



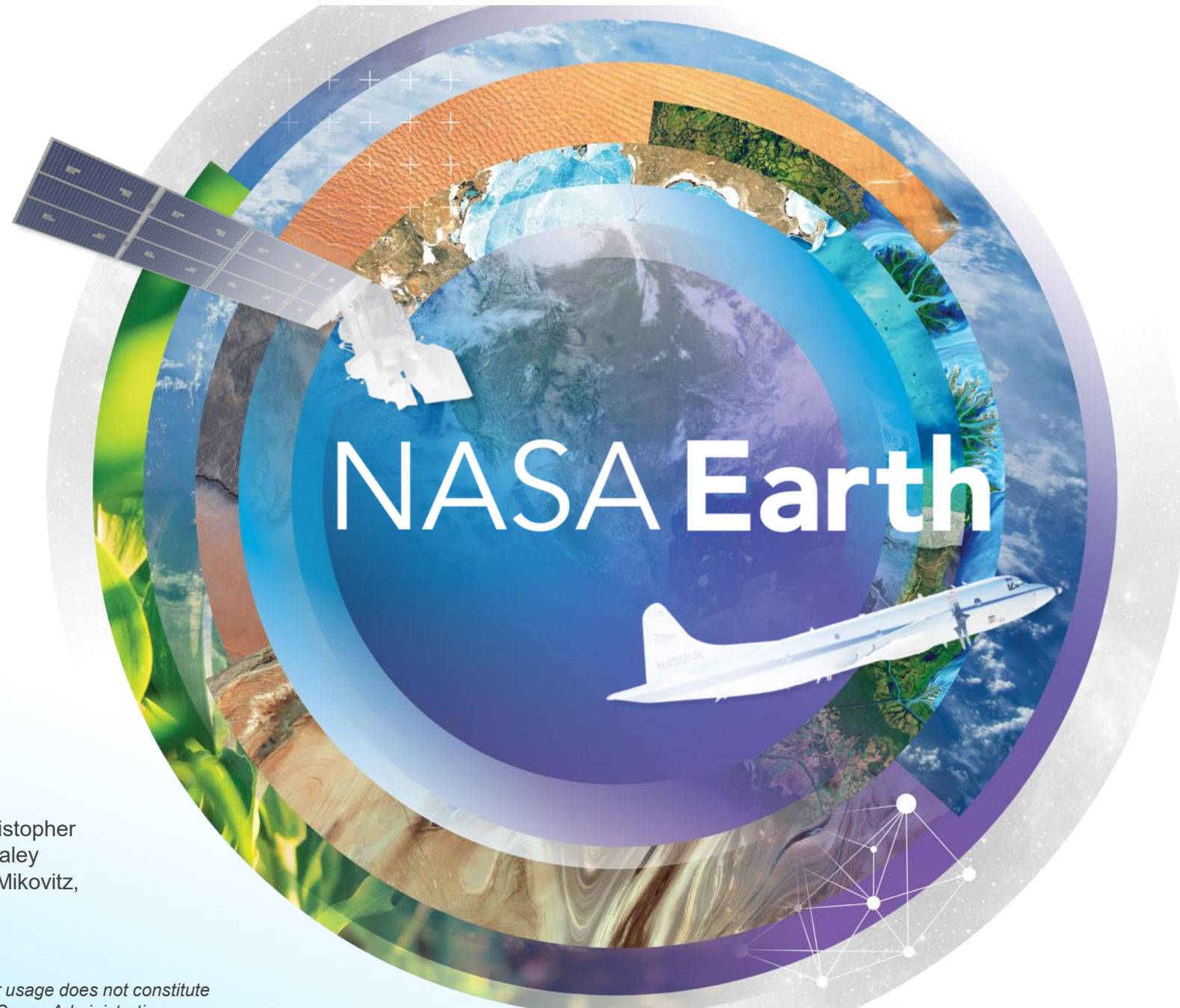
National Aeronautics and
Space Administration

The NASA POWER Project

Enabling Open Access to
Expansive, Real-Time
Earth Data

Principal Investigators: Dr. Paul W. Stackhouse, Jr. &
Dr. Falguni Patadia (NASA Langley Research Center)

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NASA Prediction of Worldwide Energy Resources (POWER) Project

NASA POWER improves the capability to integrate NASA Earth observations and model data specific to **surface solar irradiance and meteorological parameters** into decision processes related to energy, buildings, and agriculture.

- **No-cost**, no-account-needed.
- **Multi-decadal**, low-latency, high-accuracy, **community-specific** datasets offered in customizable units and formats.
- Hourly, daily, monthly, annual, and preset as well as custom climatology time scales at a global coverage.

Energy Development



Assisting in
Energy
System
Design

Building Systems & Infrastructure

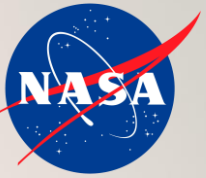


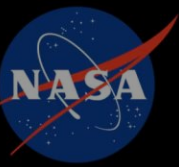
Informing
Building
Energy
System
Performance
& Resilience

Agroclimatology Applications



Enhancing
Food
Security





Data Requests

28

Years of POWER!




Since 2018 ...

837 Million Total Requests

1.8 Million Unique Users

163 Terabytes of Data Served

**Metrics cover 2018 to present and only include API.*

-  User Location
-  Request Arcs
-  Data Location



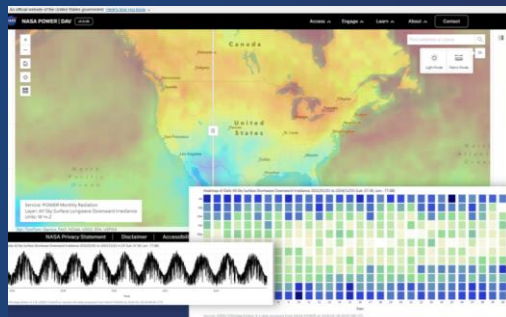
Enhancing Accessibility Through a Range of Tools & Applications



Application Programming Interface (API)

The API delivers analysis ready data for inputs to decision support tools, modeling and forecasting packages, and as inputs to scientific research.

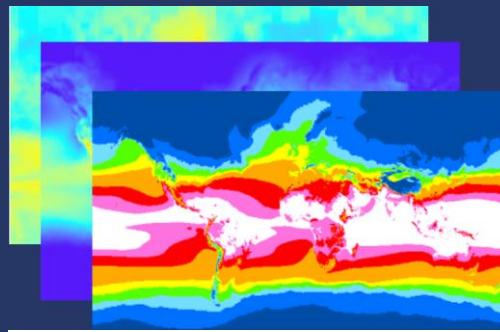
The API allows for direct integration into external applications and custom user scripts; users can submit a request, and a RESTful response will be returned in a web-compliant JSON standard.



Data Access Viewer (DAV)

The DAV is a web-based, cross-platform data access service that provides a simple user interface with interactive web elements and visualization capabilities.

The DAV allows users to select community specific parameters, units, time periods, and output formats among other features to efficiently retrieve data from the POWER archive.



Geospatial Services

POWER provides Esri ArcGIS Image and Feature Services allowing users to efficiently interact with POWER data in geographic information system (GIS) applications.

Image services for annual and monthly solar radiation and meteorology are available on NASA ArcGIS Online and Esri Living Atlas of the World.



Amazon Web Services (AWS)

Direct access to POWER's ~8.5TB of analysis ready data is provided through NASA managed AWS. The data follows open standards, OpenAPI, and GeoJSON. POWER datasets in AWS are near real time i.e., processed as soon as source data becomes available from source data providers:

Meteorological: ~2-3 days; Solar ~5-7 days



Multi-decadal, high-accuracy, community-specific datasets



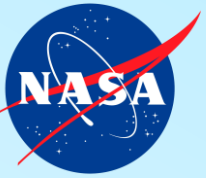
Hourly, daily, monthly, annual, & climatology scales w/ global coverage



Numerous access options ranging from an API, user interface application, & geospatial services



Customized data products, units, & formats for specific user communities (improves usability & lowers adoption costs)



POWER x Esri





POWER x Calcite

POWER utilizes the Calcite Design System in multiple web mapping applications.

- Integration within the ArcGIS for JavaScript SDK
- In-depth and organized documentation and offers plenty of customization options with in-page testing.
- Seamless look within panels and frictionless interactivity with the data and imagery services.

The screenshot displays the user interface for selecting data parameters and time extent. On the left, the 'Temporal Level' is set to 'Daily'. Under 'Parameters', 'Precipitable Water (PW)' is selected. A 'Parameters Search' box is visible. The 'Time Extent' panel shows a calendar for January 2020 with the 1st highlighted. Below the calendar, date range inputs are set to '1/1/2020' and '12/31/2024'. Latitude and longitude input fields are also present. The 'Solar Fluxes and Related' panel lists various irradiance and index parameters, with 'All Sky Surface Shortwave Downward Irradiance' selected.

Su	Mo	Tu	We	Th	Fr	Sa
29	30	31	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

Solar Fluxes and Related

- All Sky Surface Shortwave Downward Irradiance
- Clear Sky Surface Shortwave Downward Irradiance
- All Sky Surface Shortwave Downward Direct Normal Irradiance
- All Sky Surface Shortwave Diffuse Irradiance
- All Sky Insolation Clearness Index
- All Sky Surface Longwave Downward Irradiance (th
- All Sky Surface Photosynthetically Active Radiat
- Clear Sky Surface Photosynthetically Active Radiat
- All Sky Surface UVA Irradiance
- All Sky Surface UVB Irradiance
- All Sky Surface UV Index

Available in POWER's Data Access Viewer (DAV) at <https://power.larc.nasa.gov/data-access-viewer/>



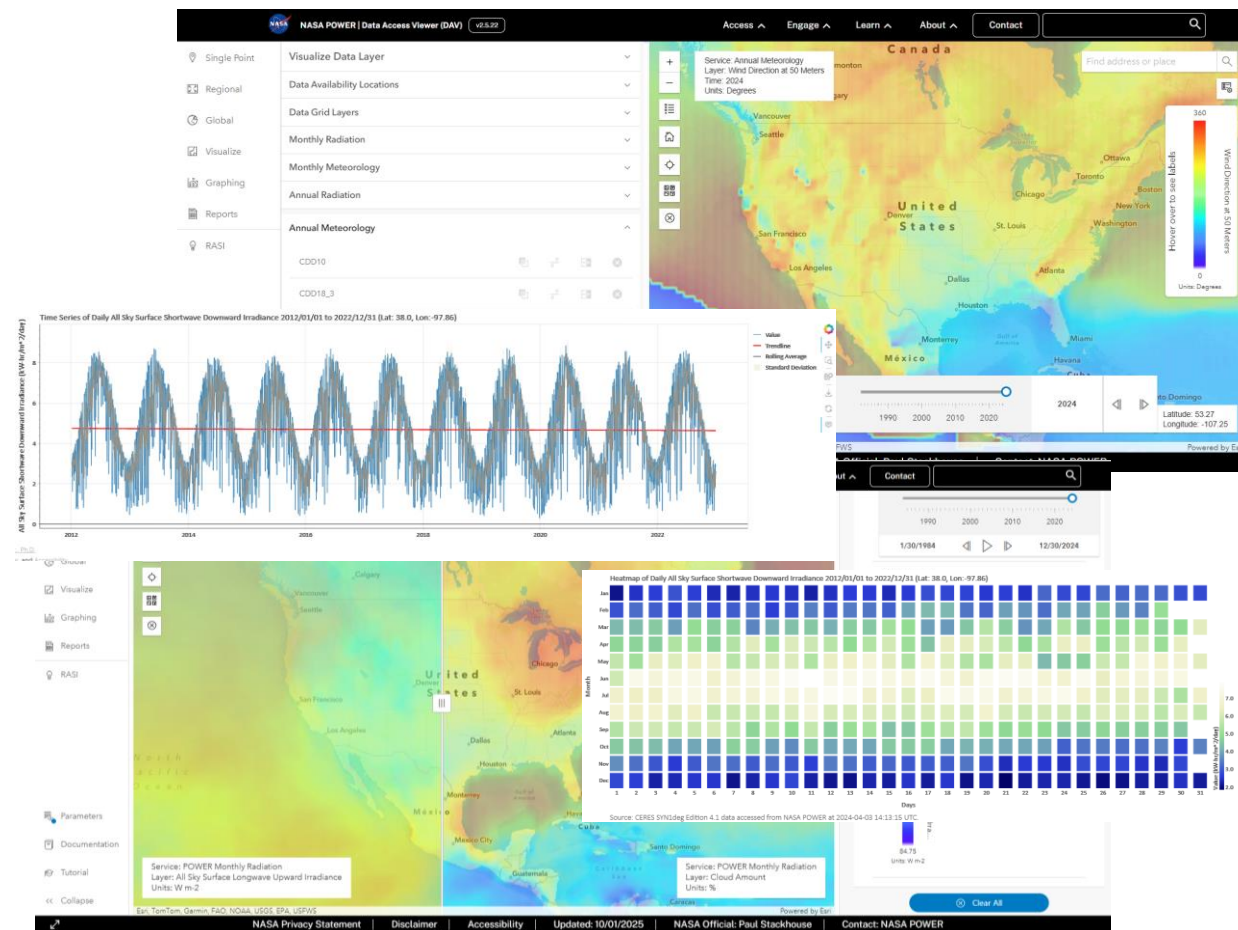
Data Access Viewer: Data Sub-setting, Downloading & Visualization

Enhanced user interface that enables:

- Selection of parameters based on community standards and units.
- Ability to download parameters in general and community-specific formats.

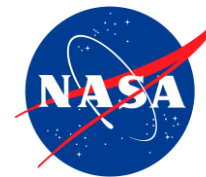
Visualization and charting of key data parameters such as:

- Thermal zones
- Anomalies
- Monthly heatmaps
- Annual cycles



Scan the QR to explore NASA POWER data

Integrated reporting capabilities such as standardized climatic design conditions derived from ASHRAE equations

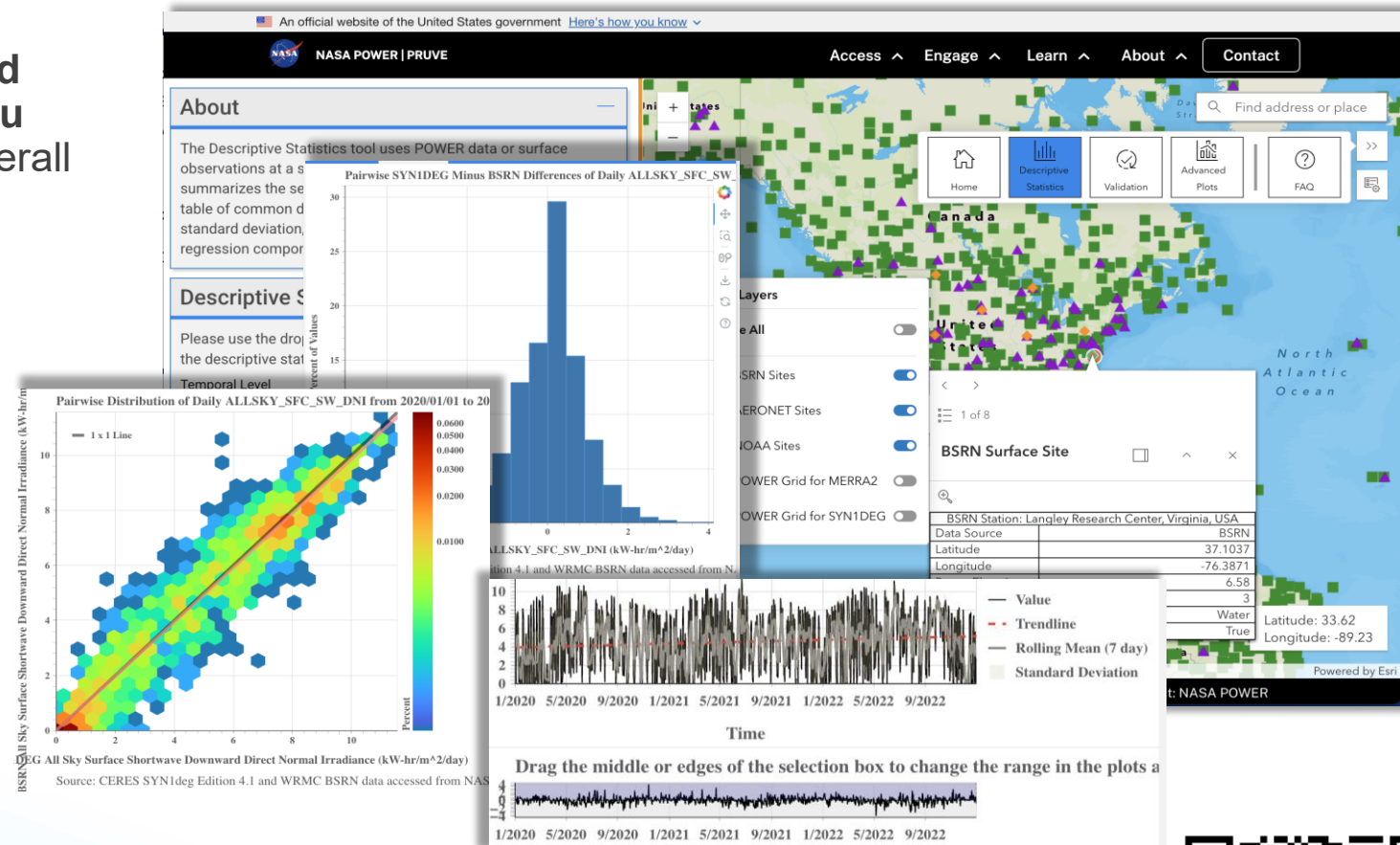


PaRameter Uncertainty Viewer: Statistical Analysis & Validation

PRUVE compares surface satellite-based and assimilation data products to in-situ surface site measurements, lowering overall level of complexity in assessing data uncertainty for both technical and non-technical users.

Capabilities:

- Solar and meteorological surface measurements
- Data visualization
- Descriptive statistics
- Validation analysis



* Currently a standalone tool with plans to transition into a feature of the DAV.

Meteorology comparison data from National Oceanic and Atmospheric Administration (NOAA) stations and solar radiation comparison data from the World Climate Research Programme's (WCRP) Baseline Surface Radiation Network (BSRN).

Scan the QR to
explore PRUVE





Geospatial Image Services

Imagery Layers

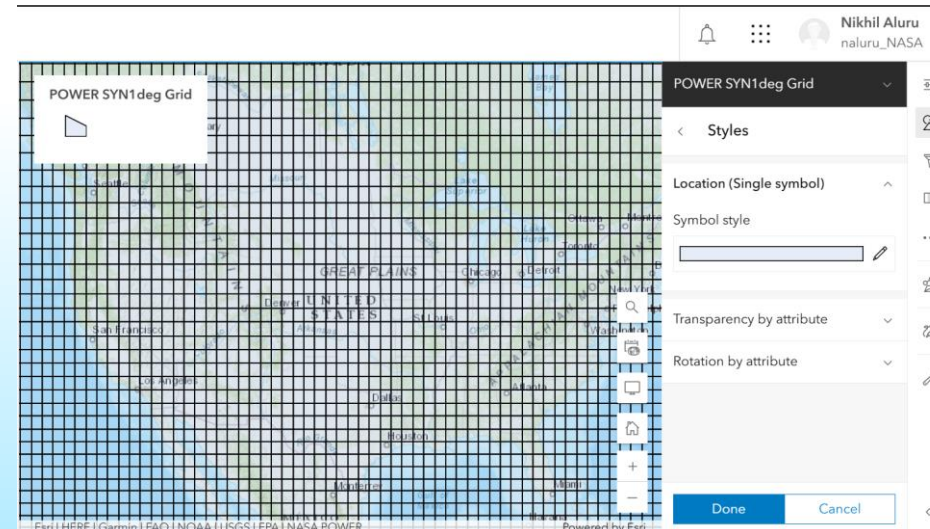
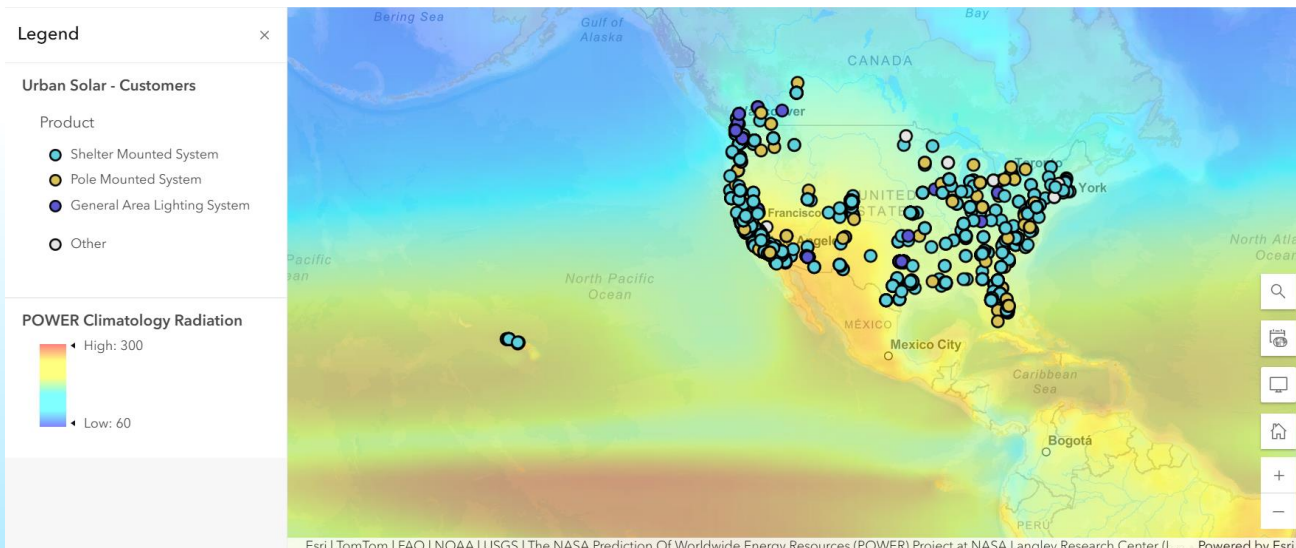
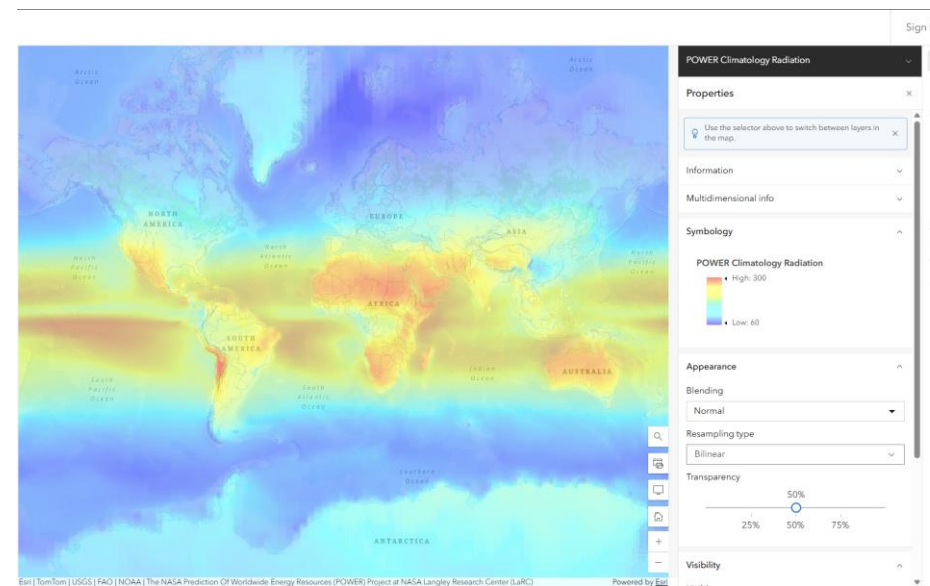
Serving POWER parameters to Esri users as raster data at scale.
On-the-fly processing and seamless integration with workflows.

Feature Layers

Serving data provider grids to further inform users on data provenance – what the data they are getting represents.

Miscellaneous Publications

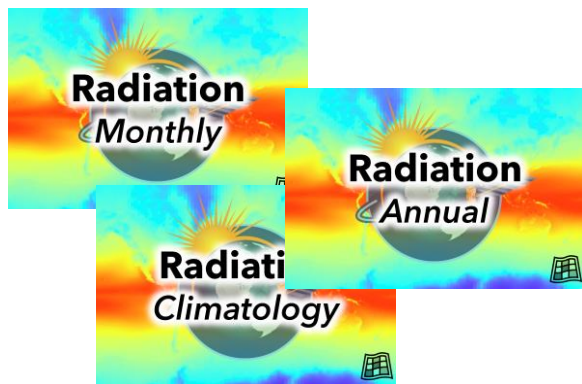
Using Esri Experience Builder for user needs.
ArcGIS Notebook to demonstrate POWER API access.



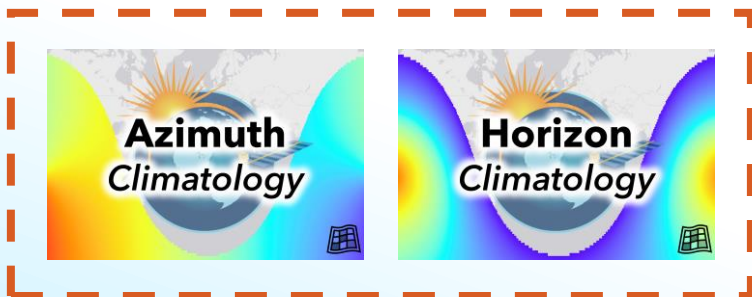
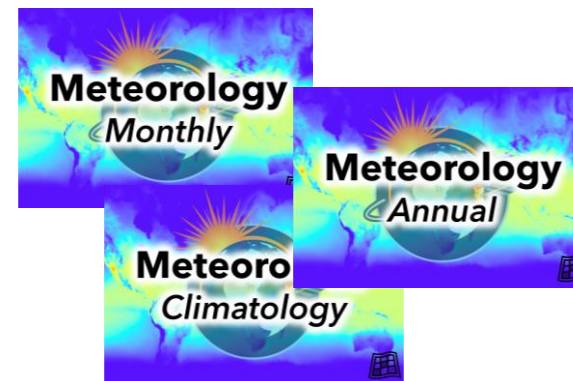


POWER Image Services

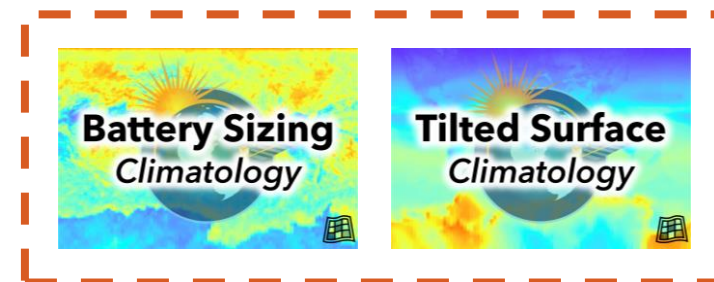
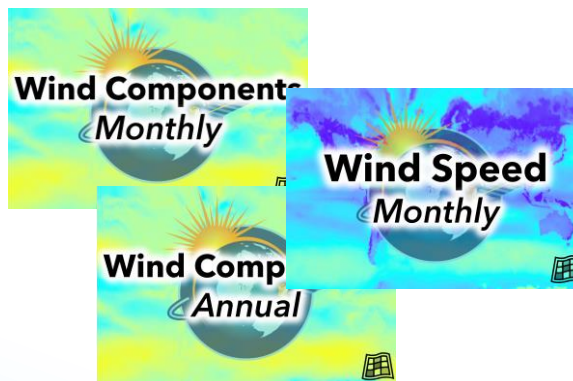
POWER's Esri ArcGIS geospatial services allow users to visualize and explore datasets as well as enable efficient interact of data with GIS applications and tools.



Climate Zones



Solar Geometry



Climatologies

Available on: Esri Living Atlas of the World & NASA ArcGIS Online



Data Access Viewer Demonstration

An official website of the United States government [Here's how you know](#)



NASA POWER | Data Access Viewer (DAV)

v2.5.38

Access ^

Engage ^

Learn ^

About ^

Contact

Single Point

Regional

Global

Visualize

Graphing

Reports

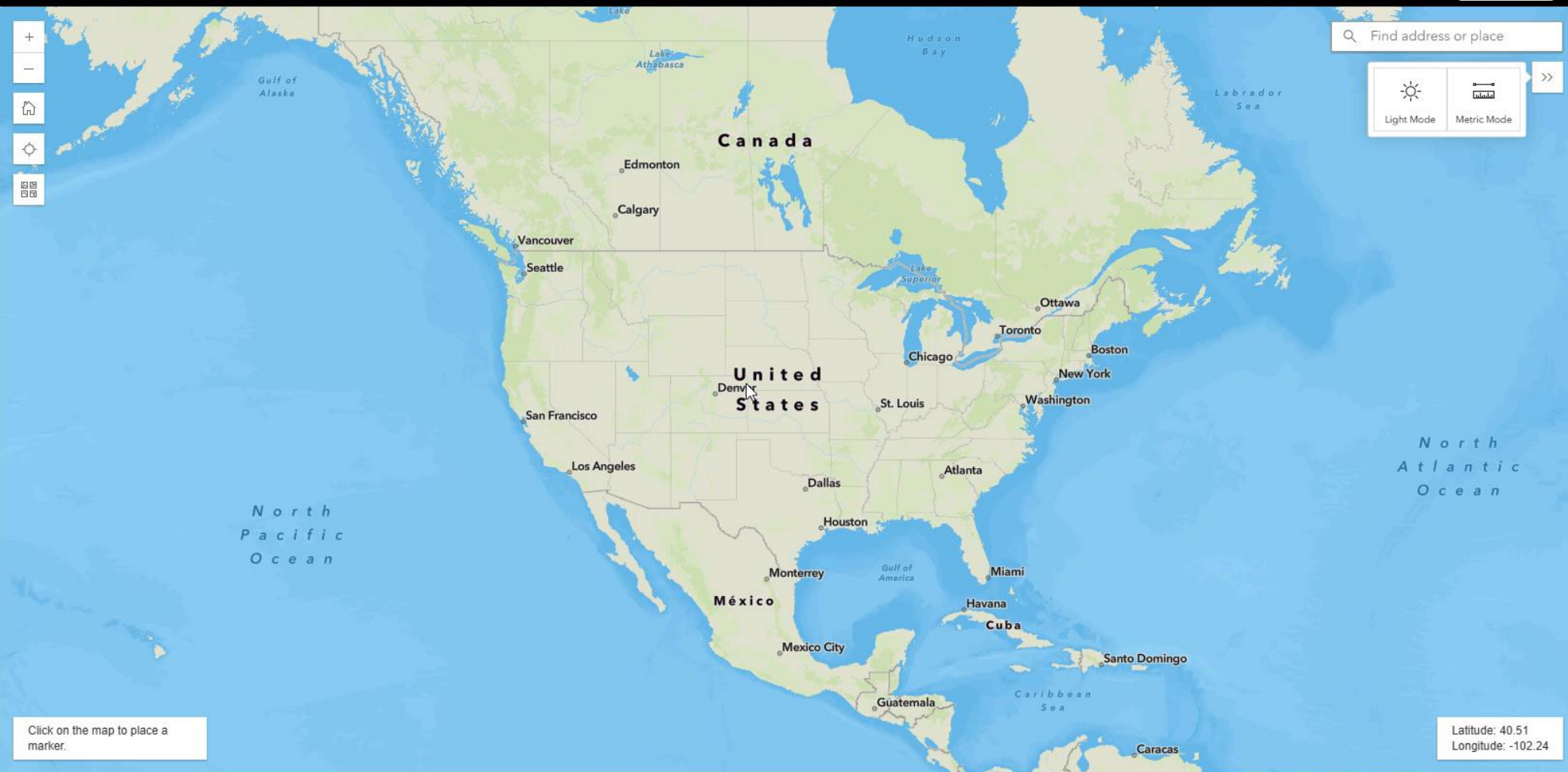
RASI

Validate

Parameters

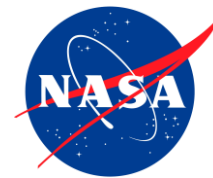
Documentation

<< Collapse



Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS

Powered by Esri



POWER's Global Impact

Energy Use Cases



Energy

Hydropower

Solar radiation, precipitation, temperature, humidity, wind, and surface data is used **across the hydropower value chain**, from site selection to inflow forecasting to power system optimization.



Energy

Utility

ACES used POWER data to conduct a market analysis comparing "dark calm" events to near-normal conditions to determine **more dependable energy solutions**.



Energy

Maritime Research & National Security

Saildrone leverages POWER solar data to **ensure energy output** for UAVs conducting oceanic research and military threat detection.



Energy

Government

A NASA DEVELOP team used POWER data to pinpoint optimal community solar sites, enabling Wilmington, Delaware to **advance affordable rooftop energy solutions for high-burden households**.

Join Us In-Person or Virtual at the 2026 Global Community Summit!

When: September 22-23, 2026

Where: Langley Research Center (Virginia) & Virtual

Highlighting this year's must-see moments:

- **NASA Recognition of Excellence Awards for RETScreen Expert Users:** Celebrate with us as we honor the outstanding achievements and innovative applications of RETScreen and POWER data across the global user community.
- **POWER User Community Panels & Lightning Talks:** Hear directly from practitioners, researchers, and stakeholders as they discuss real-world challenges, lessons learned, and emerging opportunities using POWER data.
- **Technical Deep-Dive Opportunities:** Participate in live demonstrations of POWER tools and new capabilities with the chance to ask questions and interact directly with our technical, science, and communications teams.





How to Stay Involved with POWER

Reach out to the POWER team directly with questions or feedback via email at larc-power-project@mail.nasa.gov.



Scan the QR code to visit the POWER website

The screenshot displays the NASA Prediction Of Worldwide Energy Resources (POWER) website. The main header reads "POWERing the Future of Energy, Infrastructure, and Agroclimatology" with a sub-header: "Enabling NASA Earth observations, modeling, and analysis for decision-makers worldwide to address the most pressing challenges posed by our environment and make decisions that enhance societal well-being." A "Sign Up for Updates" button is visible. Below the header is a search bar and three main navigation categories: "Parameters" (Explore our catalog of 300+ solar and meteorological data parameters), "Documentation" (Review data methodology, tutorials, and publications citing POWER data), and "Impact Stories" (Dive into stories demonstrating POWER's impact worldwide). A "Tools and Services" section includes "DAV Data Access Viewer" (Data accessing and visualization), "PRUVE Parameter Uncertainty" (Statistical analyses and visualizations), "API", and "GIS". The "Featured Stories and Events" section highlights "Impact Story: NASA POWER Helping to Sail the Oceans" (Enabling more accurate energy generation forecasting for solar and wind powered unmanned vessels used to study oceans and provide maritime security), "Data Methodology" (Review POWER data methodology), and "Annual Event: Global Community Summit" (Explore past Global Community Summit speakers and user-driven lightning talks). The footer contains navigation links for "Access" (Data Access Viewer, Parameter Uncertainty Viewer, Application Programming Interface, Direct Database Access, Geospatial Data Services), "Engage" (Communities, Impact Stories, Global Community Summit), "Learn" (Methodology, Project Questions, Training and Tutorials, Parameters Dictionary, Dashboards), and "About" (Team Members, Team Publications, Acknowledgements). It also includes a footer with "NASA Privacy Statement", "Disclaimer", "Accessibility", "Updated: 06/30/2025", "NASA Official: Paul Stackhouse", and "Contact: NASA POWER".