Commercial Building Partnership Success Story Webinar Series:

A Look at The Home Depot's Most Energy Efficient Store

May 9, 2013

Project Overview:

- The Home Depot partnered with the Department of Energy (DOE) to develop and implement solutions to build new, low-energy buildings.

- The typical Home Depot prototype store averages 106,800 s. f. with approximately 28,000 additional s. f. of outdoor area other products; wall construction is typically non-insulated concrete tilt panels or insulated precast concrete panels; the roof is a metal deck with insulation and an open joist design.

Project Overview:

- This case study focused on The Home Depot store in Lodi, CA in comparison to the baseline prototype store in West Sacramento, CA.

- This is the **first** Home Depot store built using the new prototype design and is the **most energy efficient** Home Depot store in the country.

Energy Efficient Measures:

- 57 Energy Efficient Measures (EEM's) were identified and researched as potential measures to incorporate into Lodi, CA.

- EEMs, like reduced lighting density in sales areas, were tested in other stores around the country, and the change in energy consumption was measured to verify possible savings.

Energy Efficient Measures:

- Utilizing the Trane Trace energy model, to assess whole-building savings, three different energy models were created.
  - Model 1 - Code Baseline
  - Model 2 - Prototype Design
  - Model 3 - Final Design

Energy Efficient Measures:

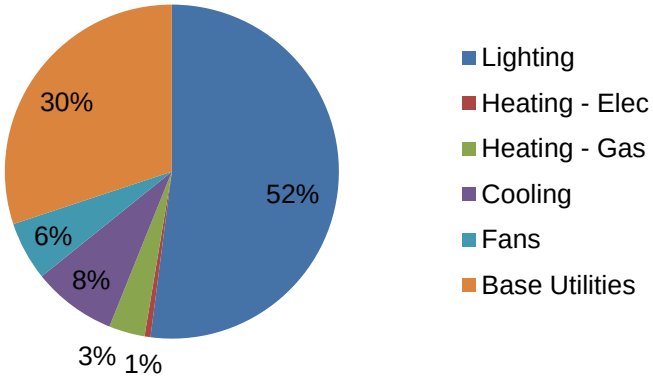
- The EEM selection process focused on the local climate in Lodi. Due to mild temperatures, the typical store spends 60 times more on electricity than natural gas compelling the CBP team to focus on EEMs that saved electricity.

- The final list of 12 EEMs was selected and applied to the project resulting in the greatest energy savings from our baseline prototype:
  - EEMs with an ROI of < 2 years are implemented directly.
  - EEMs with an ROI of 2-5 years are evaluated carefully.
  - EEMs with an ROI of > 5 years are considered if the implementation cost is relatively low.

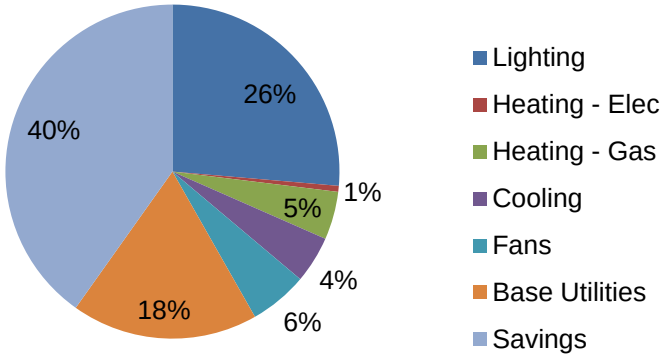
Performance Measures:

- Comparing the estimated energy use intensities (EUI) of Model 1 to Model 3, the Final Design displays 40% in savings.

Model 1 – Code Baseline

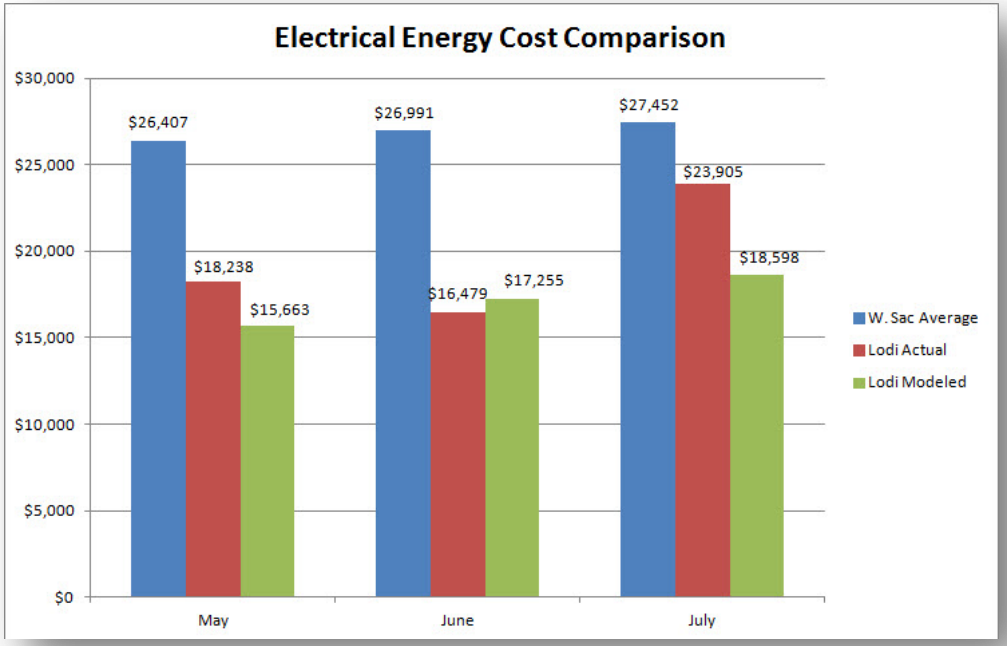


Model 3 – Final Design



Performance Measures:

- Actual data measured over a three month period confirmed the store is operating as modeled for the projected energy savings.



Lessons Learned / Moving Forward:

- The design team took a proactive approach to testing the measures in existing stores when possible:
  - The light-emitting diode in-rack lighting was installed in an existing store to evaluate the impact to customers and sales.

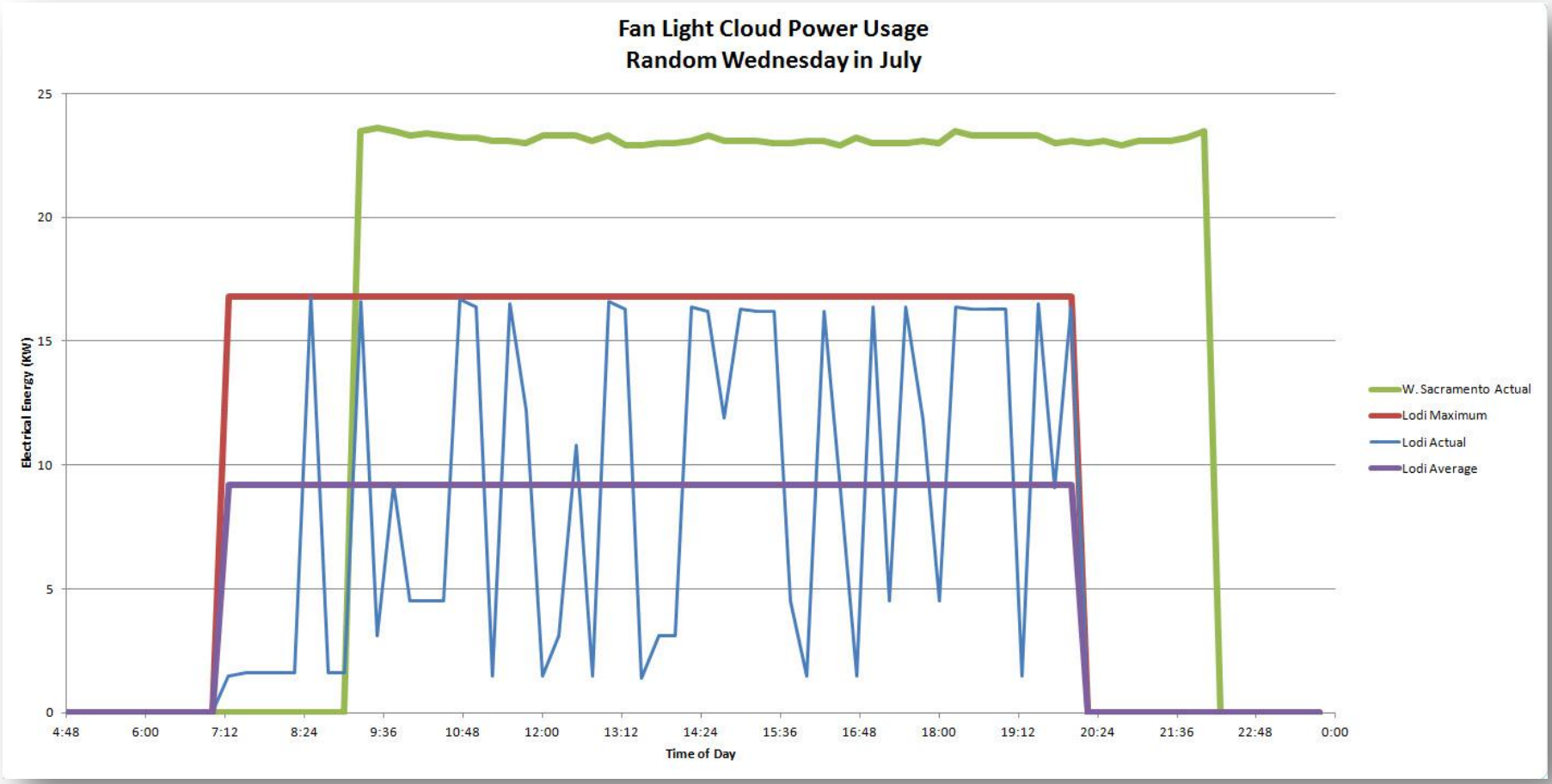
Lessons learned / Moving forward:

- In the Lodi store, the aisles have motion sensors that turn the display lighting fixtures on only when a customer is in the aisle shopping.

(Left) Lighting display area when no customer is present. *(Right)* Lighting display area when customer is present. Motion sensors activate the display lighting in this aisle during the time a nearby shopper is browsing.

Lessons learned / Moving forward:

- This EEM is expected to significantly reduce the load required for the roof top HVAC in addition to the direct energy savings from the lighting.


Fan Light Cloud Power Usage
Random Wednesday in July
Electrical Energy (KW)
25
20
15
10
5
0
4:48
6:00
7:12
8:24
9:36
10:48
12:00
13:12
14:24
15:36
16:48
18:00
19:12
20:24
21:36
22:48
0:00
Time of Day
W. Sacramento Actual
Lodi Maximum
Lodi Actual
Lodi Average

Lessons learned / Moving forward:

- Local climates play a significant role in determining which EEMs to implement for the most cost effective changes and greatest energy savings.

- The savings for heating energy would be much larger in the other areas of the country compared to Lodi (more than 3 times in Hartford and more than 2 times in Baltimore).

Lessons learned / Moving forward:

- The package of EEMs considered for the following locations would be well over the 50% target for the CBP.