Enhancing the NASA Prediction Of Worldwide Energy Resource Web Data Delivery System with Geographic Information System (GIS) Capabilities

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The Description of the Prediction of Worldwide Energy Resource (POWER) Project

Renewable-energy technologies are changing the face of the world’s energy market. Currently, these technologies are being incorporated within existing structures to increase energy efficiency. Crucial to the success of the emerging renewable market is the availability of accurate, global scale radiation, and meteorology data. This poster outlines the history of the development of an effort to distribute data products from NASA’s research for use in the energy sector applications spanning from renewable energy to energy efficiency. These data have been used within renewable energy sector and wind power generation, agricultural crop modeling, and sustainable energy applications.

POWER Overview

- Objectives: improve the Nation’s ability to support decision making and economic growth in renewable energy and energy efficiency applications spanning from international to local scales.
- Major thrusts: Radiative fluxes and climate forcing, quantitative data sets to support studies of climate change, energy security, energy efficiency, renewable energy, regional and remote sensing climate services.
- Goals: development of services that link renewable energy, agricultural, and socioeconomic applications.

POWER (Prediction of Worldwide Energy Resource) is a NASA research project that provides energy resource data sets and parameters in a variety of formats including GIS compatible formats.

POWER partnerships and collaboration have resulted in significant improvements to the web site and format. The most important of these was the addition of the POWER Information Interface (POWERi). POWERi is an application which allows users to create custom data sets and parameters using the suite of GIS compatible formats.

New GIS Applications on the POWER web site

A recent focus has been to process, formulate and geographically enable current data to formats consistent with Earth and openGIS tools useful for decision support systems. Functions in development to improve upon the current site capabilities to produce data products, the by extending them beyond the single location to regional and global scales. A major improvement on the inclusion of GIS with POWER will be the development of Open Geospatial Consortium (OGC) compliant web services (WMS, WCS, WFS, and WMTS) to extend ArcGIS Image Services. This will provide additional data accessibility options and geoprocessing tools for the renewable energy and agricultural applications. This will result in improved functionality to the POWER web applications, allowing users to view and project images of their desired parameters in relation to larger geographical areas.

New GIS Applications on the POWER web site

• High quality viewing (Desktop/Mobile) and printing
• Data Extraction/Subsetting
• Simultaneous Dataset
• Visualization (Line graphs)
• Temporal Visualization
• Custom Color Ramps
• Pixel Attribute Value Identification at Selected Location

Summary and Conclusions

This poster summarizes the POWER project efforts to distribute data products necessary for the decision support tools useful for decision support systems spanning from renewable energy to energy efficiency. The poster outlines the importance of improving the energy sector’s ability to access renewable energy data. These improvements have resulted in greater accessibility of the data set, improved validation of data products to the new spatial resolution of ½ x ½ degree and the expansion into the POWER project. The parameters were increased spatially to ½ x ½ degree and temporally to daily averages. POWER increased the variety of methods for users to download data. These products were made available from NASA research data sets and parameters in a variety of formats including GIS compatible formats.

This model prediction driven approach to distribute data products provides an open computing platform for maps and geographic information, making it easy to create and share POWER data on useful and geographically intelligible maps.

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