



LED lighting Panel

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Green Proving Ground – LED Lighting Study



- *How many Federal Employees does it take to change a light bulb?*



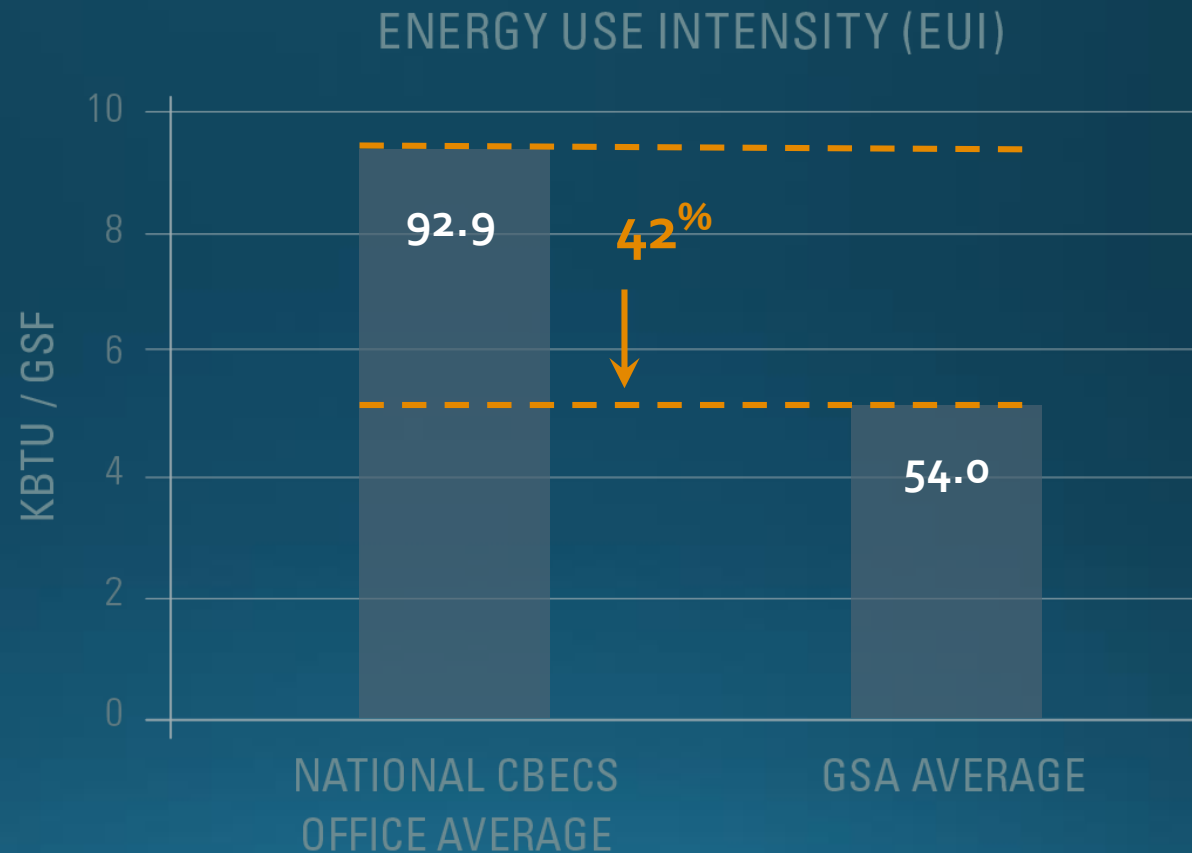
Green Proving Ground leverages GSA's real estate portfolio to evaluate innovative sustainable building technologies.



GSA Fosters Outstanding Building Performance

GSA buildings are 42%* more efficient than typical U.S. commercial buildings.

*September 2015, GSA Average EUI = 54 kBTU/GSF/yr



How Does GPG Work?



Identify promising technologies at the edge of commercialization



Pilot technology installations within GSA's real estate portfolio



Partner with Department of Energy national laboratories to objectively evaluate real-world performance



Recommend technologies with broad deployment potential



Test Bed Site Objectives

Primary Objective

- Outcomes from this project aim to shape ESCO procurement nationwide

Key Tasks

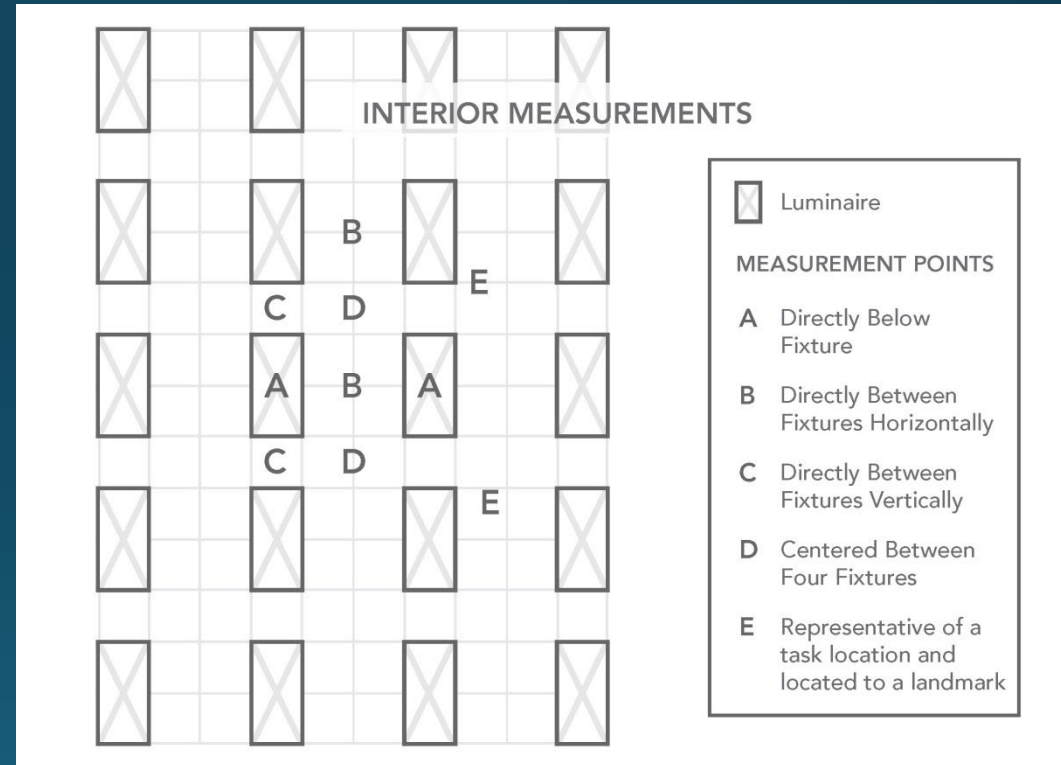
- Track energy usage, system costs, installation process and challenges, and operation and maintenance.
- Evaluate user acceptance.
- Track installation and operating expenses and establish payback.



Photometrics



Proposed EM&V Plan



How Will Success be Measured?

QUANTITATIVE OBJECTIVES	METRICS & DATA REQUIREMENTS	SUCCESS CRITERIA
Reduce Energy Usage	Real-Time Energy metering pre and post installation plus comparison with current standard practice lighting and P-100 requirements	Energy savings compared to standard expected GSA facility lighting
Reduce Costs	Cost comparison of current technology and LED replacements including initial and life costs (LCC)	Favorable energy savings (SPB, SIR) over expected lives of the lighting systems
Reduce GHG Emissions	Reduction factors based on energy savings	Reduction from typical current fluorescent systems
QUALITATIVE OBJECTIVES		
Easy Installation	Installer survey	No issues identified that would raise safety or excessive labor concerns
Reduce Maintenance	Installer survey plus operator survey plus equipment specifications	Lower calculated maintenance needs compared to fluorescent system
Increase Occupant Satisfaction/Comfort	Occupant Survey	70% of occupants expressing no issues with the system that would cause dissatisfaction in terms of light levels or function of the system in performance of tasks



Occupant Surveys

- Why Survey Occupants?
 - GSA has strong interest in customer satisfaction
 - Identifies opportunities for future installations
 - Will not accept energy savings if quality of workspace is not acceptable
- Will conduct both Pre and Post Installation Surveys
- Surveys – complete and mail back in postage paid envelopes.



Installation Timeline

May	Begin procurement construction contractor
May	Occupant Pre-installation Survey
July	Deliver technology to the site
October	Installation
November	Post install measurement
December	Occupant Post-Installation Survey



So, how many Federal Employees does it take to change a light bulb?





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