

Western's monthly energy efficiency and renewable energy newsletter dedicated to customer activities and sharing information on energy services.

## University, utility looks to TES to improve chiller efficiency

**F**aced with increased demand on the chilled-water system on its East Campus, the University of Nebraska at Lincoln (UNL) is installing a three million-gallon thermal energy storage system (TES) to boost the performance of the three existing chillers.

“We were out of firm cooling capacity, so if one unit went down, the other two would not be able to handle the demand,” explained Clark deVries, director of utilities for UNL. “We looked at building another chiller, but determined that TES would give us the extra firm capacity and pay for itself.”

TES uses off-peak electricity to chill water to 42 degrees Fahrenheit, effectively serving as a storage battery. During the hottest part of the day, when demand is peaking, the chillers draw on the stored water to efficiently cool buildings.



**Building a three million-gallon thermal energy storage tank instead of a new chiller is expected to reduce the University of Nebraska's electric bill by up to \$250,000 annually.**

Reducing the campus's peak demand with TES is expected to decrease UNL's electric bill by \$250,000 per year. Lincoln Electric System (LES), the university's utility, charges large light and power customers a 65-percent demand ratchet fee to collect an appropriate share of fixed costs throughout the year. The customer's maximum demand during the previous June, July, August and September sets the fee for the next year. “If we can lower that,” deVries noted, “it saves us money all year around.”

The project should be ready to test by May 2012, deVries said, and cooling the campus by June—just in time for peak-demand season.

### Benefit for utility

LES is in full support of this money-saving project, and with good reason. “We did two different analyses, and it looks like the system will displace 1.6 megawatts of peak demand,” said Project Engineering Manager Tom Davlin.

The summer-peaking municipal utility has a lot of experience with TES, Davlin added, using the technology to get more capacity from one of its peaking plants. Also, LES's District Energy Corp. (DEC) uses TES at its thermal energy plant which serves several city and county buildings. The DEC is installing a district energy system

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## Chiller efficiency *from page 1*

to serve the new West Haymarket development, which will include a new basketball arena for UNL along with private facilities. Thermal storage options will be evaluated for the project as the development take shape and load profiles are better understood. “LES is a big proponent of district energy,” observed Davlin.

### Project funding

Partnership is also important to the utility, and it played a central role in the East Campus project. A nonprofit board formed through an inter-local agreement between UNL and LES in 2001 funded the TES installation through the sale of revenue bonds. The Nebraska Utility Corporation (NUCorp) operates like LES's District Energy Corp., but the university is the only member. “That’s because we are LES’s biggest customer,” deVries noted.

The cost for the project was originally placed at \$4 million, or roughly the price tag for installing a new chiller unit. However, for \$6.16 million, the system could be built to accommodate the future



**The Lancaster County Hall of Justice in Lincoln, Neb., is on a district energy system that uses thermal energy storage. (Photo by District Energy Corp.)**

addition of a low-temperature chiller at the tank pump house. This design doubled the cooling capacity of the TES tank, deferring the need to add another chiller at a little more than half the cost.

### Eye on the future

TES makes even more economic sense where utilities offer time-of-day rate structures, something not currently available to LES customers. Nebraska is a public power state, so it boasts some of the lowest electricity rates in the nation. Recently, however, LES has begun to explore time-of-day rates, Davlin said. “We participate in the Southwest Power Pool, which will be moving to a real-time energy market in a few years. When that happens, TOD rates may help optimize our load.”

Taking the long view, deVries looks forward to TES saving the university even more on energy

costs when those rates arrive.

TES could also play a role in Nebraska’s renewable energy future by “storing” wind power. Wind farms in the state generate a significant amount of electricity at night, when electrical demand is low. This energy could be used to charge thermal storage facilities providing an energy storage option for the wind energy. UNL and other facilities with TES systems could provide LES with valuable off-peak load for the renewable generation.

The technology has proven to be such a good energy management strategy that the university and the utility are investigating installing a TES system at UNL’s larger City Campus. A TES system is also under consideration for a privately developed “innovation park” the partnership is planning. In Cornhusker tradition, the university has found a winning game plan and is sticking with it. ⚡

### Energy Services Bulletin

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## Energy audit programs come of age

One of the hottest topics at the fifth annual Rocky Mountain Utility Efficiency Exchange was energy audits: How to finance retrofit projects, train auditors, build a reliable contractor network; even what to call them was up for grabs—one speaker suggested energy assessment was better because the word “audit” had frightening connotations.

The good news is that a few years worth of sharing and collaboration have had a positive effect on energy audit programs in Colorado and beyond. Utilities may still be working out a few kinks in how to deliver this crucial step toward achieving energy efficiency, but experience and solutions are growing by leaps and bounds.

### Hand-holding required

The bad news is that the central problem of converting energy audits into energy savings is still very much with us. Even when the economy was stronger, consumers struggled with investing in energy-efficiency upgrades, especially with deep retrofits. Now, economic uncertainty has only made people more cautious about spending money on home improvements. Rebates and incentives help, but most of the utilities in attendance have found that consumers need more support.

The importance of consumer coaching was a recurring theme throughout presentations on audit programs. EnergySmart, a program to improve home efficiency in three Colorado counties, had to start with providing the most basic information: Some consumers weren't sure who their utility was, let alone what programs were available to help them reduce their energy bills. That may surprise anyone who spends their day thinking about kilowatt-hours, but it



(l. to r.) Kevin Afflerbaugh, project manager for Nexant, Inc.; Aspen Utilities Efficiency Manager Jeff Rice and Equipment Loan Program Manager Gary Hoffmann discuss infrared thermography, an important tool for energy audits. (Photo by Randy Martin)

underscores the need to think about programs from the consumer's point of view.

Partnering with nonprofit groups and consulting services can give utilities a much-needed outsider's perspective on their programs, as well as another channel for customer outreach. SourceGas and San Miguel Power Association have tapped the International Center for Appropriate & Sustainable Technology (iCast) to provide a turnkey auditing program. iCast plays the role of energy advisor to customers while providing the utilities with a one-stop shop for energy audits, sub-contractor management, quality inspections and access to financing options, invoicing and reporting.

Customers who are program alumni can be a secret weapon for reaching more customers. EnergySmart representatives attended

homeowner association meetings on the invitation of active members who had their own homes audited. Boulder County's 10 For Change program enlists small business owners who have cut their energy costs to speak at local Chamber of Commerce meetings on the benefits of energy-efficiency improvements.

### Reaching the hard-to-reach

San Diego Gas and Electric found similar success reaching low-income customers by enlisting trusted community members to explain its energy-saving program. Adding multi-lingual representatives in its call center, encouraging local organizations to post announcements and letting residents know when contractors were in their neighborhoods also increased customer follow-through on audits.

*See ENERGY AUDIT, page 4*

## Energy audit *from page 3*

Residents of multi-family housing and small business owners—mostly renters—remain stubbornly beyond the reach of energy-efficiency upgrade programs, as several speakers admitted. One approach to engaging small businesses is the Business Energy Education Program created by the City of Lakewood, Red Rocks Community College, Alameda Gateway Community Association and The Learning Source. The partnership presented a poster on its work with business leaders to reduce building operating costs and make them more energy-efficient.

Platte River Power Authority's Building Tune-up program targets small buildings with short, relatively inexpensive improvements. Measures like adjusting thermostat set points, repairing or replacing HVAC components and installing lighting controls are saving small businesses thousands of kWh, therms and gallons of water, and paying for themselves in one to two years.

### Make-or-breakers

Getting home and business owners on board to upgrade energy efficiency is one thing, but finding knowledgeable contractors to do the work is whole different gauntlet to run. The sheer amount of discussion on the topic indicated how important contractors are to a program's success—and that a sure-fire strategy for involving them has yet to be devised.

Education and mentoring programs for energy auditors and contractors have sprung up throughout the state since the first exchange. Red Rocks Community College's energy auditor training is supplying energy coaches to the City of Lakewood, Colo. Judy Fosdick of Pueblo Community College created a weatherization job-training certification program with a grant from the state Department of Labor. The Community Energy Exchange partners with experienced BPI-certified building analysts and RESNET HERS raters to mentor newly-trained contractors on real-world building projects.

Getting experienced contractors to participate in energy-efficiency programs may be more difficult than training new ones, but it is necessary. Ed Thomas of the Electric & Gas Industries Association and Tiger Adolf of the Building Performance Institute offered a 12-step roadmap to contractor network development. The organizations have teamed up for home energy makeover projects and had many lessons to share from their experience. Training, screening and quality assurance are essential to building consumer trust and making sure upgrades deliver the promised savings. To put it another way, "It isn't a program until you've kicked someone out."

There are more than 100 programs nationwide focused on developing standards to provide building owners with reliable, pre-screened contractors, according to BPI statistics. The National Renewable Energy Laboratory

is working with the home performance industry to establish guidelines for quality work, effective training and professional certifications that can be applied on a national level.

### A few final lessons

Having read this far, you have probably absorbed the most important point about implementing a successful energy audit program: No one size fits all. Every customer base is different, and successful program designers must keep their ratepayers' needs in mind.

Simplicity is a high priority for everyone in the energy audit chain. Anything you can do to streamline applications, explain a customer's options and connect him with a reputable vendor will improve your conversion rate.

There are also a lot of different organizations out there that want to save energy, too. Before you reinvent the wheel, find out what other organizations in your area are doing. You may find a group that has cultivated strong relationships with customers or contractors, but needs the energy expertise of a utility to make their program a winner.

As Mindy Craig of BluePoint Planning pointed out in her presentation on the California Energy Commission's Energy Upgrade California project, market transformation takes time and a lot of coordination of different stakeholders. But it can be done, and the results—20 billion Btu energy savings for Energy Upgrade California's first 10 months, for example—are well worth the effort. ⚡

For links to more resources,  
visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb2.aspx>

# Need help registering your RECs? Call Western

**Y**our utility has overcome many challenges to complete a multi-megawatt renewable energy project that meets your clean energy goals. Better yet, you have excess generation that can be sold with renewable energy certificates (RECs) to cover your development costs. Now you face another obstacle: How do you prove to potential customers—in other states, with different rules—that your product meets their requirements? Regional certificate tracking systems offer one answer, and Western can help customers register their RECs with the appropriate system.

Customers in our Desert Southwest (DSW) and Rocky Mountain (RM) regions are registering their projects' generation with the Western Renewable Energy Generation Information System (WREGIS). WREGIS is the independent renewable energy tracking system for the region covered by the Western Electricity Coordinating Council (WECC), which is much of Western's territory. The North American Renewables Registry and the Midwest Renewable Energy Tracking System serve that purpose for portions of the Rocky Mountain and Upper Great Plains regions.

## Leave it to Western

To register RECs from a renewable project, WREGIS requires an independent qualified reporting entity (QRE) to verify the amount of generation. In DSW, Western is the QRE for a low-head hydropower dam owned by the Yuma County Water Users Association. Our RM office is doing the same for projects owned by Platte River Power Authority.

The QRE reads the meter on the renewable energy plant and enters the data into the WREGIS system,



confirming the amount of energy the facility generated. WREGIS then issues verified RECs for that number of megawatt-hours. "It's easy for Western to provide this service, especially where we already have an established relationship with the customer," explained DSW Energy Services Representative Audrey Colletti. "All we need is access to the meter. If there are any discrepancies with the report, Western will work with WREGIS to reconcile them. It's one less thing for our customers to worry about."

Once WREGIS creates the REC, it can be used to meet a mandated standard or sold to another party (except those from Federal hydropower).

## Different strokes

One of the confusing things about the renewable energy market is that each state has different rules governing RECs.

In Arizona, for example, the state Corporation Commission only requires the generator owner to sign an attestation that the facility has produced the claimed amount of power. The owner is then free to sell RECs for the environmental attributes of that amount.

However, the state of California requires all renewable generation, both the electricity and RECs, to be WREGIS-certified to count toward its statewide standard. So to be able to sell RECs to California buyers, the Arizona-based water users association is voluntarily registering its generation through the tracking system.

Platte River is registering generation from its Medicine Bow wind project to sell to its member utilities as certified

renewable energy. With a growing number of entities in the West using WREGIS certification as their standard, it just seemed like a good idea, said Platte River Energy Services Manager Paul Davis. "And if the opportunity ever arises to sell RECs, we are covered," he pointed out.

The northern Colorado utility could be its own reporting entity, Davis added, "But that would have required us to duplicate work that Western is better positioned to do," he said. "WREGIS ties its verification to the meter, and Western reads the meter, so it was an obvious choice to make Western our QRE."

## One more good reason

States are still trying to figure out how to promote renewable energy development and what role RECs will play in meeting their goals. Unfortunately, this uncertainty leaves an opening for inaccurate reporting—or worse, green-washing—to taint an otherwise valuable tool in our transition to cleaner energy sources. Voluntarily registering RECs through your regional tracking system builds transparency, accountability and trust into an emerging market.

Western offers this service to support our customers' efforts to increase the use of renewable energy, whether by building new renewable generators or by buying RECs. A small administrative fee may apply. If you have questions about your regional renewable energy tracking system, don't hesitate to contact your Energy Services representative. ⚡

For links to more resources,  
visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb3.aspx>

# Questions and answers about smart grid

**Q: Is lowering rates one goal of implementing smart grid technologies?**

**A:** The smart grid will provide a wide variety of benefits, which may include lowering rates. But “restructuring rates” may be a more accurate way to describe the cost-savings opportunities for utilities and their customers.

For instance, the smart grid could allow consumers to take advantage of dynamic pricing. Dynamic pricing means that the price for electricity changes depending on how much electricity is available at a particular time of day and how many other customers want to buy it. If a customer can postpone certain activities, such as running the clothes dryer, to a time when there are fewer demands on the electric supply, that customer may be able to pay less and the utility will not have to generate additional electricity to meet excess demand.

To take advantage of dynamic rate structures, advanced metering infrastructure (AMI) must usually be in place. AMI works with “smart” household appliances that automatically respond to peak load price signals or dynamic price-point information fed to them through the meter. In other words, customers can just “set it and forget it,” and gain cost savings without having to engage in hands-on home energy management.

**Q: Does the smart grid technology being considered help both the consumer and the utility?**

**A:** Like most grid improvements that create efficiencies, both the consumer and the utility will likely share benefits

of implementing smart grid. While most analysts believe the single largest benefit of AMI will be reducing the utility’s operating costs, potential benefits to customers include:

- Cost reductions
- Faster diagnosis of problems in the home
- Faster outage diagnosis and restoration
- Elimination of intrusive meter reading
- Added opportunities for utilities to improve customer service

Benefits to customers are likely to vary as utilities work to implement the smart grid.

The Energy Independence and Security Act of 2007—the “official policy of the United States to support the modernization of the nation’s electricity transmission and distribution system”—outlines the intended benefits of the smart grid. It states that the smart grid should provide consumers with timely information and control options, empowering

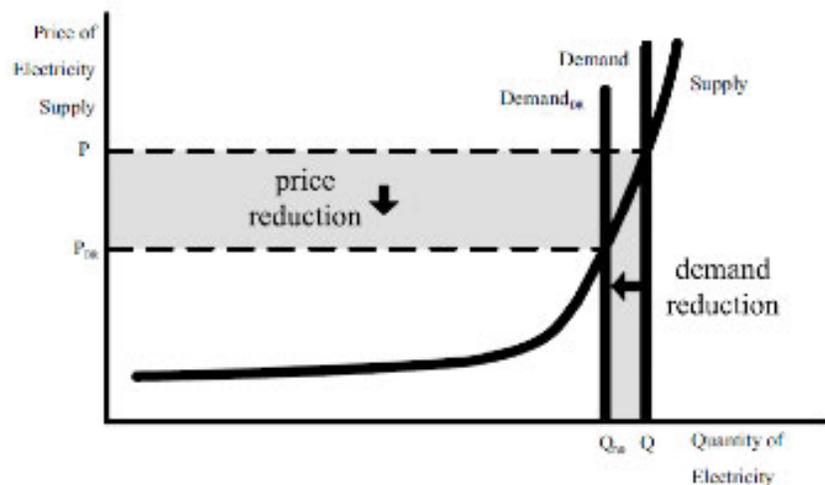
them to take charge of their energy use. This clearly benefits individuals and society as a whole.

Another benefit we can anticipate from smart grid adoption is the ability to accommodate added demand for electricity from the anticipated influx of new plug-in electric vehicles (EVs). Leveraging the smart grid to ensure that cars are smart charging will be a key to successful EV deployment.

**Q: Should utilities educate consumers on how to benefit from smart grid technologies?**

**A:** According to Assistant Secretary Pat Hoffman of DOE, they should. Utilities need to let their customers know how the smart grid helps them and work to maximize the benefits to the customers. This involves defining a vision and communicating that vision to customers, and listening and responding to customer feedback. This ongoing dialogue will bring the

*See TECHNOLOGY SPOTLIGHT, page 8*



**Figure 2 - Impact of Demand Response on Vertically Integrated Utility Supply Cost**

## Website of the month:

# Tax Incentive Assistance Project update

**T**he end of the year is upon us and once again, our thoughts turn to...taxes! Get ready to help your consumers file for rebates for energy-efficiency improvements with a visit to the Tax Incentive Assistance Project.

If you haven't visited TIAP since it was last profiled in this column (January 2009, to be specific), it's time to refresh your knowledge of the world of Federal incentives—and there are still plenty available to offset the cost of energy-saving projects.

Start with the home page, which displays a list of updated resources for 2011. Learn about the status and successes of incentives implemented since 2005 from a white paper posted in June. Download current TIAP flyers for residential and commercial incentives to send as end-of-the-year bill stuffers. A white paper and presentation from the American Council of an Energy Efficient Economy can help you evaluate your incentive programs or create new ones.

### For homeowners

Following those resources, visitors will find the answers to the big question, "What has changed in 2011?" Residential consumers who upgraded their home envelopes or their heating or cooling systems in 2011 may still be eligible for incentives, although amounts were reduced in most cases when Congress extended the programs.

### Pass-throughs

Manufacturer incentives on high-efficiency appliances—clothes washers, refrigerators and dishwash-



ers—were also extended through 2011. States and utilities may offer these credits through their efficiency programs, too, but they are not direct to consumers.

Another extended credit that will benefit homeowners is the new home credit for site-built and manufactured homes. Builders who sell a site-built home that uses 50-percent less energy than a conventionally built model will be eligible for a \$2,000 credit through the end of the year. Manufactured-home producers can either receive \$2,000 for 50-percent greater efficiency, or a \$1,000 credit for selling a unit that saves 30 percent or that qualifies for the U.S. EPA Energy Star Homes program.

### For business

There are incentives for increasing the efficiency of commercial buildings as well—measures that can mean a lot to a business's bottom line. Projects that reduce a new or existing commercial building's heating, cooling, ventilation, water heating or interior lighting energy costs by at least 50 percent are eligible for a tax deduction of up to \$1.80 per square foot. The building must meet ASHRAE Standard 90.1-2001, and the person or organization paying for the construction generally takes the deduction.

### Renewables

Tax credits are available to businesses and individuals investing in solar technologies, wind generators or geothermal heat pumps. Solar incentives cover qualified solar water heating, photovoltaic systems and some solar lighting systems for businesses, and water heating and photovoltaics for individuals.

Homeowners, farmers and businesses that install wind turbines with nameplate capacity of 100 kilowatts or less are eligible for the incentives. Energy Star-qualified geothermal heat pumps are still a great investment for both residential and commercial customers.

Large commercial customers are most likely to take advantage of the tax credit for advanced distributed generation systems. Credits for fuel cells and micro-turbines are based on system capacity and efficiency, and when the unit was placed in service.

### About 2012

Some of the credits mentioned above extend only through 2011, so this information will be most helpful to your customers who have already completed projects and just need guidance at filing time. To keep current with changes to incentives in the coming year, bookmark the Tax Incentive Assistance Project and check back frequently. ⚡

For links to more resources,  
visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb5.aspx>

## Technology Spotlight *from page 6*

greatest levels of satisfaction to utilities, their customers and their regulators.

### **Q: What participation rate is needed to make AMI technology effective for both utility and consumer?**

**A:** A 2011 study by the Brattle Group showed that upgrading to AMI, or smart meters, makes sense for utilities in a wide variety of scenarios, including where utilities that have already deployed automated meter reading (AMR) infrastructure. This study considers a variety of “opt in” and “opt out” rate structures with realistic

participation rates for each scenario and concludes that “in all cases, the benefits of smart meters exceeded the costs.”

The largest benefit to utilities that have deployed smart meters is in reducing or eliminating manual meter reading expenses and improvements to monthly billing. In many cases, utilities see net benefits from simply deploying the metering infrastructure. Other benefits, including energy management options AMI makes possible, are also significant and may exceed meter-reading benefits, even if participation rates in these demand management programs are not unusually high.

When it comes to peak demand reduction, a little can go a long way. Prices for electricity during peak demand periods increase exponentially as the peak load goes up. A small reduction in demand can provide significant cost savings, as illustrated in Figure 2 (see page 6).

Which benefits the smart grid provides, and who get them, will ultimately be answered by utilities as they put together their business cases for smart grid investments. To help with this, the Edison Electric Institute offers guidance on developing business cases for AMI deployments and dynamic pricing structures. ⚡

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