



Data Call—Become a Data Partner

Costs Associated with Integrating PV onto Electric Power Distribution Systems

This project aims to advance the understanding of costs associated with integrating PV onto the electric power distribution system while maintaining reliable grid operations. We have developed a bottom-up framework for calculating these costs as a function of PV penetration levels on specific feeders. This framework will be used to inform and improve utility planning decisions, increase the transparency and speed associated with the interconnection process, and provide policymakers with more information on the total cost of energy from PV.

Our bottom-up cost approach hinges on having a robust database of unit costs for different components that might be deployed to mitigate any impacts of PV on the distribution system. We are collecting input data for this database. While statistics on unit costs will be made public, individual data and data sources will be kept confidential.

Synthetic Models for Advanced, Realistic Testing: Distribution Systems and Scenarios

The “Smart-DS” project specifically, and the GRID DATA program in general, aim to develop large-scale, realistic, validated, and open-access power system network models that overcome current challenges with finding realistic data sets for developing and testing advanced algorithms, analyses, and technologies for the grid. The data sets will catalyze new technology developments by enabling utilities and researchers alike to more fairly and easily evaluate the impacts, performance, and scalability of emerging technologies.

A key component of the project is an unprecedented nationwide survey of the distribution system. Our intent is to identify overall characteristics, the diversity of technical approaches, and where possible regional and national trends. Although the motivation for the survey is to provide a detailed technical basis for generating and validating the synthetic distribution data being produced, it will also represent an important research product in its own right by providing a comprehensive description of the U.S. distribution system to help inform other research and development toward the future power system. While the fully synthetic distribution network data and summary outcomes of the survey will be made public, the real system information from data partners will be kept confidential.

What You Get

As a data partner, you would not only help advance the future of distribution-level research but also have early access to the results of the survey to understand how your utility compares to nationwide trends or how your company’s costs compare with market trends. For the Smart-DS project, we would also provide you with system-specific summaries and representative feeder identities, as desired. In addition, we would also be happy to explore other value-added analysis based on partner-specific data sets, if desired.



How You Can Help—Specific Data Needs

Component Costs

Specific needs include data on the unit cost and maintenance cost of:

- Components of communication networks
- Platforms for interfacing with grid edge devices (e.g., gateway devices, network cards)
- Remote terminal units
- Smart meters
- Current and voltage sensors
- Advanced inverters
- DMS, ADMS, DERMS, and ANM software and systems
- Phasor measurement units
- Distribution capacitor banks
- Relays and reclosers
- Voltage regulators, conductor (cost per foot, multiple types), transformers and switchgear

Other data that would be helpful for validating our models include:

- Any data on the total cost of projects that involved implementation of DMS, DERMS, ANM, or ADMS
- Data on total cost of design, engineering, and integration of advanced communication and controls systems on the distribution grid
- Data on the total cost of any smart grid demonstration projects
- Interconnection studies

Please contact Kelsey Horowitz if you are interested in becoming a data partner on this project:

Kelsey.Horowitz@nrel.gov, 303-275-4347

Smart-DS Data

Specific data requests include:

- Service territory-wide data on all substations and associated distribution feeders, including:
 - MW-rating
 - Voltage level
 - Number and type of customers
 - Regulation equipment
 - Reconfiguration ability.

These could be shared as complete substation and feeder data (e.g., in CyME, Synergi, WindMil, or GIS) or as a summary in a spreadsheet template.

- Detailed technical data for a small number of representative feeders and their associated substations in a service territory (e.g. CyME, Synergi, WindMil, or GIS data). If desired, we can help identify the statistically most representative substation-feeder units based on the system-wide metadata.
- A description of your distribution system, approaches for planning, and future perspectives.

Please contact Bryan Palmintier if you are interested in becoming a data partner on this project:

Bryan.Palmintier@nrel.gov, 303-275-3926

National Renewable Energy Laboratory

15013 Denver West Parkway • Golden, CO 80401 • 303-275-3000 • www.nrel.gov

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Data Sensitivity and Disclosure

We recognize the sensitivity of these data and will use non-disclosure agreements (NDAs), secure data management, and other best practices to protect your raw system data. Any publications associated with the data set would contain only summaries, statistical results, and generalized analyses that are not attributable to specific data partners. It is also up to you whether you would like to share your identity or that of your organization, or if you would prefer to remain anonymous.