NASA Initiatives to Support Renewable Energy and Sustainable Infrastructure

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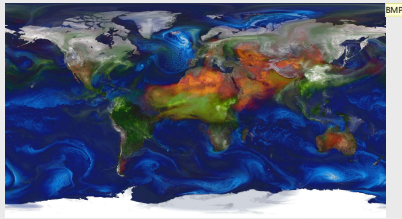
NASA & Earth Science

NASA is known as a space exploration agency, but NASA studies our home planet more than any other.



The Earth Science Division uses the vantage point of space to understand Earth as an interconnected system. Through observations of Earth's oceans, land, ice, and atmosphere, NASA Earth science helps people understand how Earth works, how and why it is changing, and what that means for humanity.

The Earth Science Division offers end-to-end development, launch, data collection and dissemination, research, analysis, and application of its missions.

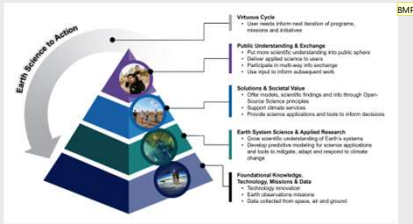


BMP(EAHI0)

Earth Science to Action

BMP(EAHI1)

NASA's Earth Science to Action Strategy seeks to we advance and integrate Earth science knowledge to empower humanity to create a more resilient world.



BMP(EAHI2)

Learn more about the strategy at: https://science.nasa.gov/earth-science/earth-science-to-action

NASA's Earth Action Program

Within the NASA Earth Science Division, the Earth Action section develops and applies Earth observations and scientific knowledge for private and public planning and decisions. Earth Action encompasses thematic program areas (see right) that were previously part of the Applied Sciences Program, as well as cross-cutting initiatives such as the interagency U.S. Greenhouse Gas Center.



BMP(EAHI3)

NASA's Energy & Infrastructure Applications Program

The Energy & Infrastructure applications program seeks to enable and expand the use of NASA Earth science observations, models, research, and analysis to support renewable energy, energy efficiency, and sustainable infrastructure activities that build resilience to global change.

NASA is delivering the Energy & Infrastructure program applications program objectives through the POWER project and initiatives under development.

NASA's Prediction Of Worldwide Energy Resources (POWER): Delivering Analysis Ready Data

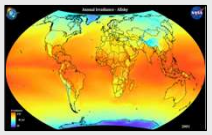
https://power.larc.nasa.gov

BMP(EAHI4)

The NASA Earth Science Division has delivered decades NASA scientific information to support the siting, orienting, assessment, and maintenance of solar energy projects. These activities are supported by the POWER Project, which fulfills an average of 110 million unique data requests per month. POWER offers:

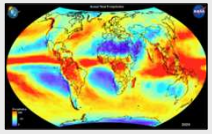
- No-cost, no-account-needed access to all of its tools, services, and decades of data
- Hourly, daily, monthly, annual & climatology scales at a global coverage
- Customized data products, units, & formats for specific user communities
- Numerous access options such as an API, user interface app, & geospatial services

POWER supports the renewable energy, building systems, and agricultural communities in integrating global NASA Earth Observations and model data relating to solar and meteorological information into their decisions using the below data sources:



POWER's Sources: Surface Solar Irradiance
- Time Span: 1984 - near real time
- Example parameters: irradiance (longwave/shortwave and upward/downward), UV index, earth skin temperature, cloud amount, and aerosol optical depth
- Data Sources: NASA's GEWEX SRB, CERES SYN1deg, & CERES FLASHFlux

POWER's Sources: Meteorology
- Time Span: 1981 - near real time
- Example parameters: heating/cooling degree days, precipitation, snow precipitation, soil wetness, humidity, wind speed/direction, and surface pressure
- Data Sources: NASA's GMAO MERRA-2, GMAO GEOS FP-IT, & GPM IMERG



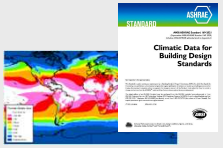
User Story: Urban Solar specializes in manufacturing solar power systems and lighting solutions, aiding communities by installing cost-effective and carbon neutral lighting solutions for projects such as parking lots and pathways. They used data form POWER's API to calculate the power generated by solar arrays, which informs the design and placement of their systems.



Partner Collaboration: RETScreen®, a clean energy management platform widely used by building engineers, uses POWER to pull in NASA historical and near real time solar and weather information, supporting a seamless connection between NASA science and its use for building energy efficiency analyses and decisions. These analyses include assessments of retrofitting existing buildings with renewable technologies and evaluating their benefits in terms of energy savings, cost savings and greenhouse gas emission reductions.



Partner Collaboration: POWER works with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to identify opportunities to incorporate NASA solar, meteorological, and climate projection information into ASHRAE building standards. NASA's Office of Strategic Infrastructure also uses this information for physical infrastructure operations and master planning to ensure resilience to potential future climate conditions.



Emerging Activities

NASA is currently expanding the sustainable infrastructure portion of the portfolio through several avenues.

Via an interagency collaboration, NASA is working with the American Society of Civil Engineers (ASCE) to improve the awareness and use of NASA Earth science observations, models, and science to support the development of civil engineering standards. ASCE is a Standard Developing Organization (SDO) ((fill this in)) . A pilot project starting this June will explore the use of airborne and satellite snow observations to improve estimates of roof load requirements (fill this in more). Pic of roof collapsing. Exploring building communities of practice .....

The program is also looking to expand opportunities related to green infrastructure in support of efforts to use Nature Based Solutions to support climate resilience.

NASA Opportunities

Funding : NASA issues numerous calls for proposals, including the ROSES omnbus solicitation, via the NSPIRES website. These include opportunities for early career researchers, as well as opportunities



Learning: ARSET

Data: data stuff, highlight free and open, blurb about open science

Slide 1

BMP(EAHI0 EO fleet picture? Shows how much NASA has in space right now just looking at the Earth
Broddle, Madison P. (LARC-E302), 2024-04-18T14:38:17.082

BMP(EAHI1 I think noting either the gaps NASA is trying to address or the key objectives could fit great here.
Broddle, Madison P. (LARC-E302), 2024-04-18T14:41:00.331

BMP(EAHI1 0 The bottom of this space could also be a QR code that leads to the strat plan. Something like "Interested in reading NASA's vision for the future of Earth Science?"
Broddle, Madison P. (LARC-E302), 2024-04-18T14:46:39.270

BMP(EAHI2 I have this pyramid I edited that has darker text and lines for easier readability.
Broddle, Madison P. (LARC-E302), 2024-04-18T14:42:33.348

BMP(EAHI3 If you have the PowerPoint this is coming from, I can change the globe's color.
Broddle, Madison P. (LARC-E302), 2024-04-18T14:47:05.486

BMP(EAHI4 Added in POWER's key differentiators (aka our biggest talking points) as well as images for each of the user stories.
Broddle, Madison P. (LARC-E302), 2024-04-18T15:45:09.390

BMP(EAHI4 0 For ASHRAE, if you have the NASA faciality image you wanted to put here, that'd be an easy swap. The current image shows the data we

provide to ASHRAE.

Broddle, Madison P. (LARC-E302), 2024-04-18T15:46:55.293