Campus Lighting Strategies

Last updated: 03/30/11
Brody Complex Renovations
Energy-efficient lighting design

The following efficient lighting concepts are being incorporated into the project:

• All lighting is being replaced in rooms, corridors, crawl spaces, mechanical and electrical rooms, stairs and janitor closets

• Compact fluorescent lighting will be used in place of incandescent

• The corridors will have bi-level lighting (50% to 100%) 32W T8 lighting with motion sensors

• T8 vs. T5 have been analyzed for a typical student room, and the results showed minimal energy savings with T5

• Walkway lighting is proposed to be retrofitted with LED or induction lighting with motion sensors
What are common lighting energy saving projects at MSU?

- T12 32W fluorescent lamp/ballast to T8 32W fluorescent lamp/ballast
- ASHRAE/LEED lighting energy reductions – Lighting Energy Density (W/SF)
- Occupancy sensors
- Controls – Time of day scheduling with timers or through the BAS (Building Automation System)
- Photo controls or daylighting
- T8 32W fluorescent lamps to 30W, 28W, or 25W T8 fluorescent lamps
- HID (High Intensity Discharge) to T8 or T5 fluorescent lighting fixture conversions
- HID dimming
- Reflectors
- New lighting technologies – LED (Light Emitting Diode), Induction lamps
- Incandescent lamps to CFL (Compact Fluorescent Lamps)
What is MSU doing now?

• **T12 32W fluorescent lamp/ballast to T8 32W fluorescent lamp/ballast**
  – MSU has been changing out the T12 lamps/ballasts over the last decade
  – Academic areas: Complete
  – Residential and Hospitality Services: In progress

• **ASHRAE/LEED lighting energy reductions – energy density (W/SF)**
  – MSU Construction Standards since 2006 require 29% reduction from ASHRAE

• **Occupancy sensors**
  – Included in MSU Construction Standards since 2006
What is MSU doing now? (cont....)

• **Controls**
  – TOD (Time-of-day) scheduling with timers or through BAS
    • BAS is already performing TOD controls in several buildings
    • PROJECTS UNDERWAY
      – Spartan Stadium Concourse Lighting

• **Photo controls or daylighting**
  • PROJECTS UNDERWAY
    – Spartan Stadium Concourse Lighting – Implementing daylighting for north/south ends
What is MSU doing now? (cont....)

• T8 32W fluorescent lamps to 30W, 28W, or 25W T8 lamps
  – Energy savings can be realized
    • Examining foot candle levels, ballast compatibilities, diminished lamp performance, lamps costs, maintenance issues of inserting a 32W lamps back into fixture
  • PROJECTS UNDERWAY
    – Trials underway at the Manly Miles Building and Physical Plant EAS office

• HID to T8 or T5 fluorescent lighting fixture conversions
  – T5 and T5HO work good for gymnasiums and high ceilings
  • PROJECTS COMPLETED
    – IM West, Pavilion Exhibit Area (lighting energy costs were reduced by 46%)
What is MSU doing now? (cont....)

- **HID dimming systems**
  - Energy savings can be realized (10%) by reducing voltage to the HID fixtures
    - Parking Ramp #5 has a HID dimming system in place
    - PROJECTS UNDERWAY
      - Examining Parking Ramp #5 lighting options

- **Reflectors**
  - Energy savings by simply removing lamps and adding reflectors (4 lamps to 2 lamps)
  - Concerns include ease of retrofits, costs, fixture/reflectors long-term issues, ballast losses, adequate lighting levels, limitations of fixtures to retrofit
  - Large-scale implementation in question
  - Trial underway in EAS basement corridor – scheduled for December
How is MSU doing? (cont …)

• **New lighting technologies**
  – LED
    • Researching LED recessed can downlight fixtures, T8 LED tube light trials
      walkway lighting, garage lighting, sconce lighting
    • LED exit sign in Construction Standards, evaluating more LED standards
    • Projects include: Vet Med, Intl Center, Spartan Village walkway trials
  – Induction lamps
    • Researching various manufacturers
    • Trials underway on campus

• **Incandescent lamps to fluorescent lamps**
  – Majority of incandescent lamps replaced with CFL, limited usage on campus
  – Incandescent lamps will no longer be available within a few years
### Summary

<table>
<thead>
<tr>
<th>Retrofit T12 to T8</th>
<th>Conversion/Retrofit Fluorescent 32W to 25W lamp</th>
<th>Retrofit T8 to T5</th>
<th>Two-level lighting with motion Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>• General Fund buildings complete</td>
<td>• Testing in progress, study to identify/measure locations applicable</td>
<td>• Not recommended for retrofit, limited applications</td>
<td>HID dimming</td>
</tr>
<tr>
<td>• RHS &amp; Athletic facilities in progress</td>
<td></td>
<td>• Need correct fixture with optics</td>
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<td>• 10% energy reduction</td>
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</tbody>
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<table>
<thead>
<tr>
<th>LED Down light</th>
<th>Controls</th>
<th>LED Fluorescent</th>
<th>Reflectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Evaluating LED down lights for revisions to Construction Standards</td>
<td>• Occupancy/motion sensors, Photocell</td>
<td>• Still in development</td>
<td>• Works best in over lit areas</td>
</tr>
<tr>
<td>• Investigating retrofits kits</td>
<td>• Time of Day/Astronomical Calendar</td>
<td>• Trial in EAS and Comp Center</td>
<td>• Prismatic lens only</td>
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<td></td>
<td></td>
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<td>• Trial underway at Physical Plant</td>
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