SOLID STATE LIGHTING IN HIGHER EDUCATION FACILITIES

US Department of Energy
Pacific Northwest National Laboratory
Can we Illuminate the Lighting Systems?

- We design it
- We install it
- We take photographs to get awards
- Owners use it
- Owners maintain, maybe
- We get a bad reputation when it fails!
Examples

- Compact CFL’s
- A wide variety of base styles
- A wide variety of fixtures
- After years of operation they finally fail
- An untrained maintenance worker encounters a multi pin lamp that does not fit the fixture.
- The worker tries to snip off the extra pin to make it fit!
Examples

- Linear Fluorescents
- T12 lamps have been in use for a long time
- T8 is now the lamp in inventory
- T5 is the latest lamp we select
- Can you fit a T5 into a T8 fixture
- Believe it or not some people try to!
SSL’s
They have been installed in newer buildings as decorative illumination for specific locations

EMPAC Concert Hall
SSL’s

Folsom Library

Lighting designed to work in conjunction with outside environmental conditions

Colors change in response to outside temperature
SSL’s

Where can we install them for widespread use?

Classrooms (Multimedia)

Conference rooms
Lighting Controls

- Interface between lamp, fixture, controls and humans
- Specific or general purpose?
- Who programs the use?
- Who understands the requirements?
We commission HVAC systems since they are a complex set of systems with significant operability concerns.

We install and test complex A/V systems to insure that they have a high degree of functionality.

We should commission lighting systems.
Lighting Systems Commissioning

- It is no longer just a lamp
- We need to view lighting systems in the same light
- The commissioning should involve the maintenance staff so that they understand the design intent, the technology and will have the information years later when the system experiences a failure.
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How are is SSL being used in ways that can be applied in higher education?
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- Lecture settings and classrooms
- Laboratories and special teaching environments
- Libraries
- Dining
- Specific application challenges
Lecture settings and classrooms
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Laboratories and unique teaching environments
Laboratories and unique teaching environments
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Libraries
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Dining
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Typical application challenges
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## Typical application challenges

<table>
<thead>
<tr>
<th>Application</th>
<th>“Old School”</th>
<th>Present and Future</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimmed downlightng</td>
<td>Incandescent</td>
<td>CFL, LED</td>
</tr>
<tr>
<td>Cove lighting</td>
<td>Linear T-8, luminous tubing, cold cathode, linear low voltage</td>
<td>Linear T-5 (HO &amp; addressable output ballast), linear LED</td>
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<tr>
<td>Task lighting</td>
<td>Linear fluorescent, CFL, linear low voltage</td>
<td>Fiber optics, linear LED</td>
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<td>Wall washing</td>
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Questions?