FUTURE Lighting Solutions
Making LED Lighting Solutions Simple™

Case Study:

Historic Gas Street Lamps

Braun's LED-driven street lamps installed on Berlin's Alexanderplatz public square

Braun Brings Century-Old Gas Lights into LED Era, Replicating Warm Glow with Future Lighting Solutions

Gas street lamps have largely gone the way of the horse and buggy, but cities like Berlin, Prague and Warsaw and even a few towns and neighborhoods in the U.S. have clung to their historic gas lights because of their old-time charm. Berlin-based Braun Schaltgeräte & Service caters exclusively to this market, maintaining existing gas lamps as well as manufacturing new ones that duplicate the older designs. Now Braun is expanding into LED retrofit systems that cut energy costs as well as multiplying lamp life by a factor of more than 10. With Future Lighting Solutions supplying LUXEON® Rebel LEDs and providing vital support services such as optical modeling to achieve the proper light distribution, Braun installed eight 'LED-Gaslights' on a well-known public square in Berlin in early 2009 and began approaching municipalities looking for gas lamp retrofits.

Old-world charm on the outside, LED technology on the inside

COLOR-CRITICAL PROJECT

As Europe's biggest manufacturer of gas-illuminated street lights, Braun has long recognized the need to use a more energy-efficient, longer-lasting light source in the existing gas fixtures to assist municipalities dealing with ever-tightening budgets. The company began offering electrified inserts with conventional compact fluorescent and mercury vapor lighting to satisfy customers' environmental demands over the short term, but president André Braun was convinced that the future lay in power LEDs. One critical reason was the quality of light.

"Gas lighting has a color temperature of less than 2900K. This produces a distinctive golden glow that is so tied into the character of cities like Berlin that the public won't accept anything else, and that glow cannot be reproduced with cooler light sources like mercury vapor and sodium vapor," Braun noted. "The only way to achieve a comparable color tone in a street lamp is with warm-white LEDs."

The usual solid-state efficiency and engineering advantages applied as well. After retrofitting from gas-driven lamps to Braun-LED-Gaslight, energy consumption and related costs would be reduced by more than 90%. The new lamps would also last more than 50,000 hours compared to 4,000 for gas and

"We wanted to develop an LED retrofit for historic gas lamps, but we needed LED-specific engineering advice as well as assurance that we could get a consistent supply of LEDs at the right color temperature. Future Lighting Solutions was able to provide both."

André Braun, President, Braun Schaltgeräte & Service

Golden glow achieved with warm-white LUXEON LEDs

New LED module fits old gaslight form factor

an average 16,000 for standard electrical illumination; improve color rendering for better visibility of street signs and other objects; and simplify the process of creating the desired light distribution because of the small form factor and optical properties of the LED package.

Braun was therefore determined to create a drop-in replacement module that would fit into the existing gas lamp head. In April 2008, he met Future Lighting Solutions at the Light+Building show in Germany. He learned that Future could supply LUXEON LEDs from Philips Lumileds as well as provide engineering support to ensure that the LED retrofit would meet his requirements. His response? "Let's get started."

DESIGN ASSISTANCE

The challenge was to design an LED retrofit that would use the same four screw base sockets as the incandescent mantles in the existing gas lamps. Braun furnished a concept drawing showing multiple LEDs mounted on cone-shaped copper fittings that would screw into those sockets. Future's assignment was to recommend the best LED product for the project as well as an LED layout that would match the brightness and light distribution of the gas-illuminated street lights as closely as possible.

After evaluating Braun's requirements, Future's engineers recommended LUXEON Rebel LEDs based on two key factors. First, they were the smallest surface-mountable high power LEDs on the market and therefore well-suited to the space limitations of Braun's application, including the need for a low profile due to a glass housing tightly coupled to the LED assembly. Second, they were available in high volume in specified correlated color temperatures through Philips Lumileds' proprietary manufacturing process, making it possible to have a reliable supply of LEDs in the warm-white color range critical to achieving a beam color reminiscent of gas lighting.

The Future team then supplied proof-of-concept services through a series

Vintage look without the high cost of natural gas lighting

of optical modeling exercises. With these simulations, the Future team demonstrated that LEDs could meet Braun's photometric requirements, mapped the light distribution that would be produced from the initial sketch, and suggested modifications such as a change in the shape of the copper mountings that guided the final design.

Future assisted in other areas as well, from recommending the appropriate driver for the application to using its proprietary Usable Light Tool to calculate the number of LEDs required to produce the needed light output. The original 64-LED module proved to be too bright for the purpose and was cut back to 48, delivering 2000 lumens of total flux like the gas fixtures it would be replacing.

"As a company, Braun had no experience with solid-state lighting design. They needed technical advice and resources to build an LED retrofit solution that would perform to their specifications," said Alexander Müller, Business Development Manager at Future Lighting Solutions. "This is the case with most lighting designers because LED application development is still an emerging field, and it's why we offer our tools and expertise to the industry."

BERLIN SEES THE LIGHT

Armed with Future's optical design, Braun completed development of the LED replacement module – including transforming the aluminum disk that formerly collected the gas into a heatsink for LED purposes - and contracted with one of Future's network members to assemble the LED boards. By December 2008, he had a demo unit that was installed in Berlin as part of a search for a less expensive alternative to natural gas lighting.

Braun's demo design won a test over three other manufacturers for its innovative use of LED technology as well as its near-perfect replication of the color, brightness and light distribution of the gas originals. Separately, in early 2009, eight Braun LED lamps were installed on Berlin's famous Alexanderplatz public square in front of the Rotes Rathaus (Red Town Hall), the city's seat of government. Outside, they look exactly like the historic gas fixtures. Inside, they are powered by LUXEON technology.

"From an energy point of view, gas lamps have too many negatives. They produce more heat than light – just 2 lumens per watt compared to 50 lumens per watt for LEDs. It is just a matter of time before they will be converted to a more efficient light source," Braun said. "There are 100,000 gas lamps throughout Europe, and we are targeting that market with our LED retrofit. With Future's assistance, we have a solution that we expect will help us secure a substantial portion of that business."

Contact Information

In North America:
1-888-LUXEON2
Americas@futurelightingsolutions.com

In Europe:
00-800-44FUTURE
Europe@futurelightingsolutions.com

In Asia:
+800-LUMILEDS
Asia@futurelightingsolutions.com

In Japan:
+81-0120-667-013
Japan@futurelightingsolutions.com

Philips Lumileds
370 W. Trimble Road
San Jose, CA 95131
www.PhilipsLumileds.com