Oregon Coast Aquarium LED Lighting Upgrades Case Study

Oregon Coast Aquarium utilizes LED Lighting to illuminate "Passages of the Deep"

Project Background & Scope

A highlight for visitors to the Oregon Coast Aquarium is walking through transparent, underwater tunnels that extend the length of the 80-foot-diameter tank while surrounded by sharks in the "Passages of the Deep" display. The lighting for this open ocean display in good weather is provided by daylight. But on the many wet and stormy days near the ocean, a roof closes and a combination of skylights and electric light fixtures provides illumination to the underwater display.

Until recently, these 22 light fixtures were 1000 Watt metal halide (MH) lamps. But these had to be replaced frequently and staff did not relish performing this chore while hanging above the sharks. The aging lighting system was due for replacement and Kevin Clifford, Curator of Fishes and Invertebrates, began looking for better and more efficient lighting. LED lighting was being discussed on the aquarium operator's email discussion forum, Listserv, as a solution, with the added benefit of eliminating mercury from the lighting products located above the animals. LED lighting would also provide much longer intervals between lamp replacements. Rick Goulette, also at the aquarium, noted that using LED lighting would be a way to "practice what we preach" as far as conservation.

After some discussions on the Listserv and online research, Ecoxotic Aquarium lighting company was contacted to help. An evaluation of the project economics using lifecycle costs, where labor cost savings are included, clearly showed LED lighting to be the most cost effective choice in spite of high first costs. The company offered a good price and Central Lincoln PUD provided financial incentives.

Passages of the Deep Exhibit

Ecoxotic's Cannon LED 100-Watt Elliptical LED Pendant was selected to replace the 1000-Watt MH lamps on a one to one basis. The LED lighting is whiter than the MH lamps, with a color temperature of 10,000K (simulating blue sky on a clear day) and the exhibit appears much brighter. The LED luminaires are very well sealed and should hold up well in the harsh coastal environment. The fixtures were hung just above the water surface and did not require additional light focusing; in contrast, the MH fixtures required tunnel-like draping to help direct more of the light deep into the water. Only one LED unit had early failure of LED chips. The modular construction allowed just the LED head to be sent back to the manufacturer for repairs and the fieldwork was not difficult.

No controls beyond switches are currently used, but Clifford has hopes of eventually adding controls to simulate sunrise and sunset.

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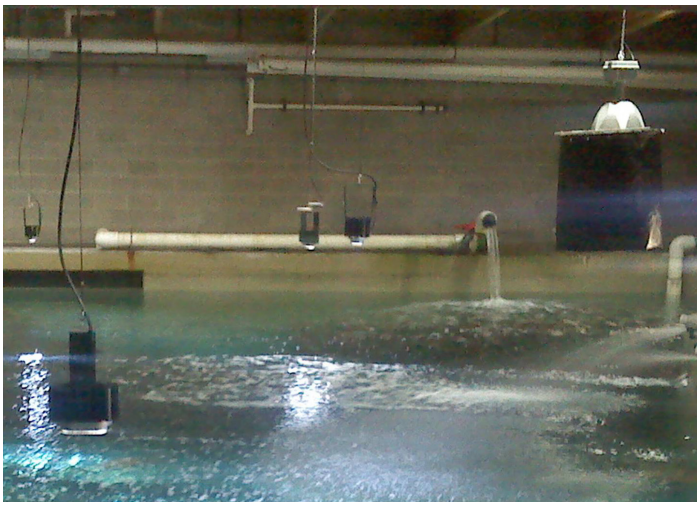

This photo taken during the retrofit shows an LED fixture on the left hanging low over the water, and a MH fixture on the right with a drape

Results

The success of the LED lighting above the large shark tank inspired the Aquarium to install LED lighting in other applications. LED lighting has already been installed in the parking lot and service yard. Next, the Aquarium is considering LED lighting for the galleries, replacing incandescent and compact fluorescent lamps. Additionally, lighting for artwork and educational displays and for close-up displays that small aquariums visitors look into rather than pass through, will be converted to LED sources as the existing lights fail. Aquarium staff members believe that conversion to LED lighting is definitely worth the investment and, though funding constraints will necessitate a longer conversion period, LED lighting is the path to the future at this facility.

Lessons Learned

Aquarium staff stress, “Don’t just go for cheap! It is important to deal with a good company and find a good product. Try some samples for a couple months before you commit. You probably get what you pay for.”

Additional Resources

Products

- Passages of the Deep lights – Cannon LED 100 Watt Elliptical LED Pendant: http://www.ecoxotic.com/100-watt-elliptical-cannon-led.html
- Parking lot lights – Lithonia DSXF1 LED 1 50 M4 22W LED Flood Light, 5000K

Considerations for Purchase

Before purchasing LED lighting:

- Understand warranty coverage and length. Coverage might include various components, field repair, shipping and labor, over 5 to 10 years. Warranty eligibility may require multiple LEDs to fail before replacement.
- Install a sample before committing to a purchase.
- Check your local utility for available incentives.
- Engage a professional to provide lighting that meets your needs, complies with energy code, and is compliant with utility incentive requirements.

Most utility incentives for LED lights use a qualified list:

- For light bulbs, look for ENERGY STAR products: http://www.energystar.gov/index.cfm?c=manuf_res.pt_lighting
- For commercial light fixtures, refer to Design Lights Consortium qualified product lists: http://www.designlights.org

Additional questions to ask are listed at this U.S. Department of Energy website: http://www.eere.energy.gov/buildings/ssl/what-to-ask.html

Facility

Oregon Coast Aquarium

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Utility

Central Lincoln PUD

Cannon LED 100 Watt Elliptical LED Pendant