

Grid edge intelligence

# GridAdvisor 3 sensor

Enabling widespread edge intelligence  
to improve grid resiliency



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# Improving outage management

Due to the energy transition, managing a safe and reliable grid is becoming increasingly challenging. By collecting accurate, granular grid measurements in strategic locations, utilities have access to the data they need to manage changing load conditions and disruptive grid events that threaten grid stability.

**Eaton's GridAdvisor 3 sensor helps utilities operate their distribution systems more efficiently by improving outage and asset management. In addition, it provides real-time monitoring and historical profiling of the grid at both overhead and underground circuits. The GridAdvisor 3 sensor saves both operation and maintenance costs by reducing drive time and maximizes energy dollars by keeping assets online operating at peak efficiency. These industry-leading sensors are hot stick installable and the easiest way to gain SCADA visibility across the power distribution network.**

## Outage management

Electric utilities continuously look for ways to improve reliability by reducing the frequency and duration of customer outages.

Eaton's GridAdvisor 3 sensor provides reliable fault detection and location, using modern, flexible communication technologies to provide fault-targeting data into operations systems, including SCADA and Outage Management Systems (OMS).

Providing this data in real-time allows utilities to dispatch crews to the precise location of the problem, reducing drive time and shortening restoration times.

By differentiating between sustained faults, momentary faults and line disturbances, the utility can make better decisions regarding when service crews are needed and when to prioritize preventative maintenance activities such as vegetation management. The sensor also provides additional intelligence by reporting the direction and magnitude of fault current while capturing waveform data that can be retrieved later and viewed or exported via COMTRADE format for further analysis.





### Asset management

The GridAdvisor 3 sensor can be deployed to enable proactive, exception-based maintenance of noncommunicating assets, such as hydraulic reclosers and fixed capacitor banks. Hydraulic reclosers are used at many points along the grid as workhorses to keep the lights on. Still, they are unmonitored and rely on rough estimates of duty cycle and periodic inspections to keep track of the asset lifecycle.

The GridAdvisor 3 sensors can notify the utility of operations in real time, keep track of event history and operation counts and have an algorithm to track contact lifecycle based on IEEE Standard C37.60. Capacitor banks, which support base VAR load critical for system efficiency, can often go offline due to various conditions, such as fuse operations. Customers can set sensor alarm limits on neutral current to detect a phase imbalance indicating failure. This reduces the need for physical bank inspections, minimizing operations and maintenance efforts. The smart sensor allows utilities to maximize the benefits of capacitor investment by ensuring all banks are in service, having more VAR availability and resulting in increased system capacity and efficiency.

### Demand monitoring and historical profiling

The GridAdvisor 3 sensor provides real-time monitoring of the grid by reading and reporting load flow magnitude and direction. This information is critical for operations when making switching decisions and can provide insight into the impact of ever-increasing distributed energy penetration on the grid.

The sensor also calculates integrated demand readings, reported in real-time and stored in a local profiler, with daily statistics and peak demand tracking. This information provides an easy means for distribution planning to capture seasonal peak loading on circuits to a previously unattainable granularity level.

With its ease and low cost of deployment, the GridAdvisor 3 sensor can be deployed at multiple points of interest along a feeder, at important loads or even moved from location to location as needed.

### Key features

- Patented energy harvesting technology to eliminate external power sources
- Flexible remote communications via LTE CAT M1 cellular modem or integration to local gateway
- Replaceable battery to increase the longevity of the smart sensor
- Upgradeable over-the-air firmware eliminates costly trips to update sensor
- ProView NXG application software standard interface provides a common configuration platform for use with other Eaton utility controls products
- DNP3 protocol for simple integration into SCADA, OMS and other smart grid applications
- Accurate demand reporting to provide simple SCADA visibility to remote locations
- Directional fault targeting to better isolate faults on closed loop or paralleled circuits
- GPS radio for reporting location coordinates



## How it works

The GridAdvisor 3 sensor is a conductor-mounted line sensor with integrated communications capability. It continuously monitors the line to which it is connected and uses patented energy-harvesting technology to power the device without needing an external power supply. Being a DNP3-native device, the sensor's data can be retrieved directly by SCADA or OMS via DNP3 polling and can also be configured to report by exception for immediate notification of events.

In outage management applications, the sensor monitors the power system for a high rate of current change followed by a loss of current. This waveform characteristic is used to report system disturbances and provide fault targeting to the utility. The variable trip characteristic does not need a static trip threshold programmed into the sensor. This frees a protection or control engineer from having to custom program each sensor for the specific installed location.

As a capacitor bank monitoring sensor, the GridAdvisor 3 sensor measures current levels on the common neutral conductor and raises an alarm in an overcurrent or undercurrent condition. High neutral current readings may indicate blown capacitor bank fuses or other bank failure, whereas undercurrent may indicate an open bank.

A sensor can directly support long-term evolution (LTE) networks on multiple global bands, maximizing the coverage of multiple public cellular providers along with private LTE networks. Leveraging a CAT-M/ NB-IoT modem, the sensor enables low cost of data while being both 4G- and 5G-ready. Alternatively, the sensor can be configured to enable real-time DNP3 communications over the embedded Bluetooth radio, allowing integration to any type of network by using a Bluetooth wireless access point. The wide spectrum of supported frequencies gives the sensor a true global footprint.

## End-to-end solution

Eaton's Brightlayer Utilities suite provides a full complement of planning, security, performance, remote access, automation and analytics solutions.

Eaton's Feeder Automation Manager software is a well-established software platform used by many utilities to monitor and operate their electrical grid in real time. The software's communication bridge module can concentrate thousands of sensor connections into a more manageable data connection for SCADA or OMS using DNP3 or intercontrol center communications protocol (ICCP). It also provides user administration tools, allowing multiple working groups to leverage the same IT infrastructure. The software can also generate email or SMS text messages to user-defined distribution lists when an event is reported from the smart sensors.

Eaton's IED Manager Suite software can greatly reduce the man-hours required to manage the device life cycle of a deployment of sensors. The software provides a means for change management of device settings and firmware by automatically scanning devices on a scheduled basis and flagging any changes to the appropriate administrators or asset management personnel.

The software also manages bulk firmware and settings file updates to the sensor fleet as a background process with minimal user interaction. IED Manager Suite supports a strong feature set for security management, as it is used for NERC CIP compliance in the substation market for a large variety of IEDs (including non-Eaton devices).

For Eaton's GridAdvisor 3 sensor product information, visit: [Eaton.com/GridAdvisor](https://Eaton.com/GridAdvisor)

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