Massachusetts Technical Standards Review Group (MTSRG)
Chair: Babak Enayati, National Grid
Vice-Chair: Michael Conway, Borrego Solar Systems
MTSRG Regular Meeting
Date: December 3, 2015
Time: 9AM-3:30PM
Location: National Grid
939 Southbridge St
Worcester, MA

Babak Enayati - National Grid
Mike Conway - Borrego Solar
Mike Brigandi - Eversource East
Reid Sprite - SourceOne Veolia
John Bonazoli - Unitil
John Texeira - NGrid
Mike McCarty - SolarCity
Paul Krell - Unitil
Jeannie Piekarz - NGrid

McKay Miller - Ngrid Strategy and Exploration group
Richard Gross - DOER (alternate)
Gerry Bingham - DOER
Laura Bickel - Ngrid counsel
Nancy Stevens - DPU
Brian Ritzinger - DPU
Ghebe Daniel - DPU
Tim Roughan - NGrid
Cindy Janke - Eversource West
Bob Andrew - Eversource East

1. **IEEE1547 update**

- Babak presentation on Phoenix IEEE1547 meeting in Nov
- PCC vs DG terminals for all requirements?
- Existing 1547 says requirements shall be met at PCC
- UL can't certify equipment at PCC, only generator terminals
    a. For IPPs over 500kW, requirements shall be met at PCC
    b. For true net metering sites (>10% gen:load) shall be met at generator terminals
- Mainly applicable to voltvar controls at generator. Issues like flicker are a system-wide issue, still need to be handled in a System Impact Study
- PCC vs DG terminal specification will be made in the overall definitions; will apply to the entire document (though it's mainly used for voltvar and ridethrough)

- Each DG will be mandated to have the capability of providing vars (sourcing or sinking), utility policy and study will determine whether that is activated
- 44% (0.9 pf) of nameplate capacity before active power curtailment is required
- Cat 1 = rotating machines

- Cat 2 = any machine that meets requirements that meet Transmission ride thru needs
- Cat 3 = any machine that meets requirements for high penetration service territories (rule 21 for example)
- Frequency ride through treats all categories the same
- 1547 adding a storage section - charge and discharge modes
- 1547 adding a microgrid section - Babak to chair group

2. NREL GFOV / LROV report and MA utility response

- GFOV next steps
- John T Ngrid - not convinced that the results are comprehensive enough to warrant a standard. 12kW, 20kW, and 4.5kW units were used in test.
- Next steps: more testing? Field testing?
- Jeannie - report doesn't answer question of whether inverters are capable of producing overvotlage or programmed to prevent it. Major distinction for protection engineering.
- Is the programming not sufficient to protection? Programming is the basis of most protection functions (overcurrent relays, etc)
- If there was a certification process for a testing a certain inverter with wye wye windings - unitil would then waive gnd bnk requirements (with some permutation for 2,4,8% load unbalance during certification)
- Next step suggestion from PK Unitil: What are the reasons, imbedded in the inverter, that the results are coming out this way - in the context of traditional generator transient model (pos seq 3ph voltage source)
- SolarCity next steps - used lab results to create a transient inverter model, so they can run different sensitivities for other cases using this new inverter model
- Solar Phase II site, not yet comfortable with removing the grounding bank for research purposes
- PK - NREL report shows that invert is not a pos seq ideal voltage source, however, the current fault analysis tools are based on that. We're incapable of modeling that accurately

3. Supplemental Review screens - Voltage/PQ and Safety/Reliability

- Review of common screening methods in matrix from 9/23/15 meeting

- To be adapted to Common Guideline for posting to TSRG website
- Add language to clarify that service design changes (service xfmr increase) may necessitate supplemental review - Add that language to Simplified Section
- Group to explore outreach - ensure that general public knows these resources exist
- **Action item: Babak and Mike to revise and update the Common Guideline**

4. External disconnects < 10kW

- MB - Eversource wants a disconnect for each generator. Worker safety issue for line workers who believe the section is dead
- MB - language says gang-operated switch, not necessary for a single phase installation. For small residential, a simple disconnect switch is preferred.
- NEC 2014 does not require an accessible disconnect switch. It can be on the roof.
- New policy was submitted at 9/23 TSRG meeting
- Eversource West announced at DG seminar that they'll be pivoting to new external disconnect policy on January 1, 2016

- National Grid and Unitil still don't require external disconnects <10kW.
- DPU, concerned with uniformity between utility service territories
- CJ - many cities and towns require disconnect switches, many installers already standardize on them
- Unitil - metering group is comfortable with pulling the meter as the disconnecting means (visible)
- For de-energized work, inverter can't be energized due to UL1741 certification
- OSHA tagging practices for source-tagging come into play
- Eversource: Requirement will not be retroactive
- Eversource rationale: chose to make this change for consistency between service territories in policies and work practices

5. 3V0 alternatives and Negative sequence relaying

- MC - 3V0 is the most significant barrier to interconnection in both MA and NY, warrants a closer look at:
    a. Rationale for the protection - whether there are line-line loads on transmission system. What is being protected? Substation xfmr arresters? They're intentionally a sacrificial piece of equipment. Is it justifiable to require customer payment for 600k upgrade to save a 10k piece of equipment?
        - PK: Surge arrestor operates successfully within its rated voltage range. Surge arresters are not sacrificial components. 3V0 GFOV exposes those arresters to voltages that may cause them to fail catastrophically. Could potentially damage neighboring equipment in a violent failure.
        - Once remote end breaker is open, there's no real overcurrent source into the transmission fault
        - Arresters can't withstand that overvoltage for longer than a few cycles
    b. Can we use an alternate method? Negative sequence relaying. Response from utilities - participation has not been encouraging so far
        - Borrego, SolarCity looking for feeder loading data and load imbalance information
        - **Borrego, SolarCity to provide a circuit diagram and sequence model proof**
    c. PK - suggestion: use traditional generator models, detect an open phase on a high side delta on the low grounded wye side. Go to SEL and ask if they have a product or a paper to see if they've explored this

6. Status update on Solar Phase II

- Babak presentation on SPII
- Features to be test: Volt-var, Volt-watts, Frequency-Watts, Ridethrough
- Solar Phase I sites were tested with volt-var functions and provided positive results on substation voltage. Improves LTC, regulator operations, voltage excursions, etc.
- **Action item: Babak to present Solar Phase 1 volt-var findings at next meeting**
- OP17 load power factor requirements - how does a dynamic reactive load on the feeder affect the OP17 compliance. Any DERMS control scheme needs to consider OP17 requirements.

7. 2016 Gameplan

- Babak summary of TSRG tasks of past 3 years, complete task and ongoing tasks
- Smart Inverter - 1547 adoption target is end of 2016

- Looking forward to next year's items
    - Unitil: 3V0 research

- Eversource: Is MA going to get involved in REV-type demos. Can we take lessons learned from REV demonstration projects?
- Reid: Public feeder maps for development, microgrid, etc
- Unitil: Microgrid specifics
- Babak: Storage, lessons learned from other states
- MC: Smart inverters and utility requirements for dynamic power factor. Which utilities will enable which functions?
- DPU: Group Study practices, challenges, success stories

Action item: TSRG members to prepare early Group Study takeaways, lessons learned for next meeting

TSRG bylaws: TSRG chair and vice chair can serve for 4 years. Babak and Mike have one more year (2016)