Laboratory Lighting Controls Upgrade

- New Laboratory Building Biological Sciences 3
- Beat Title 24 Energy Standard by 20%+
- Challenge to reduce annual energy consumption from lighting by ~50%
- Extremely low Lighting Power Density (LPD)
  \[ LPD = \text{Lighting Watts} / \text{Square Foot} \]
- Lab Environment with ~50 Foot-candle Requirement
- Reducing true LPD not a probable option
Before:

- Lab Area LPD = 1.1
- Lab Prep LPD = 0.9
- Prep Room LPD = 2.0
- Corridor LPD = 0.6
Manual Switch to Occupancy Sensor

50% Auto On - Manual to 100% - Auto Off
Auto on to 50% Light Level
Lower Blinds to Allow for Daylighting
Photocell to Control Window Fixture

BUTTON
PHOTOCELLS
Fixture Closest to the Window is OFF
Lab Area SAVE +50%

Lab Prep SAVE 40%

Prep Room SAVE +50%

Corridor SAVE +50%
Summary

- Project Is Scalable (floors, buildings, campuses)
- Simple Payback Period in the 2.3 to 3.4 year range
- Savings Based on Controls not LPD!
- Consider under cabinet task lighting at the work surface to augment overhead lighting
- Consider perforated blinds to increase light and reduce glare through “views” portion of fenestration
1. Lighting should be as flexible as the possible
2. Provide task lighting when additional illumination is needed
3. Encourage occupants to be conscious of their lighting needs
4. Do not discount the synergistic savings of heat produced by over illuminated spaces
## LIGHTING

<table>
<thead>
<tr>
<th>Previous Best Practice</th>
<th>Space Type</th>
<th>Gross Hall</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.9 watts/sqft</td>
<td>Offices</td>
<td>0.49 watts/sqft</td>
</tr>
<tr>
<td>1.1 watts/sqft</td>
<td>Labs</td>
<td>0.66 watts/sqft</td>
</tr>
<tr>
<td>1 watts/sqft</td>
<td>Overall Conditioned Space</td>
<td>0.61 watts/sqft</td>
</tr>
</tbody>
</table>

208,561 kWh/year

94,753 kWh/year

Results in a savings of $11,897 per year at $0.105 per kWh
Perforated Window Blinds
Make use of daylighting without the glare
LIGHTING

Lab areas within 15’ of the window line and all private offices and conference rooms are equipped with automatic daylighting controls.
Lighting is controlled per lab bay not per lab to maximize savings.