

Circuit-Level Energy Monitoring

What is this Technology?

Circuit-level submetering analyzes energy use in real time on a circuit-by-circuit basis. Hardware sensors, either wired or wireless, capture data at the electrical panel, then transmit them to a cloud-based platform for virtual access, analysis and reporting. Data can be aggregated and disaggregated to provide granular and scalable device- and system-level energy intelligence. While the technology itself does not save energy, real-time energy monitoring at the circuit level can help building managers identify excess or off-schedule energy consumption, safety hazards, faulty BAS settings or overrides, and predict device failures. It can also be used to incentivize tenants to take actions to reduce their energy use. The visibility and analytical insights provided by this technology promise to be more granular and scalable than data delivered by traditional submetering. In addition, the installation is much simpler and significantly less costly.

Why is GSA Interested?

The U.S. Department of Energy estimates that U.S. commercial buildings waste an average of 30% of the energy they consume. Circuit-level energy monitoring can help reduce that waste. Accurate energy measurement can help improve tenant billing practices, identify areas for more effective building operations, and encourage tenant behavioral changes. The technology promises a metering solution that can be integrated into GSALink, GSA's building energy management system.



ENERGY EFFICIENCY Circuit-level energy monitoring is an enabling technology rather than a direct driver of energy savings. It can identify specific energy consumption and suggest energy and operational efficient changes for both people and systems. The manufacturer estimates between 8% and 20% energy savings based on the technology's ability to identify wasted energy.



COST-EFFECTIVENESS Cost-effectiveness is a function of building energy usage, the number of sensors needed to track energy consumption, and resultant operational and behavioral changes. The wireless solution has the potential to further reduce installation costs by eliminating the need for lengthy implementations and disruption to ongoing operations. The manufacturer estimates payback at under two years.



OPERATIONS & MAINTENANCE The technology requires negligible physical maintenance. Any experienced facility manager can monitor the system, define data-based energy management plans, and balance energy management with tenants' energy needs.



DEPLOYMENT POTENTIAL Circuit-level energy monitoring has broad deployment potential throughout GSA. It is anticipated to be particularly beneficial for data centers and office buildings with high overtime utility usage.

The Green Proving Ground program has commissioned the National Renewable Energy Laboratory to perform real-world measurement and verification of circuit-level energy monitoring in a pilot installation in a federally owned building within GSA's inventory.



The Green Proving Ground program leverages GSA's real estate portfolio to test innovative building technologies. The program helps GSA meet its sustainability goals by providing actionable data that informs investment decisions targeted at energy-use reduction.