OSIsoft®

SUMMARY

Peak Reliability

Industry

Transmission & Distribution

Business Value

- Situational Intelligence
- Grid Reliability
- Load Balancing

PI System™ Components

- PI Server™
  - Data Archive
  - Asset Framework (AF)
- PI Integrator for Esri ArcGIS
- PI Vision™
- PI ProcessBook™
- Enterprise Agreement

Peak Reliability Keeps the Lights On with Real-time Data

In August 2016, the Blue Cut Fire erupted in Southern California's San Bernardino County, short-circuiting a 500-kV transmission line. Meanwhile, in Peak Reliability's control room, operators were working to get information on the area and direction of the fire to keep the lights on in Southern California. The stakes were high – 175,000 homes and businesses in the Los Angeles area were at risk of an outage. The analytics available to the operators lacked the necessary geographic context, and they were forced to re-dispatch power generation to bypass the damaged facilities. The re-dispatch was a costly and "less than optimal" solution that required the local power company to pay tariffs for using electricity from outside the balancing authority.

The Balancing Act in High-Voltage Electrical Transmission

The Western Interconnection
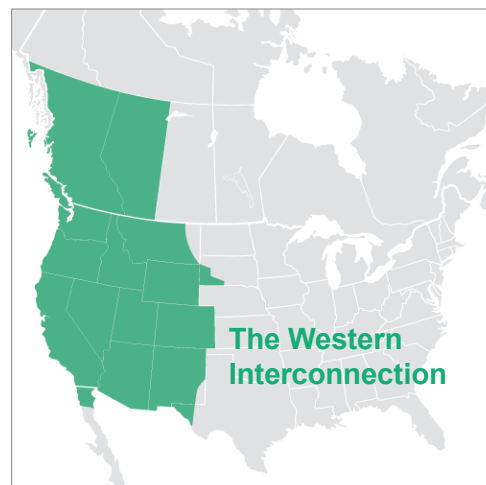
The Western Interconnection is a transmission network that links 24 transmission operators (TOPs), providing power to over 80 million people over 1.8 million square miles stretching from Canada to Baja Mexico. The TOPs model their network and points of interconnection with adjacent power companies. Peak Reliability receives these network models in order to model the entire Western Interconnection network and provide critical data and information to TOPs.

Severe weather and natural disasters, such as the Blue Cut Fire, are a major challenge for Western Interconnection grid operators, where wildfires and landslides are seasonal occurrences and daily temperatures can fluctuate up to 50°F. Because electricity is not stored, disturbances and imbalances can cause blackouts. To prevent outages, it is critical that Peak Reliability and transmission operators continually monitor and maintain the balance between generation and demand. At the time of the Blue Cut Fire, Peak Reliability was using a system comprised of many components bound together. This system was costly to develop, difficult to maintain and, as the fire demonstrated, did not fully meet operational and customer needs.

A Smarter Way to Manage the Grid

To help TOPs more easily spot and resolve problems, Peak Reliability first entered into an Enterprise Agreement with OSIsoft in 2013 that allowed it to harmonize and consolidate device data. OSIsoft's PI System collects, structures, stores, and visualizes sensor data in real time. "Systems that need to communicate with each other about the same equipment speak different languages. They have different models, units, nomenclature, process and terminology," says Aronson. "[The PI System] Asset Framework is used to consolidate and normalize all of this information. It is our Rosetta Stone."

To help TOPs respond to disturbances, Peak then developed a system called the Peak Visualization Platform (PVP) that monitors and visualizes sensor and equipment data geographically. PVP was made with off-the-shelf technologies from OSIsoft and Esri that required little to no customer coding.

"The PI Integrator for Esri® ArcGIS® was implemented to connect OSIsoft's PI System with Esri's ArcGIS Platform. This allows the visualization of SCADA and other sensor data within a geospatial context. We are using Esri's Operations Dashboard to visually monitor the grid," says Dayna Aronson, Enterprise Solutions Architect for Peak Reliability, "This provides critical situational awareness for our operators when they have to make rapid decisions."

> **"When you talk about grid reliability that's really what you're trying to do… empower your operators to, as quickly as they can, comprehend the action that they have to take in the operation of the facilities to ensure that the lights stay on."**
>
> — *Dayna Aronson,*
> *Enterprise Solution Architect,*
> *Peak Reliability*
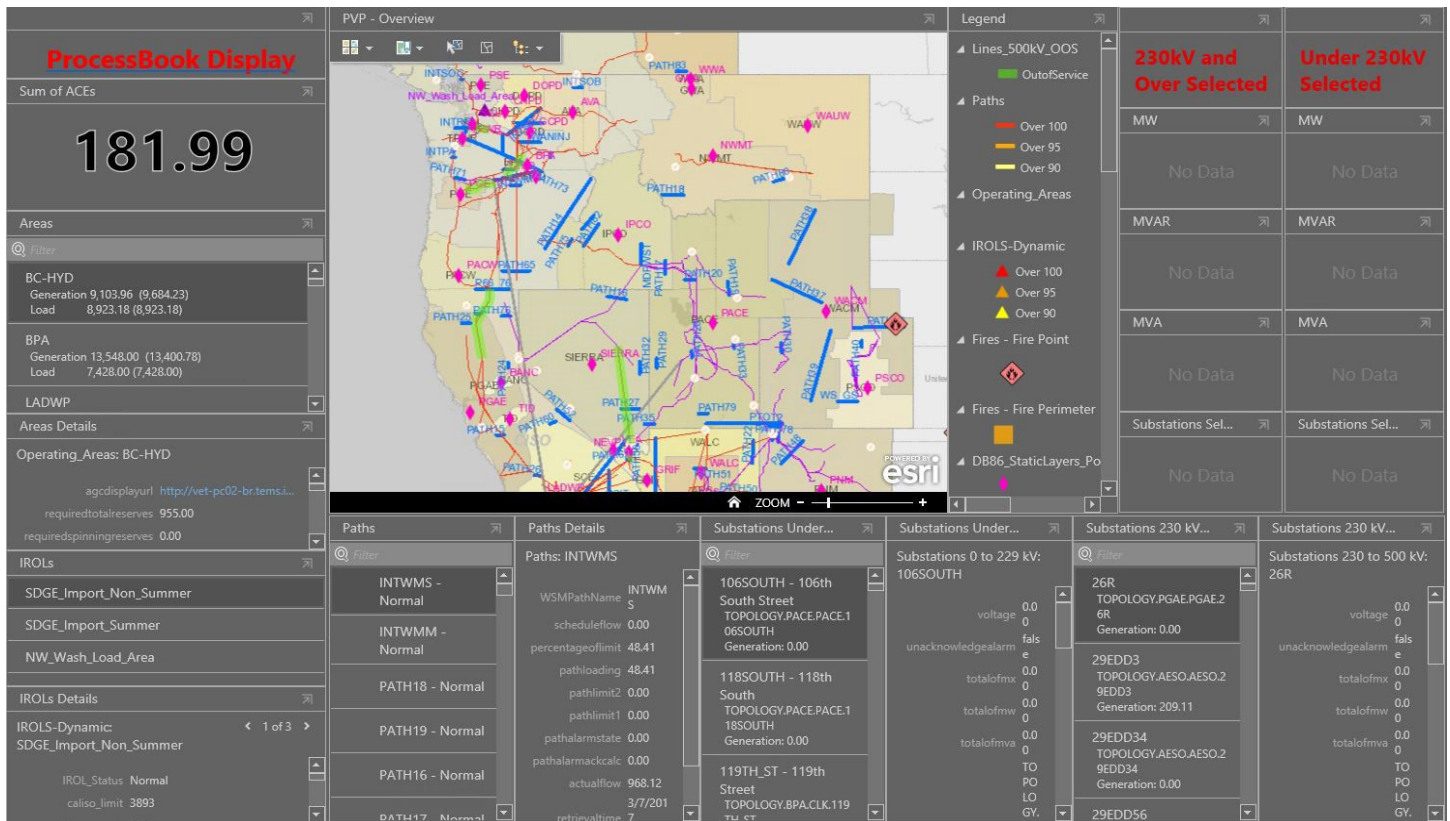
Operations dashboard provides critical details in real-time for rapid decision making.
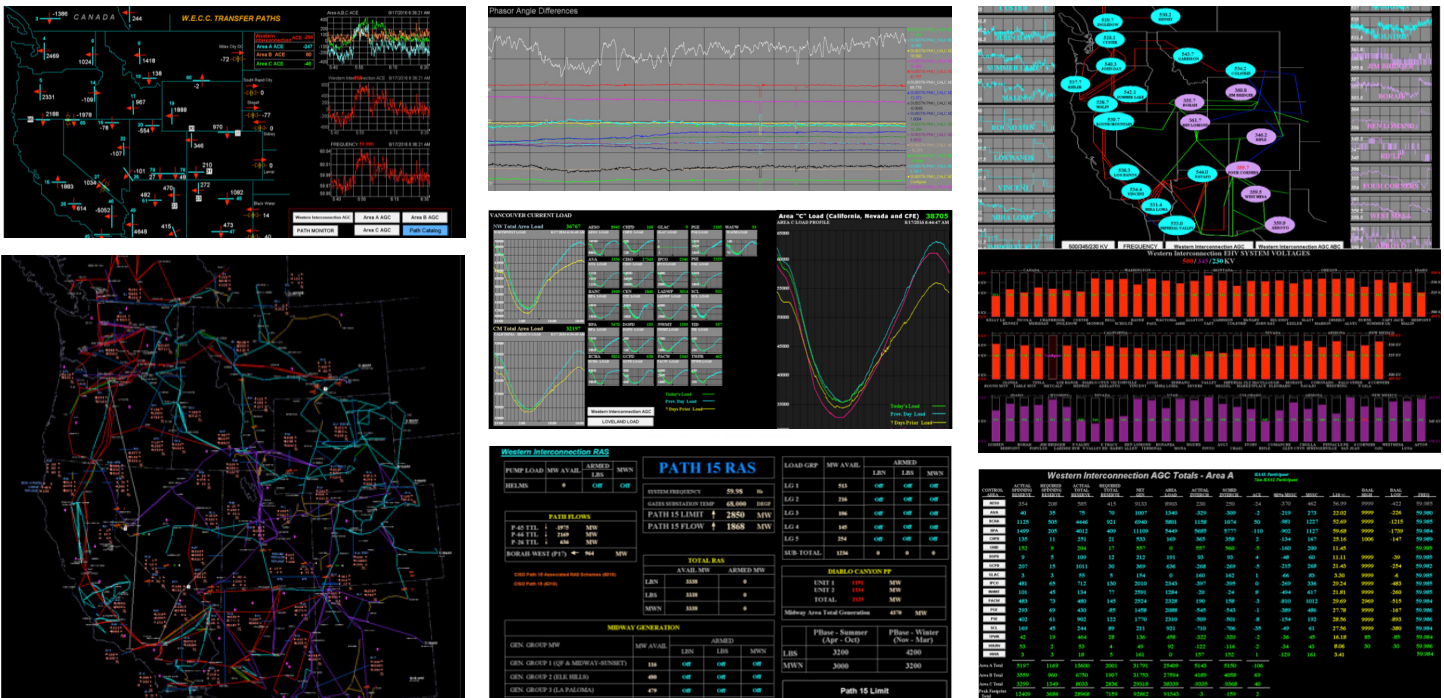
Ensuring grid stability requires simultaneously monitoring voltage, flow, PMU angle difference, load, and more.

Today, Peak collects 440,000 data streams, many updated every 10 seconds. In addition, they have deployed a synchrophasor network on the Western Interconnection. Through this network, the data that Peak Reliability collects is updated 30 times per second. All of the data generated from the networks and the 8,000 substations that Peak monitors comes into its control room where operators continually review more than 13,000 displays for anomalies that could lead to disruptions in the grid.

Benefits

"We have only just begun to explore the potential of the Peak Visualization Platform," concludes Aronson. "Originally, we defined about 30 use cases and have so far delivered roughly a third of them for the platform. One thing that is very interesting to us is including a geospatial context for the Real Time Contingency Analysis (RTCA) displays. These displays provide a 5-minute ahead, what-if scenario analysis of possible grid conditions. The RTCA application simulates more than 8,000 contingencies, which it prioritizes based on their potential negative impact on the operation of the grid. We are going to geo-reference the RTCA results and superimpose them over the topology of the network to give the control room operators the locational intelligence needed to make quick and well-considered decisions in the event of a facility failure, negative contingency, or other event that threatens the reliability of the grid."

For more information about Peak Reliability and the PI System, watch the full presentation [here](#).

[1]PI Coresight was renamed to PI Vision in 2017.

Aronson, Dayna. *Unlocking Grid Analytics using AF, Maps and Rosetta Stones*. OSIsoft.com. 22 March 2017. Web. 8 January 2018. <https://www.osisoft.com/Presentations/Managing-the-Power-Grid-Using-Maps--Real-time-Data-and-Rosetta-Stones>.