

**From:** Boemer, Jens  
**To:** [Rosier, Michelle \(PUC\)](mailto:Rosier_Michelle@state.mn.us)  
**Cc:** [Key, Tom](mailto:Key_Tom@epri.com); [Johnson, Pam \(PUC\)](mailto:Johnson_Pam@state.mn.us); [Tyrano, Barbara](mailto:Tyrano_Barbara@state.mn.us); [Dennis, Deana](mailto:Dennis_Deana@state.mn.us)  
**Subject:** RE: Possible terminology concerns regarding Xcel's slides for MN PUC Aug 3 regarding "Principle for Defining Capacity?"  
**Date:** Friday, August 03, 2018 4:18:39 AM  
**Attachments:** [image002.png](#)  
[image003.png](#)  
[EPRI\\_MN\\_PUC\\_TSG\\_Mtg\\_5\\_Ex-ante\\_comments\\_2018-08-02.docx](#)  
**Importance:** High

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Michelle,

I actually did it! Though it got quite late here on Pacific Time...

Please find attached our draft memo on the topic. Please let us know if you expect us to present/contribute to the call.

Also find my draft answers to Pam and your questions **below in red**.

We wish you success with today's meeting.

Jens

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**From:** Rosier, Michelle (PUC) [<mailto:michelle.rosier@state.mn.us>]  
**Sent:** Thursday, August 2, 2018 10:26 AM  
**To:** Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Cc:** Key, Tom <[tkey@epri.com](mailto:tkey@epri.com)>; Johnson, Pam (PUC) <[pam.johnson@state.mn.us](mailto:pam.johnson@state.mn.us)>  
**Subject:** [EXTERNAL] RE: Possible terminology concerns regarding Xcel's slides for MN PUC Aug 3 regarding "Principle for Defining Capacity"?

Jens:

Reminder as requested ☺ Both Pam and my questions are attached below.

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**From:** Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Sent:** Wednesday, August 01, 2018 2:02 PM  
**To:** Rosier, Michelle (PUC) <[michelle.rosier@state.mn.us](mailto:michelle.rosier@state.mn.us)>  
**Cc:** Key, Tom <[tkey@epri.com](mailto:tkey@epri.com)>  
**Subject:** RE: Possible terminology concerns regarding Xcel's slides for MN PUC Aug 3 regarding "Principle for Defining Capacity"?

Michelle,

I will try to respond tonight. Please remind me if you don't hear back by Thursday noon.

Jens

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**From:** Rosier, Michelle (PUC) [<mailto:michelle.rosier@state.mn.us>]  
**Sent:** Tuesday, July 31, 2018 10:59 AM  
**To:** Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Cc:** Key, Tom <[tkey@epri.com](mailto:tkey@epri.com)>  
**Subject:** [EXTERNAL] RE: Possible terminology concerns regarding Xcel's slides for MN PUC Aug 3 regarding "Principle for Defining Capacity"?

Jens and Tom:

Can you confirm if the following is accurate and respond to questions below (happy to get on the phone if that is easier):

DER capacity is:

Aggregate nameplate rating; however, configuration settings can identify a nameplate alternative as described in IEEE 1547-2018 Cl. 10.4 **Jens: yes, that is correct.**

MN DIP 5.14.3 allows for maximum capacity capable of injecting different from the aggregate nameplate rating of DER unit(s) if there is a mutually agreed to limit to the DER system (What Xcel is calling "Control Limited Capacity" and IREC "Maximum AC Capacity") **Jens: please refer to the table in the attached draft memo**

Although Clause 10.4 suggests you can have a "nameplate alternative", I'm confused with how that is reconciled with the note on the definition of nameplate ratings: **Jens: the NOTE below is unrelated to Clause 10.4**

NOTE—For Local EPS with multiple DER units, the aggregate DER nameplate rating is equal to the sum of all DERs nameplate rating in the Local EPS, not including aggregate capacity limiting mechanisms such as coincidence factors, plant controller limits, etc., that may be applicable for specific cases.

While the DER local interface may have load between the DER unit and the interface, load is not factored into the configuration setting nameplate alternative, correct? **Jens: yes, that is correct but it only holds for "loads" (=Devices and processes in a local EPS that use electrical energy for utilization, exclusive of devices or processes that store energy but can return some or all of the energy to the local EPS or Area EPS in the future.) In other words, energy storage systems can be factored into the aggregate nameplate DER nameplate rating if the storage operates in generation (export) mode; when it operates in load (import) mode, it is not factored in. That is an important distinction because factoring ESS in load mode into the aggregate nameplate rating would create a loophole that would allow DER developers/owners to claim smaller nameplate ratings of a composite DER with storage than actually present. And nameplate rating is crucial for thorough grid planning and protection studies.**

Lastly, does changing the configuration settings impact the certification of DER(s) that are type-tested? **Jens: I am not sure about this. We may have to discuss this further within EPRI and with UL, but my best guess is that it should not impact the certification of DER(s) as long as they have been certified by the revised 1547.1 and are fully compliant with 1547-2018. For the interim period, you may need to refer to the new UL CRD on Power Control Systems (see also the draft memo).**

Thanks,  
Michelle

**Michelle Rosier**  
Distributed Energy Resources Specialist | Economic Analysis

**Minnesota Public Utilities Commission**

121 7th Place E, Suite 350  
Saint Paul, MN 55101-2147  
O: 651-201-2212  
[mn.gov/puc](http://mn.gov/puc)



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**From:** Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Sent:** Wednesday, August 01, 2018 2:02 PM  
**To:** Johnson, Pam (PUC) <[pam.johnson@state.mn.us](mailto:pam.johnson@state.mn.us)>  
**Cc:** Key, Tom <[tkey@epri.com](mailto:tkey@epri.com)>; Rosier, Michelle (PUC) <[michelle.rosier@state.mn.us](mailto:michelle.rosier@state.mn.us)>  
**Subject:** RE: 16-521 TSG: Draft TIIR may need further updates to align with published IEEE Std 1547-2018

Pam,

I will try to respond tonight. Please remind me if you don't hear back by Thursday noon.

Jens

**From:** Johnson, Pam (PUC) [<mailto:pam.johnson@state.mn.us>]  
**Sent:** Friday, July 27, 2018 2:41 PM  
**To:** Rosier, Michelle (PUC) <[michelle.rosier@state.mn.us](mailto:michelle.rosier@state.mn.us)>; Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Cc:** Key, Tom <[tkey@epri.com](mailto:tkey@epri.com)>  
**Subject:** [EXTERNAL] RE: 16-521 TSG: Draft TIIR may need further updates to align with published IEEE Std 1547-2018

Hi Jens and Tom,

I have a couple questions per your note below.

With regards to the note below about "control limited capacity," I am finding myself circling from one iteration of "nameplate configuration setting" to "configuration setting value" and various permutations of those phrases without resolution as I read and re-read and map out Clause 10.4 and Table 28 of IEEE 1547-2018. Is "nameplate configuration setting" a phrase that is gaining momentum with IEEE 1547 balloters in any on-going discussions? Jens: it seems as if most discussions in Hawaii and California around "inadvertent export" etc. have missed to utilize the terminology framework that IEEE 1547-2018 provides. Please refer to the attached draft memo for a first attempt to map the various terms that were recently developed with 1547-2018.

Also, do you get the sense that the TSG working on Phase II of MN Docket 16-521 would come to consensus on some outstanding items if Category II did not include all inverter-based DER in Table 2? If yes, which items? Not sure I understand your question here but EPRI suggests that MN PUC follows the recommendation of Annex B that suggest technology- and primary resource-specific assignment of abnormal performance categories. For example, Category II could be assigned to those inverter-based DER where the prime mover does not restrict the ride-through performance (e.g., solar PV, certain energy storage technologies, modern wind turbines, most fuel cells) but defer to a case-by-case assignment for those inverter-based DER where the prime mover does indeed restrict the ride-through performance (e.g., certain fuel cells, energy storage technologies with slower chemical processes, others).

Thank you very much,  
Pam

**Pam Johnson, PhD**  
Innovator, Solar Energy Innovators Program

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**From:** Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Sent:** Thursday, July 26, 2018 3:15 PM  
**To:** Rosier, Michelle (PUC) <[michelle.rosier@state.mn.us](mailto:michelle.rosier@state.mn.us)>  
**Cc:** Key, Tom <[tkey@epri.com](mailto:tkey@epri.com)>  
**Subject:** Possible terminology concerns regarding Xcel's slides for MN PUC Aug 3 regarding "Principle for Defining Capacity"?

Michelle,

I just reviewed Xcel Energy's presentation for Aug 3 and noticed the proposal for "Principle for Defining Capacity" on their slide 2.

I am concerned whether that proposal is harmonized with the existing concept of "configuration setting" as the "as-configured" value for the nameplate information. We recommend a review of clause 10.4 (Configuration information) of the IEEE Std 1547-2018 and consider harmonizing the terminology with the IEEE standard.

Do not hesitate to contact me if you have any questions or concerns.

Thanks,  
Jens

IEEE Std 1547-2018  
IEEE Standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power  
Systems Interfaces

## 10.4 Configuration information

Configuration information shall be available through a *local DER communication interface* to allow the setting and reading of the currently active values.

Each rating in Table 28 may have an associated configuration setting that represents the as-configured value. If a configuration setting value is different from the corresponding nameplate value, the configuration setting value shall be used as the rating within the DER. Changes to the configuration setting shall be made with mutual agreement between the DER system operator and Area EPS operator.

Configuration settings are intended to be used as a configuration option as nameplate alternatives. Configuration settings are not intended for continuous dynamic adjustment.

## Principles for Defining Capacity



- Differentiate the new term of **Control Limited Capacity** from **Nameplate Rating**.
  - *Nameplate Rating* is defined in IEEE 1547-2018, but the new term of *Control Limited Capacity* is not defined by national standards
  - The terms should not be used interchangeably to describe DER power capability
- *Nameplate Rating* dictates the review track eligibility, based on potential impact and complexity of review, and some dynamic technical impacts while the *Control Limited Capacity* is used for steady-state impact evaluation
  - Controls are not reviewed before eligibility is determined
- Use a qualifier to “capacity” for this use, such as “control limited” or “source limited”, since the term “capacity” is used in a variety of situations (i.e. hosting capacity, load capacity),

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**From:** Key, Tom  
**Sent:** Thursday, July 26, 2018 12:40 PM  
**To:** Boemer, Jens <[jboemer@epri.com](mailto:jboemer@epri.com)>  
**Subject:** FW: 16-521 TSG: Prep Materials for 8/3; Prep & Draft Agenda for 8/10

fyi

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**From:** Rosier, Michelle (PUC) <[michelle.rosier@state.mn.us](mailto:michelle.rosier@state.mn.us)>  
**Sent:** Thursday, July 26, 2018 12:35 PM  
**To:** Rosier, Michelle (PUC) <[michelle.rosier@state.mn.us](mailto:michelle.rosier@state.mn.us)>  
**Subject:** [EXTERNAL] 16-521 TSG: Prep Materials for 8/3; Prep & Draft Agenda for 8/10

TSG:

Attached are:

- 1) prep materials provided by Xcel and MNSEA for the August 3<sup>rd</sup> TSG Meeting 5 which continues the discussion on storage, limited or non-exporting and capacity (Note: 7-26-18 DRAFT TIIR includes new comments/edits from Xcel for the TSG Meeting 5 discussion);
- 2) prep request and draft agenda for August 10<sup>th</sup> TSG Meeting 6 on metering, interoperability and cyber security – **Prep is DUE August 3<sup>rd</sup> COB.**
- 3) 7-26-18 Draft TIIR – Please review for 8/3 TSG Mtg 5 and edit for 8/10 TSG – **EDITS DUE August 3<sup>rd</sup> COB.**

Upcoming Schedule:

Materials	Due	Who
Draft Slides/Updated Agenda for 8/3 TSG Mtg 5	8/1/18	Staff
TSG Mtg 5	8/3/18	All
Prep Materials (Slides/Edits/Background info)	8/3/18 COB	TSG

Share Prep submitted with TSG	8/6/18	Staff
Draft Slides/Updated Agenda for 8/10 TSG Mtg 6	8/8/18	Staff
TSG Mtg 6	8/10/18	All

Thanks, and looking forward to our upcoming discussions!

**Michelle Rosier**

Distributed Energy Resources Specialist | Economic Analysis

**Minnesota Public Utilities Commission**

121 7th Place E, Suite 350

Saint Paul, MN 55101-2147

O: 651-201-2212

[mn.gov/puc](http://mn.gov/puc)



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