**ITWG 08/29/18**

SI = Solar Industry (Bryce/Shay)

JU = Joint Utilities (Heather)

***Interconnection Guideline Matrix***

SI would like to clarify these topics in the matrix and prevent wasted applications from use of this information. SI argues knowing this information beforehand will help them to apply where there is good chance of avoiding costly upgrades.

JU will need clarification on some of these issues. JU does not want to be held to cost estimates on unique projects. Some utilities do not have much experience to these topics as they have not had to deal with these updates extensively.

*Substation Transformer Back-feeding*

* Criteria for neutral over-voltage protection
	+ SI wants definition neutral-voltage definition
* Rest of the information can be provided by JU at high level

*Monitor and Control*

* JU states that there is a separate document that covers the issues and they would reference that document
* Look at website on the DPS website, appendix missing? JU will look at whether to add the appendix in the M&C document
* Jason: Not enough information on cost and need time for projects to be implemented
* JU would like to wait till the end of the year to gather enough cost information
* NYSEG/RGE (Mark) has concerns that there may be more requirements may need to be implemented for ESS + Solar projects
* Current M&C document solar only (may need to add to title of the document on website)

*Anti-Islanding Mitigation*

* ­JU can provide most of the information requested
* Did not get which topic JU had a concern with

*Effective Grounding*

* Does your system typically require means of effective grounding in order to interconnect?
	+ JU needs clarification on what information is being requested with this question
	+ SI will clarify question to be a bit more specific (project/transformer configurations)
* SI wants to clarify what system configuration will require effective grounding
* JU:
* Jason: Can the presentation from May (check this) be used by the SI as a guideline
* CHGE will look at anything over 50kW
* National Grid already has a table with thresholds

*Follow up*

* September 14th 2018 for comments and actions items to be completed

**IEEE C62.92.6-2017: IEEE Guide for Application of Neutral Grounding in Electrical Utility Systems (Tom Short)**

* This is a guide and not a requirement
* Scope: “…provides definitions and considerations related to system grounding where the dominant sources of system energization are current-regulated or power-regulated power conversion devices.”
* Inverters are current sources while rotating machines are voltage sources
* Classical Ground Fault Analysis: Rotating machines will rise from 1pu to 1.73pu when a ground fault happens
* Current sources (Inverters)
* Line to ground loads
* Line to Line loads
* Ground Fault Sequence Network
	+ Positive Sequence
	+ Negative Sequence
	+ Zero Sequence
* Percentage of Grounded-Wye Load
	+ Effective grounded 1.38PU
	+ PF leading vs lagging
* Effectiveness of Supplemental Grounds
	+ Ground source (grounding transformer) does not significantly reduce GFOV
	+ Not much difference between no GT w/any PF and GT w/ 0.9 lagging PF
	+ Provides no benefit for reducing overvoltages during ground faults unless the island is dominated by line-to-line load
* Drawbacks of Supplemental Ground Sources
	+ Desensitize utility ground fault detection
	+ Subject to overload due to system imbalance
	+ Maintain energization of opened phases
* Using guide for NYS Interconnection Practices
	+ The IEEE guide identifies inverter grounding considerations however there is not a defined procedure
	+ Develop method for applying to specific inverter connections and grounding at a POC
	+ Consider software tools to support inverter grounding analysis
	+ Define sizing method for grounding transformers and withstand criteria

**SIR Technical Screen D**

* Background: 3-phase 4-wire primary distribution line configuration requirement, fail unless aggregate DER AC nameplate rating must be less than or equal to 10% of line-section peak load. This is causing some projects to fail.
* Current approach reasonable for the time being

**Energy Storage Roadmap**

*SIR Templates*

* Development of SIR agreement template for ESS operating characteristics, Attachment 1 of Appendix A
* Development of SIR agreement template for ESS application requirements, operating characteristics and market participation, Appendix K

*Hosting Capacity*

* Coordination with stakeholders regarding the Hosting Capacity roadmap and use cases for energy storage

*Monitoring and Control Mechanism*

* Ability to ensure systems are operating as per the standardized interconnection agreement (Attachment 1 of Appendix A of the SIR) and cannot be easily changed to a new operating mode (i.e. standalone vs. parallel mode)

*Metering Requirements*

* Ability to support required tariffs
* Development of requirements for installation

*Market Considerations*

* Understanding of capabilities and requirements such as frequency regulation markets maximum and frequency of power output changes
* Insight into ramp rate requirements
* Determination of how to balance economic and reliability needs between NYISO and TOs

*Technology*

* Relay and control scheme requirements
	+ Formation of requirements of primary and backup control systems
	+ Developer education of technology available to meet utility needs for control mechanisms and primary/backup systems
* Improved understanding of how technologies operate based on manufacturer propriety information
* Voltage control via smart inverters
	+ i.e. monitoring and control to maintain voltage at the service point within ANSI C84.1 limitations

*Data Availability*

* How to manage 8760 analysis
* How to coordinate with interconnected storage already served by a particular feeder/substation given unique operating characteristics of each facility

*Technical Review*

* Modeling challenges/limitations to be considered
	+ Increase in the number of scenarios studied as operating characteristics proposed evolve during discussion
	+ Expected increase in time and need for restudies when developers submit application with uncertainty regarding operating schedules
* Fast tracking of specific ESS application types to be reviewed
	+ Reverse power relaying limitations
	+ Load threshold for behind the meter applications
* Local municipality interconnection requirement impacts (e.g. Energy Storage System Permitting and Interconnection Process Guide For New York City Lithium‐Ion Outdoor Systems)
* ESS paired with other Distributed Generation (other than solar)

*Massachusetts ESS implementation*

* Mike Conway mentioned MA ESS implementation and challenges that have popped up:
	+ Queue explosions of ESS projects
	+ ESS being added to existing solar projects already in the queue
* Mike feels NY should anticipate these issues and get ahead of them if possible

*Follow up*

* SI to comment on JU notes by 9/21/2018.

**Multiple DER Meter Configuration**

Background

* Multiple DERs with different energy values
	+ PV: VDER
	+ Wind: NEM until 0.3% Cap is reached
	+ CHP: VDER if ≤ 10 kW
	+ ESS: Multiple possible valuations
* Expected increase in Commercial PV + Storage
* Updated Utility admin role
* New applications for Metering Departments

Issues

* Utility Concerns
	+ Inverter night-time load (1W – 4W per String Inverter)
	+ Administrative Work
	+ Visibility / Monitoring
* Industry Concerns
* Correct Valuation and Billing
* Expensive Metering Equipment
	+ New Service Costs: ($10k - $50k)
		- Utilities would like SI to provide examples to better understand the issues and see if there are alternate solutions to these service costs
	+ Required Primary Metering ($30k – $50k)
	+ Expensive CTs ($5 - $10k)

**CESIR Standardization Efforts**

* Clustered costs
	+ Be aware that some of the CESIR cost data is for multiple projects