Energy Services BULLETIN
December 2004
Western's bi-monthly energy efficiency and renewable energy newsletter dedicated to customer activities and sharing information on energy services.

Wray builds Colorado's first school wind project

Following the example of many small rural school districts around the country, but setting one in its home state of Colorado, Wray School District RD-2 plans to cut its annual energy costs and teach students about renewable energy by harvesting local wind resources.

Over the past few years, changes in state school finance formulas and the declining rural populations cut three quarters of a million dollars from district's budget. To counter the shortfalls, the Wray superintendent challenged district staff to find new revenue sources, focusing on projects that could enhance education for the district's 700 K-12 students.

Development opportunity

Jay Clapper, who teaches vocational and agricultural technology at Wray High School, saw the challenge as an opening for a long-held dream. "I've been talking about alternative energy in the classroom for years," he said, "and I've often wondered why we didn't have our own wind turbine to offset electricity costs. The budget crunch gave me the opening to present the idea to the school board."

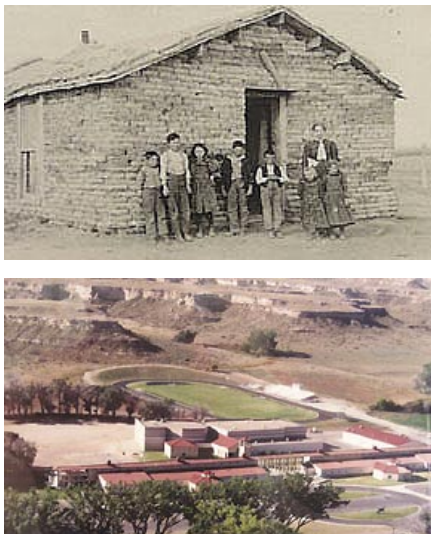
The board of education agreed with Clapper that a wind turbine offered both economic and educational benefits. A committee of interested Wray citizens promptly formed to study the feasibility of the project. Clapper joined the committee and enlisted his vo-ag students to collect wind data on a hill south of town.

The data indicated class 4 wind resources on the proposed site. Using the costs and output of two wind turbines—a 660-kW and a 950-kW model—as examples, the study concluded that the area around Wray was an excellent prospect for wind energy development.

Fundraising at home

The committee initially selected a 660-kW unit and set out to raise the $917,000 needed to install it. Local support was strong from the outset. Eva Bowman, whose family has lived in Wray and attended district schools for five generations, committed $200,000 seed money to fundraising efforts on behalf of the family in spring 2004.

"My grandfather had died recently and we wanted to do something for the community in his memory," explained Michael Bowman, a volunteer member of the wind committee. "We realized that the school district had been the common thread running through our family. That seemed like the place to make our mark."



The Wray schoolhouse c.1905 (top) and today. The school district is installing a wind turbine to cut operating costs and teach students about renewable energy. (Photo by Michael Bowman)

With the Bowman family contribution, everything seemed to fall into place. A group of 21 local residents contributed another $167,000 to the project.

The Kitzmiller-Bales Trust, a local foundation set up by a retired school teacher, agreed to match the Bowman gift. In August 2004, the Colorado Department of Local Affairs awarded the district a $350,000

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What's inside

California consumers flex power to save energy

The 2000-2001 energy crisis knocked California for a loop, but the Golden State came up swinging with an outreach program that put blackouts on the ropes and won it the title of conservation champ.

Flex Your Power showed California consumers how to wield their economic clout to reduce energy prices, avoid shortages and lower their energy bills. The program also produced strategies and resources that utilities around the country can use to promote energy efficiency in their service territories.

Shortages spur action

As early as the summer of 2000, the state government saw serious electricity supply shortages looming due to increased energy demand, cuts to energy-efficiency programs, drought conditions and powerplant closings. By winter, state agencies ramped up an outreach campaign to encourage Californians to conserve energy.

In April 2001, then-governor Gray Davis unveiled an energy management strategy that identified three key areas: generation and supply-side issues, stabilization and restructuring plans for the power industry and conservation and demand-side management.

The first two elements address California's long-term energy needs. The Flex Your Power campaign, however, proved that energy conservation and efficiency are immediate and powerful weapons for managing energy consumption. During the summer of 2001, Flex Your Power reduced California's energy consumption at peak by as much as 14 percent. One third of the state's commercial customers and 33 percent of residents cut energy use by at least 20 percent.

The key to California's historic success was an aggressive, comprehensive outreach campaign that targeted not only the general public, but also specific consumer sectors. Thousands of business, non-profit and local government partners joined state agencies to teach Californians how to shift energy use away from peak hours to avoid blackouts.

Program teaches wise energy use

Flex Your Power launched in summer 2001 with a statewide paid media campaign that reached 95 percent of adult and teen Californians.

Under the 20/20 Program implemented in spring 2001, investor-owned utilities gave a 20-percent credit to all business and residential customers who cut energy use by 20 percent or more from the same month in 2000.

The second phase of Flex Your Power launched 13 demand-reducing initiatives in the summer of 2001 and gained momentum through summer 2002. Field staff in Sacramento, San Francisco, Fresno, Los Angeles and San Diego recruited partners across the commercial, local government, water, agricultural and residential sectors to cut energy demand immediately.

Flex Your Power, a public outreach program, makes consumers partners in managing energy consumption. (Artwork by Flex Your Power)

Following a successful summer without blackouts, the campaign moved into its third and most important phase—making conservation a way of life and focusing on energy efficiency. The energy crisis taught California that conservation must be part of the solution.

Utilities use local strategies

Flex Your Power continues to build on the success of that first summer with a full range of marketing and outreach strategies. Television, radio and newspaper ads; public relations; printed and electronic collateral materials; events, meetings and forums; and a comprehensive Web site spread the energy efficiency message to all Californians.

Many Western customers in California are Flex Your Power partners, linking their Web sites to the Flex Your Power site, running campaign ads and public service announcements in their territory and printing joint collateral material.

Flex Your Power has honored Western customers for conservation

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) 962-7451.

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and efficiency efforts with its annual energy efficiency awards. Burbank Water and Power's "Torchiere Exchange Program" earned a 2003 award for education and outreach. The program showcased the dangers of halogen floor lamps and offered residential customers energy-efficient fluorescent lamp replacements. The switch saved an estimated 877 kilowatts annually.

This year's Innovative Implementation Actions award went to Lawrence Berkeley National Laboratories, Doubletree Hotels, Sacramento Municipal Utility District and The Watt Stopper. The team researched and tested motion-sensing wall switches in hotel bathrooms. Data from a 400-room hotel installation determined an average energy savings of 47 percent.

Investment saves energy

Broad outreach and education programs come with a price tag. California's initial investment in energy conservation was $250 million for funded incentives, retrofits and other programs including Flex Your Power. The State Senate went on to approve more than $850 million additional funding for 2001-2002.

The campaign was awarded $15 million to run through 2003, and received $30 million total for two years, 2004-05. The state's Public Goods Charge supplies the bulk of the funding with municipalities, partner organizations and companies also contributing.

Investments have their payoff, however. A report sponsored by the California Energy Commission cited striking changes in consumer energy use during summer 2001. Californians reduced electricity usage by almost seven percent and peak monthly summer demand by 8 to 14 percent compared to 2000. Electricity use continued to drop in 2002. Of the consumers surveyed, 70 percent reported taking one or more conservation actions.

Utilities outside California can visit the Flex Your Power Web site. The site offers reports, case studies, product guides and energy-savings tips free.

Just think of your utility as an aspiring prize fighter and Flex Your Power as the champ offering to coach you for the big fight against electricity supply shortages. Only instead of learning how to put your opponent's lights out, you'll learn the secret of keeping them on.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec042.htm

Wind project

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grant from the Colorado Energy Impact Fund.

Broad range of partners

The project has drawn support from both sides of the political aisle. Supporters include Colorado Governor Bill Owens, U.S. senators Wayne Allard (R-Colo.) and Ben Nighthorse Campbell (R-Colo.), U.S. Congressional representatives Mark Udall (D-Colo.) and Marilyn Musgrave (R-Colo.), State Representative Greg Brophy (R-District 63) and State Senate Majority Co-leader Mark Hillman (R-District 1).

Through the partnership and leadership of Valmont Industries, the school district has upgraded to a 1.5-MW turbine. The city, YW Electric Association and Western negotiated an agreement with the district that will allow the city to purchase the turbine's total output.

Community development model

As the first renewable energy project of its kind in the state, the school wind turbine will be a template for Colorado's rural communities and schools seeking to develop community-scale projects. Rural AmeriTowne, a non-profit educational program located in Wray, plans to use the turbine to demonstrate the educational, environmental and economic aspects of renewable energy development in rural Colorado.

Wray School District RD-2 expects to complete construction on the turbine and commission it in spring 2005. Anticipated revenues from the project will approach $250,000. The district hopes to use that money to restore some teaching positions that had been cut due to budget constraints.

Beyond direct economic benefits, Wray students will learn first hand about sustainability and clean energy. Perhaps even more important, they have had the opportunity to see what happens when a community meets a challenge head on with imagination.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec041.htm

Breakthrough heat pump delivers when mercury drops

For decades, the air source heat pump offered an energy-efficient option for home heating and cooling best suited to milder climates.

Until now. A new concept in heat pumps may turn air-source technology into the hottest thing in cold climates. The cold climate heat pump stages the air source system with components that deliver more heat as the outdoor air gets colder, instead of less as conventional air-source units do.

Nyle Special Products, Bangor, Maine, designed the super-efficient heat pump with smart controls, primary two-stage compressor, booster compressor and economizer (heat plate exchanger). The Johnson Controls Metasys control compares outdoor temperature with the building's demand to produce only as much heat as is necessary, saving electricity and money.

Utilities test heat pump

CCHP technology has only been in existence about six years, and available commercially for less than two. "It's exciting to be involved with a new technology," said Don Mordal, president of Preferred Energy Solutions, Inc., CCHP distributor for the Midwest.

Mordal has been spreading the word about the new heating system in Minnesota and the Dakotas. "Electricians, HVAC technicians, homebuilders and homeowners all show up at the presentations, but most of the participants are from utilities," he said. "Utilities have shown a lot of guarded interest."

Great River Energy invited Mordal to give a presentation to its technical advisory committee where member co-ops can learn about new, energy-saving equipments and strategies. The CCHP is covered under Great River's rebate program for energy efficient heating and cooling systems. The incentive requires a minimum SEER rating of 13 for split-system, central air conditioners and air-source heat pumps. CCHPs rate 16 to 18.

Replacing a conventional electric heating system with a cold climate heat pump can reduce operating costs 30 to 40 percent. "I get maybe a call a week from members about the new kind of heat pump," said Key Account Representative Steve Kosbab for Great River Energy.

Kosbab is familiar with CCHPs because one has heated his home for the past three years. "The manufacturers claim that the heat pump works to 30º below zero. I don't know about that but it did an excellent job last winter when it was minus 18º," Kosbab said. "I have a backup gas furnace, but the heat pump is my primary heat source."

Alternative to geo exchange pump

The relatively compact cold climate heat pump is slightly larger than an evaporative cooler and is installed above ground. The cost of the unit is comparable to a geoexchange system, but with no need to dig wells, installation is less expensive. "It's a great alternative to ground source, especially for homeowners who don't have the property to accommodate the loops," said Marketing Manager Marshal Albright of Cass County Electric Cooperative.

Albright installed a beta test CCHP in his new home in 2002. The Fargo, N.D., co-op has used Albright's system to learn more about the CCHP's reliability, performance and maintenance. "Initially, there were some technical issues, and questions about the distributor network," Albright recalled.

Cass County Electric Cooperative Marketing Manager Marshal Albright of installed this CCHP at his Fargo, N.D. home. (Photo by Cass County Electric Cooperative)

The manufacturer redesigned the latest units to improve durability, reliability, noise reduction and efficiency.

More contractors needed

Getting the product to market and proving long-term reliability are two of the biggest challenges facing CCHPs. Contractors are aware of the new heat pumps and are curious, but it takes time to build a good distributor base, noted Kosbab. "Many HVAC contractors just don't know how to sell heat pumps," he said, "and it's sad because they are missing out on providing savings and comfort to their customers."

Some of Great River's member co-ops have been taking contractors under their wings and familiarizing them with the new technology. Both Kosbab and Albright stressed the need for the CCHP to be installed properly.

The smart controls and environmentally-safe R-410 refrigerant require special training, but not

See HEAT PUMP, page 6

Western welcomes new customers

Every 20 years, Jupiter aligns with Saturn and Western brings new firm power customers into its orbit, an occasion governed not by the planets and stars but by the Power Marketing Initiative of Western's Energy Management and Planning Program.

The PMI set 20-year contracts to provide Western's long-term, firm power customers with the resource stability to support integrated resource planning and efficient energy use. Having a stable resource mix gives customers a starting point from which to add new resources or demand-side management measures to meet load growth.

As existing contracts expired, a small amount of power was reserved for new customers. Western allocates resource pool resources to new preference customers such as Native Americans and universities.

The PMI specifically targeted Native Americans to receive allocations for reservation use. Historically only tribal utilities received allocations. Some reservations also received hydropower through cooperatives that served tribal loads. A 1995 policy change allowed tribes to apply for allocations directly based on tribal member usage rather than utility status.

Native American tribes

In October, the CRSP Management Center and the Rocky Mountain Region began serving a total of 57 new customers, all Native American tribes.

The Iowa Tribe of Kansas and Nebraska, the Kickapoo Tribe in Kansas, the Prairie Band Potawatomi Nation and the Sac and Fox Nation of Missouri all signed contracts for allocations from the Loveland Area Projects resource pool.

The remaining 53 customers are located in the CRSP MC's service territory.

Many of the tribes have investigated or undertaken renewable energy development and energy efficiency programs. The Fort Mojave Tribe, Jemez and Taos pueblos, White Mountain Apache Tribe and Yavapai Apache Nation conducted feasibility studies through the Department of Energy's Tribal Energy Program. The program funded solar installations for the Jicarilla Apache Nation and the Laguna Pueblo.

Customers practice sustainability

There are several Native American tribes among the Sierra Nevada Region's new customers, too. The Coyote Valley Pomo Tribe, has been working with the non-profit Builders Without Borders to launch a sustainable model homestead project. The homestead would incorporate ecologically and economically sustainable water, waste, power and food production systems.

The municipalities joining Western's Sierra Nevada family also have an interest in sustainable practices. The city and county of San Francisco is developing construction standards that will save the city millions in operational costs. The city's Green Building Ordinance promotes design principles that increase energy efficiency, protect the environment and improve employee productivity.

The Jicarilla Apache Nation of New Mexico, one of Western's new customers, installed a 2.4-kw photovoltaic system on the Dulce High School, and monitored it's performance for three years. (Photo by DOE Office of Energy Efficiency and Renewable Energy)

Truckee Donner Public Utility District helped Sierra College create an energy demonstration site at its Small Business Development Center building.

TDPUD and the city of Fallon, Nev., contracted to buy one of Western's custom products, a basic resource firming package, tailored to the needs of relatively small utilities. Custom products are supplemental services that address customers' specific power needs.

New allocation process

All of Western's projects follow the same 20-year contract term, but on different cycles. Upper Great Plains is nearing the end of the allocation process for its post-2005 resource pool, and Desert Southwest is beginning the process for the post-2008 power pool from the Parker-Davis Project.

The procedure begins with Western seeking public comment on its proposed allocation criteria and issuing a call for applications. The deadline for written comments and applications for Parker-Davis power is Dec. 30, 2004.

See NEW CUSTOMERS page 6

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec044.htm

New customers

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Following the public comment period, Western will set eligibility criteria, evaluate applications and set the terms and conditions under which it will sell the allocated power. Then, on Oct. 1, 2008, a new group of customers will begin receiving their power allocation from the Parker-Davis Project.

A new cycle will be set in motion, spreading low-cost, reliable Federal hydropower and wise energy planning practices throughout Western's service territory.

Heat pump

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special certification, Mordal pointed out. "If a contractor is familiar with R-410 and heat pumps, then they will be able to handle the CCHP with very little training," he said. "Our company provides training to contractors, usually on referrals from the power companies."

"Don has been working to get people comfortable with the technology," agreed Albright. "If more contractors had training, it would help the CCHP take off."

Most CCHPs are in use in New England and the northern Midwest. Minnesota boasts 10 units and in North and South Dakota, there are 7 CCHPs, mostly residential. Chelan County, Wash., Public Utility District is testing one at Wenatchee Community College.

There are no CCHP dealers in Western's service territory. Mordal advised utilities and individuals interested in CCHPs to look for local contractors, qualified to work with R-410 refrigerant and experienced with heat pumps and he will assist them in the CCHP training.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec043.htm

New hydropower customers cover three regions, 9 states

Western's projects are supplying allocations to the following new customers:

CRSP Management Center

Arizona

- Cocopah Indian Tribe
- Colorado River Indian Tribes
- Fort Mojave Indian Tribe
- Ft. McDowell Mojave-Apache
- Gila River Indian Community
- Havasupai Tribe
- Hopi Tribe
- Hualapai Tribe
- Navajo Tribal Utility Authority
- Pascua Yaqui Tribe
- Quechan Indian Tribe
- Salt River Pima-Maricopa
- San Carlos Apache Tribe
- Tohono O'Odham Utility Authority
- Tonto Apache Tribe
- White Mountain Apache Tribe
- Yavapai Apache Nation
- Yavapai Prescott Indian Tribe

New Mexico

- Acoma Pueblo
- Alamo Navajo Chapter
- Canoncito Navajo Chapter
- Cochiti Pueblo
- Isleta Pueblo
- Jemez Pueblo
- Jicarilla Apache Tribe
- Laguna Pueblo
- Mescalero Apache Tribe
- Nambe Pueblo
- Picuris Pueblo
- Pojaque Pueblo
- Ramah Navajo Chapter
- San Felipe Pueblo
- San Ildefonso Pueblo
- San Juan Pueblo
- Sandia Pueblo
- Santa Ana Pueblo
- Santa Clara Pueblo
- Santo Domingo Pueblo
- Taos Pueblo
- Tesuque Pueblo
- Zia Pueblo
- Zuni Pueblo

Nevada/Utah

- City of Fallon
- Confederated Tribes Goshute
- Duckwater Shoshone Tribe
- Ely Shoshone Tribe
- Las Vegas Paiute Tribe
- Paiute Indian Tribe of Utah
- Skull Valley Band of Goshute
- Ute Indian Tribe
- Yomba Shoshone Tribe

Colorado/Wyoming

- Southern Ute Indian Tribe
- Ute Mountain Ute Tribe
- Wind River Reservation

Rocky Mountain Region

Kansas

- Iowa Tribe of Kansas and Nebraska
- Sac and Fox Nation of Missouri
- Kickapoo Tribe

Nebraska

- Prairie Band Potawatomi Nation

Sierra Nevada Region

California

- California State Universities (11 campuses)
- California State University (Sacramento)
- Coyote Valley Tribe of Pomo Indians
- Placer County Water Agency
- Reclamation District #108
- Redding Rancheria
- Susanville Indian Rancheria
- Table Mountain Rancheria
- Truckee Donner Public Utility District
- University of California, Berkeley
- University of California, San Francisco

Basin electric joins pilot project to marry wind, hydrogen

Intermittent renewable energy resource seeks fuel storage technology. Object: clean power production, storage and distribution. No, it's not a scientific singles ad. It's an innovative pilot program designed to bring wind energy and hydrogen fuel together.

A consortium of North Dakota energy companies and research institutions played matchmaker, and a $497,050 Federal grant is paying for the wedding. The goal of the project is to harness the state's immense wind resources to produce, store and distribute hydrogen fuel.

Local economic possibilities

The consortium consists of Basin Electric Power Cooperative, the University of North Dakota Energy and Environmental Research Center, Stuart Energy Systems, the North Dakota State University North Central Research Extension Center, Verendrye Electric Power Cooperative and the city of Minot, N.D. The partners will contribute a total of $124,262 to the project.

Basin Electric Spokesperson Daryl Hill said that the utility is looking forward to learning more about hydrogen technology. "It's a great opportunity to look at the economics of hydrogen fuels, different uses and the feasibility of those options," he said.

U.S. Senator Byron Dorgan (D-N.D.), a member of the Senate Energy and Water Appropriations Subcommittee, helped to secure the funding for the project.

"This project has enormous implications for the future of wind energy, hydrogen power and economic growth in America's heartland," Dorgan said in a press statement.

State wind development

North Dakota's wind energy potential ranks first among U.S. states, but the state has lagged behind in developing the resource. Low electricity demand and the need for expensive transmission upgrades to export wind power are holding back development.

The first phase of the project will examine those issues. Researchers will analyze the economic and environmental issues associated with producing hydrogen fuel using wind turbines. Converting wind energy to an alternative form locally could reduce or at least avoid regional transmission congestion problems often associated with wind generation.

Since intermittent electricity is difficult to store, the second phase seeks to develop an alternative use for wind energy. The project plan calls for building a hydrogen electrolyzer at the NDSU North Central Research Extension Center, with interconnection support from Verendrye Electric.

The hydrogen electrolyzer will convert the wind power from its intermittent form to an energy source that can be stored and used as needed. The unit would be one of the nation's first production sources of hydrogen from a renewable resource.

Some components in place

Basin Electric's wind farm near Minot, N.D., and FPL Energy's Edgeley-Kulm project will be used to supply electricity to the hydrogen electrolyzer.

"One of the factors that made the project viable was that we have the wind element already in place," said Hill.

"Dynamic scheduling" of the electrolyzer to match the wind generator is the key to the project. The electrolyzer will track the wind generation pattern and match its operation to the available wind energy.

The produced hydrogen will be stored for later use, primarily as a transportation fuel. Using hydrogen as a transportation fuel is expected to be the most efficient and economical application of wind-to-hydrogen production.

With hydrogen-powered vehicles already on the ground, there will be no need for researchers to create a prototype application. The city of Minot may purchase a municipal bus to run on the fuel the project produces.

Focus on electricity production

A partnership planning a similar project in Iowa is more interested in generating electricity than transportation fuel.

Ames Laboratory hopes to build the world's first wind and hydrogen energy plant under a three-way partnership with the city of Ames and Iowa State University. The focus on electricity is due to the lab's previous research on hydrogen storage using metallic powders.

The proposal calls for two wind turbines to provide electricity to convert water to hydrogen. The hydrogen will be compressed and stored for later use. During peak generation times, the stored gas will be recombined with oxygen in underground fuel cells.

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Radio show helps Minnesota utilities promote conservation

When KWLM-AM News/Talk radio in Willmar, Minn., invited two local utilities to its "Open Mic" show, Western customers Willmar Municipal Utilities and Kandiyohi Power Cooperative talked about energy efficiency—and got invited back.

Show promotes energy services

Originally, the general managers were going on the program to discuss a possible consolidation of the utilities, but decided that the forum might be better used for customer education. "I was informed on a Tuesday night that I was going to be on the radio on Wednesday morning," recalled WMU Energy Services Representative Dave Opsahl.

Opsahl joined Dan Tepfer of Kandiyohi on the weekday interview program, July 7. "Dan talked about our energy management program, which is very similar to Willmar's," said Kandiyohi Marketing and Customer Service Manager Diane Maurice. "We're always looking for new ways to let our customers know what's out there."

"People are always interested in efficiency when they get that light bill," said Bud Hanson, host of Open Mic.

He added that reliability is residents' No. 1 concern, and that both utilities did an outstanding job in that area.

Community spirit

Opsahl used the first show to talk about WMU's "Load Share" program. "The name recognition is out there, so I mainly hit on the high points," he noted. "People used to ask how it worked. Now they want to know 'How do I sign up?' " Opsahl said of the successful air conditioner cycling program.

"Load Share" works on a voluntary basis. "If you offer money, you have to keep upping the incentive to bring in new subscribers," Opsahl pointed out. "We chose to appeal to our customers' community spirit."

During the hottest days of the year, the utility runs air conditioners through a 23-minute-on-7-minute-off cycle. "The cycle is so short that a person would have to stand on a register to notice the difference," Opsahl commented.

Customers sign up because, "There is no risk or discomfort, it saves them money and reduces the upward pressure on rates," Opsahl listed the advantages he shared with "Open Mic" listeners. "It's much cheaper to conserve than it is to build new generation."

Those benefits have convinced 1,400 of WMU's 8,000 meters to participate in the first two years of the program. "We hope to add another 2,000 subscribers," the energy services representative said. "About 4,000 customers, both residential and commercial, have central air conditioning."

Cooperation improves service

Because WMU's Energy Services are relatively new, the exposure from KWLM is particularly valuable. Opsahl, a former electrician and electrical inspector, learned marketing promoting WMU's energy efficiency programs to the Lions' and Rotary clubs and senior citizen groups. "Those presentations prepared me for the radio show. I know the questions and the answers," he said.

Dan Tepfer of Kandiyohi Power Cooperative (left) and Dave Opsahl of Willmar Municipal Utilities (center) talk about their utilities' energy efficiency programs with "Open Mic" host Bud Hanson. (Photo by Kandiyohi Power Cooperative)

He took the job to find out what it was like on the other side of the meter. "It was a steep learning curve," he admitted, "but it's fun being the guy who helps people save money."

WMU and KPC, which serves rural Kandiyohi County residents, have a long history of collaboration. The rural electric cooperative has had an energy services program for 24 years. "When we had a question, we asked Kandiyohi or another utility," said Opsahl. "It wasn't necessary to reinvent the wheel."

Both utilities offer interruptible load programs for air conditioning, off-peak water heating incentives and rebates on efficient appliances including Marathon hot water heaters. "Because we promote the same equipment, WMU customers are able to pick up their Marathons at our warehouse," said Maurice. "We work very well together," she added.

Willmar Municipal Utilities and Kandiyohi Power Cooperative have made two additional appearances on "Open Mic" and will keep going back whenever they are invited. "It's a great way to reach our customers," Opsahl concluded.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec046.htm

Western, customers cope with record drought

As winter approaches, hydropower marketers and utilities are joining skiers in praying for record snowfall throughout the western United States.

Western's Colorado River Storage Project Management Center has been operating under severe conditions for six years and the situation has reached a critical point. Lake Powell is at 38 percent of capacity its lowest water level since 1970.

Lower storage volumes in Lake Powell have caused a 30 percent loss of efficiency in Glen Canyon Dam's generation capability. The Bureau of Reclamation forecasts a 22 percent chance that continued drought will drain the lake to minimum power pool elevation within two and a half years. Such a loss would cause the generators to be shut down, a first in Western's history.

Before panic sets in, consider that one wet year like 1983-84 could refill Lake Powell to 88 percent of capacity. According to Engineer Brian Young in the Desert Southwest Power Marketing Resources and Planning office, that would not be an "average" hydrologic cycle. Hydrology—the study of water's movement from the earth to the atmosphere and back—is central to projecting future hydropower availability. "The good news," he added, "is that we never get 'average' hydrology."

Drought reduces allotments

Praying for rain does not constitute a drought response plan. Factoring the variable nature of hydropower into long-term firm electric power contracts, however, does. When hydrology or river operations affect the amount of energy available, Western has the flexibility to modify its commitments with adequate notice to customers.

The drought forced Western to lower its contract commitment to Salt Lake City Area/Integrated Project customers for the next 20-year contract term, starting Oct. 1, 2004.

Western has worked with customers for the last year to prepare for the allocation adjustment. Customers may ask Western to purchase firming power for them on the open market. Over the drought cycle, Western has dedicated substantial funds to fulfilling its contractual obligations.

Customers can buy the power from Western at a pass-through cost, taking advantage of Federal purchasing power. To save further money, said CRSP MC Resource Manager Clayton Palmer, Western is starting a strategic purchase program initiative. "If we develop a portfolio of long- and short-term purchases, maybe add in a little green power, we can firm our hydro resources at a lower cost," he explained. "We can pass that savings on to customers."

To supplement their Federal hydropower allocation, customers may choose to buy what they need from other sources or generate their own power. Western can assist customers with those options, too. Energy Services can connect customers with resources and technical support to develop renewable energy projects. The Public Renewables Partnership, in which Western participates, offers a wealth of information on purchasing certified renewable energy or green tags.

Lake Powell at Hite Bay, 1999. (top) Lake Powell at Hite Bay, March 2004. (Photos by U.S. Bureau of Reclamation)

Protect water resources

Efficient water use is critical to mitigating the impact of the drought. Hoover Dam customers are studying equipment upgrades that could modestly increase capacity, efficiency and energy. As a bonus, measures that improve generation and cut O&M costs will continue to benefit customers when the drought is over.

Water resources are vital not just to hydropower generation, but to every aspect of life, and no single agency can protect them for all purposes. Western has enlisted state water representatives and the Bureau of Reclamation to collaborate on a plan to keep Lake Powell's elevation above the minimum power pool.

In the semi-arid West, saving water is everyone's business. Customers can do their part by educating themselves about water issues and conservation measures. Energy Services' water conservation resources provide an excellent starting point for building a drought-resistant organization.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec047.htm

Demand response keeps electricity reserves up, costs down

Simply using less electricity is one way to save kilowatts. Another is to reduce power use when the demand is highest and electricity is most expensive.

The advantages of this type of conservation include relieving generation and transmission constraints, reducing the severity of wholesale price spikes and ultimately lowering overall energy prices for consumers.This is called demand response, and the Northern California Power Agency and its member utilities have used this strategy for a number of years.

The California energy crisis focused the spotlight on demand response, recalled NCPA Member Services Manager John Berlin. "The state and the Independent System Operator offered financial incentives, but most of our members' activities started with voluntary programs for their largest customers, and these have since continued," he said.

Some activities involve sophisticated advanced electronic metering and making real-time, interval data available to customers. Others are tried and true measures like offering incentives to install high-efficiency air conditioners, or switching to back-up generators during peak demand."Technology only enhances demand response efforts," Berlin said.

Advanced metering

What is necessary is customer cooperation, as two NCPA member programs demonstrated. The City Of Palo Alto Utilities' current program asked large customers to voluntarily reduce consumption during electricity shortages. "If a business curtailed its use when we asked, we removed it from the rolling blackout list," explained CPAU Key Accounts Representative Bruce Lesch.

To make sure participants were cutting back and to give them more information about their electricity use, CPAU retrofitted some of the customers with advanced meters. "We had installed a few before the energy crisis in anticipation of deregulation and to allow automated meter reading," Lesch said. "We realized it could be a good tool for showing customers how they use energy."

The system records 15-minute interval energy use data in either real time or day-plus-one load profiles, reflecting the previous day's use. Customers can access their profiles on the Internet.

CPAU currently has 70 advanced electric meters placed with large customers along with a few gas meters. Lesch says the utility is looking at using automated meters to manage smaller loads in the future.

Honor system

Although it uses advanced electronic meters, Silicon Valley Power's program is based on community and the old-fashioned handshake, insisted Larry Owens, SVP customer services division manager.

In June 2000, transmission constraints forced the Santa Clara municipal utility to turn off two cir-

Outreach program prevents outages

California launched the "Flex Your Power, Now!" program in summer 2004 to avert power outages through peak demand season.

This spin-off of the wildly successful Flex Your Power conservation education campaign teamed the California Independent System Operator with utilities and consumers to save electricity. On high demand days, when reserves dipped below required levels, CAISO notified utilities to announce a "Flex Your Power Now!" day, urging the general public and major energy users to practice voluntary conservation measures.

From mid-August, when program ads began running, six alerts were issued, and no outages occurred. The president and vice president of CAISO commented that the program really helped and was a very, very useful tool for them.

cuits for two hours. "Our large commercial accounts hated it and they wanted to keep these rolling blackouts from ever happening again," he explained.

Initially, a group that included Intel, Applied Materials, Sanmina and the Santa Clara University met to discuss emergency load reduction strategies and best practices. Within three weeks, more than a dozen participants delivered plans to cut consumption by up to 10 percent for four hours whenever the ISO projected an operating reserve shortfall within the hour.

In return for their efforts, the companies were exempted from rolling blackouts. NCPA and the utilities agreed that reliability was a far greater incentive to customers than financial incentives. "There are a lot of corporations with world headquarters in our service territory," said Owens. "No financial incentive would be as important as keeping the lights on."

Taking money out of the equation allowed SVP to launch its demand response program quickly. "Where there's money involved, there are contracts, and it would have taken months to negotiate with each account," Owens asserted. "By basing the plan on trust, we had it up and running in a few weeks," he added.

Matching load, adding renewables

Like all NCPA members, Silicon Valley supported California's Flex Your Power Now campaign during Summer 2004. However, Owens pointed out, the utility had more than enough power to meet its demand because of its varied portfolio. "Our power mix is 26 percent eligible renewable energy," he said. "It comes from geothermal and small hydro generation."

NCPA members have done a good job of matching resources to loads, noted Berlin, and all have done a good job with their public benefits energy efficiency programs and voluntary demand response programs. "Under NCPA's agreement with the ISO," he said, "NCPA pool members don't have to follow ISO loads, and have more flexibility to apply conservation measures when needed."

NCPA and its members will continue to support California's successful conservation efforts. Electricity is a dependent resource—its availability fluctuates with a variety of circumstances—so it is necessary to look at costs and benefits, he maintains. "Demand response has been and will continue to be a key management strategy."

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec048.htm

Wind, hydrogen

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The system's primary drawback is that it recovers only half of the energy originally generated. One goal of the research is to address that inefficiency.

Expanding renewables experience

Ames, Iowa, operates a municipal utility powered by 120 MW of local generation. Since 1975, 10 to 12 percent of that power has come from a continuously operating, solid waste recovery plant. "We've been in the renewable energy business a long time," said Ames Electric Services Director Merlin Hove.

The municipal utility has no previous wind power experience. "The wind resources are not as good here as they are in some other parts of the state," Hove explained.

The community is very interested in the project, he added, and it's an opportunity to learn about a different way of generating power. "They could use electricity to make hydrogen," said Hoves, "but the point is to make a connection between an intermittent renewable resource and firm power production."

The connection might result in firm schedulable power or in clean, storable transportation fuel—research, like romance, is never certain.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec045.htm

Western helps utilities keep lights on in all weather

With winter in the air and Florida's hurricane woes still fresh in everyone's memory, utilities should review emergency plans and make sure their nearest Western line crew's phone number is handy in case they need help restoring power that storms have taken away.

Snow storm rallies utilities

That Mother Nature takes no holidays was clear to Trinity Public Utilities District, a Northern California utility about 50 miles west of Redding, Calif. Only three days before New Year's Eve 2003, a sudden, major snowstorm brought down more than 100 spans of power lines leaving 8,000 residents without power. "We were prepared for it," said Trinity PUD Superintendent Bill Keys. "It's become almost an annual event. We assembled our crews, contacted Western and went to work."

Along with Trinity PUD, Western's Redding six-man line crew was joined by Redding Electric Utility and Plumas Sierra Rural Electric Cooperative line crews. From Dec. 29 to Jan. 5, the four crews worked 17 to 18 hours a day in conditions from four feet of snow to rain and ice.

Because of Trinity County's rugged terrain, some men were hiking mountains to get to poles. "The crews are equipped and trained for winter survival, but other than that, we just use safety training and common sense," said Sierra Nevada Line Maintenance Director Ross McFate.

Communication is critical in emergency repair situations, he added. "The utility always sends one of their personnel along with the Western crew," McFate said, "and we have their radio frequencies programmed into our radios. You have to keep talking to each other."

Heavy snow at the Redding field office did not stop Western line crews from restoring power to Trinity PUD electrical customers. (Photo by Dorothy Engdahl)

By Jan. 5, the crews had restored power to TPUD customers in Trinity County. McFate noted that the repair job "was probably some kind of record."

Western relieves crews

While snow, rain and ice left Trinity County residents ringing in the New Year in the dark, high winds were causing the same problems in Sacramento. On New Year's Day 2004, wind gusts of up to 50 mph slammed trees into powerlines and poles, leaving more than 50,000 residents without power. In nearby Elverta, 150 residents lost power when trees brought down four transmission poles.

Sacramento Municipal Utility District called on Western's Elverta line crew to help repair damage and restore power in both communities. "Because of construction work and a long spell of bad weather, their crews had been working around the clock," recalled Elverta Line Crew Foreman Geoff Buchholz.

SMUD crews went to Elverta to repair the poles and lines, while the Western crew spent the next 24 hours helping SMUD repair 12-kV lines at six different locations.

Quick response to tornado

High winds also were the culprit, and cooperation the response, earlier in 2003, when Western crews repaired two lines and 17 structures on the lines to keep power flowing to customers in eastern North Dakota.

The Valley City-Forman 115-kV and the Fargo-Grand Forks 115-kV transmission lines fell victim to a tornado or high winds on June 24, 2003. Western customer Minnkota Power Cooperative rerouted power to serve both its own load and Valley City residents.

The Fargo and Jamestown line crews rebuilt downed poles and hung conductors back in place. All of Western's North Dakota line crews pitched in to rebuild the 17 H-frame structures over the next six days.

See LIGHTS ON, page 14

New Energy Services fact sheet give gift of energy savings

As heating bills go up and everyone scrambles for extra holiday spending money, Western's Energy Services has placed a package of new and updated fact sheets online, where they can help utilities and their customers save energy.

Deck the halls

In keeping with the season, the Holiday Lights fact sheet offers businesses and homeowners tips for safer, more efficient holiday decorating.

Light Emitting Diode holiday lights put a mature technology to festive use. Made of nearly indestructible epoxy, the cool-temperature bulbs use 10 times less energy than mini-bulbs and 100 times less than standard incandescent C-7 lights.

The artificial Christmas tree gets a high-tech makeover with fiber optics. Only recently available to consumers, the trees transmit the light of a single five- to 50-watt incandescent bulb through hundreds of very small fibers along each tree branch. The result is a tree that radiates cool light. Add a rotating color wheel to change the color of the light emitted from the fibers.

The fact sheet compares lighting costs for standard C-7, LED and mini lights, and lists retail outlets that may stock energy efficient decorations.

A comfortable home

A cozy, well-sealed house is the best defense against Old Man Winter and high utility bills, but a tight building envelope can hurt indoor air quality. Learn how proper ventilation and limiting household pollutants can ensure a healthy indoor environment from "Energy efficiency and indoor air quality."


Energy Services
HOLIDAY LIGHTS FACT SHEET

The Holiday Lighting fact sheet is one of six new Energy Services publications that can help consumers save money all year 'round.

Winter can be a good time to get a bargain on a new air conditioning system, so "Energy efficient home cooling" might be just what your residential customers wanted. Recommendations range from natural cooling strategies and proper sizing for room units to different types of central systems and tips for maximizing their efficiency.

Efficient appliances

Since water heating accounts for about 18 percent of home energy bills, an efficient water heater could make a great family gift. "Water heating: Purchasing a new electric water heater" is full of good advice for people in the market for a new unit.

The fact sheet lists different types of heaters along with their advantages and drawbacks. There is also information about how off-peak or time-of-use rates can save consumers money.

Household appliances that save money year after year are gifts that keep on giving, not only to the owners but to the environment, too, because they emit less pollution. "How to buy energy efficient appliances" tells consumers what to look for when shopping for refrigerators, freezers, clothes washers, dishwashers and dryers.

For people who have everything but their own power supply, "Fuel cells promise clean, distributed generation." Ok, maybe not this year. But with potential applications from powerplants to transportation to portable power sources for laptop computers and cell phones, fuel cells could wind up on your gift list sooner than you think. Learn more about the technology that may well be powering future Christmases.

If there are any fact sheets on your wish list, you can submit topics online. Western's Energy Services wishes all our customers and their customers happy holidays, and to all, reliable energy solutions

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec0410.htm

Lights on

from page 12

The job was completed with no injuries or equipment breakdowns, and only a 15-minute power outage. "That is a testimony to their commitment to safety and excellence," said Jerry Paulson, a supervisory maintenance specialist in the Upper Great Plains office.

Be prepared

Every season brings its own hazards, and some, like a car knocking over a powerpole, can happen any time of year. The key to managing emergency repairs, line crews all agree, is preparation.

Especially at small utilities with limited resources, it is important to make sure that emergency equipment is in shape and materials are on hand, said Paulson.

An aggressive tree trimming program helps Trinity PUD preempt weather related incidents, as does patrolling its system. "We try to find and repair anything that might be a potential hazard," said Keys. "If something does happen, it helps to know where to start looking for the problem."

And when accidents happen, it helps to have skilled assistance. "Western had one of the best line crews I've ever worked with," Keys said of the New Year 2004 storm. "They came with the knowledge, equipment and dedication we needed to restore power to our customers."

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec049.htm

TOPICS from the POWER LINE

Software calculates energy savings for window replacement

Editor's note: The Energy Services Bulletin features real answers to real questions posed to our staff at the Energy Services Power Line. We hope you find it useful.

Question:

We are looking for a simple program to determine the energy savings potential of window replacements for a South Dakota customer. We would also like the program to determine simple payback in years when some values are plugged in. Can you help us find such a program?

Answer:

Power Line researchers were unable to locate simple software for comparing window retrofits for energy conservation. We found some programs that require a little reading and learning, but are relatively straightforward. They did not appear to determine simple payback, but that function may be buried in the programs.

The first program is called RESFEN, for residential fenestration. This residential window program calculates the energy and cost impacts between two different windows.

THERM is a more robust program that determines two-dimensional heat transfer through wall components. This program may require a bit more work.

WINDOW is an advanced modeling package that can provide the heat transfer through windows. Its purpose is more for education and for design and development of new window products.

All three programs are available from the Lawrence Berkeley National Laboratory Web site.

FRAMEplus, a sophisticated program from Enermodal Engineering, uses advanced heat transfer equations for determining the properties of building products. It will be able to determine the energy loss, but has many other functions you may not need.

The last program, PARASOL, is available from Lund University in Sweden. It is a simple program used to determine the effect of different shading scenarios for windows. However, it does determine the heating load for the window as well.

The Efficient Windows Collaborative is a great resource to help determine which type of window to select based on a specific region. You can do the comparison of different windows listed there and formulate some estimates on payback with the data.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec0411.htm

Energy Shorts

Webcast series

On the first Monday of every month through April, small- and medium-sized public power utilities can participate in a free webcast to learn how to expand the role of renewable resources in their energy supply portfolio.

The series is based on a new resource by the American Public Power Association's Demonstration of Energy-Efficient Developments Program entitled A Guidebook to Expand the Role of Renewables in an Energy Supply Portfolio. Sponsors include Western, the APPA DEED program, the U.S. Department of Energy Geo-Powering the West Program and the U.S. DOE Wind Powering America Program.

Each webcast will review a core chapter in the guidebook.

To register for the series, contact Debbie Rock, Western Area Power Administration, at 720-962-7271. Representatives from public power utilities will have priority over non-utility participants if more than 40 people register for any single webcast.

Bills contain incentives

The president signed off on two long-awaited bills that could stimulate renewable energy production.

The $140-billion corporate tax bill targets a wide array of businesses including gas producers, electricity providers that use renewable fuels, and alternative fuels companies.

The American Job Creation Act of 2004 includes the first major revision and expansion of the Section 45 Production tax credit since it was established in 1992. The new law makes new geothermal facilities as eligible for the credit.

Tax provisions in the bill also target the ethanol industry. Modifications to the Small Ethanol Producer Tax Credit allow cooperatives to fully participate in the program. A new tax credit for biodiesel is also in the law.

California solar energy bill

Governor Arnold Schwarzenegger signed AB 135, a bill that provides additional funding for photovoltaic system incentives in the state of California for the Emerging Renewable Resources Account.

Passed by the legislature at the end of August, the "stop-gap" bill gives the California Energy Commission permission to spend $60 million, to be collected between 2007 and 2012, for small solar system rebates.

Eligible technologies are photovoltaic, solar thermal electric, fuel cell technologies that use renewable fuels, 50-kW or smaller wind and other distributed renewable emerging technologies that meet the eligibility criteria established by the commission.

Western seeks Energy Services specialist

Western's Upper Great Plains regional office is announcing an opening for an Energy Services specialist position in Billings, Mont.

As regional central point of contact for UGP's overall Energy Services program, the position is responsible for planning, developing, coordinating and implementing the region's Energy Services activities. Duties include, but are not limited to:

- Monitoring customer integrated resource planning efforts to ensure compliance with Energy Policy Act of 1992.
- Analyzing, evaluating and recommending appropriate actions for approval of customer integrated resource plans.
- Participating in Western-wide efforts regarding Energy Services products and Energy Services core programs.
- Developing and facilitating workshops to fulfill customer requests for information on Energy Services products and issues.
- Providing assistance to UGPR customers on Energy Services program and related activities.

The salary range for this GS-12 position is $58,665 to $76,261. Western will accept applications for the Energy Services specialist at DOE's Jobs Online. Contact UGP Human Resource Specialist Nancy Goddard, 406-247-7418, with questions regarding this announcement.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec04es.htm

Technology Spotlight:

Replacing motor-generator sets for efficiency

This column features helpful information, innovative equipment, systems and applications utilities can use to save energy and improve service.

by Gil McCoy, P.E.

Motor-generator sets are used in many older industrial processes that require variable speed operation. Industries may want to calculate the energy savings potential of replacing an existing MG set that drives a direct current motor.

To accurately determine the total efficiency of the MG set, measure the input volts, amps and power factor to the alternate current motor and then compare this to the measured input kW or direct current power delivered to the DC motor terminals. The efficiency of an older MG set is generally between 72 and 81 percent.

Two energy-efficient alternatives offer significant energy savings. One is to replace the MG set with a solid-state DC motor drive (an electronic converter). The efficiency of a solid-state DC motor drive is 96 to 97 percent.

The other alternative is to replace the MG set with a new NEMA Premium efficiency AC induction motor controlled by a pulse-width modulated adjustable speed drive. An AC motor drive would have an expected efficiency of 97 percent.

Because older equipment is often significantly oversized, don't select a replacement for your DC motor based on an identical horsepower rating. Instead, measure the pressure and flow provided by the centrifugal equipment at maximum speed, then use the fan or pump curve to obtain actual motor power requirements.

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2004/december/dec04spot.htm

Calendar of events

Visit Western's regularly updated Energy Event Calendar for a complete list of seminars, workshops and conferences. **http://www.wapa.gov/es/pubs/esb/2004/december/dec04coe.htm**