

Project Objectives

- > Reduce lighting energy consumption by 30% and deliver a payback from energy savings in less than 5 years
- > Reduce lighting demand by 20% and provide variable load-shedding capabilities
- > Maintain illumination levels consistent with ASHRAE standards and eliminate over-lighting where possible
- > Provide centralized computer-controlled lighting management via the enterprise network
- > Improve workplace comfort, ergonomics and productivity by optimizing lighting control

Strategies Used

ECS delivered energy savings which exceeded customer expectations through the deployment of the following energy management strategies:

Personal Control

Control of personal lighting space from the desktop PC

Task Tuning

Tuning light levels to suit the particular task or use in a workspace

Daylight Harvesting

Adjusting artificial light based on ambient natural light contribution

Smart Time Scheduling

Time scheduled switching based on zones as small as an individual workspace

Occupancy Sensing

Switching or dimming lighting based on occupancy

Load Shedding

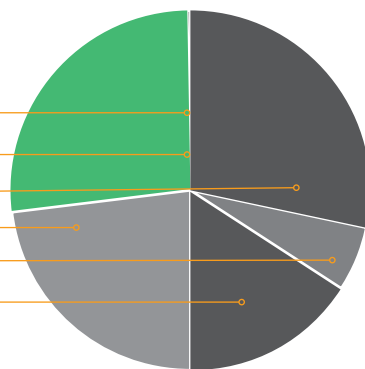
Intelligent management of peak/ non peak lighting energy demand

Results Delivered

- > Lighting energy consumption reduction of 51%
- > Annual energy cost reduction of \$38,938
- > Simple payback from energy savings of 4 years
- > CO2 Reduction of 278.18 metric tons per year

Energy Savings by Lighting Strategy

| | |
|--------------------------------------|----------------|
| Savings by Daylight Harvesting | 0.01 % |
| Savings by Load Shedding | 0.03 % |
| Savings by Occupancy Sensing | 20.0 % |
| Savings by Personal Control | 16.16 % |
| Savings by Time Scheduling | 4.10 % |
| Savings by Task Tuning | 11.12 % |
| Total Lighting Energy Savings | 51.42 % |

**ENCELIUM**

LIGHTING CONTROL FOR THE SMART BUILDING

Our Customers Speak

"During the past year, we've seen numerous operational advantages with Encelium's integrated lighting control system, but the bottom line is that ECS has helped us achieve unprecedented lighting-related energy savings. As well, with the advent of real time pricing of electricity, the ability to load shed all lighting with a single command is really powerful."



Randy Haines,
Energy Manager,
Thomas Jefferson University and
Hospital

Ensuring a comfortable working environment is an important objective, and giving users more control over lighting conditions has clearly been a win/win proposition at Thomas Jefferson University and Hospital – where individual settings range from 90% down to 15% of full lighting capacity.

"Architects and engineers tend to err on the safe side and work areas are generally overlit. Desktop lighting control gives the occupant the ability to dim lights to a more comfortable level," says Randy-Haines, Energy Manager at Thomas Jefferson University and Hospital. "Personal choice may be dependent on age, or on the tasks being performed – i.e. to reduce monitor glare or it may just depend on what kind of day that person is having."



Thomas Jefferson University and Hospital, Philadelphia, PA

Project Overview: Thomas Jefferson University and Hospital (Jefferson) make up one of the largest healthcare groups in the Philadelphia region. With over 4 million square feet of clinical, research, teaching and housing property, Jefferson has an annual lighting energy bill representing approximately 15% of Jefferson's total electricity costs – nearly \$1.7 million per year.

Randy Haines, Energy Manager at Jefferson, has spent the last several years developing an advanced metering system to help manage and control energy costs. The system generates real-time energy information by accessing data from meters and sensors throughout the campus via the University Ethernet, storing the information on a data server, and making it available via the Internet. This "smart metering" system allows Haines to compare energy information on an interval basis and make decisions based on the most current data.

Haines estimates lighting represents approximately 15% of Jefferson's electricity costs – nearly \$1.7 million per year. He determined that if he could reduce costs by at least 30% with the Encelium Energy Control

System (ECS), it would easily achieve his payback criteria of 5 years. The system would also provide him with the information and tools he needed for full lighting management as he expands energy conservation technology throughout the complex.

The historic Main Building on the Jefferson campus was originally constructed in 1906. In 2005, the 10th floor was scheduled to change usage and Haines took advantage of that renovation to establish a pilot program for advanced lighting control.

After the successful pilot program, Jefferson renovated other areas while implementing Encelium's ECS including the 5th Floor of the Main Building in 2006 and the 2nd, 3rd, 4th and 5th Floors of the Dorrance H. Hamilton Building in 2007.



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Case Study
Thomas Jefferson University, Philadelphia, PA

Lighting Control
for the Intelligent
Office Building

