

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

Partnership creates energy auditor training for tribes

After months of rigorous training, the graduates of a unique demonstration program left the United Tribes Technical College (UTTC) in Bismarck, N.D., last May ready to share their new skills with their communities.

The Native American Energy Auditor Program taught students to perform detailed building inspections and recommend cost-effective measures to improve a home's energy efficiency. The students came from 16 different tribes including Western customers the Navajo and Rosebud Sioux reservations.

The newly-minted energy auditors are not only prepared for a job with a future, they are equipped to help their tribes use less energy, save money and build safer, more comfortable housing. Few jobs deliver as many benefits to a community as that of energy auditor, one of the reasons the Recovery Act funded the program.

"Shovel-ready" idea

Training tribe members to be energy auditors is such a good idea



Melvin Long Time Sleeping (Blackfeet), Browning, Mont., shows how infrared images look in the viewfinder of a thermal imager, used by energy auditors to detect heat loss in buildings. Long Time Sleeping graduated from the Native American Energy Auditor Level II program following 18 weeks of course work and hands-on training at United Tribes Technical College. (Photo by United Tribes News; Dennis J. Neumann)

that the Office of Indian Energy and Economic Development (IEED), Division of Workforce Development (477 Office) had it well before 2009. Building industry organizations that worked with IEED projected a growing need for energy auditors over the next five years. Requests for auditors the office received from states and tribes bore out those projections. "Our leadership saw the opportunity to get out in front of the need by preparing Native Americans for the projected demand for skilled energy auditors," explained IEED Workforce Development Specialist Jim West.

When the Recovery Act earmarked \$500 million for projects to improve tribal communities, IEED and its partners already had just the project in mind. Developing the first energy auditor training just for Native Americans was the first step.

Teamwork builds program

Putting together an energy auditor training program is not easy, given that there is no standard certification or rating system. Training can range from a few hours online to weeks in a classroom depending on the type of rating system. Fortunately, construction industry partners were as interested as IEED in creating a comprehensive curriculum.

The Association of Union Constructors (TAUC) signed a cooperative agreement with IEED in May 2009 to provide construction industry careers for Native Americans and Native Alaskans, while expanding work opportunities for union contractors.

The partnership with TAUC gave IEED a wealth of industry resources to draw on. HVAC Excellence, a

See TRAINING, page 2

What's inside	
Heartland's LEED headquarters ...	3
Electric cars	4
Energy Experts.....	6
Website of the month	7

Training *from page 1*

professional organization dedicated to improving technical education in the HVACR industry, developed the curriculum for the training. United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada (UA) also consulted on the curriculum, and contributed funding and training materials.

Additional financial support came from the Spirit Lake Tribe of North Dakota, a long-time partner of IEED. The tribe acted as the Native American sponsor of the project and handled the Recovery Act reporting.

UTTC, with its central location and long history of leadership in Native American education was chosen to present the training. Founded in 1969, the accredited technical college could provide the logistics, facilities and support the students and instructors would need during the 18-week course. UTTC arranged housing and transportation for out-of-state students and provided a case manager and manpower specialist to advise students throughout the training.

Energy Services Bulletin

The Energy Services Bulletin is published by Western Area Power Administration for its power customers. The mailing address is Western Area Power Administration, P.O. Box 281213, Lakewood, CO 80228-8213; telephone (720) 962-7508.

The mention of any service, product, or technology does not constitute an endorsement of same and Western, the Department of Energy, or the United States Government cannot be held responsible or liable for use thereof.

Editor: Kevon Storie
Designer: Grant Kuhn

Comprehensive training

The program required that participants join the UA and live on campus for the duration of the training. The curriculum consisted of 23 individual classes or modules, totaling 800 contact hours. “Curriculum models from sources such as the Home Energy Rating System and Building Performance Institute weren’t going to meet the needs of students who had no experience with construction or mechanical systems,” said Jerry Weiss of HVAC Excellence. “We had to come up with a program that would prepare the graduates to work in the field without supervision.”

The course work covered everything from customer relations to computer literacy to green awareness, as well as the skills needed to evaluate building systems and envelopes for energy use. Students became familiar with diagnostic tools like infrared cameras and blower doors, and with software tools like the National Energy Audit Tool (NEAT). “It was a tough class,” West admitted.

Of the 28 students who entered the program, 18 graduated—not a bad rate for the program’s first year. “There is always a learning curve the first time you present a program,” West noted. “A lot of factors affected the dropout rate.”

One of the many factors affecting the dropout rate, he added, was that students didn’t fully understand what they were getting into. “It’s hard to explain what an energy auditor is and what one needs to learn for the job,” West said, echoing a complaint familiar to building and utility professionals.

Help wanted: auditors

With the first training completed, IEED is ready to launch the next phase of the Native American Energy Auditor Program—showing the tribes what energy auditors can do for them. “We are in the process of setting up demonstration projects on reservations,” said West. “We have five proposals in now.”

One tribe, for example, would like to perform audits on 70 houses, and another on 40 tribal homes. Initially, IEED will work with its union partners to clarify what the auditor’s role is in implementing energy efficiency measures. Eventually, West hopes to see the energy audits open doors for more construction training on the reservation, so jobs can be kept within the community.

Tribes aren’t the only ones hiring program graduates—some states have also contacted IEED looking for qualified energy auditors. The demand may outstrip the supply, however, as the IEED has not scheduled another training yet. “The grant from the Recovery Act wasn’t permanent funding,” explained West.

Tribes may be willing to contribute tuition once they see that an energy audit program can save them thousands of dollars in energy costs annually, he added. Also, a dormitory UTTC is building will help to reduce the cost of housing students, who stayed in motels for the first training program. IEED is looking for more in-kind donations to support another round of training. “I must get an application a day from people who are interested in career opportunities,” West said. “I’m confident that we will be able to offer energy auditor training again.” ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/sep/sep101.htm

Heartland headquarters earns LEED Platinum Certification

The first newly constructed building in South Dakota to receive the LEED Platinum Certification is a public power provider—Heartland Consumers Power District.

The United States Green Building Council (USGBC) notified Heartland in July that its new headquarters building in Madison, S.D., had earned Leadership in Energy and Environmental Design (LEED) Platinum Certification with a rating of 54 points. To receive LEED's highest ranking, a building must have a rating of at least 52 points.

Heartland, which serves a number of Western customers and owns transmission facilities as part of the Integrated System (IS) with Western and Basin Electric Power Cooperative, wanted the building to reflect its commitment to environmental stewardship. "Once the decision was made to build a new headquarters, aiming for LEED Platinum made the most sense," said Heartland General Manager Mike McDowell.

Saving, producing energy

The facility was designed to be 46 percent more energy efficient than a building using standard construction, and to consume one third less water. At least 70 percent of the building's energy is from renewable sources including wind energy and solar. "Our investment has already paid dividends," McDowell explained in a press release announcing the building's certification.

Investing in sustainability added roughly 4 percent to the cost of construction, compared to a similar-sized conventional facility. Most of that cost was for the mechanical

systems—which contribute heavily to the annual savings. For space conditioning, the designers combined the tried-and-true efficiency of a geothermal heating and cooling system with active chilled beams. The technology reduces the amount of fan power needed for cooling and ventilation. "It's a new system to South Dakota, but is widely used in Europe and Asia," said Keith Thompson, senior project manager for building designer Koch Hazard Architects.

Controlling the thermal environment and lighting with automated systems and occupancy sensors prevents waste without sacrificing occupants' comfort. Each room is separately zoned so employees can control the temperature in their work areas.

In the harsh South Dakota climate, there can be no efficiency without a tight building envelope. The Heartland headquarters boasts eight-inch structural insulated panels in the roof, six inches of spray foam insulation in the walls and double-paned, low-e windows.

After making sure the building uses as little energy as possible, it's time to add the renewable energy systems. The Wessington Springs Wind Energy Center, part of Heartland's power portfolio, has provided 250 MWh of renewable energy credits to retire through 2011. The RECs will cover about 70 percent of the building's estimated 175 to 200 MW annual energy use, not even counting the 3.5 kW generated by the 15-panel solar array on the roof.

Water, materials

Paying attention to water use garnered LEED points for the project in two ways. Low-flow water fixtures



Wooden ceiling panels, made from reclaimed school bleachers represent 14 percent of the building material in Heartland's headquarters. (Photo by Heartland Consumers Power District)

and motion sensors on faucets were installed in the building to conserve potable water. Outside, using native prairie plants in the landscaping made a permanent irrigation system unnecessary.

Sustainable building materials are another source of LEED points. Recycled material, such as tiles and Paperstone countertops, make up 22 percent of the building material. Reused material—ceiling panels made from reclaimed bleacher seats in Nebraska—accounts for another 14 percent of the building's construction. Most of the new wood in the building is Forest Stewardship Council certified.

Although there are no LEED points given for using local contractors, Heartland involved more than 40 area businesses in the construction of its

See HEARTLAND page 8

Electric cars are coming—are utilities ready?

Energy Services Manager Ron Horstman recently got the chance to take the future for a “test-drive”—literally—when the Ford Motor Company brought its prototype all-electric Focus to Boulder, Colo.

Next big energy-user

Horstman believes that plug-in electric vehicles have many implications for utilities. “This is a new ‘appliance’ with the potential to greatly increase demand,” he said, “but electric cars also present tremendous opportunities.

For example, the cars could be a new load-shaping tool since drivers would most likely charge their batteries overnight. Utilities could encourage the new cars’ adoption by reminding customers about lower time-of-use rates or creating new tiered rate schedules to make “filling up” more affordable. “The key is for utilities to understand how the cars are going to interact with their systems and to work on improving that communication,” said Horstman.

Utilities should be ready with answers for consumer questions directly related to charging the cars: “Will I need a special plug for charging?” or “How much will it cost me to charge my car?” It won’t hurt power providers to be familiar with general questions, either, such as “How far will the car go? How fast? Are there recharging stations on the road?” Horstman, who is considering buying either an all-electric or plug-in hybrid (PHEV) car, showed up for his test-drive thinking both as a utility professional and as a consumer.



The plug-in, all-electric Focus will be available for sale starting in 2011. Ford’s plan is to offer consumers a range of hybrid or electric vehicles, so they can choose the level of “electrification” that is right for their needs.

Consumer’s perspective

The car handled like a conventional car, according to Horstman, with good acceleration going uphill, and was extremely quiet. Ford is looking into equipping the commercial model with some kind of sound device that would alert pedestrians to the oncoming vehicle and indicate how fast it is going. Gauges on the instrument panel coach the driver to drive more “intelligently”—to get the most mileage—and tell how much of a charge is left on the battery.

Charging the 23-kW, lithium-ion battery pack takes 17 hours through a 110-volt outlet—too long to suit most consumers. With a 220-volt outlet, the car charges in six to eight hours—overnight or the length of a workday. The maximum current draw is 9 amps for a 110-volt outlet, and 15 amps with 220 volts.

A survey by Electric Power Research Institute (EPRI), in conjunction with Southern California Edison, found that 62 percent of respondents

had a standard 3-prong, 110-volt outlet in a location close to where they park their vehicles. About 83 percent reported having 220-volt service in their residence, but might need an additional outlet closer to the vehicle.

The Focus prototype drives up to 100 miles on a full charge. Ford’s Transit Connect Electric small commercial van, debuting later this year, goes up to 80 miles. Because the car charges when it brakes, like a hybrid, a charge lasts longer in stop-and-go conditions. “That makes it perfect for in-town driving where most people average only 40 miles per day,” said Julie D’Annunzio, Ford Global Electrified Fleet and Integration engineer. “It can go up to 85 mph on the highway,” she added.

Care, feeding of batteries

Energy Services Manager Ron Horstman examines the charging station that is used to “re-fuel” electric cars. There are currently about 2,000

See ELECTRIC CARS page 5

Electric cars *from page 4*

commercially available stations in the country.

Horstman expressed concern about being able to find charging stations on cross-country trips. So far, there are only about 2,000 such stations throughout the country, each capable of serving only one vehicle at a time in the same amount of time as an electrical outlet. Compare that to the nation's 160,000 gas stations that can fuel multiple vehicles in minutes, and it is clear that we don't yet have the infrastructure to serve a large number of electric vehicles.

Drivers can locate charging stations on Google's Electric Vehicle Charging Stations map, an open source map that is constantly being updated, so some stations may not show up. Coulomb Technologies, Inc., a company that manufactures and installs charging stations, also has a station finder for its own units. Smart phone applications and Twitter feeds may provide drivers with more up-to-date locations for charging stations.

Ford and Coulomb are partnering on the Ford Blue Oval ChargePoint Program to install nearly 5,000 charging stations in the homes of the first consumers to purchase the Transit Connect van. The program is part of Coulomb's larger ChargePoint America program, which received a Recovery Act grant through the Transportation Electrification Initiative to build the infrastructure needed to support electric cars.

Horstman has his own idea for increasing the number of charging stations available to electric car drivers:

"Selling or building charging stations could create a new revenue stream for power providers," he said. "At some point, such a service might even count towards reducing a utility's carbon emissions."

Of course, no battery lasts forever, and therein are barriers to adopting all types of electric vehicles. The most common consumer concerns are the cost of replacing the battery and how to responsibly dispose of them. Because the Focus is still in development, Ford has not yet priced replacements for its battery. D'Annunzio said that the company is also still working on its recycling plan. Here again, utilities have the opportunity to be a part of the solution by offering Ford their input on the recycling plan and possibly coordinating battery recycling in their service territories.

Utilities, step up

Ford understands that utilities need to be involved in the mainstreaming of electric vehicles. The company is doing a demonstration project with EPRI, placing prototype vehicles with several utilities to test as fleet cars and to learn more about how charging will affect their systems.

Horstman would like to see auto makers do more outreach to utilities, but he urged power providers not to wait to prepare for the arrival of the electric car. Some Western customers, like the city of Anaheim, are already using plug-in vehicles. The city fleet converted two Priuses to plug-ins, and recently installed a ChargePoint station to service them. The station supports Anaheim's plan to convert 90 percent of its light and medium duty fleet to alternative fuel or electric drive by the year 2020. No doubt,



Energy Services Manager Ron Horstman examines the charging station that is used to "re-fuel" electric cars. There are currently about 2,000 commercially available stations in the country.

that experience will help the city serve residents who buy electric cars, too.

Consumers all over the country will be able to buy Ford's Transit Connect van this fall, and the plug-in, all-electric Focus will be available in 2011. Another PHEV model will be out in 2012, along with the next generation of Ford's conventional hybrids. Ford's plan is to give customers a range of vehicles so they can choose their level of "electrification" based on their needs.

And choose they will, so it is time for utilities to decide if they want to be in the driver's seat or just go along for the ride. ⚡

**Want to know more?
Visit www.wapa.gov/es/pubs/esb/2010/sep/sep103.htm**



Question:

Do you have information on audits (including online tools) of commercial and industrial lighting?

Answer:

Lighting audits are great tools for analyzing existing lighting systems when you are considering energy-efficiency improvements. Conducting a thorough room-by-room tour gives the auditor a good look at not only the lighting system, but sometimes ideas on better use of space or processes as well.

Application, building codes

One thing to keep in mind with these two different settings is that lighting is often the single largest use of electricity in commercial settings, and uses a much smaller percentage in industrial facilities; therefore, lighting is usually prioritized by owners quite differently. In either case, if a lighting system is more than several years old (and especially if it is more than ten years old), there are likely to be good opportunities to improve both quality and energy efficiency.

Lighting also plays very different roles in these two applications, although enough light for good vision and safe activity is basic to both. In a retail establishment, light is used to attract and influence customers and feature products, while in the industrial arena providing safe and adequate lighting for good productivity and process control is what is important.

The “lighting power allowance” of the pertinent energy code may vary by types of facilities, and it is at least useful to know what that target is, even if a project being considered may not be required to meet it. Various jurisdictions may differ somewhat as to how extensive lighting retrofits may be before the current code must be honored. While the simplest retrofit may be replacing lamps and ballasts in an existing fixture with no additional wiring, current code may require new control strategies or efficiencies. An audit provides information about “what is” and some tools do good “what ifs,” but simply meeting a watts-per-square-foot limitation and substituting fixtures and lamps may yield disappointing (to completely unsatisfactory) results. For an optimal retrofit, consult a lighting specialist or designer when planning your project.

Free tools

A search of the Internet turned up some tools you may want to try out. If you have a well-known space for an example, try plugging it into several tool suites to compare their ease of use and output and decide which tool best fits your needs.

Any audit is only as good as the data going in—the article “Light Guide: Lighting Audits” provides some good information about the process.

- *Building Energy Software Tools Directory: Lighting Systems*; U.S. Department of Energy’s

EERE Building Technologies Program This directory provides information about several tools, many of which are free.

- **GE lighting toolkit** offers seven free estimators to help lighting professionals and their customers save energy costs:

- Simple Energy Estimator
- Cost of Waiting Estimator
- Lighting Layout Estimator
- Dimming System Wattage Estimator
- Simple Life-Cycle Cost Estimator
- Watts Per Square Foot Estimator
- Fixture Replacement Estimator

Resources for sale

Since you did not specify only free software, you might also wish to consider the following commercial products/services.

- **OptoMizer Lighting Audit System 2.3** is multi-user, network-ready auditing software for the design, data collection, analysis and energy reporting of lighting retrofit project audit data. Free to try; \$499 to purchase.
- **Novus Engineering** offers comprehensive lighting audit and design services to energy service companies, property managers and property owners. The company’s proprietary database program was developed to permit easy data handling for large sites. It produces

See *ENERGY EXPERTS* page 8

Website of the month:

Happy Birthday, ACEEE

To celebrate 30 years of promoting energy efficiency, the American Council for an Energy Efficient Economy (ACEEE) has launched a new website.

Launched in 1980 on the heels of the energy crisis, the nonprofit ACEEE is dedicated to advancing energy efficiency as a path to economic prosperity, energy security and environmental protection. Through research, education, analysis, technical assistance and partnership, the council has played a significant role in bringing energy efficiency into mainstream awareness.

Get to know ACEEE

The new website is a portal to ACEEE's wealth of information and networking resources, organized in a more user-friendly format. The primary navigation bar, just below the banner at the top of the page, links to the main sections: Energy Efficiency by Sector, About ACEEE, Newsroom, Publications, Conferences and Events and Consumer Resources. The right side of the home page highlights featured discussion topics, and along the bottom are updates about the latest events, publications, policy news and consumer resources.

Those who aren't familiar with the work of the ACEEE can learn more about its mission of advancing energy efficiency by visiting About ACEEE. This section also lists the council's research programs, including one for utility issues, staff, networking groups, FAQs and job openings at ACEEE and other energy-efficiency groups.

Policies, strategies

Energy efficiency is a big subject, which ACEEE makes manageable by breaking it down into sectors. Federal and state energy efficiency policies are included under this heading. The November 2008 Energy Services Bulletin "Website of the month" profiled ACEEE's state energy policy database, a valuable resource for utilities trying to keep track of energy legislation in their territories. The new website follows national energy policy as well, including policy priorities, proposed legislation and past legislation. All pages in the "sector" portion of the website provide a list of related resources, news items and links.

The other sectors—residential, commercial, industrial and transportation—discuss opportunities for energy savings specific to each application. Each discussion topic found on the sector pages is also listed on the Topics page in alphabetical order.

Education

ACEEE produces an extensive menu of publications for each sector. Visitors can find fact sheets, white papers, research reports, policy briefs and more in the publications database. Search by publication type, sector, keyword, author or year of publication. The page also provides a list of the most recent publications.

No association website is complete without a calendar where visitors



Founded in 1980, ACEEE promotes the benefits of energy efficiency to policymakers, business and industry decision-makers, consumers, the media and other energy professionals. (Artwork by American Council for an Energy Efficient Economy)

can find opportunities to further their education. There is one page for ACEEE conferences, such as the highly popular Summer Study, and another for all energy-efficiency events. Visitors can select to see only ACEEE events or other organization's posting, and they can add their own energy-efficiency events.

Consumer resources, as the name states, target the consumer market with tips and guides for home energy savings. However, utilities may want to include a link to this section on their own websites, or use it as a useful source of material for outreach and education campaigns.

Feedback wanted

All websites are a work in progress, so ACEEE has set up a short questionnaire for visitors to fill out. This is your chance to help make a valuable resource even better, and to help ACEEE continue to promote the benefits of energy efficiency for another 30 years. That is a birthday present to all of us. ⚡

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2010/sep/sep105.htm

Heartland

from page 3

new facility. Koch Hazard Architects of Sioux Falls designed the building, and other Sioux Falls companies provided construction management and project management. Stacey McMahan, AIA, LEED AP, of Koch Hazard, praised the utility for its dedication to reducing energy use. “Heartland has been a great partner in creating this green building,” she said. “The only way to create a great building is to work with a great client.”

LEED-ing by example

Since the building’s opening, it has received a steady stream of visitors, including U.S. Representative Stephanie Herseth Sandlin and members of her staff, and U.S. Senator Tim Johnson. Tour groups may have been interested in learning

more about LEED, but they undoubtedly noticed how comfortable and attractive the building is, too. It turns out that measures like daylighting and individual temperature control do more than save energy. “I can honestly say coming to work is a joy in such an amazing building,” said Heartland Communications Manager Ann Hyland.

Heartland welcomes the attention in hope that other organizations will be inspired to pursue LEED certification for new building projects. The Rural Learning Center in Howard, S.D., the utility’s long-time partner on energy education, plans to build the state’s next Platinum facility. Heartland facilitated a \$1 million loan through U.S. Department of Agriculture to help in their building process.

To demonstrate the lessons of energy efficiency on a residential scale, Heartland implemented an

extreme energy makeover on a home in one of its customer communities last year. Information from the energy-efficiency retrofit, such as cost of investments compared to energy saved, is being used to educate customers. A similar program this year is implementing makeovers on city buildings in four of Heartland’s municipal customers. In 2011, the utility plans to roll out a suite of energy-efficiency programs for both business and residential consumers.

Customers appreciate it when their power providers practice the sustainability they preach—not only does it keep operating costs down but it shows the utility believes in its own programs. Not everyone can have a LEED Platinum-certified building but every home and office can be more comfortable, healthy and energy-efficient. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/sep/sep102.htm

Energy experts

from page 6

accurate room-by-room lighting audits with a wide variety of output reports, including energy savings calculations, maintenance savings reports, room-by-room scopes of work, detailed materials lists, detailed material specifications and closeout forms. Customers include state

governments, military bases, school districts, colleges and universities.

■ **POWERCON consultants**, a national lighting and energy management company, uses its exclusive LightData software program to provide detailed and accurate reports, outlining its lighting retrofit recommendations. As you can see there are a variety

of tools available to choose from. Depending on the data you need, you may be able to use one or more of the free tools.

Additional resources

■ “**Lighting Audits**,” an overview by Doug Walo, Electrical Wholesaling, April 1, 2003. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2010/sep/sep104.htm