

Will LEDs replace neon in channel-letter signs?

The size of the electric signage industry has been estimated at approximately \$2 billion per year, making it an attractive market for LED manufacturers and energy savings advocates.¹ Advancing technology and a greater variety of colors, including white, reveal new applications for LEDs such as commercial channel-letter signs—the most common type of backlit signs. Neon and fluorescent lamps are the most commonly used light sources for this application, but there is a large interest and potential for their replacement by LEDs to attain energy and maintenance savings.

The LRC evaluated the system performance of six red LED signs against typical neon signs and five white LED signs against typical cold-cathode fluorescent signs equipped with electronic ballasts. Among other parameters, the evaluation included the light output, electrical characteristics and temperature inside the signs. The results showed large differences between red and white LED systems, and a wide range of performance among LED systems of a given color.

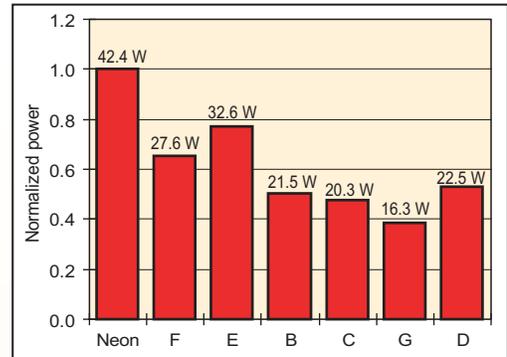
¹ U.S. Census Bureau, 1999. Sign manufacturing, 1997 Economic Census, Manufacturing, Industry Series. U.S. Department of Commerce. Publication EC97M-339L.



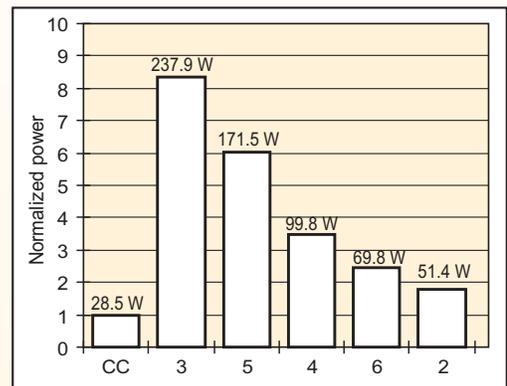
Typical channel-letter signs in outdoor retail applications

Conclusions

At the present time, not all LED systems save energy when compared with traditional light sources. For equal light output conditions, the red LED channel-letter signs tested used 20 to 60 percent less power than the neon sign. However, the white LED signs tested used up to 8 times more energy than the cold-cathode fluorescent sign. The most efficient white LED system tested was 40 percent less efficient than the cold-cathode fluorescent sign. However, this energy-based study did not consider appearance quality, which is also important.



Comparison of all LED signs for equal light output of neon (red, above) and cold-cathode (CC) fluorescent (white, below) signs.



Future work

Presently, there are no visibility standards for illuminated signs. The LRC continues working to help set criteria for the design and evaluation of more visually effective and energy-efficient backlit signs. To achieve this goal, among others, the following questions must be answered:

- How bright should a sign be?
- What is the optimum brightness uniformity of a sign?
- What is the useful life of a sign system?

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