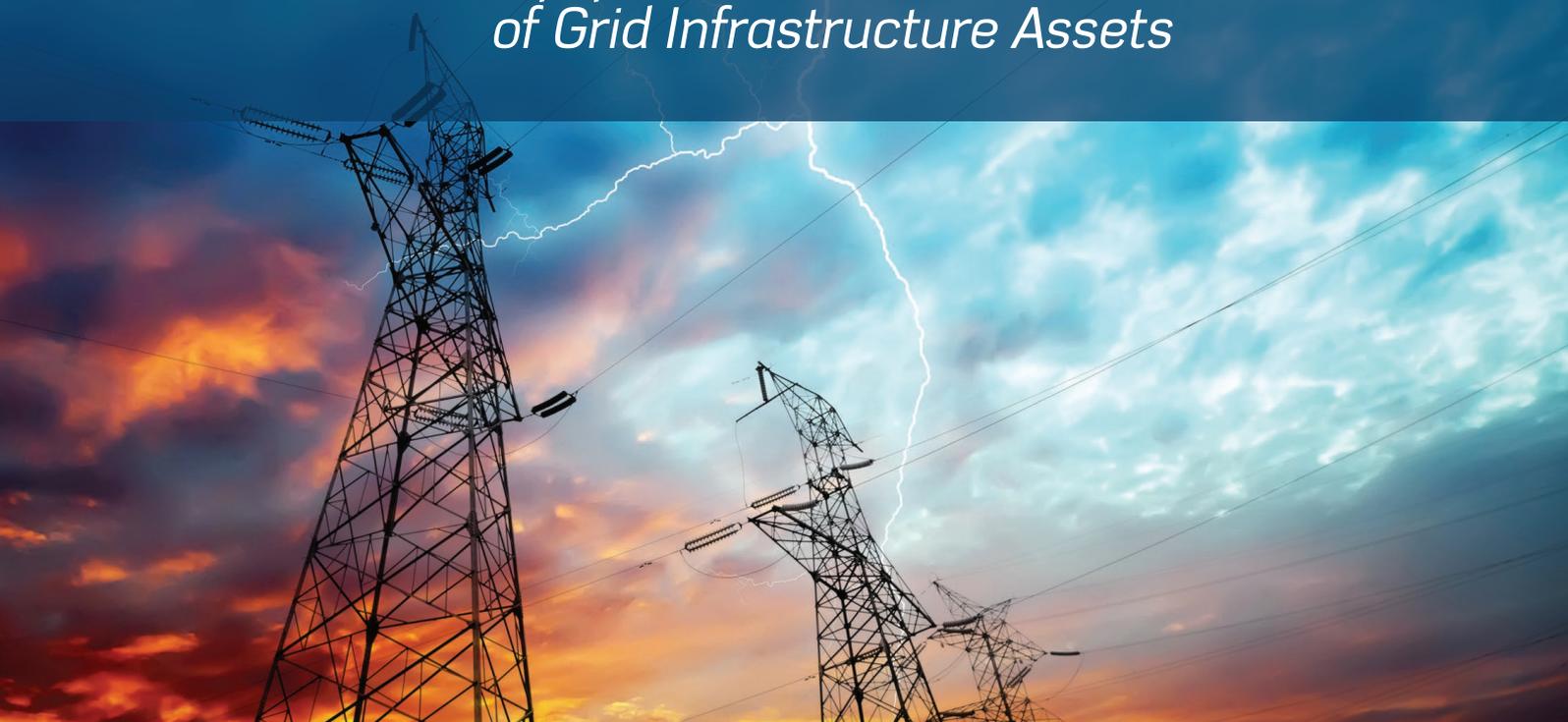


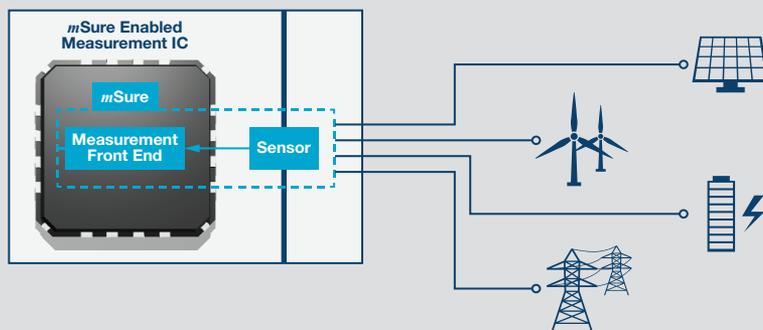
A New Technology that Maintains Equipment Health Over the Lifetime of Grid Infrastructure Assets



Keeping Your Equipment Operating at Peak Performance

Equipment OEMs test and calibrate hardware at the factory to ensure it meets a set of accuracy and performance criteria, as required by various standards prevailing in different geographies. But after installation, it is mainly a matter of faith (component quality and statistical testing) that the equipment will remain accurate over the expected design life.

Periodically suppliers will manually retest equipment in the field to ensure proper calibration but this process can be time consuming and expensive. In a vast majority of cases, there are a number of parameters that may vary over time and may degrade the accuracy and performance of the equipment. Unlike today's current capabilities, *m*Sure™ enables utilities and equipment OEMs to remotely access and proactively monitor and diagnose machine health and take action before it becomes too late—thus saving overall operating costs and creating a safer environment.



*m*Sure is an exciting and innovative technology that resides in energy measurement ICs and provides a comprehensive accuracy monitoring and self diagnostic capability for the entire system, including the sensor.

A Typical Open-Loop System

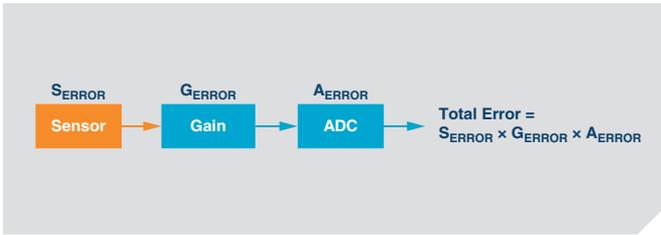


Figure 1. Each hardware component is precise but accuracy is only known at equipment manufacture. The sensor can drift and is a major contributor to error over time.

A Closed-Loop System with *m*Sure Technology

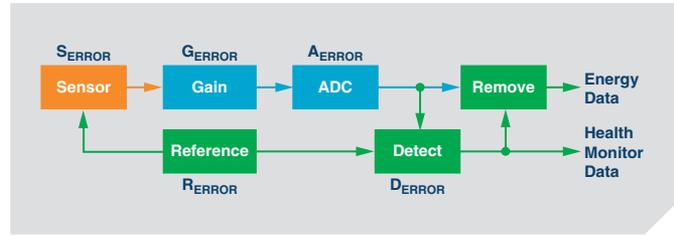


Figure 2. The system provides continuous monitoring of the whole chain's accuracy and doesn't interfere with normal metrology on energy data.

*m*Sure Enables Better Equipment Health

The system architecture shown in Figure 1 is open loop and each component, including the sensor in the signal path, influences accuracy and total error. The diagram shown in Figure 2 represents a more robust approach because the accuracy of the measurement system is no longer dependent upon the performance of the sensor. The transfer function of the sensor is continuously measured by the control system; a small reference signal is superimposed on the current flowing through the sensor and this reference current is extracted from the main signal. In effect, bringing the sensor inside a closed-loop system allows any variation in its performance, or indeed any other element in the control loop, to be compensated for if changes in the transfer function can be detected and measured.

Why *m*Sure, Why Now?

Endurance

*m*Sure ensures that readings taken on distribution equipment are always accurate with the capability of validating the health of the system without disruption and with almost no operational expenditure.

Equipment Integrity

In the case of billing-grade meters, *m*Sure helps prevent energy theft and helps utilities protect revenue.

Simplified Manufacturing

*m*Sure enables a more automated process for calibrating signal chains, including sensors. It can also reduce or eliminate the need to use time-consuming calibration techniques and expensive test equipment during manufacturing.

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