

Large Dynamic Digital Loads & Data Centers

Office of Electricity



Powering the Future of the Grid

The U.S. DOE Office of Electricity works with national labs and industry partners to tackle challenges and unlock opportunities for integrating large loads—*such as data centers*—into the electric grid. These efforts strengthen grid capacity, planning, and interoperability.

Voices of Experience (VoE)

Data Center Integration into T&D Systems

Pacific Northwest National Laboratory, Lawrence Berkeley National Laboratory, National Energy Technology Laboratory

- Focuses on information sharing, load forecasting, process improvements, and infrastructure expansion.

Contact & Resources

For recent papers or more details, email csdet@inl.gov to connect with our national lab partners.

Key Initiatives

Foundational Studies & Technical Solutions

Pacific Northwest National Laboratory, National Laboratory of the Rockies, Lawrence Berkeley National Laboratory

- Develop EMT and phasor models to assess grid reliability.
- Evaluate oscillation risks and maintain stability.
- Design controls for large loads and battery systems.
- Enhance protection systems for safe interconnection.

Grid Integration Solutions

Idaho National Laboratory

- Workshops, decision-support tools, and resilient grid design.
- Standardized utility–data center agreements.

Innovative Regulatory Approaches

Lawrence Berkeley National Laboratory

- Tariff planning and resource adequacy tools.

Planning & Siting Optimization

National Laboratory of the Rockies

- National-scale impact analysis and regional modeling.

Modeling Energy Growth (MEGA-DC)

Oak Ridge National Laboratory

- Geospatial modeling and transmission capacity analysis.

Secure Integration (SILVER)

Sandia National Laboratories

- Risk characterization and mitigation strategies.