Visualizing Energy Resources Dynamically on Earth (VERDE)

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Situation Analysis

Major power outages in the United States over the past decade have had a striking similarity: The lack of wide-area situational understanding contributed to blackouts and to difficulties managing the preparedness for and response to these destructive events. Real-time geovisualization capability characterizes the dynamic behavior of the electric grid across multiple regions, substantially accelerating the recovery from a large area power disruption.

Technology Pathway

The Energy Awareness and Resiliency Standardized Services (VERDE) situational awareness platform, developed at Oak Ridge National Laboratory, addresses the need for real-time status of the national electric grid and critical energy sectors. Eventually VERDE also will offer a "health status" of the nation's electric infrastructure to assist federal agencies (e.g., the Federal Emergency Management Agency [FEMA]) in coordination and response during major catastrophic events. VERDE takes advantage of over $3 million in research and development funded by the Department of Energy and the National Geospatial Intelligence Agency. Features include real-time electric grid status, energy infrastructure integration, real-time weather and other data streams, grid behavior modeling, and extreme contingency analysis.

VERDE has been developed as a viewing plaform for operational support missions. It is currently used by the Department of Homeland Security (specifically, the Industrial Control Systems Cyber Emergency Response Team and FEMA) and has been incorporated into US Northern Command's Situational Awareness Geospatial Enterprise. In addition, it has been displayed in the US Pacific Command/Northern Command's Smart Power Infrastructure Demonstration for Energy Reliability and Security joint capabilities technology demonstration to bring wide-area situational awareness to installation commanders. VERDE is an excellent choice as a common operational picture for the military and other federal agencies as well as for state and local government agencies.

VERDE Capabilities

- Real-time status of the US electric grid
- Real-time weather data integration
- Impacted population estimates via the ORNL-developed LandScan Population Distribution Database
- County-level outage information
- Multi-layer support with transparency
- Look-ahead restoration simulations
- All-hazard models (wildfires, earthquakes, winter storms, etc.)
- Flooding predictions
- Impacted population estimates
- Transportation and evacuation route status
- Restoration estimates
- Forecasts of cascading failures

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October 2014

ORNL 2014-G01160/chj