Grid Modernization Annual Report technical session

March 14, 2019

Technical Session Purpose

- Ensure that the information that the Companies include in their Annual Reports regarding the deployment of devices/technologies at the feeder/substation level can serve the functions identified in DPU 15-120/121/122 (at 198-201).
  1. Provide transparency regarding the level of visibility, command and control, self healing attained on each feeder
     - Number of customers served by those feeders
  2. Allow for aggregation to view performance at higher levels of the system (e.g., by substation, region, or system-wide)
- Purpose is **not** to revisit
  - the Companies' proposed performance metrics (or baselines), or
  - the benefits that the deployment of Grid Mod devices/technologies will provide

Technical Session Agenda

- Background
- Tables regarding status at feeder/system level
- Tables regarding deployment feeder/system level
- Table regarding Distributed Energy Resources
- Tables regarding spending/updates
- DOER Comments
  - Companies' Response
- Next Steps

Background

DPU 15-120/121/122 (May 10, 2018)

- Grid Mod Metrics
  - approved infrastructure metrics (at 198-201)
  - directed Companies to submit proposed performance metrics (at 201-204)
- Grid Mod Reports (at 112-113)
  - Term Report
  - Annual Report

Companies' Performance Metrics Filing (Aug 15, 2018)

- Proposed performance metrics

BACKGROUND (CONT.)

Hearing Office Memo: Request for Comments - Annual Reports (Jan 10, 2019)

- Proposed formats for information to be included in Reports (at 2-4)

Initial and Reply Comments (Feb 6 and Feb 20, 2019)

- Companies
- DOER
- Cape Light Compact

Performance Metric Technical Session (Feb 13, 2019)

Feeder/Substation Tables
Companies' Feb 6 Comments

- Request clarification regarding Summary table (at 3-4)
  - Department staff clarifies that the Summary table was included for illustrative purposes only
- Propose additional columns (at 4) *(refer to Cos' Feb 6 Spreadsheet: Tab "Infra Metrics – Feeder–SS2")*
  - Department staff supports Companies' proposal
    (see DOER Feb 20 Comments at 3 regarding uniformity)
- Propose common terminology/additional rows (at 5, 9) *(refer to Cos' Feb 6 Spreadsheet: Tab "Infra Metrics – Feeder–SS2")*
  - Department staff supports Companies' proposed terminology
    (see DOER Feb 20 Comments at 4-5 regarding uniformity)

Feeder/Substation Tables
Companies' Feb 6 Comments (cont.)

- Propose modifications to status table (at 6-7)
  - *See slide 9, below*
- Propose separate tabs, to enable Department and stakeholders to sort and query data more efficiently and effectively (at 3)
  - *See slide 23 below*
- Propose to include only those feeders "that have been impacted by grid modernization investments" (at 4)
  - *See slide 24 below*
- *Department will use Companies' revised version of tables as starting point for discussion to follow*

Privileged, confidential, protected communication, for the intended recipient only

FEEDER CHARACTERISTICS

- The Companies did not propose any revisions to the Department's proposal
  - (refer to Cos' Feb 6 Spreadsheet: Tab "Infra Metrics - Feeder-SS1")

STATUS: FEEDER/SUBSTATION

- Companies state that they are unclear as to what would constitute achievement of "full" or "partial" for "Level of Automation," Sensor Capability," and "DMS Load Flow Modeling" *(Cos' Feb 6 Comments at 6)*
- In response to Companies' comments, Department staff proposes revisions to the Status Table

  (see Spreadsheet: Tab "Feeder Status")

  - Staff discusses each status category in slides 10-14, below

Status: Feeder/Substation DMS Power Flow and Control

- A substation will be determined to have DMS power flow capability when all feeders are modeled daily with no unwarranted voltage or capacity violations over a consecutive 30-day period (Companies' Aug 15 Filing at 13-14)
- Clarifying question – Can feeders served by the same substation have different levels of DMS power flow capability?
  - Modeled and tested
  - Modeled but not tested
  - Not modeled

Status: Feeder/Substation Control Functions

- A feeder will be determined control function capability when all "fully automated" devices deployed on the feeder can be automatically controlled by DMS commands (Companies' Aug 15 Filing at 14-15)
- Clarifying questions
  - Is DMS power flow capability a pre-condition for a feeder having control function capability?
    - i.e., can feed that is not modeled have control function capability?
  - Can feeders served by the same substation have different levels of control function capabilities?
    - Fully automated devices controlled by DMS commands
    - Fully automated devices not controlled by DMS commands

Status: Feeder/Substation VVO

- Feeder status is
  - VVO-enabled
    - w/ baselines, or
    - w/o baselines
  - Not VVO-enabled
- Should Companies report status of VVO baselines for VVO-enabled feeders?
- Clarifying question – Can one feeder served by a substation be VVO-enabled, while a second feeder served by the same substation not be VVO-enabled?

Status: Feeder/Substation Fully/Partially Automated

- Definitions (Companies' Feb 6 Comments @ 6,8-9)
  - Fully automated circuit
    - Completion of intended deployment of devices
    - Obtained optimal levels of visibility, command & control, and self-healing
  - Partially automated
    - Enablement of elements, but not full implementation
    - Obtained partial levels of visibility, command & control, and self-healing
- Feeder status
  - Fully automated
  - Partially automated
  - Not automated
- Clarifying question - Can feeders served by the same substation have different levels of automation capabilities?

Status: Feeder/Substation
Reduced Automated Zone Size

- Feeder status
  - Automated zone size reduced, or
  - Automated zone size not reduced
- Clarifying question - Can one feeder served by a substation have a reduction in its automated zone size, while a second feeder served by the same substation not have such a reduction?

Status: Feeder/Substation
Automated Zone Size Target

- Eversource has established targets on maximum # customers affected by outage conditions (cite)
  - East – 1000 customers
  - West – 500 customers
- Do the other companies have similar targets?
- Staff proposes that those companies that have established such targets should report information on the number of feeders for which the company has met the specified target

Status: Feeder/Substation
Revised Table - Populated

- Based on the discussion from the previous slides

See Spreadsheet: Tab "Feeder Status Populated"

STATUS: SYSTEM

- The information reported in the Feeder Status table should allow the Department and stakeholders to calculate the following system-wide information regarding the feeders for which they have attained the status "categories" discussed in slides 10-15, above (VVO-enabled, Fully Automated, ADMS Load Flow Modelling, Control Functions, Reduced Zone Size)
  - # feeders/% of total feeders
  - # customers served by those feeders/% of total customers
  - # MWh delivered through those feeders/% of total MWh

See Spreadsheet: Tab "System Status"

Status: System Projections/Targets

- Discussion regarding whether each company establishes internal projections/targets for each of the status "categories" discussed in the previous slides.
  - If so, Department staff proposes that each company include in its Annual Report a comparison of its actual and projected performance for each of these categories

Distributed Energy Resources

- Companies propose to report following data for each technology/fuel type on a substation/circuit basis (see, e.g., NGrid Aug 15 filing at 6-7)
  - #
  - nameplate capacity
  - estimated output
  - type of unit
  - nameplate as % of peak load
- Department staff supports Companies' proposal
  - Consistent with comments form Cape Light Compact

See Spreadsheet: Tab "DERs"

Deployment: Feeder/Substation

Three Issues

1. Some devices/technologies will be deployed at the substation level
   - Department staff proposes a way in which the feeder/substation deployment tables could identify such devices/technologies (*see Spreadsheet: Tab "Substation Deployment"*)
2. The Control Functions status refers to fully automated devices *(as defined in, for example, Grid Aug 15 Filing at 5-9)*
   - Department staff proposes that the deployment tables distinguish between fully and partially automated devices (*see Spreadsheet: Tab "Fully Automated Devices"*)

Deployment: Feeder/Substation (cont.)

3. It appears the Companies propose to use one set of common investment categories to report deployment (as set forth in their Feb 6 Comments), and a different set of common device types to calculate their System Automation Saturation and Circuits with Installed Sensors metrics *(see, e.g. Grid Aug 15 Filing at 5-9)*
    - Department staff proposes that the Companies use the common investment categories set forth in their Feb 6 Comments to calculate the above metrics

- Note: The Substation Deployment and Fully Automated Devices tabs are for discussion purposes only, to inform potential revisions to the tables regarding Feeder/Substation Deployment During and At End of Plan Year

DEPLOYMENT/STATUS

- DOER Feb 20 Comments (Exh. 1) – Description of which investment enabled Grid Mod benefits, and how the investments relate to the benefits
- Department staff proposes a way in which the Companies could report information that ties feeder deployment to feeder status for discussion purposes only *(see Spreadsheet: Tab "Deployment-Status")*

Separate Tabs

- The Companies propose to report feeder characteristic, deployment, status, and DER information in separate tabs (Cos' Feb 6 Comments at 3)
  - enables Department and stakeholders to sort and query data more efficiently and effectively
- Staff proposes that feeder characteristics, status and DER be reported on same tab
  - allows for aggregation of status and DER data at sub-system levels (e.g., at town level) without cross-referencing tabs

Feeders to Be Reported

- The Companies propose to report on only those circuits that have been "impacted by grid modernization investments"
- Department staff proposes that the Companies include all feeders in their feeder/substation tables
  - Allows for more complete calculation of data (e.g., % of total) at sub-system levels

System Deployment/ Spending

Companies' Proposal

- Updated Projections table (Companies' Feb 6 Comments @ 3)
  - Report full capital spending (as opposed to spending on investments that have been placed in service)
    - Provide more holistic views of progress made under plans
- System Level table (Companies' Feb 6 Comments @ 7)
  - Report spending on investments that have been placed in service
    - Consistent with cost recovery filings

System Deployment/ Spending (cont.)

Clarification

- The 2018 Annual Report will include only the Updated Projections table
  - For 2018, there are no reported projections against which to compare actual performance
  - For 2019 and 2020, there is no revised projections to compare against reported projections (which are included in the Updated Projections table)

    Refer to Cos' Feb 6 Spreadsheet, Tab "Infrastructure Metrics – System"
- For future years, the Annual Reports will include only the System table
  - the Updated Projections table intended for the 2018 Annual Report only *(see Jan 10 Hearing Office Memo at 2-3)*

System Deployment/ Spending (cont.)

Staff Proposal

- In reporting **actual** spending, the Companies should report both full capital spending and spending on investments that have been placed in service

  See Spreadsheet: Tab "Updated Projections"

- In reporting **projected** spending, the Companies should report both types of spending information, if available

DOER Comments

Companies' Response

Summary of Tables

- Feeder Characteristics/Status/DERs
- Feeder/Substation Deployment During Plan Year
- Feeder/Substation Deployment at End of Plan Year
- System Status
- Updated Projections

Annual Report Outline

- See handout

Next Steps

- Distribute
  - Outline for 2018 Annual Report
  - Revised tables
- Comments on Revised Tables and Outline for 2018 Annual Report