L PRIZE® FIELD TESTING:

Colorado Customers, Platte River Power Authority

It is easy to quantify the energy savings delivered by the Philips 60W substitution lamp. But what about measuring aesthetics? Here is how one L Prize partner tackled the challenge—and inspired a budding engineer in the process.

On paper, Philips Lighting North America's L Prize submission looked attractive to the Platte River Power Authority, delivering light output equivalent to or better than a 60-watt incandescent bulb while "drawing less" than 10 watts of electricity. But what would users think about the quality of the light? Would it deliver on the aesthetic front as well as the energy-saving front?

Answering this question was integral to the field testing conducted by Platte River Power Authority, an L Prize partner, in Fall 2010. An electric utility serving the Mountain/Central region, Platte River engaged both residential and commercial customers in field tests in the cities of Fort Collins, Loveland, and Longmont, Colorado. In total, the utility installed 60 samples of the LED 60-watt replacement lamp in commonly used fixtures at six sites: three single-family homes, a lighting show-room, a restaurant, and a hotel. In the residential locations, fixture types included outdoor sconces, porch lights, bathroom sconces and vanity fixtures, pendants, ceiling rounds, ceiling fans, floor lamps, and table lamps; in the commercial spaces, they included chandelier up-lights, wall- swinger reading fixtures, pendants, desk lamps, ceiling round fixtures, floor lamps, and surface-mounted glass fixtures.

"A Brighter Future" was the title of the science fair project developed by a member of one of the three households participating in the Platte River Power Authority field tests. Illumination measurements comparing the LED lamp with an incandescent 60-watt bulb were one feature of the project. (Congratulations on the "A", Jay!) *Photos courtesy of Platte River Power Authority.*

Gauging User Satisfaction

By surveying 30 users and occupants at the six sites, Platte River measured the level of satisfaction with the lamps. Results—summarized on the back page—indicated that the lamp was positively perceived by a strong majority of respondents in terms of its brightness, color, and positive impact on visibility; 80 percent said they would recommend the lamps to others. As one homeowner put it, "I think it comes down to cost effectiveness. It is a great light bulb. I love the warmth and brightness." Another took note of the lamp's non-traditional appearance: "At first I thought the bulb looked funny but loved it in the fixture and the light output."

When asked whether they noticed any problems with the light, 16 of the 30 respondents cited no issues; 6 noted an odd color (when dimmed); 4 cited an issue with glare; 4 mentioned uneven lighting; 1 noted a different light distribution; and 1 did not specify the issue. (Based on its own test results, along with those of DOE, Philips began improving the dimming capabilities of its lamp during L Prize testing; the product to be marketed by the company incorporates these refinements.)

Each field test also included measurements of instantaneous power (watts), amps, volts, and power factor, taken first in the Platte River office with a light bar and kilowatt meter prior to installation, and again about two months after the lamps were installed in the test locations. Energy use was calculated based on the estimated hours of operation of each fixture type, and illumination measurements (foot-candles) were taken at various points around the fixtures where conditions permitted, comparing levels delivered by 60-watt incandescent bulbs and with the LED lamps. Generally, the Philips lamp was found to deliver illumination levels on par with, or slightly brighter than, the 60-watt incandescent.

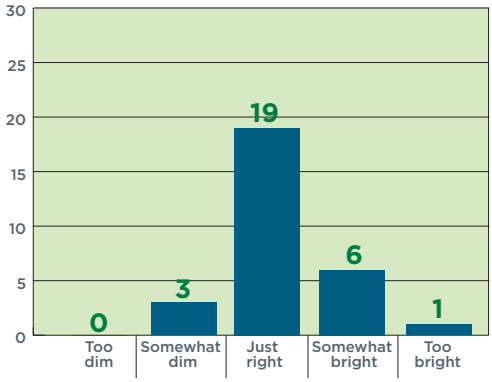
In its cost-effectiveness analysis, Platte River anticipated the use of a utility rebate program to support the market

introduction of the L Prize winner in the 60-watt category, on the assumption that, at initial retail price points, the lamp would not be cost-competitive for typical mass market applications. According to the Platte River field test report, "We believe it will be important to educate our customers of the benefits of LED bulbs and appropriate applications that will achieve the maximum energy savings."

Hitting the Right Notes

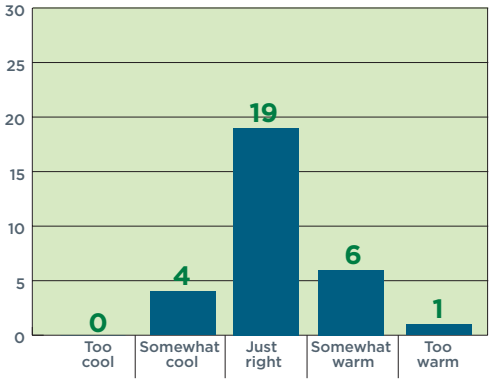
Surveys of 30 occupants at residential and commercial field test sites indicated satisfaction with the key performance aspects of the Philips lamp in a variety of applications.

Is the lighting too dim? Too bright? Just right?

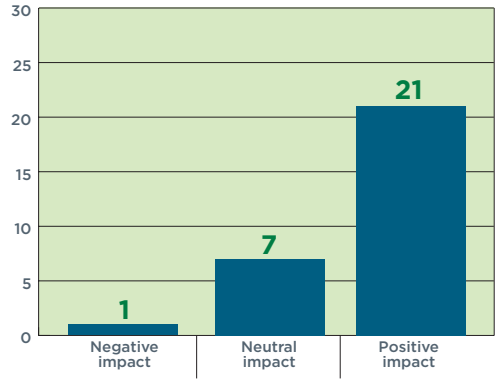


One not responding

Is the color of the lighting too cool (blue) or too warm (yellow)?



Does the lighting have a positive, negative, or neutral impact on your ability to see clearly in this space?



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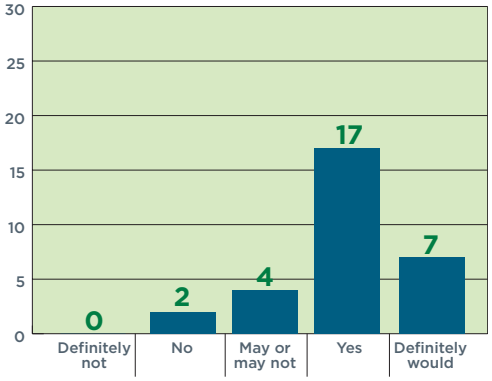
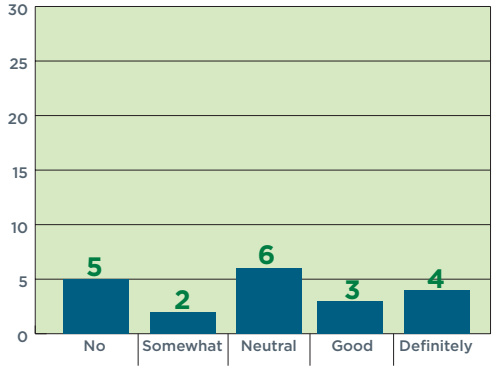
Would you recommend this type of lighting to others?



Do you like the dimming capability of this bulb (if applicable)?



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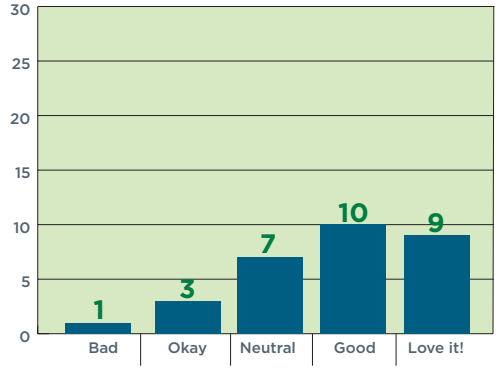
Overall impression?



L PRIZE®

U.S. Department of Energy

No light bulb in history has endured more extensive public testing than the winning L Prize entry from Philips Lighting North America. A highly energy-efficient replacement for the 60-watt incandescent bulb, the Philips lamp stood up to rigorous assessments in the laboratory and in the field.

For More Information

For more information about the L Prize competition, sponsored by DOE's Solid-State Lighting program, see lightingprize.org.

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