

Prediction of Worldwide Energy Resources (POWER)

The POWER project serves as a bridge between NASA Earth observations and the specialized needs of energy development, sustainable building systems, and agroclimatology applications, supporting their integration into decision processes.



Dataset: POWER constitutes of EO and model assimilation datasets. We process and store community specific parameters from the core solar irradiance and meteorological datasets along with additional derived value-added parameters. The entire data catalogue is made available through our data services.

Data Services: We provide customized, validated and easily accessible NASA solar and meteorological data through diverse suites of tools and services.

Direct Data Access

Direct Access to all NRT ARD via AWS S3.

- Navigable Pages
- Full Catalog Access
- Available on Catalogs

API Services

Access for NRT ARD via RESTful Endpoints.

- External Integration
- Customized Selection
- Community Formats

DAV Website

Web Interface Access for NRT ARD via Services.

- Integrated Tutorial
- Responsive Design
- Simple User Interface

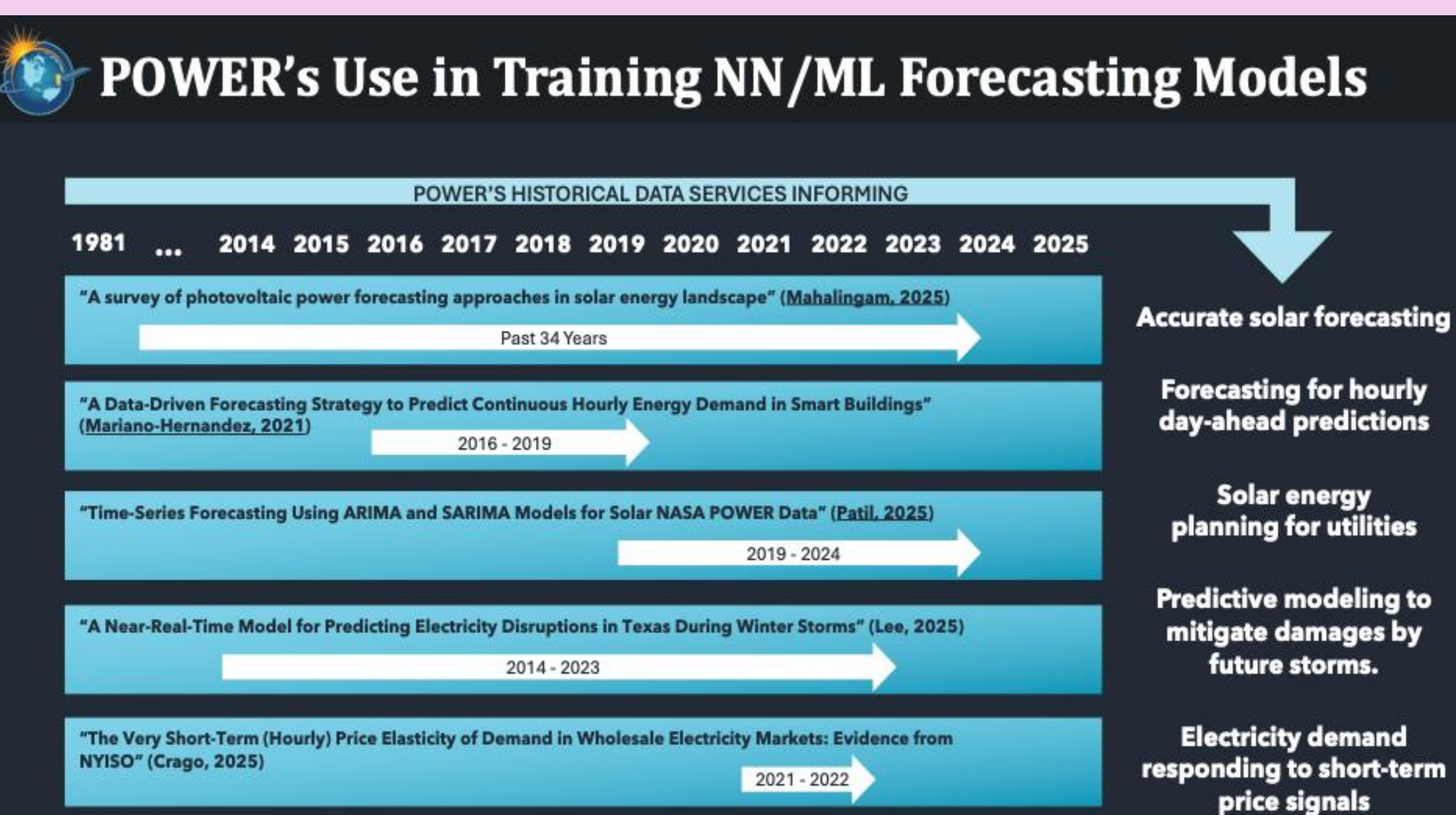
GIS Services

Geospatial Access for ARD via Image Services.

- Enables Map Views
- Useable in GIS Tools
- Available on Catalogs

Use Cases:

POWER's Use in Training NN/ML Forecasting Models



POWER'S HISTORICAL DATA SERVICES INFORMING

1981 ... 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

- "A survey of photovoltaic power forecasting approaches in solar energy landscape" (Mahalingam, 2025) - Past 34 Years - **Accurate solar forecasting**
- "A Data-Driven Forecasting Strategy to Predict Continuous Hourly Energy Demand in Smart Buildings" (Mariano-Hernandez, 2021) - 2016 - 2019 - **Forecasting for hourly day-ahead predictions**
- "Time-Series Forecasting Using ARIMA and SARIMA Models for Solar NASA POWER Data" (Patil, 2025) - 2019 - 2024 - **Solar energy planning for utilities**
- "A Near-Real-Time Model for Predicting Electricity Disruptions in Texas During Winter Storms" (Lee, 2025) - 2014 - 2023 - **Predictive modeling to mitigate damages by future storms.**
- "The Very Short-Term (Hourly) Price Elasticity of Demand in Wholesale Electricity Markets: Evidence from NYISO" (Crago, 2025) - 2021 - 2022 - **Electricity demand responding to short-term price signals**

Looking Ahead:

- POWER is advancing technology to improve data traceability and reproducibility and I/O performance, ensuring robust and scalable backend for AI driven Earth science workflows, including a dedicated AI agent and MCP server to support industry agentic applications.
- POWER continues to expand its data suite by integrating additional high-resolution geophysical parameters- including global MERRA-21C data, as well as CONUS-focused HydroSCS, NEX-GDDP, and TEMPO ventilation and pollution information, broadening accessibility to a wider range of Earth observation products to meet the evolving needs of its diverse user community.