



DIGITAL SIGNAGE:

TECHNOLOGICAL ADVANCEMENTS DRIVING REDUCTIONS IN ENERGY CONSUMPTION

By:

Richard Barrington, Professional Engineer (PE)
Management Associate – The Louis Berger Group, Inc.

Robert Nardi, Professional Planner (PP)
Senior Vice President – The Louis Berger Group, Inc.

The Louis Berger Group, Inc. (LBG) recently completed an analysis of the effects of technology advancements on energy consumption for digital signage. Using data obtained from actual meter readings for digital signage, LBG has concluded that technology utilized for digital signage has advanced significantly in the last four (4) years such that energy consumption has been reduced by as much as 40% in “posters”, smaller digital billboards typically sized 12x24 feet and less. Energy consumption has dropped as much as 61% in “bulletins”, larger digital billboards typically sized 14x48 feet. LBG evaluated actual energy consumption data for digital signage located at various locations in the continental United States for products manufactured by both Daktronics and YESCO Electronics.

LBG evaluated meter readings for a series of digital billboards across the United States. Digital billboards range in size, type, and usage. Due to the multiple variables associated with each billboard, LBG utilized weighted averages to account for deviations in usage, location, and billboard type. In accordance with code requirements, both YESCO and Daktronics recommend electrical infrastructure above the consumption necessary to operate the billboard and its equipment. In many cases, the actual consumption was found to be, at a minimum, 25% less than the recommended infrastructure capacity. This factor, combined with the location and use of the billboard, makes it difficult to provide a true “apples to apples” comparison by manufacturer and technology vintage. The following variables are typically associated with digital signage:

1. Digital billboards require variable amounts of power depending on their location and their utilization. Typically, warmer locations require greater use of cooling fans and will increase power consumption than those in cooler climates. Further, earlier models for digital signage typically included air conditioning in order to cool the electronic equipment. As technology has progressed, the climate resistance of the equipment has increased thus making the need for air conditioning obsolete. Current digital signage vendors employ air circulation fans in lieu of air conditioning units to maintain operating temperatures for their equipment.

2. Additionally, the management or usage of the billboard greatly affects and in most cases reduces the maximum potential energy consumption. For example, most billboards have variable brightness controls that owners commonly use to reduce brightness at night to reduce energy consumption and costs. The advancement of controls has enabled billboard owners to further reduce energy consumption.
3. Pixel Count and Pitch can affect the energy consumption of each billboard. Depending on the model of digital billboards, the energy consumption can vary approximately 20%.

Figure 1 below depicts the average monthly energy consumption for digital signage for various installation years. The larger light blue bars represent energy consumption for signage in the 14x 48 foot size while the smaller dark blue colored bars represent energy consumption for the smaller variety, sized 12 x 24 feet and varying. The chart demonstrates a consistent reduction in energy consumption during the last four years for both the smaller and larger billboards.

Figure 2 depicts the average monthly energy consumption for digital signage for various installation years using a per square foot metric to allow compilation of both smaller and larger sizes. Similar to Figure 1, the charts show a decreasing trend of energy consumption for billboards using the per square foot metric.

FIGURE 1: MONTHLY ENERGY CONSUMPTION

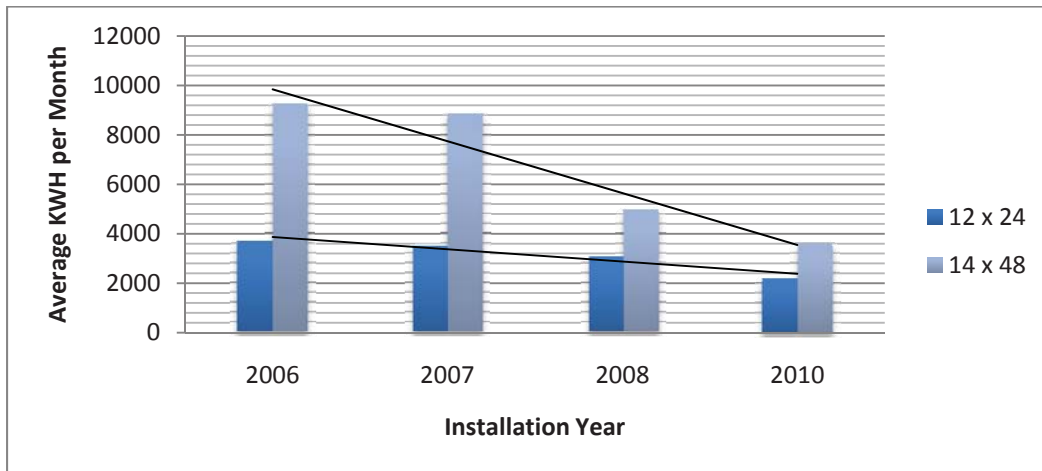
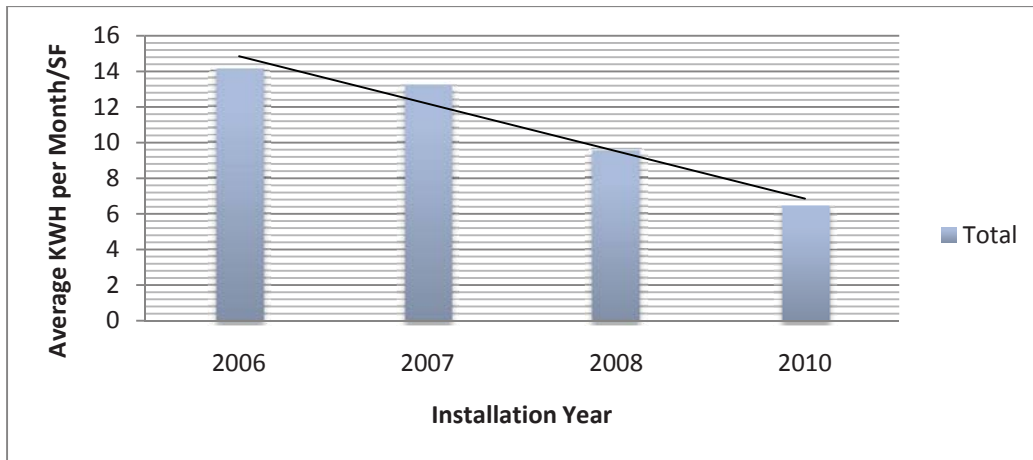


FIGURE 2: MONTHLY ENERGY CONSUMPTION / SIGN SQUARE FOOT



The data clearly indicates a downward trend for both the smaller and larger signage. The decrease is more significant in the larger size, 14x48 feet, as the advances in technology are more clearly demonstrated due to the amount of illumination required for the larger signs. Advancements in technology have driven the downward trend of energy consumption. The increase in LED diode efficiency has steadily contributed to energy reductions in each year. Technology advancements have also contributed to increase the equipment environmental tolerances and subsequently allowed the elimination of air conditioning with each billboard. Beyond technology, it is clear that controls and management of digital signage have also contributed to decreases in energy consumption. The ability to vary brightness by time of day has allowed billboard operators to minimize operational expenses and energy consumption. Continued advancements in both LED efficiency and climate tolerant equipment are expected to allow energy consumption to maintain their downward trend.

Richard Barrington, P.E.
Management Associate

Robert J. Nardi, PP
Senior Vice President

The Louis Berger Group, Inc., (LBG) is an internationally recognized consulting firm that provides engineering, architecture, program and construction management, environmental planning and science, and economic development services. We are a devoted and trusted partner to federal, state, and local government agencies; multilateral institutions; and commercial industry. To this diverse client base we bring strategic vision and an entrepreneurial spirit, developing innovative solutions to some of the world's most challenging problems. With a resource base of 5,000 employees and affiliate employees in more than 90 countries, we are able to respond to local conditions while providing clients with the technical resources and rapid response capabilities of a leading global organization.