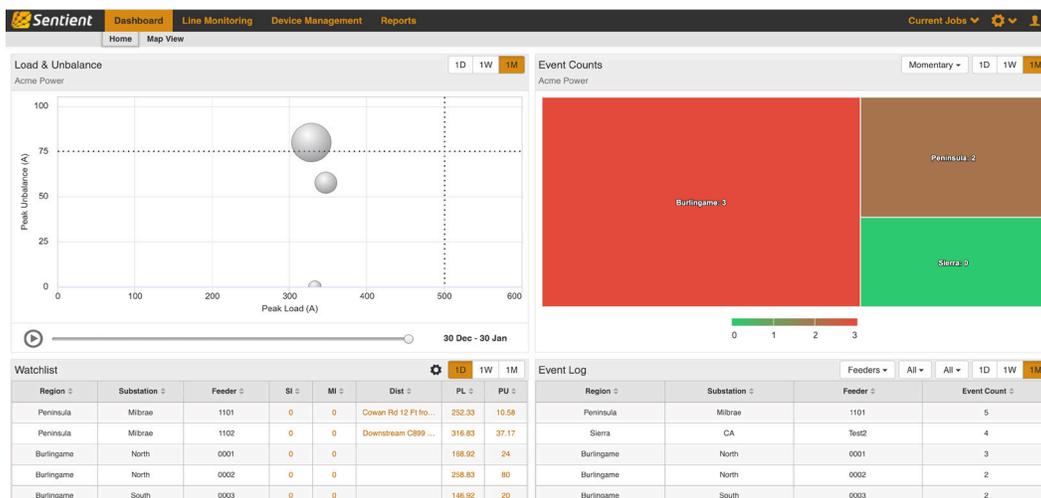




Ample[®] Analytics Platform

Delivering Real Field Data to Each User

Sentient Energy's Ample Analytics Platform is a comprehensive set of software tools that turns sensor data into critical information for fleet managers, network operators, network design engineers, planning engineers and reliability managers.



The Full Benefit of an Intelligent Sensor Network

Ample users have real field information from any grid location at their fingertips. Leveraging data from a large number of monitoring points on utility circuits maximizes effective operation of their sensor investment with significant improvement of SAIDI and SAIFI metrics. Ample's advanced visualization tools support electric utility personnel responsible for circuit restoration and grid maintenance, reducing the duration and frequency of outages.

Ample Software Consists of 4 Modules: Manage, Monitor, SAIDI, and SAIFI Detect

- **Manage** provides a turnkey solution for the sensor fleet manager to commission, configure, and wirelessly update all Sentient Energy sensors. Industry leading auto-phase identification allows for phasing the entire grid sensor fleet with only a few references.
- **SAIDI** offers reliability managers fault reporting and location capabilities with high-resolution oscillography of all fault events.
- **Monitor** gives planning engineers immediate, detailed access to load and unbalances anywhere on the distribution grid or at substations.
- **SAIFI Detect** enables power quality and reliability engineers to see disturbance statistics both before and after grid events, allowing grid operators to take preemptive action to avoid impending issues.

Grid and Reliability Management

Grid and reliability dashboards show Key Performance Indicators (KPIs) to help grid and reliability managers ensure the operational efficiency of transmission and distribution circuits:

- Quick identification of the highest loaded and most unbalanced circuits
- Fine-granularity circuit loading and phase balancing at every sensor location
- SAIFI-reducing analytics and reporting on momentary interruptions and non-fault grid disturbances
- Visualizations according to the user's Area of Responsibility (AOR), and the ability to drill down to the substation, circuit, and sensor levels for mitigation by maintenance crews

These tools complement and increase the effectiveness of utility applications such as GIS, OMS, and ADMS by leveraging sensor data and analytics not previously available.

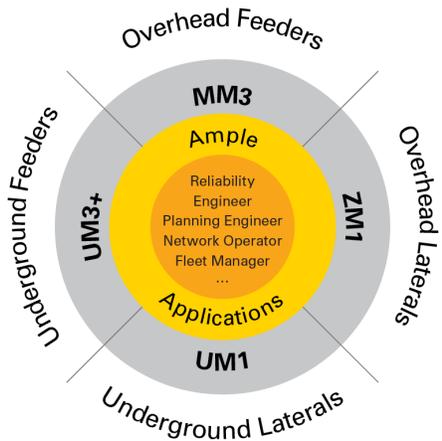
Managing the Fleet

Ample enables efficient rollout and maintenance of large sensor deployments. Sensor fleet managers have direct access to dashboards with KPIs to help ensure the fleet is operating effectively. Sensor firmware can be remotely upgraded with the latest software versions, and automated alerts and notifications provide exception notifications for immediate mitigation. Grid analytic tools such as auto-phase identification are provided to confirm initial conductor phasing as sensors are deployed, as well as for ongoing (daily) validation thus reducing the need for error-prone visual tracking of conductor phases by crews. Sentient Energy's auto-phase detection algorithm validates conductor phasing using the MM3[™] line sensor's high-resolution data sampling capabilities, reducing errors in supporting utility applications such as GIS and ADMS.

Ample Analytics Dashboards

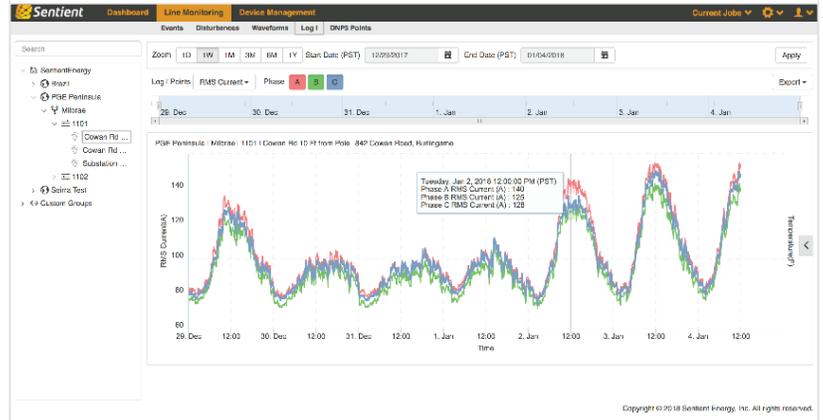
A Complete Grid Analytics System

Sentient Energy's Grid Analytics System consists of the MM3™, ZM1™, UM3+™, and UM1™ line sensors, and the Ample Analytics Platform. Each sensor features fault detection and load monitoring capabilities, an LED indicator, GPS, and integrated cellular or mesh communications. The MM3 is used for overhead feeders and the ZM1 monitors overhead laterals as well as low load feeder segments. The UM3+ addresses underground feeders while the UM1 monitors underground residential distribution. All four sensors are designed to maximize the amount of system data gathered while transmitting only the necessary information.

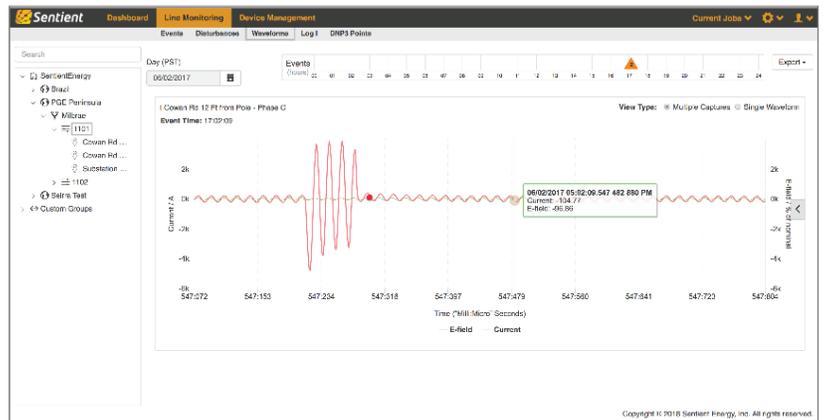


Ample® Analytics Platform

Sentient Energy's Ample Analytics Platform is a comprehensive set of software tools that turn sensor data into actionable insights for network operators, reliability engineers, and planning engineers. In addition to providing data visualization and analytics, Ample streamlines sensor fleet management and integration of sensor system data into existing OT systems.



Operations and planning can track load by location, phase, and time; revealing trends, load exceptions and imbalances.



High-resolution amperage and electric field voltage waveforms can be displayed and analyzed for grid event forensics and prediction.

User Interface	Microsoft Edge, Google Chrome
Security Implementation	TLS, HTTPS, Federated Identity with SAML 2.0
Licensing	Based on endpoints and Ample modules, one-time license (on premise), or annual subscription (hosted)
Software Deployment Options	Utility data center or private cloud
Client	Microsoft Edge, Google Chrome; direct DNP ¹ to SCADA
Scalability	50,000+ endpoints
Communications Support	Cellular (LTE/4G), Itron Mesh
Communications Security	Transport Layer Security (TLS) with managed PKI, DNP3 SAV5
Protocols	DNP3, IPv4, IPv6

¹DNP/IEC 60870-5-104 through concentrator

Visibility, Analytics, and Control for a Better Distribution Grid

Sentient Energy®, a Koch Engineered Solutions company, is the premier provider of intelligent sensing, data analytics, optimization, and control technologies for the distribution grid. Sentient Energy's hardware and software solutions help electric utilities make data-driven decisions to enhance the delivery of safe, reliable, and efficient power. With the industry's only Grid Analytics System™ that covers the entire distribution network, Sentient Energy leads the global market with the largest network of line sensor deployments in North America, gathering rich data in real time for predictive insights and strategic grid management. Sentient Energy's Grid Edge Control solutions enable utilities to reduce energy costs at the grid edge through Volt-VAR optimization, conservation voltage reduction, and peak demand reduction. Sentient Energy partners with leading communications network providers. For more information visit www.sentientenergy.com.

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