Planning Procedure 12

Procedure for Distributed Energy Resource Data Collection

Dan Schwarting

(413) 535-4073 | DSCHWARTING@ISO-NE.COM

Planning Procedure 12 Overview

Proposed Effective Date: September 2024

- ISO-NE proposes a new Planning Procedure to formalize and standardize the data collection of size, location, and characteristics of Distributed Energy Resources (DER)
- Distribution providers would be responsible for providing installation-level data on DERs connected to their system
- Transmission providers would be responsible for providing basic data to translate feeder IDs into substation names and other identifying information

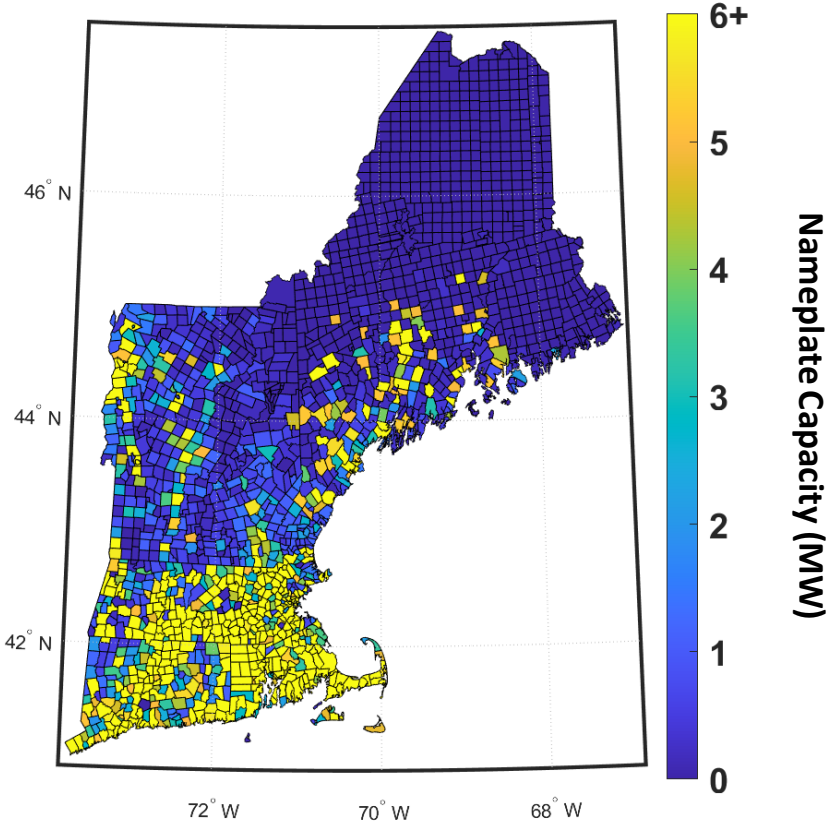
Background

- ISO-NE currently collects data on DER installations through a voluntary DER survey
  - Data format and data quality vary among providers
  - Not well suited for co-located generation/storage facilities
  - Until recently, the DER survey did not include information on the electrical location of DER, limiting its use for some applications
  - Results of DER survey distributed via the Distributed Generation Forecast WG (example)
- ISO-NE learned from numerous distribution providers that additional data is often available beyond what is requested in the DER survey
- ISO-NE proposes to create a more formal process with a uniform format for providing data on DER installations
  - Both the current process and new process would cover all types/fuel sources of DER

Benefits of Proposed New Process: Load Forecasting

- DER installed capacity data are used to quantify and model DER load reductions over time in support of long-term, short-term, and real-time load forecasting objectives
- Modeling of historical and forecast DER is needed at all timescales (*e.g.*, at intervals of 5 minutes, hourly, etc.) and spatial resolutions (*e.g.*, load zone, substations, etc.)
- More accurate forecasts and historical accounting lead to more efficient market outcomes and less uncertainty in system operations and planning

Installed DER PV Capacity, December 2023
Regional Heat Map



Note: Heat map color scale represents total nameplate installed capacity per town

Benefits of Proposed New Process: System Modeling

- Benefits for data submitters:
  - A consistent data format, with clear expectations of data to be included
  - Clear timelines and a robust data request procedure
  - Better accuracy of system models provided to stakeholders
- Benefits for ISO-NE:
  - Less time spent on data validation and processing
  - Less uncertainty – data will be complete and in desired formats
  - Ability to convert into different data types/formats
  - Ability to quickly pull data for quick turnaround of case builds
  - Single source for DER, rather than different data being spread across different groups within the ISO
- Better accuracy in models provided to external groups, such as the Multi-Regional Modeling Working Group (MMWG)

Benefits of Proposed New Process: Transmission Planning

- Proper accounting for the location, size, and type of DER will lead to more accurate study outcomes
  - DER's electrical location affects distribution of net load, and thus loading on transmission lines and bus voltages
  - Complete information on electrical location will ensure the accuracy of Needs Assessments and other planning studies, and help the region target transmission system needs most effectively
- Information on DER in-service dates will help ISO-NE appropriately size and locate transmission system upgrades related to DER
  - For example: IEEE 1547-2003 legacy DER in the proposed New England 2034 Daytime Minimum Load Needs Assessment

Benefits of Proposed New Process: Transmission Service Studies

- In order to perform accurate interconnection studies for both FERC and non-FERC jurisdictional studies, high-fidelity DER data is needed
  - DERs are modeled in steady state, stability, short circuit, and EMT studies
  - DER data informs assumptions used in interconnection studies
- ISO-NE currently collects high-fidelity data for proposed DERs through the I.3.9 process, but this only applies to future projects > 1 MW
  - Information for projects > 1 MW can become stale and inaccurate due to changes in in-service dates and other parameters before the project enters commercial operation
  - Projects ≤ 1 MW are modeled generically, and location cannot be collected through the I.3.9 process
- Inaccurate DER data being used in interconnection studies could result in:
  - Erroneous violations and project impacts being observed
  - Real violations and project impacts being missed
  - Improper mitigations and interconnection upgrades being developed
- A formalized process to collect higher-fidelity DER data would allow the ISO to develop more accurate assumptions and models
- A formalized process would also allow the ISO to better track the transition of projects from a planned project to a commissioned project, making studies more accurate
- Collection of more accurate and higher-fidelity DER data supports more accurate interconnection studies and more efficient/faster study timelines for FERC- and state-jurisdictional generation projects to interconnect to the transmission system

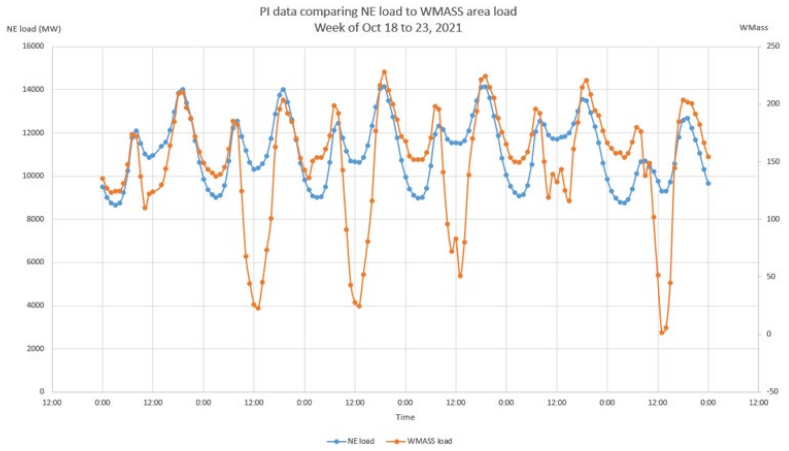
Benefits of Proposed New Process: Operations

- Displacement of traditional generation by DER leads to voltage control and transient stability challenges
- Over time, high-DER scenarios such as midday minimum load conditions may elicit the most severe system response when studying all-lines-in and outage conditions for system operations
- Knowing the size and location of DER will impact generation dispatch assumptions when conducting analysis used to generate Transmission Operating Guides
- In many locations, DER lowers real power load without affecting reactive power load, leading to high voltage conditions
  - At present, steady-state high voltage is the predominant concern for conditions during the most challenging minimum load periods, predominantly during spring and fall
  - Knowing the quantity and location of DER will allow for better accuracy in assessing risk of high voltages and developing mitigation strategies to prevent equipment damage or out-of-merit generation commitments

Benefits of Proposed New Process: Energy Management System

- Growth in DER leads to negative net loads at high-DER substations during certain periods
- ISO's Energy Management System (EMS) cannot allocate load correctly among New England's substations when some net loads are negative
- Areas with high PV DER penetration do not follow the overall pattern of load in New England on sunny days
- Better DER data will allow for separate modeling of DER and load, leading to better accuracy in state estimation and other EMS applications in real-time operations and better accuracy in market outcomes
- Better DER data will also reduce EMS on-call issues and other maintenance actions

Rapid growth of negative loads at high-DER substations



Proposed Data Collection Process

- Distribution providers will be responsible for submission of data on an installation-by-installation basis, as with today's DER survey process
  - Data is already organized on an installation-by-installation basis by most distribution providers
  - Aggregating data by substation does not show the trends of various installation sizes required for accurate long-term DER forecasting
  - In-service dates and installation sizes lead to different protection assumptions, affecting modeling in transient stability simulations
- ISO understands that many distribution providers are currently implementing or upgrading systems for DER data management, making this a convenient time to standardize the format for data submission

Proposed Data Collection Process

- Proposed process would replace the current voluntary survey
  - Timeline would be identical, with three collections per year in January, May, and September
  - Depending on effective date of new Planning Procedure, new process would take effect at either the September 2024 or January 2025 data collection cycle
- Additional data necessary for modeling accuracy would be included
  - These additional data fields are limited to information that distribution providers likely have at hand already
  - Distribution providers will be responsible for providing a feeder ID for each installation, indicating its electrical location
  - Transmission owners will be responsible for translating distribution providers' feeder data into identifiers used in ISO-NE systems, including EMS substation names and PSS®E bus numbers
  - Transmission owners may assemble and submit data for many distribution providers, with agreement from all parties involved

Sample Data Fields To Be Collected

Within Scope of Proposed New PP12	Outside Scope of Proposed New PP12 (not requested or collected at this time)
Installation ID*	Real-time MW/MVAR output
Nameplate capacity (MW)	Address/other personal information
Date of interconnection	Inverter manufacturer/characteristics
Fuel type/unit type	Transient stability modeling data
Location (town/city/ZIP code)	Market participation characteristics
Distribution feeder connection	
Transmission substation connection	

* A unique installation ID is helpful in cataloguing and organizing data. This is intended to be a unique ID within a distribution provider's data – for example, an interconnection request number or work order number – but does not have to be unique among all distribution providers' data.

Proposed Data Collection Process

For each installation:

Data to be provided by distribution provider

- Size (kW)
- Fuel Type (PV, wind, gas, etc.)
- In-Service Date
- Location (town/city/ZIP code)
- Feeder ID
- Etc.

For each feeder ID:

Data to be provided by transmission owner

- Corresponding PSS/E bus number
- Corresponding ISO-NE EMS substation name
- Corresponding latitude/longitude of beginning of feeder
- Etc.

A full list of data fields requested, and a detailed description of each, will be included in future presentations.

Conclusion

- ISO-NE proposes a new Planning Procedure to formalize and standardize the collection of size, location, and characteristics of Distributed Energy Resources (DER)
- Uniformity in data submission will lead to better accuracy of load forecasting and studies at ISO-NE, in time frames from ten years into the future to real-time operations
- Draft procedure language to be presented at a future RC meeting

Stakeholder Schedule

Stakeholder Committee and Date	Scheduled Project Milestone
Reliability Committee **April 17, 2024**	Initial introduction & background
Reliability Committee **May 14, 2024**	Present draft procedure
Reliability Committee **June 18, 2024**	Present updated draft procedure; vote
Participants Committee **August 1, 2024**	Vote

Questions

Dan Schwarting

(413) 535-4073 | DSCHWARTING@ISO-NE.COM