Saving Utility Dollars: It's Everyone's Business

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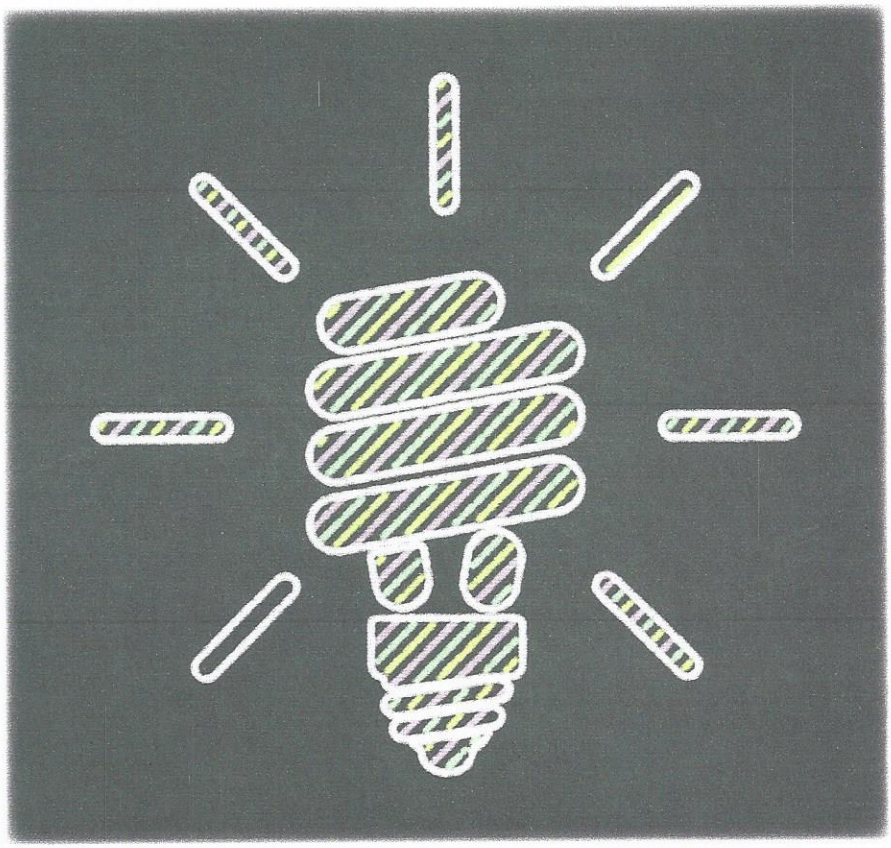


A school district director of finance shared with me a while back that his school district had secured an energy performance contract, but that the district had upgraded only the low-hanging fruit, including the lighting systems, the HVAC systems and controls, the energy management system, and equipment motors. He believed much more money could be saved through reduced energy consumption without affecting the learning and teaching environment.

He was right. Energy waste is prevalent throughout education facilities and with some information and guidance, most districts can save money by reducing energy waste.

First and foremost, recognize that school facilities don't operate themselves. People determine when lights are on or off, when computers are powered up or turned off, whether windows and doors are open, and what the settings are for the HVAC systems. Consequently, it's people who leave lights on in unoccupied rooms and hallways; leave computers on over holiday breaks; and regulate room temperature by opening and closing windows.

Therefore, all administrative, instructional, and support personnel should have energy awareness training at least twice a year. The training should provide basic information about how energy-related systems work and how occupants' actions can increase or reduce energy consumption and the buildings' efficiency. Students also affect the energy efficiency or inefficiency of the building. Therefore, information about energy and energy efficiency should be incorporated into all academic subjects, PreK–12. Achieving and sustaining reduced energy consumption is a responsibility of everyone in the district, from the administration to the students.

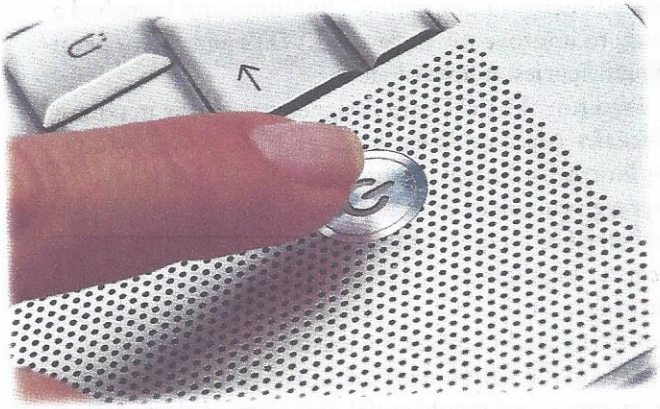
Power and Voltage Management

Two areas that district personnel should consider when looking for ways to save energy dollars are plug loads and low voltage distribution transformers.

PLUG LOADS

In my experience, plug loads account for up to 25% of the electrical consumption in a building. Plug loads refer to the energy used by equipment that is plugged into an outlet, such as computers and monitors, printers, and copiers. Districts can significantly reduce plug loads and related costs by implementing simple, no-cost and low-cost strategies such as power management processes and powering down equipment that is not in use.

Energy Star computers and associated equipment have power



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management programs already installed, but they are often disabled by users. Make sure those power management features are enabled so the electronics are not using optimum energy when inactive. Computers, printers, copiers, and fax machines should always be turned off at night. Plug strips can save energy by automatically powering down computers and office equipment when they are not in use.

VOLTAGE MANAGEMENT

Take a tour of a school or other building in your district. Find a door with the word Electrical on it and you likely discovered a significant source of energy inefficiency: a low voltage distribution transformer (LVDT).

Most power comes into a school rated at 480/277 volts; it must be transformed to 120/208 volts to provide the electricity to the outlets in the classrooms and other rooms throughout the building. That's the job of the LVDT. The wasted energy is due to several factors, but the key ones are no load losses, the electricity needed to energize the transformer, loads significantly below design levels (code-determined), and the incorporation of electronics into the teaching tools.

The design of LVDTs in the last half of the 20th century was based on supplying electricity to linear load equipment. In schools, these included TVs (tubes), radios, record players, tape recorders, adding machines, projectors (slide, overhead, filmstrip, and 35mm), incandescent lamps, and typewriters. Instructional tools introduced in the 1980s and 1990s increased the use of more integrated circuits, such as computer chips, which resulted in what is called nonlinear loads, like computers and their peripherals, instant-on TVs, LCD/LED TVs and monitors, copy machines, dot-matrix/laser printers, wireless phones, and DVD players.

The U.S. Department of Energy (DOE) realized in the late 1990s that LVDTs were a significant source of wasted energy in our nation's buildings and launched a study to improve the design of LVDTs and their operating efficiencies at lower loads.

Traditional LVDTs are designed to achieve maximum efficiency based on linear loads at 35%. A 1999 study for Northeast Energy Partnership (NEEP) found the average peak loads in schools was about 16%. A preliminary DOE report published in the July 2004 *Federal Register* highlighted a redesigned LVDT with the lowest life cycle cost (LLCC). At the time, it was determined that if one could replace the existing 40-million-plus LVDTs in the nation with the LLCC design, the electrical energy saved would equal nine days of electrical generation in the nation annually—about 2.6%.

DOE subsequently updated the 2004 recommendation and in April 2013 published mandates requiring an improved design, but still based on the 35% linear loads. This represents an improvement in efficiency and energy savings over the preliminary recommendation but does not match the loads currently in use. This requirement goes into effect on January 1, 2016.

There are LVDTs that meet or exceed the minimum efficiency requirements of the DOE 2016 mandate for linear and also nonlinear loads. The school district director of finance and I looked at plans of one of the district's elementary schools to determine the number and sizes of LVDTs and identified four—about average for elementary schools. The annual energy savings potential for this number of LVDTs was around 30,000 kWh. This meant at 12 cents/kWh, the district would see an annual savings of about $3,600 by installing the 2016 LVDT (UL approved for nonlinear loads). Savings over the remaining life of an existing facility could range from several hundred thousand dollars to a couple of millions of dollars. New construction payback would be between three and five years, depending on energy rates. A similar range of energy savings would result for new construction.

Once installed, these transformers require no maintenance, are 99% reliable, consume electrical energy with or without loads (no load losses), and have a normal life as long as the building. Installation of 2016 LVDTs will result in increasing efficiency of the building electrical system and a significant reduction in the electrical energy consumption and provide resources for instructional needs. Learn more about installing these new LVDTs at http://exclusive.multibriefs.com/content/what-the-does-2106-mandate-means-for-your-school/education.

Installing new 2016 LVDTs will establish a cornerstone for future achievement and sustain net-zero performance well into the 21st century.

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