Executive Summary

Modern Electricity Meter Safety, Accuracy and Performance Testing

Prepared for

Sensus

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We all expect electricity meters to function seamlessly, transparently, and accurately. A meter should fade into the background – a tireless workhorse – and should be trusted to never over-account for the energy we consume. It may not be top-of-mind, but meter design, testing, and installation methodologies are all critical factors in how that forgotten electricity meter will perform its daily duties.

Today's meters are feature-rich computers, capable of measuring, recording, and transmitting many types of data. Compared with electromechanical, kilowatt-hour-only meters, modern meters operate differently and have the potential to fail differently. As meter design has continued to evolve, we must also investigate whether or not meter testing has kept pace. The right levels of meter testing can replicate actual field conditions to:

- Boost consumer confidence and overall safety.
- Contribute to improved device performance and accuracy.
- Help utilities better plan for installations, device replacement, or faulty socket detection.

But what are the "right" levels of electricity meter testing? There is no single gold standard test, no universal seal that designates superior meter performance. Rather, there are multiple standards that define meter tests along safety and accuracy dimensions. Historically, the American National Standards Institute (ANSI) has provided the fundamental code for safety and accuracy meter testing. Building upon a subset of the entire suite of ANSI tests, Underwriters Laboratories (UL) has layered on its version of safety-focused meter tests as well in their own meter testing standard. Both ANSI and UL provide a solid foundation for electricity meter standards, and they continue to improve the safety and performance benchmarks.

Still there are deficiencies within the existing standards. This report examines the history of electricity meter design and testing. It suggests multivariate testing and further investigation of modern meter failure modes could help address some current shortcomings. Derived from real-world conditions and occurrences, additional testing could help to test, detect, and – in some cases – predict failure at the network, site, and device levels.

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