The Challenge
Passed in 2006, Ohio House Bill 251 requires institutions of higher learning to develop plans to reduce energy consumption by at least 20 percent by the end of 2014. To achieve this goal, Kent State University has launched an energy efficiency and sustainability initiative on its Kent Campus (29,000 students).

Working with The Brewer-Garrett Company in Middleburg Heights, Ohio; Kent State has focused its efforts on retrofitting interior and exterior lighting, replacing roofs and windows, initiating water conservation measures and more.

A key project in Kent State’s overall energy reduction plan included a retrofit of the lighting in the university’s more than 40 parking lots and along multiple roadways on the 941-acre Kent Campus. The university, which serves commuters and students living in 29 residence halls, was previously illuminated primarily by high-pressure sodium (HPS) luminaires mounted on 25- and 30-foot poles.

While reduced energy consumption was the primary objective, the university also wanted to improve campus-wide safety and security as well as overall aesthetics.

“Yellowish light from the high-pressure sodium fixtures created an inaccurate color representation that made the color of vehicles, clothing and other objects hard to distinguish and could lead to safety issues,” said Robert Misbrener, Project Manager in the Office of the University Architect at Kent State. “The

Kent State University Saves 76% in Energy Costs with the D-Series Area Lighting and Controls
Timing was right for a retrofit based on Ohio House Bill 251, modern LED technology and our desire to improve the campus appearance.

**The Solution**

Kent State University commissioned The Brewer-Garrett Company to evaluate the existing HPS system and recommend an LED lighting solution that would help achieve its sustainability goals and could also be implemented campus wide.

During the exploratory phase, The Brewer-Garrett Company conducted tests evaluating the performance of three different LED luminaires in a parking lot with poles spaced 150-feet apart. The test allowed Kent State and The Brewer-Garrett Company to analyze the real-world performance of individual LED luminaires and determine how effectively each product illuminated the space.

All luminaires were evaluated on minimum light levels (according to IES standard), maximum to minimum uniformity, fixture wattage, apparent glare while walking and driving, daytime and nighttime aesthetics and market pricing.

“This higher CRI rating is extremely important for safety and security and for general navigation since it’s easier for drivers to see any ground markings.”


“The Lithonia Lighting LED parking lot fixture was the highest ranking product—or tied for highest—in nearly all categories,” said Steve Marshall, LC, Energy Engineer, The Brewer-Garrett Company.

The Brewer-Garrett Company installed 572 Lithonia Lighting D-Series Area Size 1 luminaires in the parking lots throughout the Kent Campus and along multiple roadways. The project was designed for one-for-one fixture replacement on existing poles and the performance of the D-Series luminaire actually allowed Kent State to eliminate fixtures in some instances.

“There is so much variation across this large campus,” Marshall said. “Digitally designing the lots with different distribution patterns allowed us to use various fixture quantities to provide the proper level of illumination.”
The Results

By upgrading to the D-Series LED Area Size 1 luminaires, Kent State will save 778,000 kilowatt-hours annually. At average U.S. energy costs of 10 cents per kWh, this would represent a $77,800 reduction in energy costs each year. Energy savings are estimated at 76 percent over the previous HPS system and are equal to the greenhouse gas emissions from 114 passenger vehicles.

The reduction in energy consumption, however, does not equate to a reduction in light levels. With the upgrade, the university replaced 464-watt HPS fixtures with 106-watt LED luminaires while still providing a brighter campus.

"As a Kent State employee who is also the parent of a student, I am very proud of this university and its commitment to safety," Misbrener said. "We were able to reduce our energy consumption and also improve the nighttime lighting on our large and beautiful campus. This will benefit our faculty, staff and the many students who call our university home."

The LED system was designed to meet or exceed the "Enhanced Security" recommendations of IES RP-20-98 "Lighting for Parking Facilities," which specifies 0.5 footcandles minimum horizontal illumination, with a 15:1 maximum to minimum or better uniformity.

The color rendering index (CRI) also increased from 20 with the HPS system to 70 with the LED luminaires. "This higher CRI rating is extremely important for safety and security and for general navigation since it's easier for drivers to see any ground markings," Marshall said.

For enhanced energy savings, Kent State controls outdoor lighting with existing photocells and equipped remote roadway D-Series LED luminaires with photocells. These control the fixtures and provide dusk to dawn illumination.

Besides achieving considerable energy savings, Kent State will significantly reduce its overall maintenance costs. Designed to deliver an estimated LED service life of more than 100,000 hours, the D-Series luminaires will be virtually maintenance free for more than 20 years.

"We are very pleased with the Lithonia LED fixtures and look forward to many years of trouble-free performance," Misbrener said.

Due to the results and success the university experienced, staff members from Kent State's Office of the University Architect have made the D-Series LED luminaires the standard for all area lighting in new parking facilities.

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— Robert Misbrener, Project Manager in the Office of University Architect at Kent State