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A Moment Of Clarity

The Eneref Institute examines how a new lighting technology adds brilliance to the basketball court at the William Paterson University in Wayne, N.J.

If it appears that the William Paterson University men's basketball team has a glow around it when it plays, it's not only because the team has reached two NCAA Final Fours and 13 NCAA Tournaments. Actually, that radiant shine from the basketball court is due to a facility lighting retrofit upgrade that burns brighter lights while using far less energy.

The 10,000-student William Paterson University in Wayne, N.J., is one of nine state colleges and universities in the state, and offers 43 undergraduate and 22 graduate programs through its five colleges. The recreation center includes the 28,000-square-foot basketball gymnasium, an exercise room and various other recreational services. Before the lighting retrofit project, the gym was lit with standard 465-watt, metal-halide fixtures.

According to the Director of Physical Plant Operation, Lou Poandl, some people were skeptical when he first proposed the idea of a lighting retrofit, but after the results were on display, even the naysayers were swayed.

LOW LIGHT WITH HIGH BILLS

Over time, the light output of the old lamps deteriorated dramatically, leading to an inadequately lit basketball court. At the same time, energy costs were growing. And when the gymnasium was not in use, the lights were kept on to avoid the lengthy delay for them to fully turn on—a common problem with metal halide lighting technology.

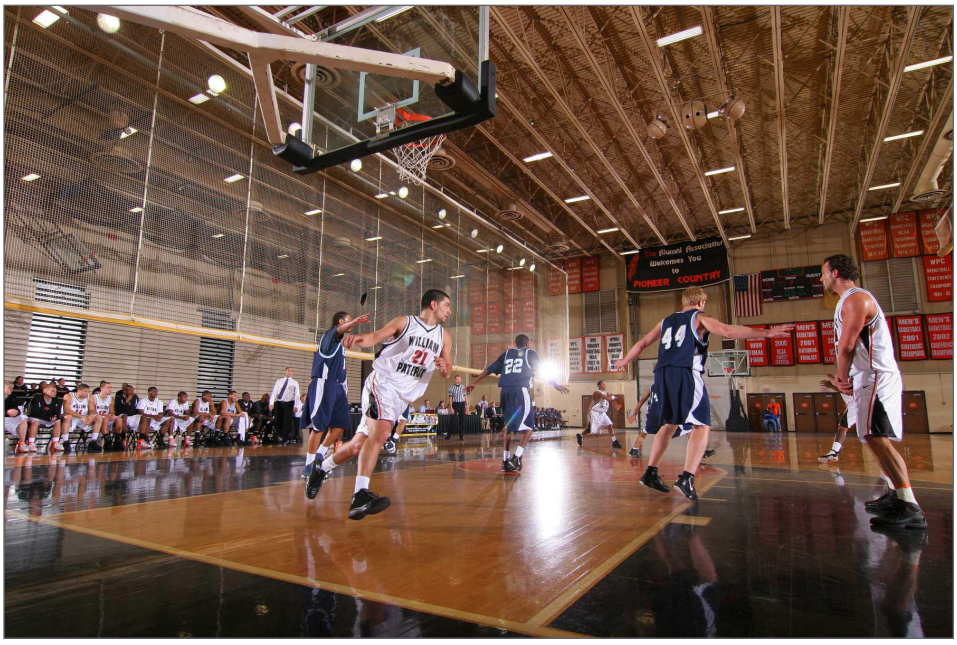
With a ceiling height of 32 feet, increasing the available light while reducing energy seemed like a contradictory approach. Yet the two objectives were met and even exceeded expectations.

William Paterson University sought competitive bids for the project, looking for the biggest energy savings.

NEW TECHNOLOGIES IMPROVE LIGHTING

The solution came in the form of a lighting fixture that employed a new reflective technology called Miro, built into a fixture from Westinghouse Lighting Solutions. Miro material— made by German manufacturer Alanod Aluminum—essentially squeezes every particle of light out of the fixture.

Poandl, who has been with the university for ten years, says that "the Miro makes a highly reflective fixture, so it actually throws more light onto the surface where you want it. Light does not get absorbed by the fixture." The optimized fixtures are far more efficient than fixtures made with traditional anodized aluminium reflectors.



The new Miro reflector system offers more light and better color rendering, which gives players and fans a better view of the game at the William Paterson University in New Jersey.

"In fluorescent lighting, the right reflective material can improve the energy savings by as much as 25 percent," claims Matthias Weigert, Director of Lighting Technologies for Alanod Aluminum.

But it's not only the material that makes the new fixtures so efficient. It is also the unique way in which Westinghouse designed the fixture to maximize efficiency. The fixture takes advantage of many new lighting technologies: a light-weight aluminum body to manage heat; precise reflector design, using Miro technology that spreads light beams to specific areas; T5 high-output fluorescent bulbs; and rapid-start ballasts. And for easy maintenance, Westinghouse included protective wire guards to cover the fixtures from impacts and an easy-access design so that no tools are needed to remove the lamps and reflectors to access the ballast.

According to Poandl, "In some cases, contractors were obviously throwing us a low-ball price where we'd know they couldn't do the job for that price, or they were using the wrong materials. If a vendor did not specify Miro, for example, we knew we wouldn't be able to save as much energy, and we would question the numbers closely."

Specialized optic design has become a popular method for lighting-fixture designers to improve energy efficiency. Until Miro was introduced several years ago, anodized aluminum and white painted aluminum were the most common reflector materials.

Specularity is a material's ability to direct light exactly where the lighting designer points it. Older reflectors defuse light, thereby wasting it on the walls and ceiling where it's not needed. Especially for sports facilities with high ceiling heights, lighting designers now look for materials that are nearly 100-percent reflective and highly specular to bounce light in the most-efficient way possible.

The fixtures are not only green because of reduced energy, but the fluorescent lamps are compliant with Toxicity Characteristic Leaching Procedure (TCLP) requirements, meeting the classification of "low mercury."

TCLP is an Environmental Protection Agency test to determine whether a solid waste substance is hazardous for the purposes of disposal. If the concentration of the toxic chemicals does not exceed maximum regulatory levels, the waste product is classified as "TCLP-compliant." The cost of hazardous disposal can be very expensive.

Poandl says that the original specification only called for "as much light as we had before," so he is delighted by the light increase.

MONEY IN THE BANK

Selling a new lighting system to a CFO should be like selling an investment, rather than a capital expense. Once the initial investment of the light fixtures is

paid for, a new lighting system is money in the bank. According to the Eneref Group, using the right combination of lamp, reflector, optics and ballast can achieve 75-percent energy savings over older T12 or metal-halide systems.

And the results for the university proved to be impressive. Even as light levels increased by 40 percent, the new system needs 50-percent less energy. That makes sense when you consider that the 465-watt, metal-halide fixtures were replaced with 234-watt, Westinghouse T5HO fixtures. The rapid-start ballast alone saved the university $500 a year because the lights are now turned off when the gymnasium is unoccupied.

Poandl says that the original specification only called for "as much light as we had before," so he is delighted by the light increase. But the actual light color also improved, helping one's ability to see. "It's a much better color rendition, so things look better," says Poandl.

The university's Assistant Basketball Coach, Brian Chapman, who makes a living winning basketball games, is just as competitive discussing the school's new lighting system as he is on the court. "Even though we have an older facility in comparison to others in our conference, our light is actually better. Going to other gyms, with new facilities, the lighting isn't as good."

William Paterson University has embraced the "American College and University Presidents Climate Commitment" (ACUPCC), which promises that its institution's short-, medium-, and long-term efforts will reduce greenhouse gases emitted in energy generation and use, with the ultimate goal to make the campus "carbon neutral." For example, the university has just completed the bidding process for a large photovoltaic project.

Still, the new lighting did come with one downside, says Poandl. "Now we are seeing some of the imperfections on the floor that we weren't able to see before."

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This article is an excerpt of the future Eneref report which assesses the impediments to building zero-energy urban communities in the US. A companion film documentary, The Eneref Project, will seek to demonstrate to key decision-makers how zero-energy communities can be commercially viable.