



Vulcan Road to HCL

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Situation



- Corporate Office system discontinued
- Capital operating plan
- Set out for new system.
 - Our list of demands
 - ✓ Energy efficiency
 - ✓ Central control
 - ✓ Schedule
 - ✓ Daylight harvesting
 - ✓ Occupancy sensor
- LED Introduction
 - Lighting Wizard
 - Meeting in Seattle

Education



Introduced to PlanLED and HCL

- Research
 - Advancement of LED technology
 - The impact of blue LEDs
 - Environmentally friendly
 - HCL (Human Centric Lighting)
- Applied new knowledge - Pilot

"The impact of the invention of the blue LED is hard to overestimate. LED lamps give out light at up to 300 lumens per watt (lm/W) compared to 16 lm/W for conventional incandescent bulbs and 70 lm/W for fluorescents." - David Szondy, October 7, 2014 - 2014 Nobel Prize in Physics awarded to inventors of blue LEDs

LED Pilot

Pilot Scope:

- Pilot began in 2013 in a small area
- Expanded pilot to ¼ of a floor in 2014
- Tested and developed SW and HW

Pilot Outcomes:

- User friendly application
- Energy efficiency and tracking
- Human centric lighting benefits

“Once I had the Plan LED lights installed above my desk, I immediately noticed an increase in personal productivity. Not only that, but I actually look forward to coming to work because of my new work lights.”

-Bret Coffman, Program Manager

Implementation - Scope

Project overview:

- 129,000 sqft of occupied office space
- 1400 fixtures replaced
- 400 occupancy sensors installed
- 100 daylight sensors installed
- New controls interface
- 3.5 months install for 5 occupied floors

Implementation - Results

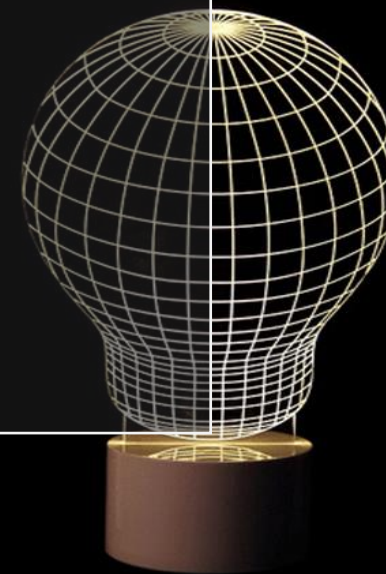
- 30% - 40% less installation cost - \$6-\$7/sqft vs. \$11-13\$/sqft
- Currently on target to reduce total energy consumption by 15%
- Flexibility – user and operator
- User friendly application
- City rebate

Lessons Learned

- Technology coordination
- Education
- Communication
- Plan to survey
- Overhead control vs. Task Lamp Control

Next

- Happy worker is a productive worker
 - Well Standard
- Industry paradigm shift corporate culture and innovation
- IOT/M2M
- People love good lighting



“FMs have some degree of responsibility for the health and well-being of their occupants. How exactly they do this depends on the culture of each organization.”
– Well Standard