

Date:	June 20, 2024	Meeting held as part of the Massachusetts Technical Standards Review Group (TSRG) for discussion of industry topics and collaboration amongst utilities and the DG community. Meeting minutes are outlined below. If there are any corrections, additions, or omissions please notify the preparer.
Prepared by:	Tony Morreale tmorreale@ligconsultants.com	

Participants:

Michael Porcaro (Member – National Grid)	NAERA HAGHNAZARIAN
Shakir Iqbal (Member – Eversource)	Nancy Israel
Tony Morreale (Member – LIG Consultants)	Prasanth Gopalakrishnan
Greg Hunt (Member – Zero-Point Development)	Quinn Perry
Brian Lydic (Member – IREC)	Rahul Panatagada
Brian Ritzinger (Member – DPU)	Raman Somayajulu
Emily Slack (Alternate – National Grid)	Richard Labrecque
Brett Jacobson (Alternate – Eversource)	Ruvini Kankanamalage
Gerry Bingham (Alternate – DOER)	Ryan McGlothlin
Brad Marszalkowski	Samer Arafa
Daniel Passarello	TRAVIS S CARLESS
Devon Marcaurele	Xinghao Fang
Doug Pope	
Doug Smith	
Eric Every	
Glenn McGillicuddy	
Griffin Anderson	
Jacques Asselin	
Jake Dusling	
James George	
Jeannie M Amber	
Jeff Long	
Jeremy Kites	
John M Kreso III	
Jon Beniers	
Jorge Jorge	
Michael T Wall	
MUHAMMAD A KHAN	
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Notes:

1. Administrative Items

- Refer to TSRG Website for all information related to the group.
- For any questions, suggestions, or to get on the mailing list email:
 - Chair Mike Porcaro - Michael.Porcaro@nationalgrid.com
 - Co-Chair, Tony Morreale - tmorreale@ligconsultants.com
- Membership Update
 - Mrinmayee Kale (New Leaf) resigning as solar representative.
 - Greg Hunt (Zero Point Development) appointed as replacement by NECEC vote.
- Michael Porcaro has served three (3) consecutive terms as chair, will need to step down at end of year.

2. Underfrequency Response Related to PV Inverters – Griffin Anderson, Neo Virtus

- See slides for details.
- Griffin Anderson, Neo Virtus: Hypothetically, during an underfrequency event the DER shall increase active power output. However, this is not practical for a PV Inverter which is operating at maximum output power.
- GA: Some utilities are requiring PV inverter PSCAD models support this capability. This is causing significant delay's and lingering issues, as models are only garnering conditional acceptance.
- GA: PV designed to output maximum at all times.
- GA: PSCAD model represents how inverter operates. UF Droop not possible for typical inverters.
- GA: NEO proposes underfrequency droop operation for a PV inverter not be required during PSCAD model verification testing and actual system operation.
- Greg Hunt, Zero-Point Development: Would it be a solution if PV system not participating in wholesale market be exempt? Might not make sense for all PV projects.
- GA: We are an engineering firm, systems we work on connect to feeders and need to meet SRD. Cannot speak to market participation. Until you have DERMS, we cannot have reserve capability.
- Bryan Lydic, IREC: Frequency/watt function required by the standard, so cannot be turned off. Are tested to respond to underfrequency conditions per UL standard. It is required and tested already.
- GA: Distribution level system, 1-2 MW, no one is curtailing active power. In practicality, it isn't going to happen.
- Brad Marszalkowski, ISO-NE: For enabling UF response, adding headroom, I would not say never. As plants get replaced by DG, it is possible there would be requirement for contractual headroom. Could be applied retroactively. Reason why the model needs the capability. ISO-NE does not enforce the requirements. Up to TOS and dist companies to enforce those requirements.

- BM: AS of right now those who participate in wholesale 10 MW and larger to have O/U frequency response.
- Tony Morreale, LIG Consultants: Looks like sometimes you might actually have active power reserve.
- GA: Look at case by case basis, but would be too much work. Inverter manufacturers are making it pass by setting active power to ~ 0.5 of nominal. They meet the requirements of UL standard, so it does not seem necessary to make PSCAD model prove it out.
- Eric Every, Kearsarge: Does standard allow for temporary export limit? Nominal limit and abnormal limit. Some projects where SIS came back, we will curtail inverters, where we might have additional capacity. Would it make sense to use this for underfrequency response?
- MP: If you need two limits, it would be very difficult to manage. Adds more ambiguity. Cannot exceed ISA limit.
- BL: We have write up about this issue in the guide for 1547 (1547.2-2023). Open issue. Some say you should exceed contract limits to support frequency, but not how it works now with controls. Transmission vs distribution operators might have different opinions. Off-unity power factor operation does not indicate the ability to have active power headroom.
- Jeannie Amber, Eversource: EEE 1547-2018 clause 6.5.2.7.2 states "A DER response during low-frequency conditions may be subject to *available active power* and the pre-disturbance dispatch level". If you don't have power, you don't put it out. I can ask for settings changes during DERMS enrollment, but PSCAD inverters need to predict how inverters will react. If PSCAD model behaves differently than inverter does, we will have to restudy. Do not want to have to restudy during enrollment.
- GA: Was not aware that projects could be retroactively enrolled in DERMS. Inverter manufacturers are creating tests for things that they think might not actually happen.
- JA: If inverter is not capable of receiving a curtailment signal, might want to find another inverter.
- Raman Somayajulu, National Grid: Hearing inverters do not have capability, but then also hearing they meet UL standard, which tests this capability.
- BL: If the PSCAD model has the capability to apply the Plimit command, then that should be the end of it right?
- GA: Some manufacturers are doing this, some are not.
- RS: We are not asking for head room. Just the capability to provide active power if it has headroom for some reason. Inverters should be able to take power command. It is the requirement and is being tested per IEEE/UL.
- GA: During testing, they are creating extra active power, if there is nothing that does that in the PSCAD model, then it is hard to test it in PSCAD.
- Samer Arafam, National Grid: Agree with Griffin. We may have a problem. PSCAD model should reflect real life. If we fudge DC source to operate as something of a battery, we are not getting the expected performance. Purpose of PSCAD model is going away. Is DC source being replaced? You would be getting false data.

- GA: We are testing functionality that will not be used on site.
- GH: Not seen this active power increase allowed in the US. We have seen this issue with inverter manufacturers and had to fix it. How do we get through this temp period as inverter manufacturers work to fix? Sounds like some inverter manufacturers are not up to speed. Should we have a waiver for a period of time?
- GH: Will there be retroactive active power curtailment for existing projects?
- MP: There may be financial incentive to enroll in DERMS. Nothing in statute now. Could be requirement in new BESS tariff.
- GH: Acceptable to create a temporary exemption?
- BM: MPPT is an input into inverter, power output is governed by PWM. Maximum DC power does not mean you need to put out maximum AC power. Should be straightforward to implement in PSCAD. Inverter manufacturers pushing back do not have a good case. We should avoid those manufacturers.
- GA: Cannot speak directly to base PSCAD model development, but have heard from some manufacturers that it is difficult to implement.
- SA: PSCAD model should be configured as close to real life as possible.
- GA: Possible looking for a grace period for those stuck in queue to bridge the gap.
- GH: Propose that EDCs will pick a date in the past (retroactive) prior to which inverters that are under 10 MW not operating with active curtailment or wholesale market participation, need to be listed and certified, but do not need to provide a PSCAD model showing this capability.
- GH: Idea was to only include projects that are already in queue.
- Gerry Bingham, DOER: Can you make it effective immediately for all projects stuck due to the requirement?
- MP: Propose June 1, 2024.
- Dough Smith: Sometimes market participation does not include active power control.
- GH: Idea was to include requirement for market participation that includes active control of the project.
- Shakir Iqbal, Eversource: Want Eversource transmission planning to review before voting.
- MP: Might need to wait.
- EE: Seems like this is an issue with PSCAD models not being an exact digital twin of inverter. Causing a lot of issues. How can we streamline this in the future?
- MP: Broader topic to discuss in the future.
- BM: Do we know how many projects this would affect or MW amount?
- GA: We have projects in contingency hold. Cannot turn on system until resolved.
- BM: Sounds like it could be a lot of projects. Risk for future studies and projects. ISO-NE would likely be against this.
- MP: Does this conflict with ISO-NE requirements?

- BM: Yes. It does.
- MP: Not sure EDCs can approve then.
- GH: How do we make sure it does not conflict with ISO-NE requirements?
- BM: As long as it already has or does not need I.3.9 approval.
- Motion:
 - Pending final EDC review with confirmation within 2 weeks of this meeting, projects:
 - With application date on or before June 1, 2024
 - That are PV-only facilities that are > or equal to 1MW and < or equal to 10MW at a single PCC
 - Operating outside of any wholesale markets that would require active ISO/bulk power system based signals for operational activity/dispatch
 - Having already received I.3.9 approval, or not requiring such approval
 - Shall not be required to include in the provided PSCAD model the underfrequency droop operation. The functionality must be present in the inverter and have it turned on, however is not required to be reflected in the PSCAD model.
- Motion passed.

3. Sub-Committee Updates

- Inverter Repowering - Jeremy Kites, Unutil
 - Jeremy Kites, Unutil: Notice of change required.
 - JK: Once received, they will decide on scope of study required.
 - JK: Most studies will be reduced scope. Steady state normally not a concern.
 - JK: Risk of islanding may be a concern. Example: different inverter manufacturer.
 - JK: All new equipment must meet present requirements (1547 settings, UL 1741 SB)
 - JK: Must meet requirements in present interconnection tariff and common guidelines (i.e. SCADA, recloser, etc.)
 - JK: Need to provide a PSCAD model.
 - JK: Will need to amend ISAs as needed.
 - TM: Requirement to meet present IC Tariff and Common Guidelines seems like a heavy burden for swapping out obsolete inverters.
 - GH: Understand the need to bring projects up to safety standards, but need to be careful that language is more prescriptive than “must meet requirement”.
 - EE: Do we need PSCAD models for existing inverters too? This might be impossible for older inverters.
 - MP: Need to take that back because the original idea was the entire facility was to be upgraded.
 - BM: For ISO-NE projects, we require PSCAD models for older inverters too. No grandfathering.

- BL: Likely hard to have one requirement for all cases. Seems onerous to require all updates when replacing one component.
- MP: This was a first pass. Will need to circle back and take this to subgroup. Provide more formal language at next meeting.
- Glenn McGillicuddy, MC2 Renewable Energy Services: If we have heavy upgrades, project may just hold capacity on feeder and not generate. Projects might have financial ability to meet requirements.

- Flexible Connections Sub-Group – Michael Porcaro, NGRID
 - Michael Porcaro, NGRID: 4/12/2024 meeting discuss centered around alignment on Initial Constraint Criterion (Thermal) and Initial Foundational Technologies (software, hardware/equipment, communications protocols – DNP3/IEEE 2030.5)
 - MP: 5/21/2024 meeting centered around Transmission system capabilities, impact, & benefits and how this impacts the Flex Connect discussion moving forward. Thermal constraints data /Reporting for viable circuits – preliminary list for early scaling was also reviewed.
 - MP: 6/18/2024 meeting involved discussion of initial IIRG – flex connect / DERMS language and deliverable list established by UL 3141, failsafe items, & data points.
 - MP: Upcoming activities include reviewing UL 3141 criteria for equipment standardization, defining fail safe mode operation/countermeasures, and developing operation requirements to address voltage issues.

4. Group Study Status

- See meeting slides for details and links.
 - <https://www.eversource.com/content/residential/about/doing-business-with-us/interconnections/massachusetts/distribution-group-studies>
 - <https://gridforce.my.site.com/s/article/MA-Distribution-Group-Studies>
- Eversource has TSRG June 2024 update table in PDF format on website. Includes total duration, developers, cases, MW, milestone dates, and sub step durations.
- National Grid has similar report on website that is updated monthly.
 - GB: What does non-ASO hold mean?
 - Emily Slack, National Grid: Those are CIP holds.

5. Technical Standards Update from EDCs

- MP: No new technical standards updates from EDCs.
- SMART Phase II Order issued by DPU 6/4/2024.

- MP: Requirements of the Order are being worked through by EDCs for implementation planning including billing implications and metering arrangements.
- MP: EDC plan to provide a more robust update at next TSRG quarterly meeting.
- National Grid Flexible Interconnection Program.
 - MP: There are pilot programs seeking interest from solar and storage cases for both ARI and Local Power Controllers. Deadline moved to 2/28/2025.
 - MP: Email requests to NationalGridARI@nationalgrid.com.

6. Close Out & Final Discussion

- Next quarterly meeting scheduled for September 26, 2024.
- Doug Pope, Pope Energy: For inverter replacement, for example on an SREC I site with 6 inverters and you replace 1 inverter with same manufacturer. How do you deal with that?
- MP: Answer will vary based on site and system conditions.
- BL: Hawaii had to deal with this. They tie ISA to interconnection requirements at the time. Will need to review and decide what needs to be brought up to new requirements. Discussion in current 1547 revision group. How to deal with hybrid systems.
- MP: Is there something in Hawaii's standard we can review?
- BL: Will look into it.
- GM: With single inverter replacement, we develop interconnection drawings, but until utility approves, cannot issue construction drawings. Flood gates will likely be opening soon.
- GB: ISO-NE was okay with not retroactively requiring settings updates due to the small population size of earlier projects. Might just be temporary "flood gates".