Date: February 3rd, 2020

To: Jason Pause, Electric Distribution Systems
Office of Electric, Gas & Water
Department of Public Service
3 Empire State Plaza, Albany, NY 12223

From: New York Solar Energy Industries Association & ITWG Industry Group

RE: 12/18/2019 ITWG Meeting Follow-Ups - Interconnection Milestone Deliverables

Per the request of the DPS and JU, the Industry discussed internally what changes to the existing Interconnection Milestone Deliverables (e.g. Pre-Application Report, Preliminary Screening Analysis, Supplemental Screening Analysis, Coordinated Electric System Impact Review, Detailed Study) they would like to see. The following is the result of those internal conversations and reflects the Industry’s latest opinion:

1.0 Current State - Interconnection Milestone Deliverables

In order to review the Industry’s proposed changes, please see how these milestones are incorporated into the interconnection process today [Figure 1].

[Figure 1: Utility Interconnection Milestone Deliverables]
2.0 Pre-Application Report - Industry Requested Changes:

The Industry recognizes that the pre-application report has been immensely useful in the DER development life-cycle, however, we would like the ITWG to revisit the data points provided in this report in order to increase their usefulness as the market and interconnection challenges change.

2.1 Current State:

- 2.1.1 See Appendix D in the Standard Interconnection Requirements - 2019

2.2 Industry Ideal Future State:

- Include All Existing Data Points

- Include Additional Data Points:
  - Status of Circuit Voltage Regulation Backfeeding Protection
  - Status of Substation Voltage Regulation Backfeeding Protection
  - Status of Substation GFOV Protection
  - Substation GFOV Threshold
  - Peak and Minimum Load Curves
  - Time-Stamp When Report Was Generated
  - Load Zone
  - Substation Queued & Interconnected DER
  - Interconnection Process Costs Including:
    - Cost of Application
    - Cost of Supplemental Screening Analysis
    - Cost of Coordinated Electric System Impact Review
    - Cost of Available Detailed Studies
  - Unit Cost Guideline for Major Upgrades Such As:
    - Cost of Substation 3V0 (if applicable)
    - Cost of Line Extension Per Mile
    - Cost of Utility PCC SCADA & Protection Equipment
    - Etc.

- Process Changes:
  - Pre-Application Report may be requested by the developer in parallel to the interconnection application being submitted.
  - Standard Template in SIR updated to reflect agreed-upon changes
3.0 Preliminary Screening Analysis - Industry Requested Changes:

3.1 Current State:

- See Appendix A at the end of this document.

3.2 Industry Ideal Future State:

- Include all updated data points from the ‘Industry Ideal Future State
  Pre-Application Report’ OR allow developers to request the pre-application
  report at the time of the application which will establish the system conditions in
  which the analysis was conducted

- Provide developers with an updated pre-application report if an application is
  submitted after the receipt of the original pre-application report which will
  establish the system conditions in which the analysis was conducted.

- Include Additional Data Points:
  - Circuit Peak and Minimum Load Curves
  - Unit Cost Guideline for Major Upgrades Such As:
    - Cost of Substation 3V0 (if applicable)
    - Cost of Line Extension Per Mile
    - Cost of Utility PCC SCADA & Protection Equipment For Various
      System Sizes & Generation Types
    - Cost of Customer Transformer Replacement For Standard
      Customer/Residential Interconnections
    - Cost of Substation Transformer Replacement
  - Estimated Cost for Failed EPS Equipment Identified in Screen C
    (Example shown in Appendix C)

- Revisions to Screens:
  - All Screens: ITWG to review all screens and determine how to implement
    with Energy Storage System, CHP, and Wind applications
  - Screen C: Screen should identify all EPS equipment located between POI
    and substation so that developers know exactly what equipment ratings
    they exceeded. See Appendix C for an example of our recommended
    deliverable.
  - Screen E: Screen should identify all line sections on the circuit bounded
    by automatic sectionalizing devices upstream of the DER including their
15% peak load value. The Industry also recommends utilizing visual representations of the circuit to assist in screen clarity. See Appendix D for an example of our recommended deliverable.

○ Screen F: The Industry does not have any recommended changes for this evaluation, however, the Industry requests that the JU perform long-term analytics on the usefulness of the stiffness factor threshold of 25 in identifying potential voltage issues found in the Supplemental or CESIR. This will allow for future refinement of the threshold.

• Process Changes:
  ○ Add revised ‘Preliminary Screening Analysis Template’ to the Standard Interconnection Requirements 2020
  ○ Publish example results to the ITWG website
  ○ Attach developer submitted application Layout and Site Plan to the end of the application. This will ensure that the utility and the developer are completely certain of the proposed project’s specifications.

4.0 Supplemental Screening Analysis - Industry Requested Changes:

4.1 Current State:

○ See Appendix G of the Standard Interconnection Requirements - 2019

4.2 Industry Ideal Future State:

• Include all updated data points from ‘Industry Ideal Future State Pre-Application Report’ establishing the system conditions in which the analysis was conducted

• Include Additional Data Points:
  ○ The potential cost of upgrades for failed screens (i.e. Unit Costs for equipment failures

• Revisions to Screens:
  ○ All Screens: ITWG to review all screens and determine how to implement with Energy Storage System, CHP, and Wind applications

• Process Changes:
- Add ‘Supplemental Screening Analysis Template’ to the Standard Interconnection Requirements 2020
- Publish example results to the ITWG website
- Attach developer submitted application Layout and Site Plan to the end of the application. This will ensure that the utility and the developer are completely certain of the proposed project’s specifications that were evaluated

5.0 Coordinated Electric System Interconnect Review (CESIR) - Industry Requested Changes:

5.1 Current State:

- See Appendix B at the end of this document.

5.2 Industry Ideal Future State:

- Include all data points from existing ‘CESIR Template’
- Include Additional Data Points:
  - Addition of Pre-Project and Post-Project results for each screen
  - Addition of Pre-Mitigation and Post-Mitigation results for failed screens
  - Appendix section with Circuit Diagram identifying sections or equipment impacted by the proposed project
  - Standard delivery of ground fault & impedance data:
    - Positive (+) and Zero (0) Sequence Impedance ($Z_{(\pm)} \& Z_{(0)}$)
    - Identification of Resistive and Reactive components of Impedance
    - If per-unit is used, identification of $Z_{BASE}$
  - Standard cost table across the JU similar to those shown in Appendix E and Appendix F or a standard list of minimum requirements for cost tables including but not limited to:
    - Include a minimum of three-distinct subsections:
      - Distribution Upgrades
      - Substation Upgrades
      - New Service/PCC Upgrades & Equipment
    - Line-item breakdown into a minimum of two-distinct subsections:
      - Material & Equipment
● Labor
 ● If Applicable - Overhead, O&M, or Miscellaneous
 ■ Estimated Upgrade Costs with and without Contingency

● Revisions to Screens:
  ○ All Screens: ITWG to review all screens and determine how to implement with Energy Storage System, CHP, and Wind applications
  ○ Industry requests that the ITWG revisit Voltage Fluctuation screens and review the recommendations in ‘Section 7.0 - Power Quality’ from IEEE 1547-2018. The group should also review the work that EPRI has done on guiding utility screens based on IEEE 1547-2018.
  ○ Industry requests that the ITWG revisit Effective Grounding screens and adapt the latest IEEE 62.92.6 methodologies into a standardized approach to evaluating grounding for various DER technologies

● Process Changes:
  ○ Add ‘CESIR Template’ to the Standard Interconnection Requirements 2020
  ○ Publish example results to ITWG website
  ○ Attach developer submitted application Layout and Site Plan to the end of the application. This will ensure that the utility and the developer are completely certain of the proposed project’s specifications.

6.0 Detailed Study - Industry Requested Changes

6.1 Current State:

● One standard Detailed Study analysis across JU: Flicker Time-Series Analysis

6.2 Industry Ideal Future State:

● Standardization of Detailed Study parameters for Flicker Time Series Analysis to be published in the Standard Interconnection Requirements - 2020
 ● Additional Standard Detailed Study options across the JU:
   ○ Time-Series Analysis for Voltage Regulator and LTC Tap Movements
   ○ Detailed Temporary and Transient Overvoltage or Grounding Study
   ○ Etc.
7.0 Conclusion:

The Industry appreciates the opportunity to express our recommendations to the JU and DPS in how we believe the interconnection process deliverables should be changed to continue to support the constantly growing and ever-changing renewable energy market. We believe that the incorporation of these suggestions would allow the market to continue to flourish without putting an exorbitant amount of burden on the utilities.
APPENDIX:

A. Preliminary Screening Analysis Template - January 2019

B. CESIR Template - August 2018

C. Preliminary Screening Analysis - Screen C Recommended Deliverable

D. Preliminary Screening Analysis - Screen E Recommended Deliverable

E. CESIR - Cost Table Deliverable - Example #1

F. CESIR - Cost Table Deliverable - Example #2
APPENDIX C - Preliminary Screening Analysis - Screen C Deliverable

Screen C: Is the Electric Power System (EPS) Rating Exceeded?

Does the maximum aggregated generation or loading capacity connected to an EPS (existing and approved prior to application) exceed any EPS ratings (modified per established utility practice)?

- Yes (Fail Screen)
- No (Pass Screen)

Below is a list of the equipment between the proposed POI and the interconnection substation along with their thermal rating, bi-directional functionality, and upgrade cost.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Location</th>
<th>Thermal Rating</th>
<th>Bi-Directional Enabled?</th>
<th>Estimated Upgrade Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/0 AL</td>
<td>POI to [X] Rd.</td>
<td>109 Amps</td>
<td>N/A</td>
<td>$100/ft</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FAIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fuse</td>
<td>Pole [X]</td>
<td>90 Amps</td>
<td>N/A</td>
<td>$3,000</td>
</tr>
<tr>
<td></td>
<td>@ [X] Rd.</td>
<td>FAIL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GOAB Switch</td>
<td>Pole [X]</td>
<td>200 Amps</td>
<td>N/A</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>@ [X] Rd.</td>
<td>Pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3/0 AL</td>
<td>[X] Rd. to [X]</td>
<td>300 Amps</td>
<td>N/A</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Rd.</td>
<td>Pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recloser</td>
<td>Pole [X]</td>
<td>300 Amps</td>
<td>No</td>
<td>$10,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pass</td>
<td>FAIL</td>
<td></td>
</tr>
<tr>
<td>Sub TB1</td>
<td>[X]</td>
<td>400 Amps</td>
<td>No</td>
<td>$50,000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pass</td>
<td>FAIL</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX D - Screening Analysis - Screen D Deliverable

If the aggregate DER capacity on any medium voltage line section (existing and approved prior to application) is less than 15% of the annual peak load for all line sections bounded by automatic sectionalizing devices upstream of the DER?

- Yes (Pass Screen)
- No (Fail Screen)

OR

<table>
<thead>
<tr>
<th>Line Section</th>
<th>Sectionalizing Device</th>
<th>Proposed Project</th>
<th>Additional Projects</th>
<th>15% of Peak Load</th>
<th>Pass or Fail?</th>
</tr>
</thead>
<tbody>
<tr>
<td>POI to [X] Road</td>
<td>3P Recloser</td>
<td>400 kW</td>
<td>0 kW</td>
<td>500 kW</td>
<td>Pass</td>
</tr>
<tr>
<td>POI to [X] Road</td>
<td>3P Recloser</td>
<td>400 kW</td>
<td>5 MW</td>
<td>1200 kW</td>
<td>FAIL</td>
</tr>
</tbody>
</table>
APPENDIX E - Cost Table Deliverable - Example #1

<table>
<thead>
<tr>
<th>Upgrade Budget Category</th>
<th>Upgrade Details</th>
<th>Estimated Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Substations Upgrades</td>
<td>Equipment Components</td>
<td>Qty</td>
</tr>
<tr>
<td>PT's for Reclose Blocking</td>
<td>PT's, steel modifications, etc.</td>
<td>1</td>
</tr>
<tr>
<td>Upgrade Substation Transformer LTC (Reconfiguration)</td>
<td>Reconfigure Backwith M-2001 controls</td>
<td>1</td>
</tr>
<tr>
<td>Upgrade Feeder Relays (Reconfiguration)</td>
<td>SEL-351A &amp; SEL-501 to be upgraded on existing panel or breaker black</td>
<td>1</td>
</tr>
<tr>
<td>New Business Upgrades</td>
<td>Equipment Components</td>
<td>Qty</td>
</tr>
<tr>
<td>Now Service – Primary Metering on customer pole</td>
<td>3 PTs, 3 CTs, test switch, wire</td>
<td>1</td>
</tr>
<tr>
<td>Install New Distribution Pole</td>
<td>Wooden distribution pole, guy wire</td>
<td>1</td>
</tr>
<tr>
<td>Estimating</td>
<td>Design work</td>
<td>N/A</td>
</tr>
<tr>
<td>Permitting/Surveying</td>
<td>Highway, Railroad, etc.</td>
<td>N/A</td>
</tr>
<tr>
<td>Tree Trimming</td>
<td>Trimming easements</td>
<td>N/A</td>
</tr>
<tr>
<td>Project Management</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Distribution Upgrades</td>
<td>Equipment Components</td>
<td>Qty</td>
</tr>
<tr>
<td>Install New Viper at PCC</td>
<td>3-Ph Electronic recloser, control box, Sensus radio, cable network 1C 4/0, Cu Wire, Switch Disconnect 600A, Ground Rod, Vice top, cutout, fuse, connector bar, connector wedge, program recloser</td>
<td>1</td>
</tr>
<tr>
<td>Upgrade Upstream Protection Settings Pole</td>
<td>Reprogram upstream recloser setting for coordination and reclose black</td>
<td>1</td>
</tr>
<tr>
<td>Replace Existing Fusng Recloser at pole</td>
<td>Remove fusng, install electronic recloser, control box, Sensus radio and program for reclose block</td>
<td>1</td>
</tr>
<tr>
<td>Replace Existing Fusng Recloser at pole</td>
<td>Remove fusng, install electronic recloser, control box, Sensus radio and program for reclose block</td>
<td>1</td>
</tr>
<tr>
<td>Replace Existing Fusng Recloser at pole</td>
<td>Remove fusng, install electronic recloser, control box, Sensus radio and program for reclose block</td>
<td>1</td>
</tr>
<tr>
<td>Convert Single Phase Line to 3-Phase from pole to POI</td>
<td>Conductor, poles, crossarms, guy wires</td>
<td>N/A</td>
</tr>
<tr>
<td>Replace Existing Grounds with 600A Disconnects at POI</td>
<td>Remove Existing Solid catouts and replace with 600A Disconnects</td>
<td>1</td>
</tr>
<tr>
<td>Replace Existing Grounds with 600A Disconnects at POI</td>
<td>Remove Existing Solid catouts and replace with 600A Disconnects</td>
<td>1</td>
</tr>
<tr>
<td>Replace Existing Grounds with 600A Disconnects at POI</td>
<td>Remove Existing Solid catouts and replace with 600A Disconnects</td>
<td>1</td>
</tr>
<tr>
<td>Install Switched Cap</td>
<td>Capacitor bank, controller</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: This is an example of one utility’s cost table previously provided to a developer to be used for discussion purposes only. This table fulfills all of the Industry recommended minimum requirements outlined in Section 5.2 of this document.
**APPENDIX F - Cost Table Deliverable - Example #2**

<table>
<thead>
<tr>
<th>Distribution Modifications</th>
<th>Planning Grade Cost Estimate not Including Tax Liability</th>
<th>Capital portion for calculating tax liability</th>
<th>Tax Liability Applied to Capital</th>
<th>Customer Cost Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Material</td>
<td>Labor</td>
<td>Overheads</td>
<td>Pre-Tax</td>
</tr>
<tr>
<td>Distribution System Modifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protection and Control Package - Reclosers, Switches, and Poles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Controller</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regulation: existing feeder voltage regulator between the Point of Interconnection (POI) and located on</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rebuild/Convert 500 feet of 4.8 kV to 3.3 kV to a FCL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replacement of one set of 300A/5kA disconnect switches on: Pole no. 30 Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pole No. 30 Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pole No. 30 Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install three 15 kVA ratio transformers east of the POI on 30 Road</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Install one set of 500A disconnect switches east of the ratio transformer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-System Costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer Documentation Review, Field Verification and Wire Testing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substation Modifications</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35kV Installation of T-212 &amp; T-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>715 kV/CU/4 and Structures, Relaying, Control, Wiring, Communications, LTC Controller</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Setting changes of 715 kV Station 311 W</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distribution Summary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Station Summary</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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