

Renewable Energy Says, It's Time to Take Me On.



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Utilities and ISOs have typically managed the unpredictability of wind and other intermittent energy sources by limiting reliance on them. Government mandates and social pressure to increase the percentage of renewable energy have effectively eliminated that option. It's time to realistically take on the challenge of intermittent energy resources.

No more avoidance. No more excuses.

Leading by example, the United States' largest independent transmission system operator began the trek to the intermittency solution with the first logical step: geospatial visual analytics. By combining real-time data on grid congestion, dynamic line rating, and weather shifts with predictive analytics and energy production forecasts, they are better able to integrate more renewable energy into the grid – under a variety of weather conditions.

Wind, temperature, humidity, cloud cover and other weather conditions directly influence energy production from renewable resources. Asset and line conditions influence balancing decisions. Further, assessment of weather shifts involves introduction of confidence samples for ramp-up and ramp-down estimations. This solution utilizes data and technology the ISO already had in place: a data historian, sensors, GIS, enterprise asset systems, real-time weather feeds and forecast data. With the addition of geospatial visual analytics, multisource data can now be correlated and geospatially plotted on satellite images, providing high-context location intelligence for balancing the challenges of line rating, wind ramps, and the availability of conventional energy resources. Further, delivery of timely alerts to operators improves situational awareness for faster, more confident action.

Rule-based load and contingency conditions with transmission constraints data enable more intuitive evaluation of available alternatives, including demand response, peaker plant use, ancillary services, and generation dispatch realignment. Moreover, the impact of alternative scenarios on the market, dispatch, and renewable subsidies can be simulated to inform optimal decisions.

Geospatial composite solutions like this can flexibly leverage existing investments in information and operational technology. When you can visualize real-time grid congestion, color-coded by line rating, overlaid with weather and sensor data correlated with historical demand data and juxtaposed with current and predicted energy flows from renewable sources, you have the means to accomplish a host of balancing decisions more quickly and confidently than in the past.



Screenshot of Space-Time Insight shows renewable energy generation in the context of grid congestion alerts, enabling improved renewables integration and grid balancing decision making.

This is neither the complete, nor the ultimate, solution. Over time, infrastructure improvements will take place to more fully optimize integration of renewable energy. Rather, this geospatial analytics solution is a spring board that is moving an important ISO meaningfully forward to a greener future - today.