

# Efficiency + Renewable Energy = Sustainability

Lincoln Electric System is putting in place a plan that will reduce the utility's load growth while minimizing its carbon emissions.

By Alice Clamp



**Union College's Don Murray, left, director of plant services, and Wilson Hardy, master electrician, view one of the 186 LED lights that replaced incandescent and halogen lights on the campus utilizing funds from Lincoln Electric System's Sustainable Energy Program. The estimated annual demand reduction is 8 kW, providing an estimated annual energy savings of 34,500 kWh and \$2,600 in annual costs. Just as important to the two-man staff was a significant reduction in maintenance costs and time.** Photos courtesy of LES.

Lincoln Electric System's customers enjoy some of the lowest rates in the country. And the Nebraska municipal utility wants to keep it that way.

"We want to do everything we can to prepare for an uncertain future," said Marc Shkolnick, manager of energy services at LES. The utility's Sustainable Energy Program (SEP) helps it to do that by mitigating

pressures on rates. The program, launched in 2009, provides incentives to residential, commercial and industrial customers that improve their energy efficiency.

"Utilities that are long in capacity and have low rates tend to focus less on energy efficiency," said Shkolnick. But an uncertain future spurred LES to take the long view, making energy efficiency part of its

culture.

**Today's SEP.** SEP has several objectives, said Shkolnick. One is to provide opportunities for customers to save energy and money. Another is to dampen peak energy use and thus avoid the purchase of high-priced energy. A third is to push the need to build another power plant as far into the future as possible. "That would



**Pfizer employees Tom Rathe and Duane Puckett display the light fixture and bulb that was replaced by the T-5 fluorescent light.**

give us more than 10 years before considering a new plant, by which time changing regulations could affect the continued operation of baseload plants,” said Shkolnick. “We want to be good environmental stewards and we encourage our customers to do so, too.”

The utility’s goal, said Shkolnick, is to be cost-effective and to reduce carbon emissions as much as possible.

The key to a successful energy efficiency program is establishing requirements that will make a difference, he said. “There’s a difference between rewarding customers and incentivizing them. We’re encouraging our customers to do something that they wouldn’t otherwise do—without the incentive.”

**Program components.** Since its launch, SEP has been tweaked to reflect what’s happening in the market, said Shkolnick. “There’s no cookie-cutter approach,” he said. “You have to adapt to the market, to new technologies. You can’t create a program and put it on cruise control.” LES continually monitors SEP, looking for ways to improve customer experience and the return on investment.

An energy efficiency program is an ever-evolving process, said Shkolnick. To be successful, a program must have built-in flexibility. “It has to appeal to the customer, but it also must have a meaningful cost-effective impact on energy and demand.”

Key elements of today’s SEP include: whole-house sealing and insulation (residential customers); high-efficiency heat pump and air conditioner (residential and commercial customers); commercial and



**LES Energy Services Specialist Jay Stoa shows homeowner Jerry Dvorak, left, how to program his new setback thermostat after replacing his 7 SEER air conditioner with an 18 SEER heat pump.**

industrial lighting retrofit; and commercial and industrial energy efficiency, including air conditioner/heat pump replacement, variable frequency drives retrofits, systems commissioning, compressed air systems analysis and energy management systems installation or upgrades.

**Getting the word out.** Incentives are an essential part of the sustainable energy program but they alone won’t lead to a successful program. Education is critical, and LES lets its customers know about the program in a variety of ways. Among them: the utility’s website, monthly news releases, radio interviews, the utility’s Smart Energy Forum—a series of energy efficiency education presentations on various program components, an article in every issue of the newsletter mailed with a customer’s bill and visits to large commercial and industrial customers.

One approach doesn’t work for all, said Shkolnick. To reach Generation Y—the millennial generation—LES is looking at ways to promote energy efficiency through online technologies, social media and mobile applications.

The utility also meets annually with local contractors to explain the program and encourage them to participate. It devel-

oped a brochure especially for these meetings. “We want to be sure that they are well trained and well versed in what we can provide,” said Shkolnick.

This year, customers participating in SEP receive a credit on their bill for any incentive they receive, and LES reimburses the vendor. “That makes it easier for customers, eliminating the paperwork,” said Shkolnick.

**Funding SEP.** LES allocated \$1.1 million for several SEP programs in its first year. In 2010, the utility decided to put the money—\$2 million—in one pot, letting the community decide how it would be spent. One-third of the funding was spent on commercial/industrial energy efficiency improvements, one-third on commercial lighting retrofits and one-third on residential and small commercial heat pump/air conditioner replacements.

More than half of this year’s SEP budget of \$2 million had been reserved or spent by the end of May. One reason may be the number of customers who replaced heat pumps or air conditioning systems early in the year, said Shkolnick. “Customers are being proactive.”

Clearly, the community supports SEP. “You rarely get an argument about the

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wisdom of being efficient,” said Shkolnick. “This doesn’t tend to be a polarizing issue.”

The SEP results, like the feedback, have been positive.

**Program results.** In its first year, SEP reduced customer energy use by a projected 5 million kWh, while peak demand was cut by a projected 2.6 MW. The results for 2010 were even more impressive: a projected energy reduction of 14.6 million kWh and a projected cut in peak demand of 4.3 MW. Over this two-year period, LES customers saved an estimated \$1.2 million annually, Shkolnick told the LES Administrative Board in early 2011. He estimated that commercial lighting retrofits accounted for 44 percent of the energy savings and commercial/industrial energy efficiency projects for 46 percent, with heat pump/air conditioner replacement by residential and small commercial customers accounting for 10 percent.

“We have found that the primary benefit of the heat pump/air conditioner replacement program is its reduction of demand,” said Shkolnick. Commercial lighting retrofits and industrial energy efficiency projects also help to dampen demand.

The utility also projected a reduction in carbon emissions of 5,100 tons in 2009 and 14,610 tons in 2010 as a result of the SEP energy efficiency measures.

LES relied on a series of operating assumptions in developing the SEP projected energy and demand savings. In the next two years, it will bring in experts to validate the results of its SEP program and confirm that the projections are on target.

SEP had another—an unexpected—benefit, said Shkolnick. It was responsible for the expenditure of nearly \$15 million in the local contractor community for 2009-2010. “A lot of people were put to work installing energy efficient equipment.”

Today’s SEP comprises an array of energy efficiency programs. But LES also is pursuing sustainability through renewable energy. The utility currently produces 7 percent of its electricity from hydro and wind projects. “We’ve been acquiring wind energy in increments and we’re now up to 17 megawatts and are actively pursuing more,” said Jason Fortik, LES’s utilities manager. LES is able to absorb this energy

in its existing load and resource mix with a manageable financial impact, he said.

Now, LES wants to push the share of renewable energy projects in its generating portfolio even higher. The existing SEP is essentially a demand-side management program, and that focus will continue. But at the same time, LES seeks to do more on the supply side, broadening SEP’s base.

**Tomorrow’s sustainable program plan.** Among the planned utility-scale renewable energy projects is the generation of electricity from landfill gas. The city’s solid waste department has installed a methane gas collection system at the local landfill. LES is working with the department on terms for purchase of the gas and an engineering analysis, said Tom Davlin, the utility’s manager of project engineering. LES is having the gas analyzed so it can select the appropriate generating equipment and develop the project’s budget. “We expect to begin developing the generating side of the project this year,” said Davlin.

Another project on the drawing board is a thermal energy storage system at the University of Nebraska-Lincoln. LES has teamed up with the university, creating the Nebraska Utility Corp., which will finance the project. The system design—a 3-million-gallon storage tank—has been completed and is out for bid. The system, which LES expects to be operational in 2012, will allow the university to reduce its peak demand by at least 1.6 MW, said Davlin. “LES and the university are load-coincident, so the university’s load reduction will have a one-for-one reduction on our peak load,” he said.

**Integrating renewable projects with energy efficiency programs.** The utility’s demand-side management activities complement its renewable energy projects, said Shkolnick. “We’ve taken an approach that seeks to balance the cost effectiveness of energy efficiency and renewable supply-side resources.”

That’s where polarity management comes in.

Polarity management is a technique used to resolve complex issues that can have contradictory and sometimes competing goals, said Davlin. He learned

about the technique as part of APPA’s Public Power Manager Certificate program from organizational development consultant and trainer Margaret Seidler.

Rather than approaching an issue with an “either/or” mentality, polarity management advocates an “and” approach.

Combining renewable energy generation and energy efficiency programs requires a number of trade-offs, said Davlin. Among them are the economics of wind energy, the limitations of load management during off-peak hours, the decline in customer participation as energy-efficiency programs mature and the need for back-up fossil fuel-fired generation when wind energy is not available.

Davlin captured such issues—or polarities—in a polarity management map that he developed last November as part of the Public Power Manager Certificate program. “I felt the sustainable energy program was a timely subject and the map could provide insights to our ongoing sustainability efforts,” he said. “It provided a good starting point for discussions.” The map identifies action steps for both energy efficiency/load management and renewable energy generation, and having this information in a single document is valuable, said Davlin.

The next step was to develop a list of options and gather cost and benefit information for each. LES then analyzed the costs and benefits of each option, using the expertise of its Planning Department’s resource modeling and its Energy Services Department’s experience with customer-based programs. “The analysis ranked both load control and renewable energy options on their ability to meet future electrical demand growth as well as minimize the community’s carbon footprint,” said Davlin.

“The aim was to identify the optimum mix of load management and renewable generation options,” he said.

In July, the results of the cost/benefit analysis were presented to the LES board.

Next, LES will begin prioritizing investment opportunities.

The ultimate goal, said Davlin, is to maximize sustainable projects and practices in the community. ■