PRELIMINARY TECHNOLOGY ASSESSMENT

Wireless Lighting Control System

What is this Technology?

This innovative private sector application of a wireless mesh network communication protocol developed by the Defense Advanced Research Projects Agency (DARPA) leverages low cost radios developed for the cell phone industry and recent advances in powering devices using scavenged power. A small wireless module mounted on the inside of an existing light fixture communicates with other wireless modules, self-powered switches, photovoltaic-powered daylight and infrared sensors, and a facility automation server to reduce a lighting system's energy use.

Why is GSA Interested?

The all-wireless nature of this technology makes lighting controls more practical and less expensive, while enabling wider deployment of high-impact cost and energy savings solutions. Because it does not require additional wiring or handling of existing wiring systems, the technology presents particular advantages for GSA's older and historic buildings, where existing interior wiring is often subject to asbestos and historic preservation concerns.

ENERGY EFFICIENCY The manufacturer estimates that the wireless control technology will yield a 67% savings in a building's annual lighting energy consumption. More conservative estimates of expected savings from combined lighting control strategies average 38%. Smaller cooling loads due to the reduction of excess heat from lighting could result in additional savings.

COST EFFECTIVENESS Simple payback estimates range between 2 and 10 years, depending on installation variables and product pricing. Daylight and occupancy sensors are powered via solar cell, and the lighting control system has demand-response, load-shedding capabilities. Appropriate window configuration and additional window shading could contribute to savings.

OPERATIONS & MAINTENANCE Decreased electrical fixture use and lower lamp burnout rate could reduce O&M costs. Direct installation of new devices and automatic programming of new modules also reduce costs. Additionally, the system is controlled centrally and can be reconfigured easily to accommodate changes in office layout.

DEPLOYMENT POTENTIAL More than 80% of GSA buildings are office buildings, virtually all of which use fluorescent and LED lights and are thus candidates for a system retrofit using this wireless lighting control system.

Adapted from a report by the National Renewable Energy Laboratory. The Green Proving Ground program, in association with a federal laboratory, is subjecting the Wireless Lighting Control System to real-world measurement and verification in GSA buildings. Findings from that investigation will be available in late 2014 or early 2015.

GPG Green Proving Ground Program

The Green Proving Ground program leverages GSA's real estate portfolio to evaluate innovative sustainable building technologies. The program aims to drive innovation in environmental performance in federal buildings and help lead market transformation through deployment of new technologies.