Non-wholesale DER Observability

DER Subcommittee
5/21/18
Feedback from last meeting

- Review how communication process to non-wholesale DER will work during an emergency
- Determine how to handle confidential issues
- Communication process to munis/coops
• Identify non-wholesale DER so it can be mapped/modelled
  – Primarily use EIA860 data
  – TO ensures critical information is accurate (so it can be modelled for PCLLRW tool)
    • PJM Transmission Substation
    • PJM Voltage
    • PJM Equipment Name
  – Other information optional (based on availability and ability to release to PJM)
• Communication to non-wholesale DER during grid emergency
  – Augment existing communication process
    • Local issue - use PJM PCLLRW tool for communication to TO
      – TO will communicate downstream as necessary to non-wholesale DER through EDC or muni/coop as necessary
    • Wider area issue – use existing emergency procedure communication, list of all NWDER in zone available through PCLLRW tool to TO.
Generic Substation from PJM Operator Training

- Loads represented by Triangles ("Jenkin A", "Jenkin B", "Jenkin C")
- Loads are at different voltage levels (230 & 69 kV).
- Depending on the facility overloaded, the loads (and NWDER at the loads) have different impact.
- BTM location determines if the facility is a *Help* or a *Hurt*. 
Non-wholesale DER Use in Operations Load Shed Scenarios

Example:
Jenkins 59 TR Overload

- Flow going from 230kV towards 69kV network
- NWDER at Jenkin A would aggravate (Hurt) the Jenkins 59 TR overload
- NWDER at Jenkins B or Jenkins C would reduce (Help) the flow down the Jenkins 59 TR.
- Depending on impedance of the Series 1 Reactor, Jenkins B may Help more than Jenkins C.
PJM Emergency Operations Manual (M-13):

- **Load Shed Directive**
  - Local in nature;
  - Typically to protect a single piece of transmission equipment.

- **Manual Load Dump Action**
  - Wide-area System issues;
  - Typically to protect the System from collapse.

Overload / System Issue Occurs

PJM Directs TO to curtail load:
Protect equipment / System 1st!!!

Bring on NWDER help(s), if any:
If not on already & prolonged issue

Restore % of load while ensuring equipment within limits / System reliability
Protect the System & Equipment 1st!

- Operators have very little time to take action to protect an overloaded piece of equipment or System emergency;

  1\textsuperscript{st}: Resolve the issue (Load Shed is fastest solution);
  2\textsuperscript{nd}: Refine the solution (via NWDER);
  3\textsuperscript{rd}: Restore load as conditions permit.

Location, Location, Location

- Knowing where significant NWDER exists is nearly as important as knowing its existence;
- Operators need this information ahead of the emergency;
- Chasing down such information during an event gives the Operator another problem when they need it the least.
<table>
<thead>
<tr>
<th>Method</th>
<th>UC#</th>
<th>Use Case</th>
<th>Local Load Shed event - local (use PCCLRW - list of help/hurt and unknown but in zone)</th>
<th>Area wide Manual Load Dump (use current notification process, list of NWDER for each zone available in PCCLRW)</th>
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<tbody>
<tr>
<td>PJM&gt;TO&gt;EDC&gt;DER</td>
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<td>AEP (TO) to implement load shed to meet need. AEP (TO) reviews PCCLRW and coordinates with APCO (EDC) during prolong event on NWDER contact/availability.</td>
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<td>2</td>
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<td>Since this is triggered on TO load shed plan, it may be confusing to go directly to EDC. Also, need to sort out notification issues (PCCLRW)</td>
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PJM/TO annual DER identification/verification process

• Identify non-wholesale DER resources and associated information
  – PJM to start with public information (EIA860) and create/update list
  – PJM to reconcile list for resources that are currently in the wholesale market (front of meter or DR).
  – PJM to provide complete list which identifies NWDER plants to TO
  – TOs to verify/update information or add additional plants
    • Required information
      – Transmission substation, voltage and equipment name (enables accurate PCLLRW mapping)
    • Optional
      – Information is available (EDC/TO already captured)
      – Information can be made available to PJM
        » PJM will keep confidential and only PJM, EDC and TO have access
• See excel worksheet with required/optional data and associated source
• PJM non-wholesale DER needs
• Current Btmg data collection form
"Non-wholesale" DER observability

- Non-wholesale DER – generation (including storage) that does not participate directly in the wholesale markets (either as "front of meter" generation or demand response) and is used to self-serve load
  - Behind the Meter Generation (BTMG)
    - Cogen/CHP, emergency diesel, CTs, batteries, solar, etc.
  - Non-retail Behind the Meter Generation (NRBTMG)
    - Primarily Muni/Coop generation
DER data collection/validation and communication channel

Critical link

~30

EDC 1

EDC 2 (muni)

EDC 3

EDC 4

Cust 1

Cust 2

Cust 3

Cust 4

Cust 5

Cust 6

~25 IOU
~10 G&T orgs
~200 Muni/Coops

~500 > 1 MW DER
~100 > 10 MW DER
Why does PJM need non-wholesale DER information?

- **System Operations**
  - Address System issues/mitigate manual load dump (i.e.: Sturgis)
    - Coordinate post-contingency load shed plan
  - Operational awareness for communication process
  - Improve short term load forecast and/or better understand load forecast variance
- **Planning**
  - RTEP load flow studies (may model explicitly as gen or implicitly through load forecast)
  - Improve long term load forecast or better understand load forecast variance
- **Manage existing NRBTMG and BTMG requirements (including telemetry & metering)**
Description of each data entry field is given in PJM Manual 3A, Appendix D.

http://www.pjm.com/~media/committees-groups/subcommittees/dms/postings/btmg-submission-form.ashx