

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

Colorado utilities come together to discuss energy efficiency

Gas or electric, investor or public, all utilities share concerns about energy costs, growing demand, and increasingly, about sustainability. It makes sense that the power providers in one region might benefit from coordinating efforts to address those issues.

That is the idea behind the first Colorado Utility Efficiency Exchange, held in Aspen, Colo., Oct. 24-27. The City of Aspen Utilities and Holy Cross Energy cosponsored the event at the Aspen Meadows Resort. Dave Munk, a program manager for Resource Action Programs and a member of the meeting advisory committee, came up with the name for the CUEexchange. "CUE is the content," he said. "The focus is not on energy alone—the emphasis is on efficiency—and exchange is the process."

Consumer programs

"The great thing about the CUEexchange is that no single organization is running it," Western

Energy Services Manager Ron Horstman. "Usually, natural gas providers and electric utilities go to their own separate meetings. Both sides wind up duplicating efforts and miss the chance to create stronger programs by teaming up."

Western and several Western customers were among the 20 industry organizations that made up the CUEexchange advisory committee. Fort Collins Utilities, La Plata Electric Cooperative, Longmont City Utilities, Platte River Power Authority and TriState Generation and Transmission Association all contributed to the agenda.

The three-day meeting brought together mid-level staff from utilities, equipment and service vendors and state and local government to discuss ways to integrate carbon footprint management and demand response into energy efficiency and renewable energy programs. "It's time for Colorado utilities to get on the same page when it comes to energy efficiency and demand-side management," said Jeff Rice, Aspen Utilities efficiency manager and another member of the advisory committee.

Rice got the idea for some kind of exchange forum when he launched the city utility's first energy efficiency programs for consumers. "Right away, people



CUEexchange sponsors received a stretch fabric "billboard" display that did not require special shipping or set-up, and freed them to mingle with conference attendees. (Photo by The Hughes Group)

outside our service territory started calling and asking what kinds of efficiency programs were available to them," he recalled.

That's when Rice realized that state utilities were all doing something different, and some had no energy-efficiency programs at all. "I thought it would be great if we could coordinate our efforts so that consumers all across the state had the energy-efficiency programs they were looking for," he said.

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Format invites sharing

The agenda reflected the spirit of exchange, with almost half of the more than 90 attendees serving as presenters. “The goal of the structure was to turn attendees into participants,” said Munk. “The one-way meeting is all too common. We wanted this to be more interactive.”

Each session started with “utility snapshots,” during which co-chairs invited a few attendees to talk briefly about experiences their utilities had with the session theme. Those who didn’t make presentations had the chance to select topics for breakfast discussions by posting suggestions on a message board. At breakfast the following morning, each table had a tent card on it with one of the chosen topics. People picked the topic that interested them the most and joined other attendees for a discussion.

Attendees were able to ask questions at the end of each presentation, and to mingle with speakers and sponsors during breaks and receptions. The environmentally-friendly displays, developed by The

Hughes Group, freed sponsors from manning large booths and passing out brochures that often wind up in the dumpster. Each sponsor had a fabric billboard set up around the conference center. Brochures and handouts, as well as presentations, were posted online where attendees could read them and print them only if necessary. Attendees had no doubt who helped to make the CUEexchange happen, sponsors had the chance to circulate and a minimum amount of energy was used to create the “virtual exhibit hall.”

Western customers attend

The CUEexchange opened with two pre-conference workshops, Improving Your Utility’s Web site and Colorado Statewide CFL Program Initiative. About 20 people attended the latter, a discussion about proposals to create a seamless, coordinated effort for the popular compact fluorescent lighting programs. Adam Perry, Energy Services manager for Platte River, presented the workshop. Like Rice, he observed that utility programs ranged from just an idea to very successful. “Coordinating the message and program management would simplify things for the consumer,” he said.

Energy efficiency was the theme for the opening session of the CUEexchange. Perry represented for both Platter River and Fort Collins Utilities, talking about each power provider’s outreach efforts and incentives. Stephen Casey of Holy Cross summarized the mountain utility’s programs to address renewable generation, energy conservation and efficiency and green pricing programs. Promoting

Energy Efficiency Without Rebates was a session highlight showing attendees how Eastern Illini Electric Cooperative built a successful energy efficiency program on the philosophy, “Educate, don’t rebate.”

Western customers jumped into the interactive fray on Day Two when carbon reduction was the morning’s theme and demand response was covered in the afternoon. Calla Ostrander talked about the Aspen Canary Initiative, the city’s strategy to reduce greenhouse gas emissions during Utility Snapshots. Rice moderated a panel discussion on Colorado green building initiatives.

Calling upon his utility and consulting experience, Horstman filled in for a cancelled moderator and co-chaired the load control discussion in the afternoon. “The attendees who participated in Utility Snapshots and gave last-minute presentations really made the most of the free-form format,” said conference organizer Ed Thomas of Market Development Group.

East River Electric Cooperative gave attendees the benefit of Two Decades of Load Control Experience. Tom Holt explained how the power wholesaler worked with its members to implement system-wide load control, stabilizing bulk power costs during a downturn in the economy. Successful load management leads to further challenges, Holt noted, such as balancing customer acceptance with utility cost savings.

Collaboration continues

The CUEexchange closed on a high note, starting with what Horstman

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Energy Services Bulletin

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Editor: Kevon Storie
Designer: Grant Kuhn

Aspen, Colo., lights up efficiently for holidays

Since LED holiday decorations first appeared on the market in 2001, homeowners have snapped them up, attracted by the technology's energy-efficiency, longer life and sturdier construction—the same reasons the city of Aspen, Colo., switched from conventional holiday lighting.

Winter is the world-famous ski resort's high season, so the city dresses up for visitors. From Thanksgiving until early spring, the tree trunks and streetlight poles in downtown Aspen, City Hall and the Parks office are decked out in lights. "We think of them as winter lights, rather than Christmas lights," explained Parks Operations Superintendent Tom Rubel.

In all, that amounted to about seven miles of C-7 and twinkle lights burning 18 hours daily for 100 days. City Utility Director Phil Overeynder estimated that the display used 34.44 kilowatts per season at a cost of \$4,339.

Big electricity savings

Tom Rubel doesn't remember who first came up with the idea of replacing the city decorations, but he does recall that it wasn't hard to persuade the city council. The parks department easily got approval to invest \$35,000 in new LED decorations for the 2006 holiday season. Rubel purchased the lights online from Diogen, a lighting manufacturer in Centennial, Colo., instead of trying to find a local supplier with enough stock.

In addition to buying energy-efficient lights, the city also put daylight sensors on the light strings on the trees. "That cut down the number of hours the lights were on from 18 to



The Aspen Parks Department decked the trees on the Downtown Mall with energy-efficient LED lights for the first time in 2006. (Photo by Karen Keeney, Aspen Parks Department)

12," said Rubel. "Some strings used to stay on all the time. The sensors were an important part of the savings."

The new decorations and sensor system proved to be good investments from the start. Overeynder calculated the savings based on Aspen's residential retail electric rate.

■ Old system:

$287a \times 120v = 34.44$ kilowatts
 $34.44 \text{ kW} \times 18 \text{ hrs/day} \times 100$
days/season = 61,992 kwh/season;
 $61,992 \text{ kWh} \times \$0.07/\text{kwh} =$
\$4,339/season

■ New system:

$28.7a \times 120 v = 3.44$ kilowatts;
 $3.44 \text{ kW} \times 12 \text{ hrs/day} \times 100$ days/
season = 4128 kWh/season;
 $4128 \text{ kWh} \times \$0.07/\text{kWh} =$
\$289/season

■ Savings: 57,864 kWh/season; \$4,050/season

The actual cost savings may be less, since the city buys wholesale electric power, but the reduction in electricity use is no less impressive. The LED decorations will have about a three-

year payback, followed by years of cost savings.

Reduced maintenance

The case for the energy-efficient alternative could have made itself on electricity costs alone, but there were greater advantages from the parks department's point of view. "The old glass bulb display required tons of maintenance at a cost of about \$8,000 per year," said Rubel.

Parks workers used to spend much of the season replacing burnt-out bulbs and C-7 bulbs that vandals pull out. In the case of the twinkle-lights, they often replaced entire strings rather than do a time-consuming search for the bad light. "The department's work load has grown in recent years," explained Rubel. "If it wasn't a quick fix, we just threw out the string. We were lucky to get two years out of a twinkle lights set."

By comparison, LED lights are nearly indestructible, a definite plus

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for public decorations. Rubel observed that the decorations get a lot of wear and tear, so the strings may not last the advertised 15 to 20 years. "It's likely to be closer to 10 years, but we will still be way ahead of the game. This year was so much nicer in terms of maintenance," he added.

Displays still festive

Residents and visitors have offered mostly positive feedback on the new decorations. The city decorates its buildings with colored lights, wraps light poles with soft white lights and tree trunks with bright white lights. "A few people said the bright whites are a little too bright, but otherwise, nobody complained about the change," said Rubel.

The Sardy House, a historic bed-and-breakfast near downtown Aspen, even one-upped the city in switching to LED decorations. "The owners put the display on a programmable computer system that changes colors as you watch," said Aspen Utilities Efficiency Manager Jeff Rice. "It looks great, and people love walking by the place."

Aspen utilities is currently working on a proposal for an LED holiday light program to get customers to adopt energy-efficient decorations. But as the Sardy House demonstrated, "This is a very progressive—and competitive—area," Rice said. "We expect to see quite a few residences, as well as businesses and resorts, using LED's this year."

That's one Christmas decorating competition that everyone should consider joining. The Department

of Energy estimates that if we all replaced our traditional incandescent decorations with LED-base lights, the nation could save more than 2 billion kW in a 30-day period around the holidays each year. That is enough electricity to light 200,000 houses for a year on energy savings alone.

To learn more about efficient holiday lighting options, see the 2007 Holiday Lighting fact sheet. Western customers can download the latest edition of this popular publication and imprint it with their logo and contact information. Or Energy Services can lay out the customized fact sheet and provide a pdf file. Contact the Energy Services Bulletin editor for more information—and have an energy-efficient and happy holiday. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2007/dec/dec072.htm

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described as a free-for-all breakfast discussion. "Integrating Renewables into Your Supply Portfolio' turned into more of a 'friend-raising.' The real meaningful exchange that initiates programs and projects will happen after the conference," he pointed out.

Georg Shultz of USDA Rural Development gave the final

keynote presentation on Promoting Renewable Energy Generation in Rural Communities. He urged attendees to use the program to help rural customers implement efficiency measures.

Rocky Mountain Regional Energy Services Representative Linda Swails believes that the attendees, many of whom operate in her region, will take Shultz's advice, and more, away from the CUEexchange. "It was great to see people so excited about energy efficiency," she said. "Utilities

in all parts of the country can benefit from meeting and sharing ideas in an interactive format like this."

Horstman added that one utility's experience can become another's successful program. Contact your Energy Services Representative for more information about peer matching resources. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2007/dec/dec071.htm

USDA Rural Development funds energy efficiency

In rural communities, energy efficiency can bridge the gaps between struggle, survival and success, and USDA Rural Development is working to develop financial products to fill those gaps. That was Georg Shultz's message to utility representatives at the Colorado Utility Efficiency Exchange.

Echoing the theme that ran throughout the meeting, the Rural Development Electric Staff Division director urged utilities to work together to change the way consumers use energy. "And Rural Development can help with funding for programs that can eventually transform the markets," said Shultz.

Rural Development supports essential public services and facilities and economic development in rural America with program loans, loan guarantees and grants. Program areas focus on housing and communities, business and cooperative services and utilities.

The Electric Program of Rural Development's Utilities program provides loans and loan guarantees for building electric distribution, transmission and generation facilities. Funding is also available for electric system upgrades in rural areas, demand-side management, energy conservation programs and on- and off-grid renewable energy systems.

"Think of Rural Development as a credit agency that can finance a whole range of options—programs to support entrepreneurs, business opportunity grants, background infrastructure projects," said Shultz.

Utilities drive change

Electric utilities are in a key position to encourage consumers

to become more energy-conscious, Shultz explained, pointing to compact fluorescent lighting promotions. The efficient light bulbs require a relatively small investment, are easy to install and reduce the customer's electric bill. CFLs also help the utility to avoid higher capacity costs associated with conventional lighting.

Greater gains can come from replacing big energy-users with equipment like high-efficiency appliances and geothermal heat pumps, but the systems can cost twice as much as their conventional counterparts. "Cash flow is the big issue for consumers," Shultz said. "That's especially true in rural areas where homeowners, small businesses and growers often have less access to financing for energy-efficiency improvements." Programs offering customers long-term financing or co-op ownership of the equipment can ease consumer resistance to high first costs. Utilities already have the relationship with their customers and the technical skills and tools, said Shultz. With funding from Rural Development, power providers have all they need to build acceptance and commercialization of energy-efficient technology. "Many pioneers among electric co-ops are ready to implement such programs right now," he added.

Rural Development is currently investigating a program to offer long-term loans to utility customers installing geothermal heat pumps. "With the 30-year loans, utility customers are going to see the savings immediately," he stated. "Consumers aren't going to buy a product unless it saves them money."

The long-term loans would be a good investment for Rural

Development, too. Space heating and cooling constitute 50 percent of rural utilities' residential loads. Widespread adoption of super-efficient systems could postpone or even displace the need for Rural Development to fund new generation.

Efficiency gets grants

Utilities are keenly aware of the need to meet growing demand in the face of stricter environmental regulations. Yet power providers often overlook Rural Development as a resource when planning energy efficiency and renewable energy projects. That is likely because, until recently, utilities didn't need as much funding for load modification programs. "They were otherwise occupied with building systems and delivering electricity—just sticking to business," Shultz conjectured. "Now the industry is in a transition period, and energy efficiency is the new business model."

Projects in states that have an active culture of supporting energy efficiency and renewable energy have had a distinct advantage in getting Rural Development grants. Some states, like Iowa and Minnesota, passed legislation that drove utilities to become more familiar with funding sources for conservation programs. "The legislative route is easier on the applicant and the utility," Shultz admitted. "The application process is bound to go more smoothly when the permitting office is already familiar with the technologies."

On the other hand, Nebraska, a state that had a high number of Rural Development awards for 2007, owes its success to a government/business

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

Biofuels can be derived from almost any type of “biomass,” a broad term encompassing living or recently alive biological material. Because biomass is produced on a short time scale, it is considered a renewable resource.

How are biofuels used?

Biofuels are already used to supply a small fraction of our energy needs, with significant opportunities to expand their use as infrastructure is developed. In addition to ethanol and biodiesel for transportation, biofuels are currently used for power production, heating and cooling of buildings and the thermal needs of industry.

Biomass is today the largest non-hydroelectric renewable source for electricity in the U.S. Most of this is produced in pulp and paper mills, which often generate electricity by burning wood chips, bark or the sludges and “liquors” that are byproducts of the paper-making process. At the same time, they recover waste heat from electricity generation to meet the thermal needs of the mill. This highly efficient combination is referred to as combined heat and power (CHP) or cogeneration. The electricity generated may be used onsite and/or supplied to the local utility for distribution to the public.

Biofuel production

Issues concerning the use of biofuels include the ratio of a fuel’s energy content to the energy input required to produce and deliver the fuel, competition with food production, the cost of collecting feedstocks, infrastructure development, land and water use, diversion of biomass out of ecological systems, climate change and the sheer magnitude of our current energy consumption. Also, non-energy uses of biomass may be more cost effective, less energy intensive overall, more environmentally benign or more needed than the production of biofuels. Examples of non-energy biomass products include food, animal feeds, clothing, “bio-plastics,” and recycled paper.

Crops and wastes

Biofuel crops include corn, soy, sugar cane and palm, as well as non-food crops such as algae, grasses and trees. The energy and land area required to produce and deliver crop-based biofuels varies dramatically. For example, ethanol produced from corn has been estimated to reduce global warming emissions on average by only about 15 percent compared to petroleum-based fuels (considering the complete carbon cycle and energy inputs in production and transportation).

In comparison, ethanol produced from cellulosic materials, such as woods, grasses, straw, leaves and stocks can reduce these emissions

by 90 percent or more. Of course, how much (if any) is avoided in any particular case depends on how the feedstock and biofuel are produced and transported. Regarding land use, it has been estimated that growing algae as a biofuel feedstock requires only about 2 percent of the land area needed to produce soybean oil for biodiesel.

The waste produced by our cities, farms and industries represents a vast energy resource that, if tapped, could avert much of the need for energy crops. Waste—or “co-product”—streams include:

- Food and beverage processing waste such as trimmings, peelings, husks and floor waste; wastewater rich in fruit or vegetable biosolids; broken eggs; cheese whey and spoiled milk products; waste vegetable oil; the oily wastewater sludge from meat and fish processing; spoiled and off-spec beer, syrup and juices.
- Agricultural wastes such as animal manures; the stalks, chaff and “stover” (dried husks and leaves) from field crops; weather-damaged crops.
- Forest products industry wastes such as residue from logging, lumber milling and furniture manufacturing; and sludges and liquors from paper manufacturing.
- Municipal and urban wastes such as sewage, construction and demolition debris, landscaping

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debris, landfill gas and solid waste; and leftover food from restaurants, supermarkets, schools and hospitals.

- Other industrial wastes such as glycerol from biodiesel production. A major hurdle in taking advantage of wastes is the cost of collection. Often an individual facility does not produce enough waste to make it cost effective to use for its own thermal or electrical needs, or for producing biofuels for market.

Transportation costs to collect wastes on a community or regional level may be too high for a cost-effective project in today's energy market. On the other hand, productively using wastes often reduces the financial or environmental costs of disposal.

Summary of biofuels

Ethanol, currently used as a gasoline additive, is produced by fermentation and distillation. Cellulosic materials must also be delignified prior to fermentation. The lignin may be used to fuel the energy intensive distillation process, increasing the net energy output of cellulosic materials.

Recent advances—such as combining fermentation with evaporation to eliminate distillation, and converting syngas (see below) to ethanol by an alternative process—improve efficiency and show promise to improve cost effectiveness.

Biodiesel is derived from the oils of wastes and crops such as canola, soy, sunflower seed, mustard, safflower and some types of algae.

Biodiesel is usually winterized to reduce the temperature at which it congeals in cold weather, typically by blending it with petro-diesel.

Other ways of winterizing include using additives and de-esterification. Glycerol is a waste generated from the production of biodiesel that may be used as a feedstock in producing ethanol and biogas.

Syngas (a.k.a. wood gas or producer gas) refers to a synthetic gas largely containing carbon monoxide and hydrogen. Syngas may be produced from almost any carbon-containing materials, such as wood, stalks, grasses, vegetable oils and food wastes, but also plastics, rubber and coal. Syngas may be burned in engines, turbines and boilers to generate electricity, process heat and steam. Its bio-hydrogen may also be separated for use in fuel cell or internal combustion vehicles.

Burning syngas derived from wood is more energy efficient overall than either wood-based ethanol production by fermentation or incinerating wood in wood-fired boilers. Gasification plants are now considered commercially feasible and may be cost effective even on a relatively small scale. Production of syngas results in marketable byproducts, such as pure carbon.

Biogas usually refers to methane-rich gas (55 to 60 percent methane) produced from biomass (although the term biogas is sometimes applied to syngas.) Biogas is most commonly produced in anaerobic digesters from agricultural and food wastes and from the wastewater of municipal and industrial facilities. Biogas may be burned onsite or in a nearby

industrial facility to offset natural gas use, after removing (or “scrubbing”) corrosive components.

While serving thermal needs on-site is most efficient, biogas may also be scrubbed to produce pipeline-quality natural gas, burned in turbines to generate electricity, and used in fuel cell vehicles or in commercially-available natural gas-fueled vehicles.

Solid Biofuel, or “hog fuel,” is wood waste that is ground into wood chips. Sources include logging residue, forest thinnings, lumber milling, furniture making and construction debris. Just as with coal, hog fuel may be incinerated in solid-fuel boilers or gasified.

More information

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Visit www.wapa.gov/es/pubs/esb/2007/dec/dec074.htm

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partnership model. Nebraska Public Power District teamed up with growers to attack a single problem, high energy use for irrigation. “They were able to create a reproducible business model for grant seekers,” Shultz explained. “It took a visionary pioneer on the business side to make the partnership work.”

Talk to local office

Utilities don't have to wait for legislation or a powerful advocate to get funding for their own programs and customer projects. The first

step, said Shultz, is to call the state Rural Development office. To make his point, he asked attendees at the CUEexchange how many knew the name of the Colorado State Director for Rural Development—only a few raised their hands (*Answer: Michael Bennett*).

Member services and energy services representatives should develop an understanding of the application process, Shultz advises. “Learn about different funding options and program requirements, because customers may not realize their improvement is eligible for a loan or a grant.”

Rural Development may be able to finance creative answers to rural communities' energy needs, but utilities have the technical expertise to deliver new energy options. In the very near future, that will simply be one of the services utilities are expected to provide. Energy prices keep going up, and consumers are looking to their utilities to help them control costs. “So even if climate change and carbon reduction weren't issues,” Shultz acknowledged, “energy efficiency is inevitable.” ⚡

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- Improve economic growth and vitality
- Reduce costs and increase productivity

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