	P
Alex	Magerko	Electric Power Research Institute	Observer	
David	Freestate	Electric Power Research Institute	Observer	
Glen	Skarbakka		Observer	
Craig	Turner	Dakota Electric	Alternate/TSG	X
Doug	Larson	Dakota Electric	Alternate	X
Danielle	Winner	Department of Commerce	Alternate	
Stacy	Miller	Department of Commerce		
Bradley	Klein	Environmental Law and Policy Center	Alternate	
~~Michael~~	~~McCarty~~	~~Energy Freedom Coalition~~	~~Alternate~~	
~~Sarah~~	~~Walinga~~	~~Energy Freedom Coalition~~	~~Alternate~~	
Jacob	Schlesinger	Energy Freedom Coalition	Alternate	
Allen	Gleckner	Fresh Energy	Alternate	
Laura	Beaton	Interstate Renewable Energy Council	Alternate	
Erika	McConnell	Interstate Renewable Energy Council	Alternate	
Brian	Lydic	Interstate Renewable Energy Council	Alternate/TSG	P

Katelyn	Frye	Minnesota Power	Alternate	
Frank	Kornbaum	Minnesota Power	Alternate	
Derek	Bertsch	Missouri River Energy Services	Alternate	P
Elizabeth	Wefel	Missouri River Energy Services	Alternate	
Rob	Scott-Hovland	Missouri River Energy Services	Alternate	
Terry	Wolf	Missouri River Energy Services	Alternate	
Wes	Plaff	Missouri River Energy Service	Alternate	X
Brian	Savesky	Missouri River Energy Service	Alternate	X
Bill	Black	MN Municipal Utilities Association	Alternate	X
Barb	Jacobs	~~MN Energy Storage Alliance~~	~~Alternate~~	X
Liz	Lucente	MN Solar Industries Association	Alternate	X
Kristi	Robinson	MN Rural Electric Association	Alternate/TSG	
Jeff	Triplett	MN Rural Electric Association	Alternate	
Darrick	*Moe*	*MN Rural Electric Association*	*Alternate*	*X*
David	Prazak	Otter Tail Power	Alternate	
Natalie	McIntire	Wind on the Wires	Alternate	
John	Harlander	Xcel Energy	Alternate	X
Alan	Urban	Xcel Energy	Alternate	X
Tam	Kembonta	Citizen	TSG	X
John	Dunlop	MN Solar Energy Industry Assn	TSG	X
Jenna	Warmuth	Minnesota Power	TSG Alternate	X
Michael	Coddington	NREL	TSG Technical Assistance	X
Micah	Revel	SLS	Public	X
Matt	Schuerger	MN Public Utilities Commission	Lead Commissioner	X
Carl	Linvill	Regulatory Assistance Project	Facilitator	X
Michelle	Rosier	MN Public Utilities Commission	Staff	X
Michelle	Rebholz	MN Public Utilities Commission	Staff	X
Susan	Mackenzie	MN Public Utilities Commission	Staff	X
Hanna	Terwilliger	MN Public Utilities Commission	Staff	X
Cezar	Panait	MN Public Utilities Commission	Staff	X

X = in-person attendance; p= by phone. *Italic=new.*

MINNESOTA
PUBLIC UTILITIES COMMISSION

16-521 Phase II Technical Subgroup In-Person Meeting

September 21, 2018 Meeting Summary

Attendance

Technical Subgroup (TSG) Members: John Dunlop (MNSEIA); Dean Pawlowski (Otter Tail Power); Brian Lydic (IREC); Laura Hannah (Fresh Energy); Craig Turner (Dakota Electric); Kevin McClean/Jenna Warmuth (MN Power); Kristi Robinson (MREA); Lise Trudeau (DOC); Patrick Dalton (Xcel); Mahmoud Kabalan (Unaffiliated)

Guests: Michael Coddington (NREL, in-person); By Web Meeting[1]: Brian Zavesky; Wes Pfaff; Hilal Katmale

PUC: Commissioner Matt Schuerger, Michelle Rosier, Cezar Panait, Pam Johnson (Solar Energy Innovator Fellow)

Power Quality in the TIIR

Adding Power Quality to the TSG discussion topics was flagged at the June DGWG meeting, but PUC staff needed more details on what specifically needed to be discussed. As a subset of Power quality, flicker issues associated with IEEE 1453 came up in Xcel Energy's Community Solar Gardens program, and the resolution appears to have addressed the concerns. A participant asked if issues related to the application of IEEE 1453, such as metering, measuring, and time series data, were still a concern. It was noted that getting the statistical flicker measurements (Pst and Plt (Perceptibility in short and long term) were named specifically) at the PCC prior to the installation of DER does continue to be a logistical challenge that also carries cost implications. With regards to the power quality of the interconnected power system, UL 1741 certification is typically sufficient; especially for residential systems; more likely to see challenges at the PCC for a group of DERs where design evaluation and consideration of impedance is needed. There was some debate whether to include rapid voltage change and flicker alone, or to also include harmonics considerations in the initial version of the Draft TIIR in work. TSG agrees to pursue confirming references, summarizing that DER should not contribute to over voltage, duplicating IEEE 1547-2018 Clause 7.2 in the TIIR, and pointing to (not citing), the balance of Clause 7 and Annex G from 1547-2018. TSG did not see a need to further discuss the issue.

[1] Due to technical difficulties, the web meeting did not have audio so participants could not observe the discussion.

Phase II Timing (Slides 6-8)

While the January 24, 2017 Order "anticipated" Phase II by February 2019, there is flexibility and TSG has flagged several outstanding issues: 1) MISO's bulk power system response for performance categories; 2) timing of IEEE 1547.1-2018 and associated UL 1741 update for inverter certification. TSG does not need to wait until 2020 or 2021 for UL 1741 equipment certified to IEEE 1547.1-2018 to be on the market to finalize the TIIR, but would benefit from more guidance in the 1547.1-2018 draft on testing and verification. TSG agreed with amending the timing of Phase II from Commission Action in Feb 2019 to sometime in 4th quarter of 2019. Additional time would be used by a writing subgroup (Xcel, IREC, MREA, DEA, and Fresh Energy) to attempt to resolve the outstanding edits based both on the red-lined Draft TIIR and the summary of TSG discussion to-date (captured in these notes and the 9/21 slide deck.) The writing group will share updated Draft TIIR sections with the TSG as completed or if an impasse results. Some topics may require additional TSG discussion before writing group tackles (ex. energy storage.) The utility Technical Standards Manuals (TSMs) may need to be developed in parallel to the Draft TIIR (see pg. 8 of this summary for more.)

TSG Member's Priorities for the Draft TIIR

Develop a document where we have areas of agreement so that utilities can go forward with a focus on the 90-99% of applications utilities are seeing today. Identify the edge cases and do that separately or in the future. Estimated that ¾ of the Draft TIIR could be agreed on by TSG fairly soon. Important areas that likely need much more effort: energy storage, non-export and limited export, solar + storage applications. Utility preference with regards to voltage-reactive power mode (i.e. volt-var mode) as the default reactive power control is to learn by doing with applications that go through full study, not fast track. A top priority is working out how capacity is defined and applied because that impacts everything else – the MN DIP 5.14 can be interpreted as an export limitation and that impacts progress on export in the Draft TIIR until resolved.

Interim Issue: Certification

For some TIIR topics, consider caveat of "contingent on the availability of UL 1741 certified equipment being available" focused on certification based on IEEE 1547/1547.1-2018/19 (1547.1 is expected to be published in 2019) as the source requirement document. TSG appeared to agree to require certification to IEEE 1547 (2003) in the interim while pointing to upcoming certification to 1547 (2018); however, there was an outstanding question on interim mutual agreement opportunities to utilize advanced inverter functions (i.e. 1547-2018-like capabilities in certified equipment under UL 1741 SA) that have not been tested to 1547.1-2018; including ride-through. Need to be clear if the interim allows for mutual agreement to specify UL 1741 certification with implementation of default settings found in IEEE 1547-2003 and IEEE 1547a-2014 (utility position) or UL1741 SA as an acceptable standard against which to certify without naming the specific SRD. UL1741 SA does include ride-through and category III capabilities (IREC position.)

TSG considered what it might look like to allow for reactive power control using a mode other than constant power factor, as well as what it might look like to allow for voltage-active power mode (volt-watt), under mutual agreement. An example from Hawaii was given of enabling Volt-Watt to avoid a transformer overload. Concern raised that such language invites disputes from DER that want to reduce interconnection costs and hold the perspective that volt-var is more effective than constant power factor; and utilities not seeing the benefit of Volt-Var compared to constant power factor with regards to avoiding distribution system upgrades. Xcel mentioned that they are currently doing some investigation of voltage regulation modes to address abnormal configurations (Hawaii example was based on system under normal conditions.) Xcel is proposing Volt-Watt to help with voltage (thermal is a different issue) which would allow utility to reduce output instead of completely disconnecting a larger DER (e.g. Community Solar Garden) during abnormal conditions.

STAFF NOTE: Limited research in Hawaii found by curtailing power through volt-watt, during the highest voltage week of the year, less power was curtailed than would have been if the PV systems were disconnected when V > 1.1 pu.[2]

Topics for Further TSG Development (Slides 11 – 14)

Staff updated the 9/21 TSG In-Person Meeting slide deck based on discussion (see Updated version attached to this summary.) The topics identified on the slides were from a review of the informal notes on the discussion in the seven previous TSG meetings, and do not necessarily capture the questions and edits that remain unresolved in the 9-14-18 Draft TIIR document. Both documents are meant to be a guide for future TSG work to reconcile the Draft TIIR.

Slide 11 (Performance Categories, Updating Settings, Protection Requirements)

- TSG was not convinced by an EPRI suggestion to footnote the performance category chart in case there are inverter-based technology unable to meet category B.[3] The draft TIIR has a provision to handle exceptions to performance category assignment via mutual agreement between the DER operator and Area EPS operator. IEEE 1547 Annex B Table B.1 suggests fuel cells may not be able to meet category B; but at least one TSG member has heard from fuel cell manufacturers that intend to meet category B III.

Slide 12 (Metering, Intentional Islanding, Local Communication Interface, Cyber Security)

- TSG discussed the challenges of establishing specific metering requirements (even for Simplified eligible projects) and the primary concern being a consideration for optimization of costs when borne by the DER customer. Concerns were raised about: 1) tariff specific metering requirements (e.g.. production meters for renewable energy credit tracking or future grid

[2] Giraldez, Julieta and Hoke, Andy, HECO High-Impact Project: Voltage Regulation Operating Strategies (VROS) with Customer-Sited Resources. NREL, Hawai'I AITWG Call, 8/9/18, slides available online:

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service compensation); 2) “least cost” being contentious, and “optimization” was better option to recognize cost considerations and transparency for the customer. In addition, there was a discussion of how utilities are approaching metering differently. For instance, Dakota Electric Association is considering disconnection at the production meter and Xcel Energy’s continues to evaluate other means of communicating directly to devices capable of meter-grade accuracy (i.e. EV pilot). How energy storage is metered was an area of concern with the suggestion of a basic configuration that would work for net metering or non-exporting? Another concern was the need to recognize utilities are in different places related to advanced metering infrastructure.

Lastly, the concept of a meter collar Fresh Energy proposed in follow up comments to TSG Meeting #6 was raised as an option to replace the supply-side connection, typically for residential systems. Xcel saw it in use inCalifonia, evaluated it and decided not to use it (Patrick is following up to provide more details). Dakota Electric allows for double-lugging, but would need to know more due to concerns that if there were a need to disconnect the DER that could result in disconnecting the entire home. Department of Energy funded some of the development of the meter collar to reduce DER costs, and the collar has overcurrent protection in it according to Michael Coddington.

- TSG clarified the focus of intentional islanding was for the Local EPS. DER islands are allowed and the TIIR should point to the provision in IEEE 1547 on what the DER is required to do. Several TSG members (IREC, Xcel and Prof. Kabalan) have some language to propose.
- TSG appears comfortable with no additional edits or work on the local communication interface.

Slide 13 (Energy Storage System Operational Control Modes)

- TSG discussed that IEEE 1547 considers parallel operation related to discharge state only; although there are additional requirements in terms of the transition to the charging state. The definition of DER (in 1547 and TIIR) says load is not included; so, charging is not covered in DER. TSG agreed this would be good to clarify in the TIIR.
- TSG discussed current policy of a utility requiring a password, available to the installer but not the customer, to lock ESS operational control modes described in an operating agreement. Some wondered why the operating agreement was not sufficient; while others asked what recourse was available if the DER is operated in another mode without the utility’s consent. STAFF NOTE: Adverse Operating Effects (MN DIA 3.4.4) and a Material Modification of the DER without utility written authorization (MN DIA 3.4.5) can result in disconnection (MN DIP Att. 2 Simplified Application, 5.0.) One caveat was an approved local EPS island should be able to change ESS operational control modes when islanded from the Area EPS.
- Operating agreements and password protection have been a part of the UL 1741 CRD discussion., A specific example of concern named for the power system was frequency regulation mode – going from full charge mode to full discharge mode quickly or pulsing the charge. It may be helpful to delineate the modes that are of most concern, and see if they apply to ISO or utility uses versus residential applications. Staff noted the chart on back up slide 37 “Understanding ESS Control Modes and Use Cases/Applications” may be a useful tool.

Slide 14 (Non-Exporting, Testing)

- Draft 7 on IEEE 1547.1 on testing and verification recently came out in preparation for meetings scheduled for October 5-6. Participants will provide update at the next TSG meeting (Oct 19.)

Capacity – A Path Forward (Slides 15-24)

MN DIP 5.14 recognizes a DER's capacity may be either aggregate nameplate rating or as currently defined at 5.14.3: "maximum capacity that the DER(s) is capable of injecting into the Area EPS Operator's electric system is limited (e.g. through use of a control system, power relay(s), or other similar device settings or adjustments." The Commission referred further clarification of MN DIP 5.14.3 to the technical subgroup after it became clear that DGWG participants had different concepts of what this might include.[4] The TSG spent much of the July 20th and August 3rd TSG meetings (TSG Mtgs 4-5) on this topic, but had not resolved a path forward. Commission staff proposed at this meeting a path forward based on the input received to-date (see slides 16-21). Staff and members of the TSG agree a path forward on capacity is necessary to resolve some of the other outstanding draft TIIR edits. TSG members may not be in agreement with this path forward, and are encouraged to raise specific concerns with this approach as we continue and, if they wish, argue for an alternative approach before the full Commission.

How to measure Aggregate Nameplate Rating in kWac

The TSG was in agreement that a DER's aggregate nameplate rating in kWac is the inverter's/s' maximum power AC rating. It is common for larger DERs to have a 1.2 dc to 1 ac rating. In rare instances, inverters can produce more than the nameplate rating. UL will allow 10% oversizing on the ac side of an inverter – if the maximum ac rating is a current limit instead of a real power limit – power can be produced at up to 110% of what is rated depending on the inverter's specifications. It was noted that this concern does apply in MN in the situation where a system has a current limited inverter, since the voltage contribution of power production can increase significantly on cold, sunny days. Utilities also use inverter ac rating in interconnection technical review when the dc panels behind the inverter are undersized. Most utilities are not monitoring individual systems' output[5], but one utility representative reported they will put on hold the DER customer's net metering compensation if it is exceeding the net metering limit until the issue is addressed.

The Role of Capacity and Export in the Interconnection Process

Staff summarized TSG discussion to-date as suggesting the path forward:

[4] August 13, 2018 Order (E999/CI-16-521), p. 7-9.

[5] Xcel response after meeting: Xcel is monitoring output on all Community Solar Gardens greater than or equal to 250 kW using cellular telemetry.

1) The aggregate nameplate rating will be used for process track eligibility and short circuit current analysis;
2) The limit value will be used for steady state aspects of technical review.

TSG discussed perspectives on using the limit rather than Aggregate Nameplate Rating for process track eligibility for at least the Simplified Process. The proponents are most concerned about the impacts on solar + storage applications of using aggregate nameplate for storage that isn't tied to the same inverter as the solar. According to one TSG participant, the average Solar*Rewards (production-based incentive) application is 16 kW solar.

With a PV system of that size, it is likely AC-coupled storage, implying 2 inverters minimum, would not be eligible for Simplified Process if Aggregate Nameplate Rating determines process eligibility (DC-coupled storage would keep the project Simplified eligible.) Solar*Rewards tariff requires a production meter, so whether the storage is DC or AC-coupled should not impact the utility's ability to measure solar production. Another TSG participant argued residential peak load is typically around 5 kVa, so the 20 kW size threshold for Simplified Process should cover solar + storage residential applications (the larger Solar*Rewards projects are likely small commercial or farm applications.) For those that do exceed the Simplified Process threshold, the Fast Track Process has a slightly longer timeline and applies to all inverter-based, certified DER up to 500 kW and some up to 5 MW depending on location and line size. Fast Track includes the same initial review screens as the Simplified process and allows for supplemental review as necessary. The performance of the Simplified and Fast Track Processes are something that can be evaluated over time to make sure it is working for all parties.

There was additional discussion about why the DER capacity limit was not limited- or no- export which has been a primary area of disagreement for the group in both Phase I and II. The MN DIP initial review screens (MN DIP 3.2) are not the same screens as are used in states that consider non-export. Utilities are concerned with how load is considered when an export limit is provided, and initially intended non-exporting systems to apply for other program tariff compliance (e.g. net metering integrity). UL 1741 CRD is currently being drafted and may offer a future path for certified DER systems with an export limit; however, at this point it has not been released. Also noted that a CRD is an attestation that begins the UL process to become a UL standard, which then creates the standard which can be leveraged for certification. The CRD began in UL 1741, but applies to more than inverters; for instance, the safety of breaker panels. Utility staff doing process track determination may not be technical staff, so certification option to add to a checklist would be the best option in the future.

Capacity and MN DIP 5.14.3

Staff highlighted EPRI's proposal that the limit to a DER's capacity could be captured in its configuration settings (IEEE 1547 Clause 10.4). Both Xcel Energy and IREC noted this was too restrictive of a definition, and the TSG agreed the limit referenced in 5.14 could be either: nameplate alternative configuration setting, alternative certification (e.g. UL 1741 CRD) or mutual agreement as provided in the Interconnection Agreement.

Path forward on Capacity and MN DIP 5.14.3

The path forward discussed at this meeting could be summarized as:

The limit referenced in 5.14.1 and 5.14.3 shall be the nameplate alternative configuration setting, alternate certification or mutual agreement as provided in the Interconnection Agreement.

- The aggregate nameplate rating will be used for process track eligibility and short circuit current analysis.
- The limit will be used for steady state aspects of technical review.

STAFF NOTE: At October 19 TSG Meeting #8, the TSG discussed how load would be considered if the language above was the only clarification offered to 5.14.3 (whether offered in the MN DIP or the TIIR.) Utilities raised ongoing concern that existing MN DIP 5.14.3 appears to consider export (with load included) as capacity which, as described above, does not work with the MN DIP technical review screens as written. Further, an alternate certification of a limit (e.g. a breaker) may not be exclusive of load. The Control Limited Capacity definition offered by Xcel Energy at the October 19th TSG meeting raised questions regarding the use of "point of interconnection" instead of "point of DER connection."

Per MN DIP 5.14.1, "The maximum capacity of a Distributed Energy Resource shall be the Aggregate Nameplate Rating or may be limited as described in **Error! Reference source not found.**." Staff understand the following edit to MN DIP 5.14.3 to capture utility concerns with treating export as capacity; however, it does not necessarily address load within a DER (e.g. a DER with certified equipment that serves as the DER's capacity limit at a point other than the Point of DER connection) except that it requires Area EPS agreement:

MN DIP 5.14.3:

> ~~The Interconnection Application shall use the maximum AC capacity, that the DER(s) is capable of injecting into the Area EPS Operator's electric system over a sustained time which may be limited.~~ If the maximum capacity of the ~~that the~~ DER~~(s) is capable of injecting into the Area EPS Operator's electric system~~ is limited (e.g., through use of a control system, power relay(s), or other similar device settings or adjustments), then the Interconnection Customer must obtain the Area EPS Operator's agreement that the manner in which the Interconnection Customer proposes to implement such a limit will effectively limit active power output so as to not adversely affect the safety and reliability of the Area EPS Operator's system. Such agreement shall not to be unreasonably withheld. If the Area EPS Operator does not so agree, then the Interconnection Application must be withdrawn or revised. ~~to specify the maximum capacity that the DER is capable of injecting into the Area EPS Operator's electric system without such limitations.~~ Nothing in this section shall prevent an Area EPS Operator from considering an output higher than the limited output (e.g. ~~a~~ Aggregate Nameplate Rating), if the limitations do not provide adequate assurance, when evaluating system impacts. See Minnesota Technical Requirements for more detail.

The TSG could decide if an edit to MN DIP 5.14.3 would be useful, and if that edit should provide additional detail outlined in the 9/21 meeting about what the limit is and how it applies in the MN DIP or if a definition is necessary given the Draft TIIR will not be finalized in time for the MN DIP effective date (June 17, 2019).

Enabling Voltage Regulation Functions (Slides 25-27)

The TSG discussed voltage regulation power modes at TSG Meeting #3. The draft TIIR proposes a constant power factor of .98; however, the TSG identified five instances where being able to instead enable voltage-reactive power mode (Volt-Var) to utilize advanced inverter functions may be desired.

- Larger DER systems using the detailed Study Process (not Fast Track)
- Utility discretion or consideration
- When required communication is enabled
- Under mutual agreement
- Future TIIR consideration based on studies, pilots, national learnings or revisit the question on a future date.

One of the ongoing questions the TSG has addressed is what level of detail copied from IEEE 1547 into the TIIR is useful or necessary for transparency versus incomplete and at risk of misinforming the reader (out of date, not utility specific, etc.)

Slide 26: Enabling Voltage-Reactive Power Mode

Some on the TSG wanted more time to consider what specifically should be included. Of specific concern for Volt-Var was that the allowable range of settings for reactive power may not be constrained in IEEE 1547, so this was referred to the writing subgroup. If the IEEE 1547 table is included, it should be labeled as a reference to the standard and the default settings for a given utility may be more specific. May be better to reference the TSM and include some of the table there where the utility could note the default settings it uses.

Slide 27: Enabling Voltage-Active Power Mode (Volt-Watt)

Volt-Watt was discussed in detail at TSG Meeting 3. Volt-Watt is able to remain active with any of the reactive power control functions (e.g. Constant Power Factor mode and Voltage-Reactive Power mode). Voltage-Active Power mode default is disabled in IEEE 1547 5.4.1; however, the TSG discussed enabling Voltage-Active Power mode for future proofing with the default setting not beginning to curtail real power until the voltage is beyond 1.06 per unit voltage – above the upper end of the range of normal voltages allowed under ANSI C84.1 Range A. However, voltage can be a localized issue and is not limited to emergency or abnormal conditions. Some have proposed including consumer protection language or clarifying the intent of using Volt-Watt – not creating a new complaint process, perhaps referring to MN DIP 5.3 on Disputes. One challenge is determining what is triggering the Volt-Watt because a utility may be within the ANSI range, but the impedance in the customer's system could be activating Volt-Watt. One person suggested pointing out the difference between utility vs developer/designer caused issues. Perhaps the TSM could outline how the utility or DER would test to demonstrate causality? California has been collecting data on the impacts of enabling Volt-Watt on DER real power production which may be informative.

Scope of the Statewide Technical Interconnection and Interoperability Requirements (TIIR) (Slides 29-30)

Slide 29: Scope of Statewide TIIR

Thirteen topics were identified as in scope and have been the basis for the TSG meeting topics (see slide 29.) One additional topic should be added: Intentional Local EPS Islanding. Additionally, four overarching topics were identified by some TSG participants as within scope: consumer protection; reporting; requirements related to other tariff requirements/restrictions; and additional details for Simplified Process eligible systems on metering, testing, etc. The bolded items on the slide have not yet been fully discussed or resolved. Discussion focused on what should be said about technical requirements related to tariff requirements. The Commission and DGWG's goal has been to move as much of the interconnection-specific requirements into the statewide interconnection standards; however, there are instances where program tariffs have additional requirements (ex. production meters for Renewable Energy Credit accounting or production-based incentives.) Net Energy Metering (NEM) integrity was another example raised with discussion of DC charging, non-export storage, or recognizing a system could use controls to limit charging. IREC and others? are working on language they will share with the writing group. Staff flagged the need to check if it was appropriate to address NEM integrity in the technical requirements or if there are policy considerations that should be addressed in the NEM tariffs.

Slide 30: Out of scope for the TIIR

The first three topics on the slide are addressed in the MN DIP. There was no additional discussion on this slide.

Scope of the Utility Technical Standard Manuals (Slide 31)

Scope of the Utility TSM is not defined in the draft TIIR. Slide 31 captures what has been offered as in the scope of the TSM over the course of the TSG meetings. Including an outline of what is included in a utility TSM may help alleviate some non-utility concerns about additional, unwarranted interconnection requirements. Utilities stated their goal is if all utilities are saying the same thing in their TSM moving it to the TIIR; however, some details are utility specific (see list on slide).

Another ongoing concern is what oversight there is for the TSMs. The Draft TIIR proposal is the TSM is publicly available on the utility's webpage and an annual informational filing with the Commission, but not subject to Commission review or approval. The TSG did not discuss how TSM disputes may be handled or unique from TIIR disputes under MN DIP 5.3.

Next Steps

Oct 3	Reply Comments re: Att. 6: Rates?
Oct 19	References; Definitions; 1-line diagram requirements; Agreements, Frequency Ride-Through
Nov 9	Full DGWG Meeting # 7
Nov 13	Otter Tail Power, Minnesota Power, Dakota Electric Phase I tariff filings
Dec 28	Xcel Energy Phase I tariff filing
~Jan - Mar	Commission Review and Approval Rate-regulated Phase I tariff filings
Jun 17, 2019	Effective Date of the MN DIP and MN DIA

TSG writing group will be Patrick Dalton (Xcel), Laura Hannah (Fresh Energy), Brian Lydic (IREC), Kristi Robinson (MREA), Craig Turner (DEA). The writing group will have until 2nd quarter of 2019 (April 2019) to attempt to reconcile the TSG edits to the Draft TIIR and should proceed in a way that allows full participation of the writing group members. Staff began to untangle track changes edits and can make that document available to the writing group. The writing group should use this meeting summary and corrected slides to advance the editing process, and are encouraged to share progress with the full TSG as TIIR sections are proposed as resolved. If the writing group is unable to resolve a topic, they should attempt to clarify the proposals and why the group remains unresolved. Staff imagines Energy Storage System Operational Control modes may be an example the full TSG needs to discuss further for progress in the edits.

INTERCONNECTION PRE-APPLICATION REPORT REQUEST FORM

Requests for an Interconnection Pre-Application Report shall include the information identified in Sections 1.4.1.1 through 1.4.1.8 of the Minnesota Distributed Energy Resource Interconnection Process (MN DIP) (and as provided in the fields below) to clearly and sufficiently identify the location of the proposed Point of Common Coupling and relevant project details.

Additionally, a non-refundable processing fee of _____ (not to exceed $300) is required as specified in Section 1.4.1 of the MN DIP.

Upon receipt of a complete Request Form (including site map) and processing fee, the Area EPS Operator shall provide a report containing as much of the data described in Section 1.4.2 as is pre-existing and available within 15 business days. A Pre-Application Report request does not obligate the Area EPS Operator to conduct a study or other analysis of the proposed project if data is not available.

---

1. Requestor Contact Information:

   Name: _____

   Company Name (if applicable): _____

   Street Address: _____

   City/State/Zip: _____

   Phone Number: _____

   Email Address: _____

2. Project Information:

   a) Project Name: _____

   b) Planned Equipment:

      DER Nameplate Rating:_____ kW

      DER Type: [ ] Inverter based [ ] Other _____

      DER Number of Phases: [ ] Single [ ] Three

      Service Voltage (120/240 V, 277/480 V, etc.) : _____V

      Stand-alone Generator (no onsite load)? [ ] Yes [ ]No

Exiting DER? [ ] Yes [ ]No

Location of Existing DER (include county):

_____

c) Proposed Point of Common Coupling:

Note: The proposed Point of Common Coupling shall be defined by all or some combination of the below information, enough to clearly identify the location of the Point of Common Coupling.

Street Address: _____

City/State/Zip Code: _____

County: _____

Cross streets: _____

Latitude (in degrees/minutes/seconds or 6 decimal places):

_____

Longitude: _____

Meter number: _____

Utility equipment number (e.g. pole number): _____

Other identifying information: _____

_____

d) An attached Site Map is required that shows the following:

- True north
- Proposed project location, including general area of project
- Proposed service point location
- Major roads, streets and/or highways

3. Requestor Signature:

I understand that the confidentiality provisions of MN DIP Section 5.9 apply to the contents of the Pre-Application Report. The MN DIP Section 5.9, states in part as follows:

"*Each Party shall hold in confidence and shall not disclose Confidential Information, to any person (except employees, officers, representatives and agents, who agree to be bound by this section). Confidential Information shall be clearly marked as such on each page or otherwise affirmatively identified. … Each Party shall employ at least the same standard of care to protect Confidential Information obtained from the other Party as it employs to protect its own Confidential Information. … Each Party is entitled to equitable relief, by injunction or*

otherwise, to enforce its rights under this provision to prevent the release of Confidential Information without bond or proof of damages, and may seek other remedies available at law or in equity for breach of this provision."

I understand that 1) the existence of "Available Capacity" in no way implies that an interconnection up to this level may be completed without impacts since there are many variables studied as part of the interconnection review process, 2) the distribution system is dynamic and subject to change and 3) data provided in the Pre-Application Report may become outdated and not useful at the time of submission of the complete Interconnection Request.

Name (type or print): _____

Signature: _____

Date: _____

Pre-Application Report requests shall be submitted with attachments to:

[Fill in method of submittal as specified by Area EPS]

Fees shall be submitted by:

[Fill in method of payment as specified by Area EPS]

Attachment 5: Certification of Distributed Energy Resource Equipment~~Packages~~

1.0 Distributed Energy Resource (DER) equipment proposed for ~~use separately or packaged with other equipment~~ in an interconnection system shall be considered certified for interconnected operation if: 1) it has been tested in accordance with industry standards for continuous utility interactive operation in compliance with the appropriate codes and standards referenced below by any Nationally Recognized Testing Laboratory (NRTL) recognized by the United States Occupational Safety and Health Administration to test and certify interconnection equipment pursuant to the relevant codes and standards listed in MN DIP Attachment 4, 2) it has been labeled and is publicly listed by such NRTL at the time of the interconnection application, and 3) such NRTL makes readily available for verification all test standards and procedures it utilized in performing such equipment certification, and, with consumer approval, the test data itself. The NRTL may make such information available on its website and by encouraging such information to be included in the manufacturer's literature accompanying the equipment.

2.0 The Interconnection Customer must verify that the ~~intended~~ assembly and use of the equipment falls within the use or uses for which the equipment was tested, labeled, and listed by the NRTL.

3.0 Certified equipment shall not require further type-test review, testing, or additional equipment to meet the requirements of this interconnection procedure; however, nothing herein shall preclude the need for a DER Design Evaluation or an on-site commissioning test by the parties to the interconnection ~~nor follow-up production testing by the NRTL~~as provided for in the Minnesota Technical Interconnection and Interoperability Requirements.

4.0 If the certified equipment package includes only interface components (switchgear, inverters, or other interface devices), then an Interconnection Customer must show that the generator or other electric source being utilized with the equipment package is compatible with the equipment package and is consistent with the testing and listing specified for this type of interconnection equipment.

5.0 Provided the generator or electric source, when combined with the equipment package, is within the range of capabilities for which it was tested by the NRTL, and does not violate the interface components' labeling and listing performed by the NRTL, no further ~~design~~ type-test review, testing or additional equipment on the customer side of the Point of Common Coupling shall be required to ~~meet the requirements~~ be considered certified for the purposes of this interconnection procedure; however, nothing herein shall preclude the need for a DER Design Evaluation or an on-site commissioning test by the parties to the interconnection as provided for in the Minnesota Technical Interconnection and Interoperability Requirements.

6.0 An equipment package does not include equipment provided by the Area EPS.

~~7.0 Any equipment package approved and listed by the Minnesota Public Utilities Commission or another state agency for interconnected operation in the state prior to the effective date of the Minnesota Distributed Energy Resource Interconnection Process document shall be considered certified under these procedures for use in the state.~~

1017974.1

2.3.1 ~~At least thirty (30) Business Days before requested in-service date,~~ The Interconnection Customer shall sign and return the Interconnection Agreement within thirty (30) business days[1] or may request an extension as described in section 5.1.2 and 5.2. The Interconnection Customer must submit to the Area EPS Operator either 1) a signed copy of the Uniform Statewide Contract, if applicable, which serves as both the power purchase agreement and Interconnection Agreement; or 2) the Interconnection Customer must ~~elect to~~ submit a signed Uniform Statewide Contract, if applicable, and a separate MN DIA as described in section 1.15. ~~The Interconnection Customer shall sign and return the Interconnection Agreement or may request an extension as described in sections 5.1.2 and 5.2.~~

~~2.3.1.1 The Interconnection Customer may update the requested in-service date submitted on the Attachment 2: Simplified Application Form to a date 30 Business Days or later from the date on which the Interconnection Customer submits a signed Interconnection Agreement and payment if required unless the Area EPS Operator agrees to an earlier date.~~

2.3.1.~~2~~1 Upon receipt of the signed Interconnection Agreement and then after fully executing it as provided for in section 5.1.2, the Area EPS Operator ~~may~~ shall schedule and execute appropriate ~~metering replacement and~~ construction of facilities, if necessary, which shall be completed prior to the Interconnection Customer returning the Certificate of Completion. If construction of facilities is required by the Area EPS Operator, the Area EPS Operator shall notify the customer upon completion of construction. ~~within 5 Business Days of completing construction~~.

2.3.2 After installation, the Interconnection Customer returns the Certificate of Completion to the Area EPS Operator. Prior to parallel operation, and consistent with the MN DIP, the Area EPS Operator may inspect the DER for compliance with standards, which may include a witness test, and may schedule appropriate metering replacement, if necessary. The Area EPS Operator is obligated to complete the witness test, if required, within ten (10) Business Days of the receipt of the Certificate of Completion. If the Area EPS Operator does not inspect within ten (10) Business Days, the witness test is deemed waived.

2.3.3 Within three (3) Business Days of inspection or waiver of inspection, the Area EPS Operator shall notify the Interconnection Customer in writing that interconnection of the DER has permission to operate. If the witness test is not satisfactory, the Area EPS Operator has the right to disconnect the DER. The Interconnection Customer has no right to operate in parallel, except for optional testing not to exceed two hours, until permission to operate is granted by the Area EPS Operator.

[1] The 30-day timeframe in this step originates from Section 5.1.2 and does not represent a new step or timeframe.

Commented [LH1]: Super important that the customer understand that there is a timeline associated with the return of the Agreement. Adding the timeline for additional emphasis and clarity.

Commented [PLD2]: Intended to reinforce the process for when each party signs the IA

Commented [LH3]: (Small change here "may" to "shall")

Commented [PLD4]: Metering sometime happens during witness testing. This is covered in 2.3.2

Commented [PD5]: I agree we notify the generator we are complete and understand it is important to the generator. I am wondering if we remove the days if it would help address Laura's concern about who send what first. This could be addressed and discussed during the discussions to make sure all parties understand this process.

Commented [PLD6]: Language for this step is added so that the customer has knowledge of when facility upgrades are complete, if applicable.

Xcel Energy New Decision Option 5 f – Add Xcel Energy's edits from its March 29, 2018 filing to MN DIA Section ~~3.4.6~~3.4.7 to provide clarity.

~~3.4.6~~3.4.7
Treatment Similar to Other Retail Customers
If the Interconnection Customer receives retail electrical service at the same site as the Distributed Energy Resource, it may also be disconnected consistent with the rules and practices for disconnecting other retail electrical customers.

Xcel Energy New Decision Option 5 g - Add Xcel Energy's edits from its March 29, 2018 filing to MN DIA Section ~~3.4.7~~3.4.8 to provide disconnection as an option for a Default. This would provide additional flexibility, as under the Staff draft of the MN DIA the only option for Default is termination of the MN DIA.

~~3.4.7~~3.4.8
Disconnection for Default
If the Interconnection Customer is in Default it may be disconnected after a 60 day written notice is provided and the Default is not cured during this 60 day notice. This provision does not apply to disconnection based on Emergency Conditions.

Xcel Energy New Decision Option 5 h - Add Xcel Energy's edits from its March 29, 2018 filing to MN DIA Section 5.2.1.2 to clarify that the re-payment would be due after the Area EPS Operator and Affected System operator has received payment from the other DER that is expected to use the Network Upgrades.

5.2.1.2
If the Distributed Energy Resource fails to achieve commercial operation, but it or another Distributed Energy Resource is later constructed and requires use of the Network Upgrades within five (5) years of being constructed, the Area EPS Operator and Affected System operator (after receiving payment in the amount of the cost to build these Network Upgrades from the other Distributed Energy Resource who is expected to use the Network Upgrades) shall at that time reimburse the Interconnection Customer for the amounts advanced for the Network Upgrades. Before any such reimbursement can occur, the Interconnection Customer, or the entity that ultimately constructs the Distributed Energy Resource, if different, is responsible for identifying the entity to which reimbursement must be made.

Commented [TL(1]: Add as item # 3.4.7 (instead of adding onto the existing 3.4.6 "Reconnection")

Commented [TL(2]: Add this at 3.4.8 (instead of 3.4.7)

Commented [TL(3]: Dakota Electric edit

Generating Facility Certificate of Completion
Simplified Process

Interconnection Customer:_____

Account Number: _____ Meter Number: _____

Application ID number: _____

Address of Generating Facility:

_____

City: _____ State: MN Zip: _____

Is the Generating Facility owner-installed? Yes ☐ No ☐

If no:

Install Company:_____

Contact:_____

Phone: _____ Email: _____

Electrician Name / License#: _____

The Generating Facility has been installed and inspected in compliance with the local permitting authority as verified by the signature below or the additionally attached document.

Inspector Signature: _____

Print Name: _____ **Date:** _____

Authority Having Jurisdiction (city/county): _____

As a condition of interconnection, email a completed copy of this form to _____ ***at*** _____.

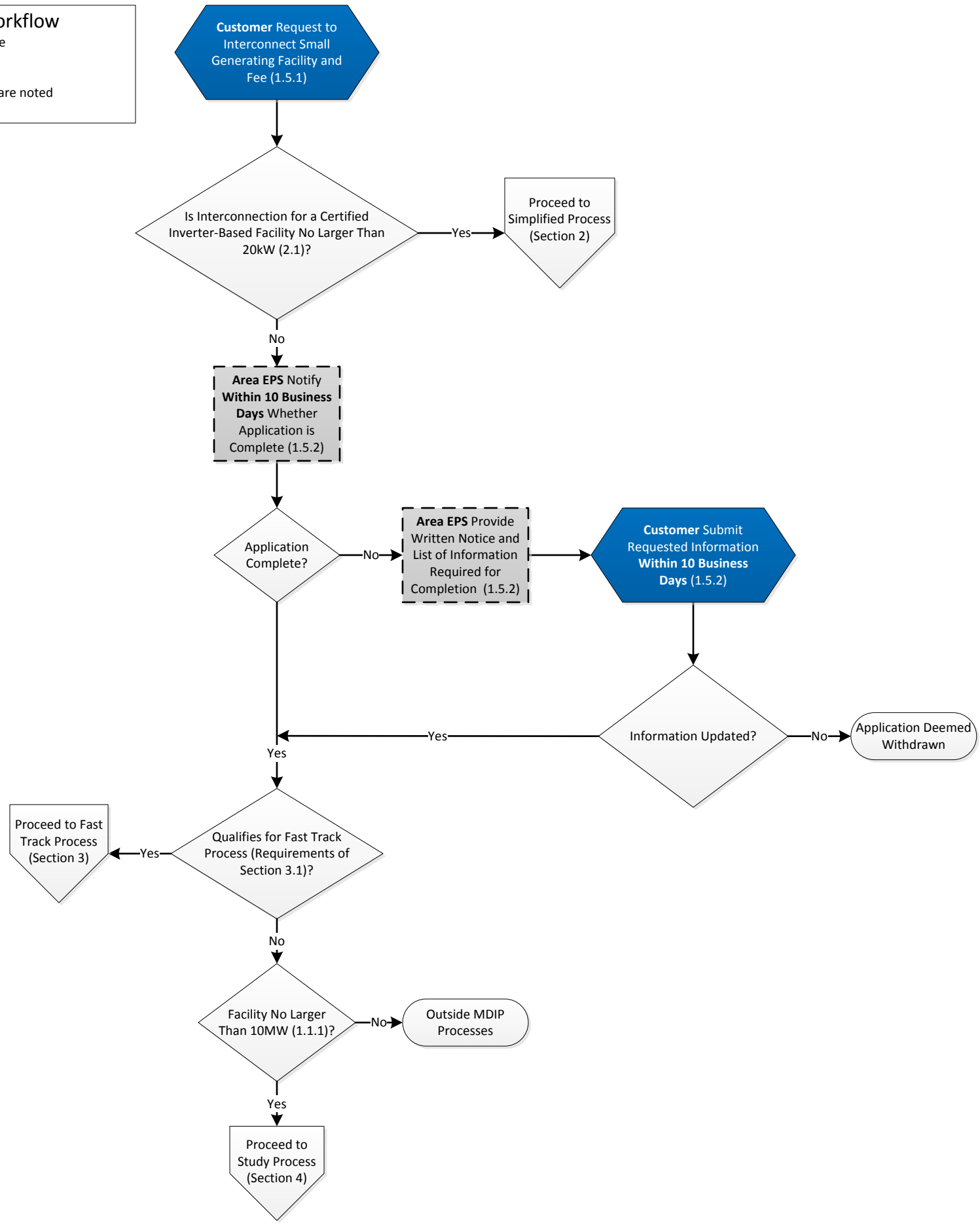
Electronic submission of this form through an Area EPS Operator's online portal [if one exists] shall be an alternative means to satisfy the Certificate of Completion submission requirements.

If you prefer to mail the form, please mail to:

MDIP Integration Workflow

High Level View – for Public Use
September 2018

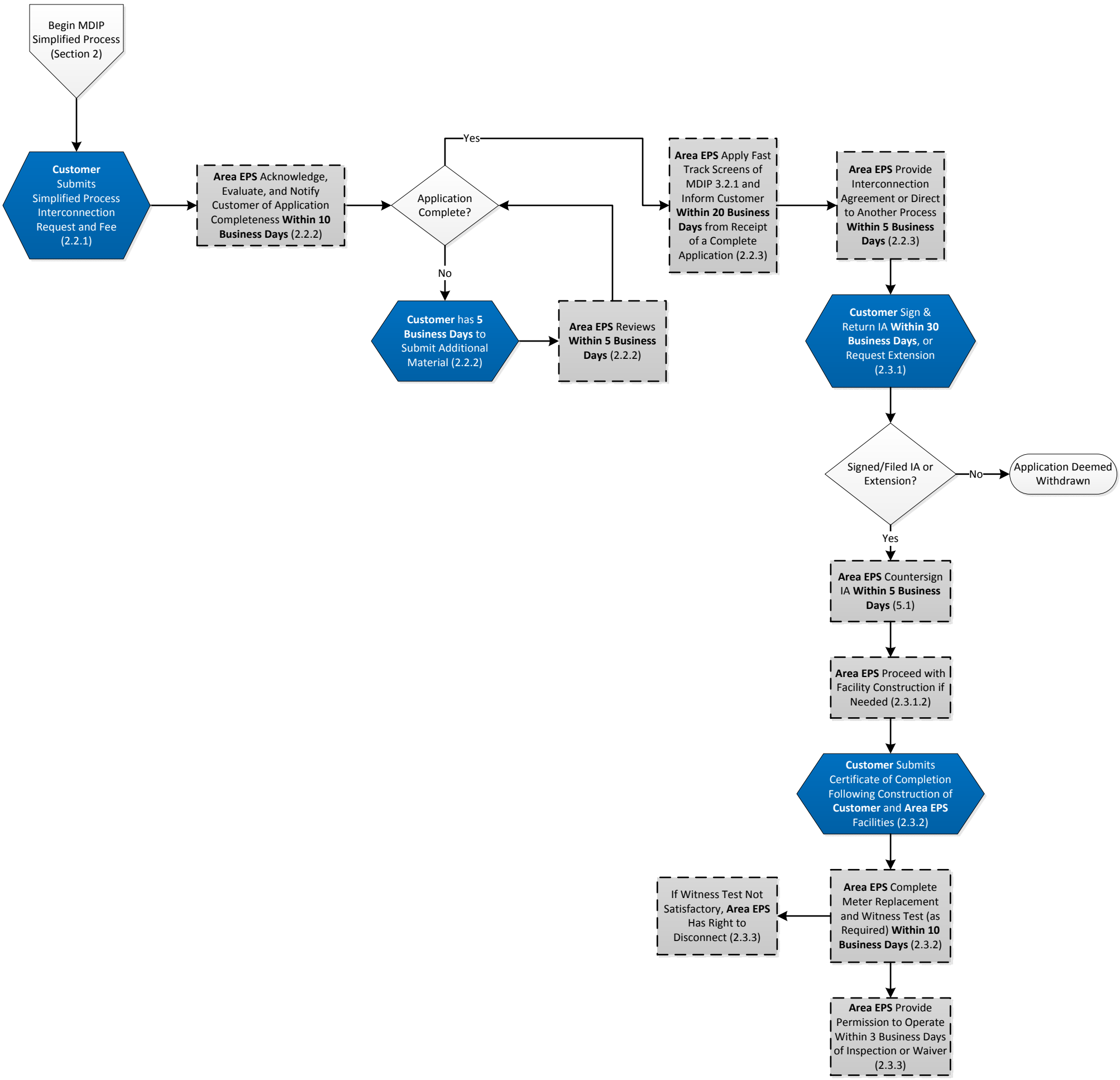
Note: Relevant MDIP Sections are noted parenthetically



MDIP Simplified Process Workflow

High Level View – for Public Use
September 2018

Note: Relevant MDIP Sections are noted parenthetically



MDIP Fast Track Process Workflow

High Level View – for Public Use
September 2018

Note: Relevant MDIP Sections are noted parenthetically

Begin Fast Track Process (Section 3)

Area EPS Perform Initial Review Using Section 3.2.1 Screens **Within 15 Business Days** of Application Deemed Complete (3.2)

Application Passes Screens and/or is Safe to Interconnect (3.2.2)?
- Yes → Construction on **Area EPS** System Needed to Support Interconnection (3.2.2)?
- No

Construction on **Area EPS** System Needed to Support Interconnection (3.2.2)?
- Yes → **Area EPS** Notify Customer of Screen Results (3.2.2.2) → **Customer** Decides Whether to Proceed **Within 5 Business Days** (3.2.2.2) → Proceed with Application?
- No → **Area EPS** Provide IA **Within 5 Business Days** (3.2.2.1)

Proceed with Application?
- Will Not Proceed → Application Deemed Withdrawn
- Proceed → **Area EPS** Elect from Two Options

Area EPS Elect from Two Options
- Option 1 → **Area EPS** Provide IA and Estimate **Within 20 Business Days** (3.2.2.2)
- Option 2 → Proceed to Facility Study

Area EPS Notify Customer of Determination and Provide Copies of Analysis and Data Supporting Screen Results (3.3)

Area EPS and **Customer** Schedule Customer Options Meeting **Within 10 Business Days** of Determination (3.2.3 and 3.3)

Two Options
- Option 1 → **Area EPS** Offer to Perform Supplemental Review and Provide Estimate (3.3.1) → **Customer** Agreement and Fee for Estimated Costs **Within 15 Business Days** (3.4.1) → Agreement?
- Option 2 → **Area EPS** Offer to Perform Study (3.3.2) → Agreement?

Agreement?
- No → Application Withdrawn? (3.4.1)
- Yes → Proceed to Study Process (Section 4)

Application Withdrawn? (3.4.1)
- No → Proceed to Study Process (Section 4)
- Yes → Application Deemed Withdrawn

Agreement?
- No → Application Deemed Withdrawn
- Yes → **Area EPS** Perform Supplemental Review Using Section 3.4.4 **Within 30 Business Days** from Receipt of Deposit, Notify Customer of Screen Results and Provide Copies of Supporting Analysis and Data (3.4.4)

Area EPS Perform Supplemental Review Using Section 3.4.4 **Within 30 Business Days** from Receipt of Deposit, Notify Customer of Screen Results and Provide Copies of Supporting Analysis and Data (3.4.4)

Failure of any Criteria (3.4.4)?
- Yes → **Area EPS** Notify Customer Within 2 Business Days to Obtain Customer Direction (3.4.4)
- No → Construction of **Area EPS** Facilities Required (3.4.5)?

Area EPS Notify Customer Within 2 Business Days to Obtain Customer Direction (3.4.4)

Customer Provides Direction **Within 5 Business Days** (3.4.4)

Continue Evaluation (3.4.4)?
- Yes → **Area EPS** Notify Customer of Screen Results and Provide Copies of Supporting Analysis and Data (3.4.4)
- No → Move to Study (3.4.4 or 3.4.6)?

Move to Study (3.4.4 or 3.4.6)?
- Yes → **Customer** Authorize Study **Within 15 Business Days** (3.4.6) → Proceed to Study Process (Section 4)
- No → Application Terminated

Area EPS Notify Customer of Screen Results and Provide Copies of Supporting Analysis and Data (3.4.4)

Failure of any Criteria (3.4.5)?
- Yes → Facility Safe to Interconnect (3.4.5)?
- No → Application Terminated

Facility Safe to Interconnect (3.4.5)?
- Yes → Construction of **Area EPS** Facilities Required (3.4.5)?
- No → Move to Study (3.4.4 or 3.4.6)?

Construction of **Area EPS** Facilities Required (3.4.5)?
- No → **Area EPS** Provide IA **Within 5 Business Days** (3.4.5)
- Yes → **Customer** Notifies to Proceed **Within 5 Business Days** (3.4.5) → Proceed with Application?

Proceed with Application?
- Yes → **Area EPS** Elect from Two Options
- No → Application Deemed Withdrawn

Area EPS Elect from Two Options
- Option 1 → **Area EPS** Provide IA and Estimate **Within 20 Business Days** (3.4.5.2)
- Option 2 → Proceed to Study Process (Section 4)

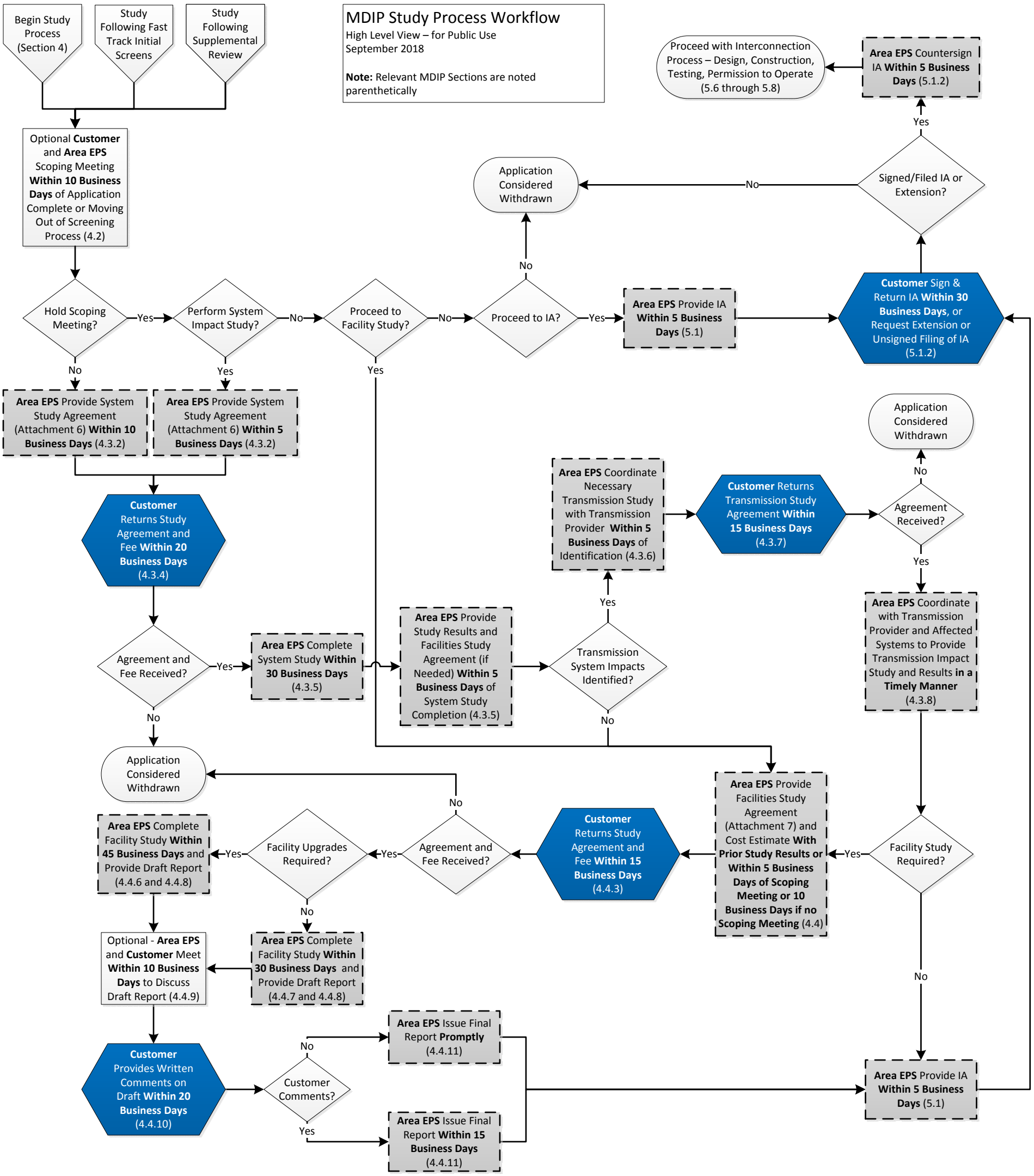
Area EPS Provide IA and Estimate **Within 20 Business Days** (3.4.5.2) → **Customer** Sign & Return IA **Within 30 Business Days**, or Request Extension or Unsigned Filing of IA (5.1) → Signed/Filed IA or Extension?

Signed/Filed IA or Extension?
- Yes → **Area EPS** Countersign IA **Within 5 Business Days** (5.1.2) → Proceed with Interconnection Process – Design, Construction, Testing, Permission to Operate (5.6 through 5.8)
- No → Application Deemed Withdrawn

MDIP Study Process Workflow

High Level View – for Public Use
September 2018

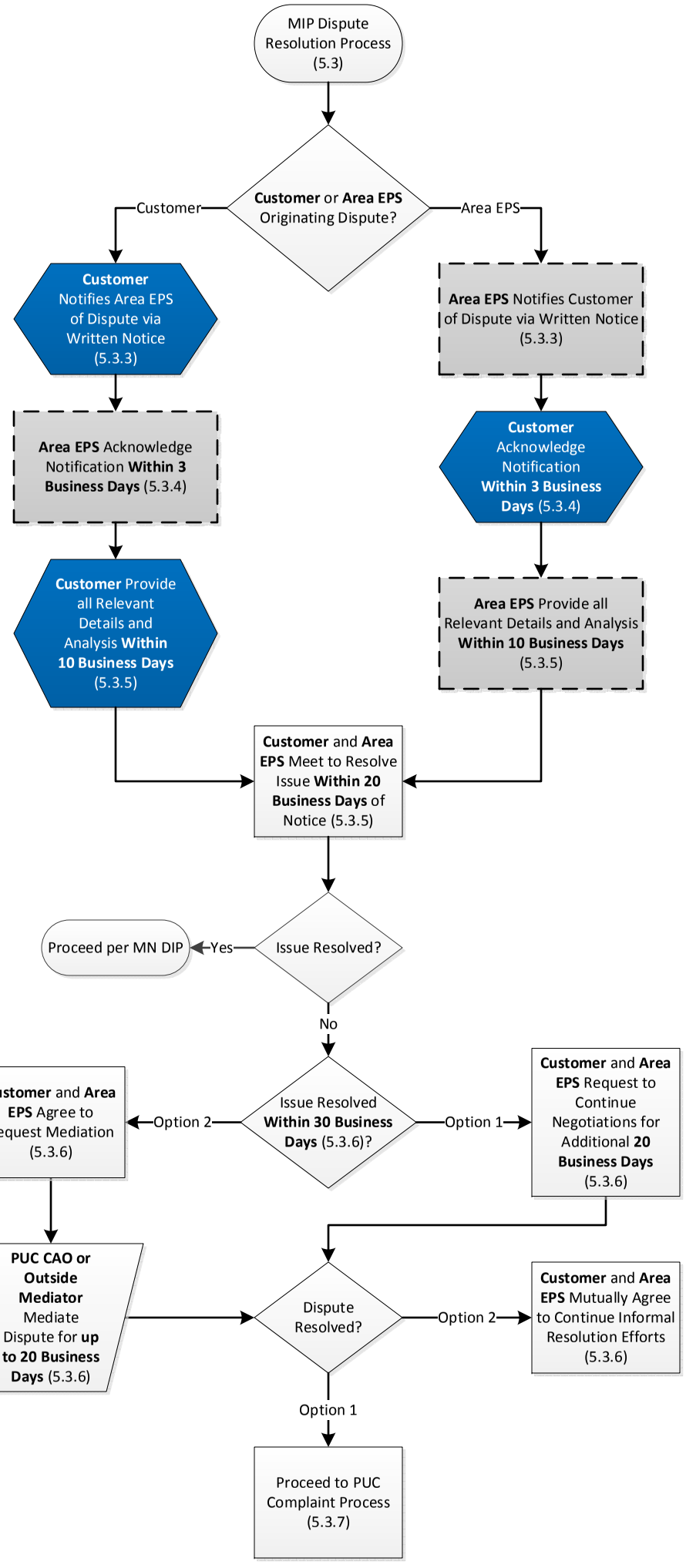
Note: Relevant MDIP Sections are noted parenthetically



MDIP Dispute Process Workflow

High Level View – for Public Use
September 2018

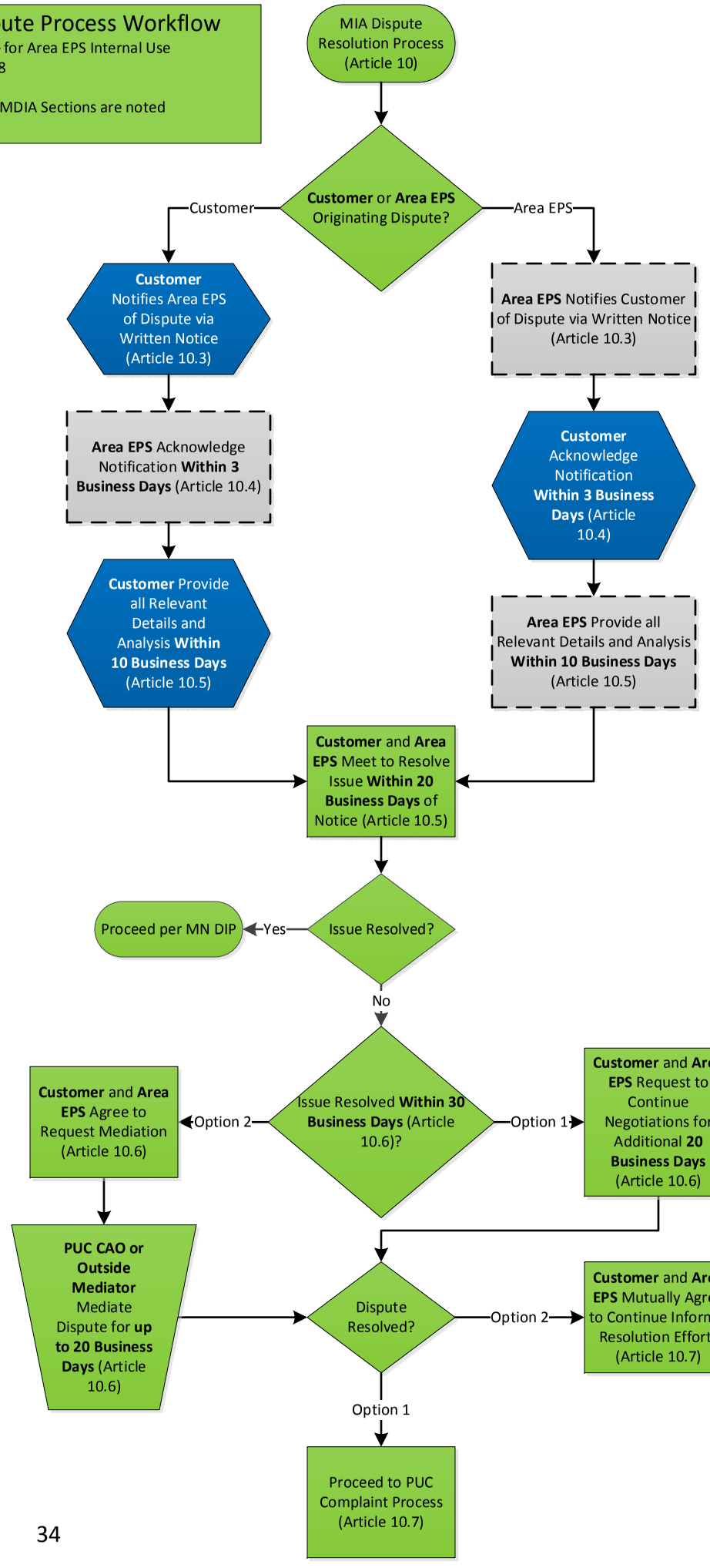
Note: Relevant MDIP Sections are noted parenthetically



MDIA Dispute Process Workflow

Detailed View – for Area EPS Internal Use
September 2018

Note: Relevant MDIA Sections are noted parenthetically



Distributed Generation Workgroup Meeting #7
November 9, 2018
(Docket No. 16-521)

MINNESOTA
PUBLIC UTILITIES COMMISSION

https://mn.gov/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.**

Agenda

Time	Topic
9:30 – 9:50	Welcome, Introductions, Overview of Agenda
9:50 – 10:20	Technical Subgroup Update & Final Feedback on 9/21 Meeting Summary
10:20 – 11:25	Dept of Commerce and subgroup report re: Phase I follow up items
11:25 – 12:25; 1 – 1:15	Implementation updates from Utilities
1:15 – 2:00	Discussion: How can the Commission and stakeholders assist in smooth Phase I implementation?
2:00 – 2:20	Observer/Public Comment
2:20 – 2:30	Wrap up and Next Steps; Feedback/Evaluation; Adjourn

Updated Phase II Timeline	Storage	Advanced inverter functions
Capacity	Non-exporting	Certification?

Pre-application Report Form	Treatment of Uniform Statewide Contract and Simplified Application as MN DIA substitute	Flowcharts
Att. 5: Certification	MN DIA amendments	PDF fillable forms
Simplified Timeline	Certificate of Completion	

Minnesota Power	Dakota Electric Association	LUNCH BREAK
Otter Tail Power	MREA & MMUA	Xcel Energy

Technical Subgroup Update

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Technical Subgroup Update: Process and Capacity

- TSG recommends moving from Feb 2019 to not later than 4Q 2019 Commission Action on Phase II due to outstanding questions on testing, verification (IEEE 1547.1) for certification (UL 1741) and DER interconnection process.
- TSG met in-person on September 21 and identified the outstanding issues that a writing group will attempt to reconcile before April 2019. (see 9/21 Meeting Summary and Slides)
- TSG spent 2+ meetings discussing Aggregate Nameplate Capacity and Capacity as defined in MN DIP 5.14.3 and the following has emerged as path forward:
  - The limit can be nameplate alternative configuration setting, alternate certification, or mutual agreement as provided in the Interconnection Agreement.
  - Establish Aggregate Nameplate Capacity is used for interconnection process track eligibility and short circuit current analysis.
  - Establish MN DIP 5.14.3 limited capacity is used for steady state aspects of technical review.
  - Outstanding question: Should we edit MN DIP 5.14.3?

Technical Subgroup Update: Storage and Non-Exporting

- TSG discussed a trade off in how storage is treated:
  - If the customer commits to an operational control mode in operating agreement, the storage will be studied with those parameters. Discussed when and how to assure against and/or evaluate a change in the operational control mode.
  - If the customer wishes to have flexibility in the operational control mode, utility will study worst case scenario which is more likely to result in distribution upgrades or limited hosting capacity.
- TSG is still working on clarifying what constitutes an "Energy Storage System operational control modes" and how storage should be treated. Unclear if writing group will be able to resolve without additional discussion.
- TSG largely agrees on non-exporting language once it was separated from limited export language. Priority in near term is to finalize non-export language; TSG will need to continue to discuss limited.
- TSG struggled with limited export likely due to: 1) initial review screens not incorporating export screens in other states; 2) utility concern over use of the term for MN DIP 5.14.3 limit. Limited export was identified as a second tier priority after resolving non-exporting.

Technical Subgroup Update: Advanced Inverters, Intentional Islanding, Certification, & Utility TSM

- Default voltage regulation is to use .98 Constant Power Factor mode. Five instances identified when Volt-Var may be desired: 1) Larger DER in detailed Study Process (not Fast Track); 2) Utility discretion/consideration; 3) When required communication is enabled; 4) Under mutual agreement; 5) Future TIIR consideration.
- Intentional Islanding of the Local EPS (DER Island) are allowed in IEEE 1547 and TIIR will point to the relevant section.
- Certification in the interim of UL 1741 catching up to IEEE 1547-2018 was a prime driver in delaying Phase II Commission Action. Key issue is the source requirement document for testing and verification and that is currently being drafted by IEEE. In interim, MN DIP Att. 4 & 5 apply.
- TIIR will include an outline of what is included in a utility technical standards manual (TSM); including sample 1-line diagrams? Also discussed 1-line diagrams as an educational opportunity and, in future, possible streamlining opportunity.

Dept of Commerce and Subgroup Report: Phase I Follow Up Items

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Follow up on MnDIP Phase 1 outstanding items

Reference	Topic
MnDIP 1.4	Standardized Pre-Application Report Request Form (PreApp)
MnDIP 2.3.1	Simplified Timeframe for signing DIA (Time)
MnDIP 2.3.2 & Att. 2	Certificate of Completion template (CoC)
MnDIP Att. 5	Certification of DER Equipment (Att5)
various	Flow Charts (flow)
various	Xcel MnDIA edits (5fgh)

Standardized Pre-Application Report Request Form (PreApp) per MnDIP 1.4

- Started with joint movants' proposed template
  - (based on forms in CA, MA, NC, SC, OH).
- Subgroup restructured and simplified the template form for improved flow and readability.

Simplified Timeframe for signing DIA (Time) per MnDIP 2.3.1

- 2.3.1 edits: ~~At least thirty (30) Business Days before requested in-service date,~~ The Interconnection Customer shall sign and return the Interconnection Agreement within thirty (30) business days*

  *The 30-day timeframe in this step originates from Section 5.1.2 and does not represent a new step or timeframe

- 2.3.1.1.: removed – duplicates 5.1.2
- 2.3.1.2: Added language for appropriate sequencing on construction of AREA EPS facilities (construction allowed per MnDIP 2.2.3). Removed language on metering (covered in 2.3.2)

Certificate of Completion template (CoC) per MnDIP 2.3.2 & Att. 2

- Started with Joint Movant's proposed form as a template.
- Subgroup restructured and simplified the template for improved flow and readability.
- New template is a fillable PDF form

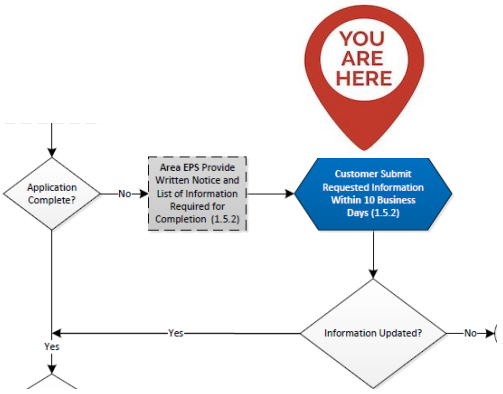
Certification of DER Equipment per MnDIP Att. 5

- Xcel and IREC worked together on revisions to the language in Attachment 5
- revisions include:
  - Distributed Energy Resource Equipment ~~Packages~~
  - Allows for DER design evaluation
  - refers to Phase II technical standards for on-site commissioning test

Flow Chart Templates (flow)

Xcel created 5 flow charts with feedback from the subgroup to help visualize the interconnection process:

1. high-level MnDIP workflow
2. Simplified Process
3. Fast Track Process
4. Study Process
5. Dispute Process



Xcel MnDIA edits (5fgh)

Xcel proposed edits to MnDIA in Decision Options 5f, g, and h :

5 f) Allows disconnect similar to other retail customers consistent with rules and practices (MnDIA 3.4.7)

5 g) Allows for disconnect after 60 day notice if customer is in default (MnDIA 3.4.8)

5 h) Modifies SGIP language on DERs that fail to achieve commercial operation to clarify payment sequence in the case of an orphaned Tx network upgrade (MnDIA 5.2.1.2)

Subgroup approved changes with one edit to 5h:

…if another [DER] is later constructed and requires use of the Network Upgrades within five (5) years of being constructed, …

Implementation Updates from Utilities

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Minnesota Power Phase I Implementation

Otter Tail Power Phase I Implementation

Dakota Electric Association Phase I Implementation

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MREA

Cooperative Minnesota Interconnection Process

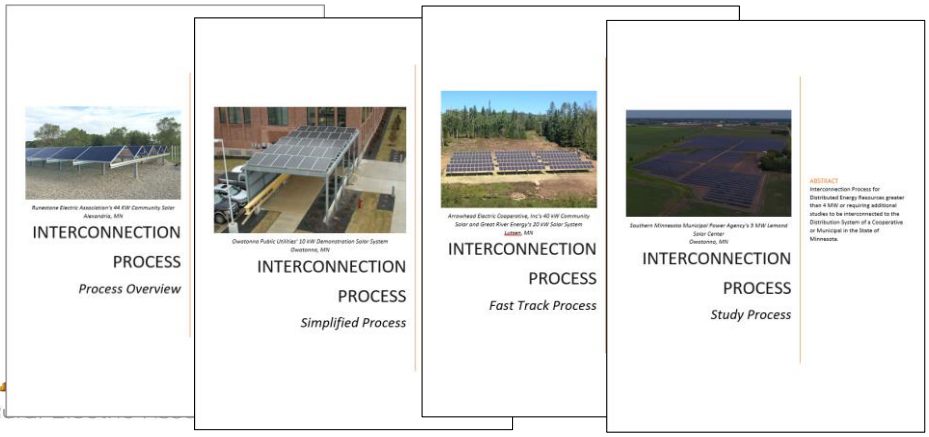
Municipal Minnesota Interconnection Process

MMUA

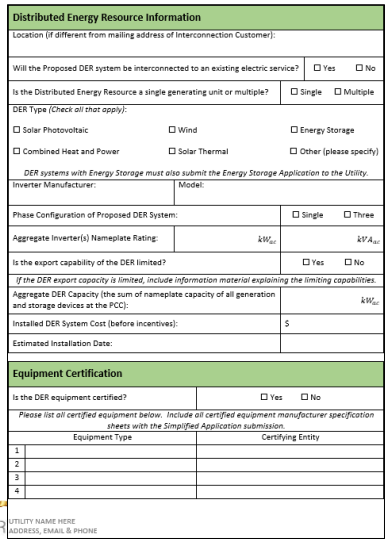
75 years
1941 - 2016

C-MIP or M-MIP

- Follows timelines, principles and concepts laid out in MN DIP
- Breaks MN DIP into 4 separate documents



Template Applications, Study Agreements & Interconnection Agreements



Distributed Energy Resource Information

Location (if different from mailing address of Interconnection Customer):

Will the Proposed DER system be interconnected to an existing electric service? ☐ Yes ☐ No

Is the Distributed Energy Resource a single generating unit or multiple? ☐ Single ☐ Multiple

DER Type *(Check all that apply)*:

☐ Solar Photovoltaic ☐ Wind ☐ Energy Storage

☐ Combined Heat and Power ☐ Solar Thermal ☐ Other (please specify)

DER systems with Energy Storage must also submit the Energy Storage Application to the Utility.

Inverter Manufacturer: Model:

Phase Configuration of Proposed DER System: ☐ Single ☐ Three

Aggregate Inverter(s) Nameplate Rating: kW_{ac} kVA_{ac}

Is the export capability of the DER limited? ☐ Yes ☐ No

If the DER export capacity is limited, include information material explaining the limiting capabilities.

Aggregate DER Capacity (the sum of nameplate capacity of all generation and storage devices at the PCC): kW_{ac}

Installed DER System Cost (before incentives): $

Estimated Installation Date:

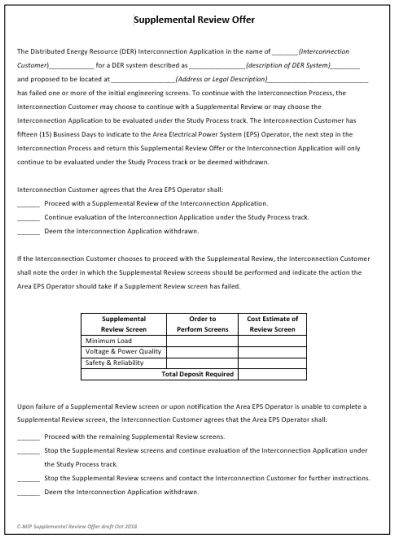
Equipment Certification

Is the DER equipment certified? ☐ Yes ☐ No

Please list all certified equipment below. Include all certified equipment manufacturer specification sheets with the Simplified Application submission.

	Equipment Type	Certifying Entity
1		
2		
3		
4		

UTILITY NAME HERE
ADDRESS, EMAIL & PHONE



Supplemental Review Offer

The Distributed Energy Resource (DER) Interconnection Application in the name of _____*(Interconnection Customer)*_____ for a DER system described as _____*(description of DER System)*_____ and proposed to be located at _____*(Address or Legal Description)*_____ has failed one or more of the initial engineering screens. To continue with the Interconnection Process, the Interconnection Customer may choose to continue with a Supplemental Review or may choose the Interconnection Application to be evaluated under the Study Process track. The Interconnection Customer has fifteen (15) Business Days to indicate to the Area Electrical Power System (EPS) Operator, the next step in the Interconnection Process and return this Supplemental Review Offer or the Interconnection Application will only continue to be evaluated under the Study Process track or be deemed withdrawn.

Interconnection Customer agrees that the Area EPS Operator shall:

_____ Proceed with a Supplemental Review of the Interconnection Application.
_____ Continue evaluation of the Interconnection Application under the Study Process track.
_____ Deem the Interconnection Application withdrawn.

If the Interconnection Customer chooses to proceed with the Supplemental Review, the Interconnection Customer shall note the order in which the Supplemental Review screens should be performed and indicate the action the Area EPS Operator should take if a Supplement Review screen has failed.

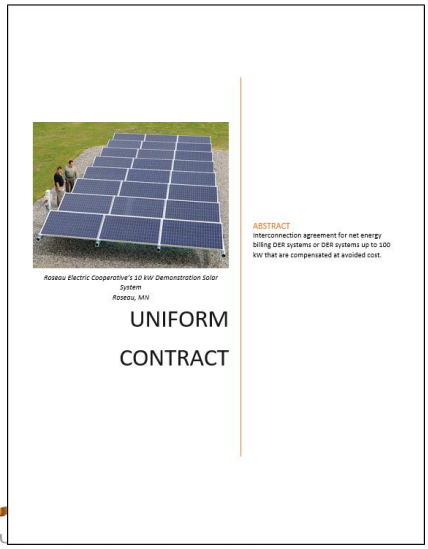
Supplemental Review Screen	Order to Perform Screens	Cost Estimate of Review Screen
Minimum Load		
Voltage & Power Quality		
Safety & Reliability		
	Total Deposit Required	

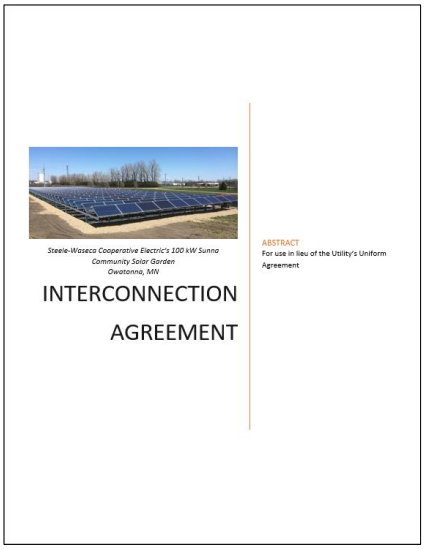
Upon failure of a Supplemental Review screen or upon notification the Area EPS Operator is unable to complete a Supplemental Review screen, the Interconnection Customer agrees that the Area EPS Operator shall:

_____ Proceed with the remaining Supplemental Review screens.
_____ Stop the Supplemental Review screens and continue evaluation of the Interconnection Application under the Study Process track.
_____ Stop the Supplemental Review screens and contact the Interconnection Customer for further instructions.
_____ Deem the Interconnection Application withdrawn.

C-MIP Supplemental Review Offer draft Oct 2018

Template Applications, Study Agreements & Interconnection Agreements





MREA
Minnesota R

C/M MIP Roll Out

- Training on C/M MIP to occur Q1 2019
- Each municipal and cooperative's governing board, council or commission needs to adopt the C/M MIP
- Designed with residential consumer in mind: readability, simplistic language, streamline approach

MREA
Minnesota R

Lunch Break

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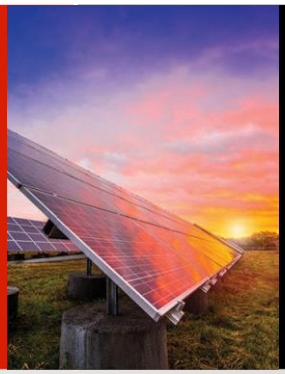
Xcel Energy®

REVISED DRAFT - Minnesota DGWG

Meeting # 7 – Xcel Energy Prep Materials

November 9th, 2018



Major Aspects of MN DIP Implementation

1. Tariff
2. Online Interconnection Application Platform
3. Business Practices (tools & processes)

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Biggest Change to Tariffs

- Our tariffs had program related details that some times differed from the statewide interconnection process (Section 10)
- Program details need to sync with MN DIP rules
- All interconnection timelines change and some new timelines are assigned to the interconnecting party, which could result in cancellations pursuant to MN DIP rules
- Existing tariffs have some steps and processes that conflict with MN DIP (i.e. completeness, IE dispute, etc.) and therefore will not apply to MN DIP applications

We are streamlining to one interconnection process by Commission Order

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Section 9 Tariff

Application Type	Impact
Net Metering	Modify such that MN DIP governs MN DIP applications (received after June 17, 2019)
Solar*Rewards (First Gen.)	No MN DIP Changes. Previously Closed Tariff.
Solar*Rewards (Second Gen.)	Will be closed to new applicants. Minor adjustments (alignment, 2019 program changes)
Solar*Rewards (Third Gen.)	New version of S*R based on MN DIP
Solar*Rewards Community Contract for those receiving Solar*Rewards Incentive	Existing tariff sheets will be closed to new applicants. Minor adjustments (alignment, 2019 program changes) New section added to incorporate MN DIP.
Solar*Rewards Community	Many tariff changes that apply to MN DIP applications

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Section 10 Tariff

- Targeted edits describing application of MN DIP. Existing tariff will apply to existing applications prior to June 17, 2019. New tariff sheets added to include MN DIP and MN DIA. Proposing assignment of MN DIA form.

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Online Application Portal Project

- IT project underway to change online application portal to comport with MN DIP and MN DIA
- Portal will incorporate new process and documents associated with revised MN Statewide Interconnection Standards.

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Business Practices

- Initial Review and Supplemental Review technical screening tools
- New Facilities Study process
- Queue management adoption to include all DER (Serial review)
- Modifications to Pre-Application Report information
- Company Point of Contact for all DER
- Track Eligibility sorting process
- Modification or supplementation of existing XcelEnergy.com information for Developer that relies on old process.

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Smooth Implementation of MN DIP

- Early Engagement by Interested Parties
  - DG Interconnection Process Implementation Workgroup held on Friday, October 26th, 2018.
  - Proposed Tariff changes based on workgroup feedback are being incorporated.
  - November 15th is final day for providing feedback.
  - Prompt comment schedule after petition is filed

Discussion: How can Commission and Stakeholders Assist in Smooth Implementation of Phase I?

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Smooth Transition Ideas

- Utilities can clearly identify tariff changes that are: 1) directly related to 16-521; 2) directly related to another docket and why that change is appropriate now. – Xcel example. Others?
- Customer friendly materials – MREA/MMUA samples. Others?
- PUC will file MN DIP and MN DIA incorporating the follow up items from DOC subgroups and TSG for Commission approval with the utility tariffs, so single reference going forward (until the next revision.)
- Testing elements of MN DIP in advance? – Xcel initial review screen example. Others?
- Training and education

Observer/Public Comment

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16-521 Next Steps

Nov. 13	Utility tariff filings – opening new dockets
Dec. 28	Xcel Energy tariff filing – open in a new docket
~Feb – March 2019	Commission Action: Utility tariff filings and Clean MN DIP with DOC subgroups contributions
~1Q 2019	Commission Consideration re: Attachment 6 Review and/or Revision Process
~April 2019	TSG Writing Group Updated Draft Technical Interconnection and Interoperability Requirements (TIIR) document
June 17, 2019	Effective Date of the MN DIP and MN DIA
Not later than 4Q 2019	Commission Action on Phase II Technical Requirements

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Thank You!

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651-201-2212