



Leviton Case Study

David L. Lawrence Convention Center



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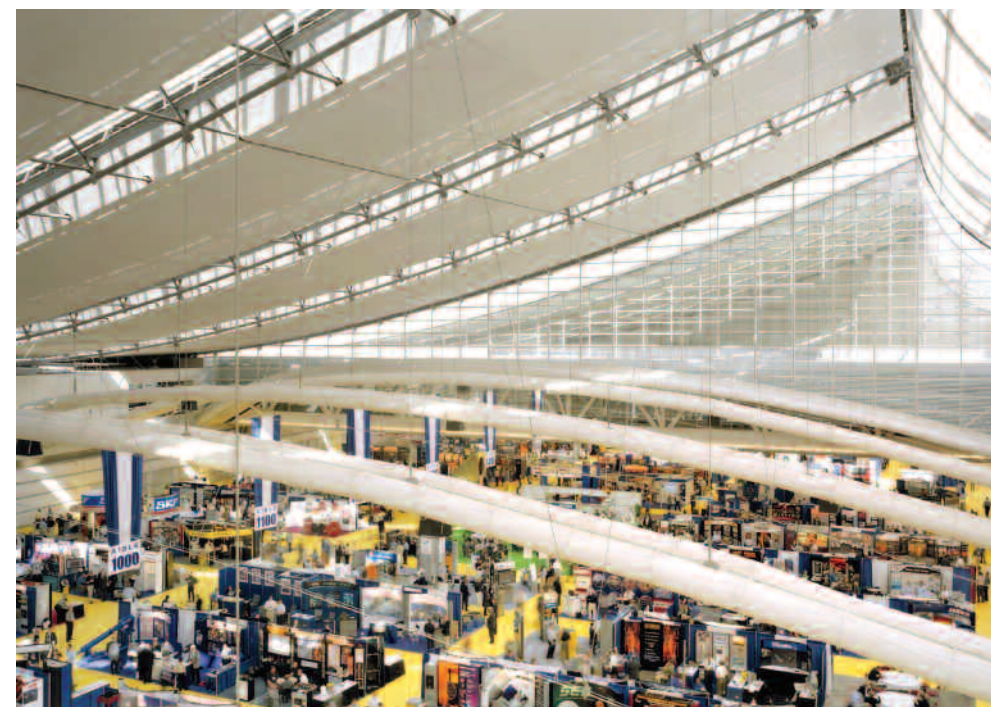


A Showplace
for Green
Technology



David L. Lawrence Convention Center Case Study

The David L. Lawrence Convention Center is both a signature project of the eminent Italian architect Robert Vignoli and the largest Gold LEED™-certified (Leadership In Energy and Environmental Design) green building in the



world thanks to its ultra-energy-efficient design. To underline its significance in the energy and environmental building design community, the United States Green Building Council will be the first to hold a conference in this recently completed showcase venue. Leviton's participation in this project is extremely important, presenting a unique opportunity for Leviton to demonstrate its leadership position in the area of advanced energy-efficient lighting control solutions.

"We were honored to have been selected to provide the lighting controls on such an important project," commented Marketing Director Tom Leonard. "Driven largely by economic factors and environmental concerns, the demand for energy-efficient lighting controls is continuing to rise on both a small and a large scale. High-profile projects such as the LEED-certified David L. Lawrence Convention Center serve to strengthen our position as a leader in this burgeoning market."

A Showplace For "Green" Technology

Set in downtown Pittsburgh along the Allegheny Riverfront, the new Convention Center offers stunning views of both the river and the city skyline. The Center provides 313,000 square feet of exhibition space, 51 meeting rooms, two 250-seat lecture halls, offices, 37 loading docks, a 2-level parking garage and a 30,000-square-foot ballroom, the largest in the region.

The facility incorporates numerous high-performance green features, including extensive use of natural daylight in the upper exhibit, pre-function and lobby areas so that artificial lighting would normally not be required on bright days. The Convention Center also makes use of sensor-controlled "daylight harvesting" technology supplied by Leviton Manufacturing that reads the changing levels of natural illumination while automatically adding artificial lighting as required to maintain a user-defined level of illumination. This saves energy on both lighting and, as lights generate heat, on cooling, as well. These lighting energy savings were supplemented with green features such as recycling water to greatly reduce the amount of potable water drawn from and discharged into the municipal system. Non-toxic materials are also used throughout the Convention Center.



A variety of energy-conservation measures, including Leviton's daylight harvesting technology, save an estimated 35% of the energy this building would otherwise require. This equals the electricity consumed by 1,900 households or over \$500,000 in savings a year. Buildings consume more than 60% of all electricity produced in the US, of which three-quarters is produced from fossil fuels. Green buildings with advanced lighting controls can have an enormous impact on reducing fossil fuel reliance and the environmental health problems associated with it.

The use of daylight harvesting in the Convention Center was also driven by its positive effect on human functioning. One study showed that skylights in similar retail stores caused a 40% increase in sales over those without skylights. In another study, overall test scores of pupils in classrooms with natural daylight were 20% higher than those in classrooms illuminated exclusively with artificial lighting.

Blending Natural and Artificial Light Into One

The most interesting lighting design features are found in exhibition halls A, B, and C. Several archways, made of pipe and cable, transit the halls laterally. These archways contain the ducting for the HVAC system as well as 277V fluorescent strip up-lighting. The fluorescent strips are

circuited so that four even lighting levels can be produced by turning combinations of circuits On and Off for each archway. The ceiling is sloped and covered with a white reflective fabric between the archways that reflects light coming from the archway fixtures as well as natural light from the upper glass walls and skylights.

Leviton's task was to design a daylight harvesting lighting control system that maximizes energy efficiency for these areas by automatically varying the amount of artificial lighting in response to changing levels of natural daylight. This was accomplished by installing many analog 0-10V photocells in key locations throughout each exhibit hall. Their combined signals were then fed into a network of electronic controls that step-dimmed or brightened fluorescent strip lights in order to maintain a constant level of illumination for the north and south halves of each hall. Special control channels were also assigned that could enable or disable the photocell control, allowing the system to be overridden to Off during unoccupied periods or set to use a combination of light fixtures at a preset level.

The pre-function/lobby areas of the 3rd and 4th levels also exploited natural daylight for illumination by widespread use of glass walls and skylights. Fluorescent strip lighting in the ceiling was arranged in three to four successive rows moving away from the outside windows. A system of



multiple photocells in the ceiling, similar to the one used in the exhibit halls, was employed to progressively switch Off lighting, starting nearest to the windows, as natural daylight increased.

Making Lighting Adjustable For Flexible Spaces

The meeting rooms were outfitted mostly with 277V dimmable fluorescent lighting arranged in 3-5 circuit combinations of direct and indirect fixtures controlled by Leviton MDS Dimmer Cabinets. Leviton D8000 2- and 10-Button Entry Control Stations with a custom stainless steel finish were utilized for control at each doorway. Leviton Architectural Wall Dimmers were used to control the specialty track lighting. Many rooms were equipped with join-separate control stations also in Stainless Steel.

Implementing A Unified Lighting Control System

The grand ballroom ceiling was supplied with hundreds of low wattage 120V fixtures controlled by Leviton I series e Dimmer Racks. The same D8000 Entry Control Stations with a stainless steel finish used in the meeting rooms were employed in the ballroom and a lecture hall, as well. Other exhibit spaces and all parking areas were illuminated with traditional HID hi-bay fixtures controlled by Leviton relays. All exterior and street lighting was also controlled with Leviton relays.



The system was completely networked, allowing astronomical time scheduling throughout using Leviton's LumaScheduler Master Control program. LumaScheduler is capable of handling over 10,000 control points. In all, over 1200 control points and more than 150 control stations were linked together on the Convention Center's network.

Leviton's LumaGraphics software, a Graphical-User-Interface-based (GUI) program, was also installed and customized using floor plan graphics provided by the convention center. The LumaGraphics web-browser-based

software represented every lighting circuit control point by icons overlaid on the floor plans of the facility. The software displayed the current On/Off state or level of illumination of every control point icon on the network in real time. Simply clicking on a single icon or group of icons permitted the user to manually control the circuit(s). The software facilitated control over Entry Stations and Photocells, as well.

Commissioning of phase one of the lighting system was completed in December of 2002, with phase two completed in 2004. Leviton worked closely with Engineer Dave Marti

of Burt Hill Kosar Rittelmann Associates during the engineering phase and Project Coordinator Mark Weissert of TPA during the commissioning phase. The Electrical Contractor was Jay Reed of Lighthouse Electric. Jay and his technically capable crew worked in concert with Leviton Field Engineers during the Commissioning.

Project Review

Dave Marti (Electrical Designer, Burt Hill Kosar Rittelmann Associates): The Leviton D8000 is an amazing system. It will do just about anything you want it to do. Leviton's

people have also been extremely cooperative. They were very good about switching things around due to last minute changes without creating a lot of hassle or adding a lot of paperwork to their efforts. From supplying custom-manufactured stainless steel plates for the controllers to fine tuning of the system's daylight sensors and the setup of their centralized Luma Scheduler lighting control system, Leviton's challenges have been many and they continued to work under a very tough schedule as we moved toward the end of this project.