

Energy Services **BULLETIN**

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

Solar gardens sell out in Southern Colorado

Delta-Montrose Energy Association (DMEA) announced on Earth Day that its members had fully leased the capacity of its two 10,000-watt community solar arrays.

A total of 84 cooperative members joined the local power partnership, leasing portions of the arrays in \$10 increments. More than half of the participants invested in the \$10 to \$100 range, 17 leases were up to \$500 in value, and 11 were above \$1,000. In sum, co-op members invested \$75,000 to receive the benefits of solar-generated electricity without having to install panels on their own homes or businesses.

"We are excited by the members' enthusiastic response to this program," said Jim Heneghan, DMEA's renewable energy engineer and the Community Solar Array manager. "Local power production can help recharge our economy."

Within everyone's reach

Community solar arrays are a clever solution to the familiar



COMMUNITY SOLAR ARRAY

DMEA members support the Local Power Partnership by leasing portions of the Community Solar Arrays. The program's purpose is to keep local energy dollars in the community. (Photo by Delta-Montrose Energy Association)

barriers to installing solar panels. Consumers living in rental properties, homeowners who don't have good solar exposure or who are put off by system maintenance and repair are able to support solar power through solar "gardens." If members move within DMEA's territory, the monthly solar credit on their electric bill goes with them.

United Power in Brighton, Colo., and St. George, Utah, were early pioneers of the concept. "Our big innovation was to fractionalize the ownership so that it is affordable for everyone," said DMEA Public Relations Supervisor Tom Polikalas. "Reaching that affordability was really important to the general manager, staff and board of directors."

Members can lease a portion of the two 10-kilowatt photovoltaic solar electric arrays for as little as a one-time

\$10 payment. On their monthly bills, they receive a credit for the electricity their portion of the array produces for the 25-year term of the lease.

Each \$10 block leased provides the subscriber with 2.67 watts of capacity in the array, or an estimated annual bill credit of about \$ 0.50. DMEA's engineering staff calculated the arrays' production based on a \$10 lease representing 2.67 watts of generating capacity:

$$(2.67 \text{ watts}) \times (6 \text{ hours sun/day}) \times (365 \text{ days/year}) = 5,847 \text{ watt-hours per year}$$

$$(5,847 \text{ watt-hours/year}) \times (1 \text{ kilowatt}/1000 \text{ watts}) = 5.847 \text{ kilowatt-hours/year}$$

$$(5.8 \text{ kwh/year}) \times \$0.09703/\text{kwh} = \$0.56 \text{ credit /year}$$

"The 50-cent credit is an estimate, but the actual credit might be a little higher. DMEA doesn't guarantee a specific return," said Polikalas. "It will

See SOLAR GARDENS, page 2

What's inside

Energy Scene Investigator 3

Free transmission workshop 5

Technology Spotlight..... 6

Website of the month 7

Solar gardens

from page 1

be interesting to see how the credit averages over the year.”

Benefits for consumers

Since the price of energy generally moves in only one direction—up—the value of the solar array shares will likely increase as well. “It’s a nice hedge against inflation,” Polikalas added.

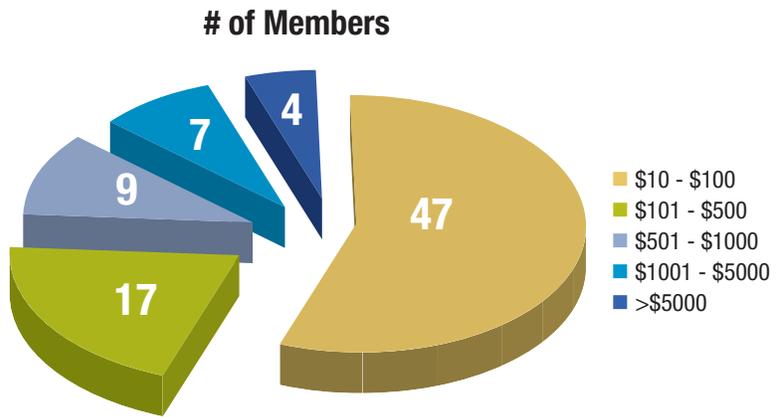
Ground mounted solar panels with a green and yellow logo for Local Power Partnership

While leases start at just \$10, members can lease as much capacity as they’d like whether that’s \$10 worth or \$10,000 worth. Polikalas noted several examples of leases at different levels: \$100 invested by Bright Beginnings, a private school in Montrose that will use its portion of the array for educational purposes; a \$500 investment by Buckhorn Geotech, a local e-engineering firm that wanted to support renewable energy development. Two other individual members invested more than \$10,000!

Community Solar Array

Member Participation

84 Total Members Participated



(Artwork by Delta-Montrose Energy Association)

“Further up the road, I think DMEA would like to do a study to learn more about why members participate,” he said. “Right now, we can really just speculate about the different motivations.”

Local generation

The cooperative is very clear on its own reasons for developing renewable energy. The solar arrays are the first project of DMEA’s Local Power Partnership. The program aims to harness the abundant renewable energy resources of Colorado’s Western Slope, while keeping energy dollars within the community.

A local company built the arrays, which cost about \$92,000 and brought a grant from the Colorado Governor’s Energy Office to the community. DMEA’s board recently voted to fund the construction of two more 10,000-watt arrays, and expects to issue a request for proposals this summer. Ideally, the project will result in more work for local contractors.

DMEA’s South Canal project offers the potential for even greater

economic development, along with 6 MW of low-impact hydropower. The plan is to harness the power of water moving through a central channel of the irrigation network that serves the Uncompahgre Valley. This locally-developed, run-of-river facility would bring roughly \$20 million in construction work to DMEA’s territory and serve about 5 percent of its load with renewable energy.

While the Community Solar Arrays and the South Canal are the co-op’s biggest renewable projects, Polikalas noted that DMEA is also looking at biomass opportunities in the area. “If you look at the logo for our Local Power Partnership program, you’ll see that it is not uniquely solar,” he said. “The Community Solar Arrays have been a great starting point for building our own local new energy economy.”

DMEA continues to seek and evaluate other renewable energy development opportunities to benefit co-op members and the local community. ⚡

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

Want to know more?
Visit www.wapa.gov/es/pubs/esb/2011/jun/jun111.htm

Energy Scene Investigator poster project has program potential

The poster session at the annual Utility Energy Forum (UEF) gives the Energy Services team an opportunity to get creative, and this year, we came up with a real gem—Energy Scene Investigator.

The idea started, as it often does, with Brady Fronk, a remarkable young man blessed with scientific curiosity and a mother, Paula, who is the Energy Services representative for the Colorado River Storage Project. Brady, who lives in a Salt Lake City condominium complex, was interested in learning how to do a simple energy audit and making some of the easy changes that can help lower energy bills and make a home more comfortable. “I was looking for a science project that would also help out my neighbors,” he explained.

Different kind of outreach

We—Energy Services Manager Ron Horstman, Equipment Loan Manager Gary Hoffmann and me, Energy Services Bulletin Editor Kevon Storie—quickly realized that such a project had implications far beyond switching a few light bulbs. It could teach ‘tweens and teens about energy conservation while helping a community’s low-income and senior consumers. From a utility’s point of view, the project offers a new way to learn from consumers themselves about their energy use habits.

Drafty houses and inefficient appliances and systems rob “victims”—homeowners—of tens, or even hundreds of dollars annually. Utilities could show customers easy steps to stop these energy crimes—if customers reported them. Unfortunately, many consumers assume that high energy rates are the culprit and,

worse yet, quietly blame their power provider, causing the customer-utility relationship to suffer.

Enter the Energy Scene Investigator (ESI), an ordinary citizen, trained and deputized to ask homeowners the right questions and collect evidence needed to identify the perpetrators, wrap the house up tight and restore order to the family budget. The investigator could be one young person on a mission, like Brady, or a youth group or science class. Even adults in search of a community service project can wear the badge. One of the benefits of a community energy services program is that it educates the helper as well as the help-ee.

Training investigators

An energy services professional could teach the ESI to do a simple walk-through audit in a few hours. Brady’s training took less time, since he already lives with an energy services professional, has attended past UEFs and has been our guinea pig—er, field tester—on other projects. The Energy Services team came up with a list of questions for the ESI to ask the “victim,” based on energy-saving tips and do-it-yourself online energy audits.

We also supplied Brady with an inexpensive toolkit. The most important tool is the notebook and pen for recording the interview and making notes about the home. The ESI can check the water temperature coming from faucets with a meat thermometer and put a few drops of food coloring in the toilet tank to trace leaks. Brady brought along a camera to take pictures of places in the house where air leakage was likely to occur. If the program manager wants this information, the ESI must



Brady Fronk became an ESI to help neighbors save on their energy bills. (Photo by Paula Fronk)

ask the homeowner’s permission first.

Another optional, but very instructive, tool is a power meter for measuring plug-in loads. “Vampire loads,” appliances which draw power even when turned off, represent a growing portion of residential electric bills. Brady, who learned how to use a Watts Up power meter for the fact sheet, *Video Games: Energy Heist*, measured the power drawn by his neighbors’ TVs, microwave ovens and computers. He recorded his findings on a form Ron uses when he performs a full-home energy audit. For liability reasons, it may not be practical to let students do this kind of testing during an audit, but they should learn about vampire loads so they can explain them to homeowners. Also, demonstrating a power meter in training may encourage ESIs to buy one of their own and test vampire loads at home.

Safety is a critical part of training, especially since ESIs may get carried away by their curiosity. Make it clear that investigators can only check things they can reach by walking through a door, standing up straight. That rules out climbing ladders, moving furniture, entering attic and

See ENERGY SCENE INVESTIGATOR, page 4

Energy scene investigator *from page 3*

under-floor crawl spaces, going up on roofs and crawling behind large appliances. Cupboards or closets should only be opened with the homeowner's permission. Even so, both the ESI and the consumer will be surprised at how much can be learned about energy use just by looking at what is in plain sight.

The investigation

Brady interviewed three neighbors in their homes and performed a walk-through inspection with them. ESI training should stress that the interview is the most important part of the audit. Homeowners often don't realize how much little things add up until someone asks about them. Here is a sampling of the questions Brady asked:

1. How old is the home?
2. How comfortable are you in the house? Does the house get really hot or cold, depending on the season?
3. Do you turn the thermostat down at night? When you leave the house?
4. How old is the furnace? The water heater? The appliances?
5. When was the last time your furnace filter was changed?
6. Do you have central air conditioning? AC wall unit?
7. How often do you use your appliances?

Member services representatives will undoubtedly think of other questions, the answers to which would be extremely valuable for determining customer needs.

The inspection is an opportunity to make homeowners aware of the many ways energy escapes from the home. Brady looked for gaps around plumbing, ducts, windows and doors and

along baseboards, and rattled windows to see if they were loose. In this case, the heating ducts were under the houses in an unconditioned crawl space. If the duct work is in an accessible basement, the investigator may check to see if it is sealed and insulated.

The usual suspects

Brady's findings were typical of most energy audits, a mixture of energy thieves we classified as petty offenders, misdemeanors and felons.

The petty offenses are those that the ESI or homeowner can apprehend by changing a few habits. One home had compact fluorescent (CFLs) bulbs in only two of 10 light fixtures. The furnace filters in two homes were overdue for replacing, and one homeowner admitted to leaving the thermostat set at 70 degrees all the time. In one home where Brady was safely able to see behind the refrigerator, he noticed that the coils were very dusty.

Misdemeanors take a little more skill and work to catch, but homeowners may still be able to "take the law into their own hands." Brady found gaps around windows, baseboards and cabinets, along with some leaky duct ingresses and loose doors. In these cases, caulking and weather stripping can quickly rehabilitate the building envelope for a very small investment.

Felonies are the "Mr. Bigs" of the energy underworld—problems like the single-pane windows or the 35-year-old HVAC system Brady found during his investigations. Homeowners need experts and resources to put an end to these crimes.



At the poster session at the Utility Energy Forum, ESI Brady presents the results of his investigation of the crimes of high energy bills and assault on the homeowner by an uncomfortable house.

Epilogue

Working on his own, Brady is installing CFLs and seals around electric outlets and light switches, caulking around windows and sharing information with homeowners about simple steps to save energy.

Had he been a part of a utility-sponsored ESI program, he could have offered homeowners information about utility programs that could help them with the "felonies." And the utility could have learned more about the type of assistance their customers need.

Attendees at the Forum agreed that it was a shame that the Fronks' utility wasn't going to get the benefit of so much great information and good will. The idea of enlisting young people to train as investigators was particularly appealing to public power utilities. "It was really great to see so much interest from utilities in working with kids, because there is so much we can learn about energy use," Brady said. "And there is so much we can do for our communities," he added. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2011/jun/jun12.htm

Free workshop covers Rocky Mountain transmission activities

Whether your needs include load growth, renewable energy development or demand response, transmission will play part in your organization's future plans. Learn about Western's plans to meet transmission challenges in the Rocky Mountain area at a free workshop June 21, in Fort Collins, Colo.

DOE's Wind Technologies Program and Cenergy, the commercialization arm of Colorado State University's Clean Energy Supercluster, are cosponsoring Meeting Transmission Challenges in the Rocky Mountain Region. Western is urging its regional customers, electric utilities, tribes, generation and transmission developers, state and Federal agencies and community leaders to come to the event at the Rocky Mountain Innosphere. Participants will get updates on state and Federal transmission activities that will help them to set their own goals and plan projects.

Goal: Outreach

The workshop is similar to one Western held in Phoenix last year, Opening Transmission Constraints for Solar Development Locally and in the West. However, the agenda will not be focused specifically on renewable energy, said Bob Langenberger, Energy Services representative for Western's Rocky Mountain Region (RM). "We want to give attendees more of an overview of Western's policies and projects in RM," he said. "Our goal is to reach beyond the core group of

stakeholders who tend to keep up on transmission issues."

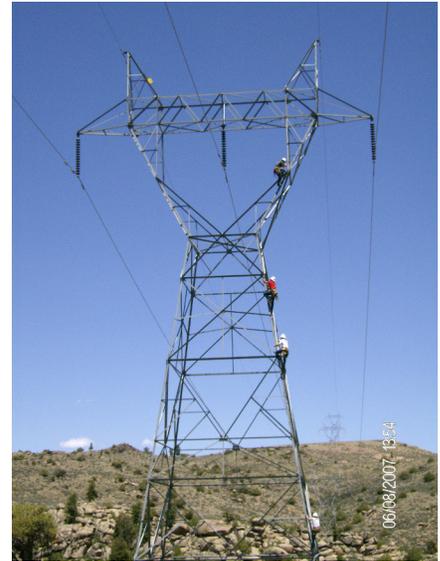
The agenda offers something both for individuals who may not be familiar with Western's transmission policies and for those who are already pursuing projects that need transmission. Members of our Transmission Planning Management Team will talk about Western's 10-year construction plan, describe our ancillary services and explain the process for requesting interconnection. Craig Knoell, manager of the Transmission Infrastructure Program (TIP), will brief participants on TIP activities as they relate to the region.

Each state in RM's territory has its own resource mix, goals and challenges. Representatives from the Colorado Governor's Energy Office, the New Mexico Renewable Energy Transmission Authority and the Wyoming Infrastructure Authority will give updates on projects in their states.

Jeff Hein, of the National Renewable Energy Laboratory, will offer a look at the broader picture with presentations on better use of the transmission system and corridors, and on Western Renewable Energy Zones. Participants will have the chance to voice their concerns during expert roundtable discussions at the end of the day.

For FERC, customers

Western is presenting the transmission workshop free of charge to encourage all stakeholders to attend. The Federal Energy



Western linemen climb a tower on the Curranti-Poncha line, a 230-kv transmission line that passes through western Colorado. A free workshop at Western's Rocky Mountain regional office will look at transmission challenges in the area.

Regulatory Commission's Order No. 890 to prevent undue discrimination or preference in transmission service requires regular communication on transmission system planning and use. But more importantly, "It's an opportunity for our customers to become more engaged in a central aspect of Western's operations," said Langenberger. "We are really looking forward to meeting everyone, hearing about their concerns and answering their questions."

Although Meeting Transmission Challenges in the Rocky Mountain Region is free, registration is required. Register online by June 17 or get more information by calling Bob Langenberger at 970-461-7481. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2011/jun/jun113.htm

Are radiant barrier window coverings energy-efficient?

Window coverings such as drapes, blinds, films, shades, shutters and storm windows can reduce heat loss from a building in the winter and reduce heat gain in the summer. The potential energy savings that may result from using window coverings vary based on the type of window covering, the building's location, how much it costs to heat or cool the building, the types and placement of windows and what they are made of.

No standard

Currently, no standard for measuring and testing the effectiveness of window coverings has been set. However, we can estimate the effectiveness of a window covering in reducing heat loss and heat gain by taking standard measurements in various conditions. Here, we evaluate the overall effectiveness of an interior window covering known as a radiant barrier insulating panel, or window insulator.

This radiant barrier is made of a clear polyester sheet that is installed tightly on a lightweight steel frame on the inside of a window. The covering has a perforated aluminized reflective surface laminated to one side and a perforated black surface laminated to the other side. The principle behind this design addresses the problems of heat gain in summer and heat loss in winter. When the reflective surface is turned out in summer, heat and light are reflected back out before they can warm up the building's

interior, which helps the building stay cooler. When the black surface is turned out in winter, it allows more heat in, which helps to warm the building's interior.

The radiant barrier window insulator we examined is very similar to an interior storm window with a transparent polycarbonate or glass material in a rigid frame installed on the inside of a window. The biggest difference between the radiant barrier and most interior storm windows is that the barrier has a silver surface on one side and a dark surface on the other, and the colored surfaces are perforated. Also, an interior storm window generally has a more traditional air seal at the frame while this type of radiant barrier uses a magnetic strip to attach to the window frame, which does not produce a seal that is as tight as the storm window.

Good for some applications

There are some good reasons to consider installing radiant barrier insulating panels:

- The idea is sound. The product is much like the reflector shades people use in cars to prevent heat build-up and provide privacy. While much of the visible light is reflected back out of the car, enough visible light comes through that you can still see out of the window, although it is darker. From the inside, the effect is much like looking through tinted glass.
- This type of radiant barrier has the most potential benefit in climates where you want to

reduce solar gain year-round and are seldom, if ever, in heating mode. However, you can reverse the panels, turning the black surface out to retain the insulation value of the screen and allow solar heat gain during the heating season.

- The radiant barrier functions as an interior additional layer of glazing no matter which side faces out, adding an R-value of approximately 0.6 to the insulation value of your window system. If the existing window is a single pane, this will reduce heat or cooling losses by about 35 percent for the window area. If you already have double-pane low-e windows, this will cut window losses by about an additional 20 percent.
- The magnetic seal around the frame of the radiant barrier will significantly reduce air infiltration from the window. If the existing windows are leaky, this can be a big advantage.
- The panels add privacy. In most situations, it is difficult to see in from the outside when the reflective surface is turned out.

New windows better?

On the downside, this product is expensive. The price of these barriers varies with the application, but can be \$20 to \$30 per square foot—not much less than the price of replacing the existing window with a new, good quality double-pane vinyl window.

Another drawback is that the barrier probably adds less value

See *TECHNOLOGY SPOTLIGHT*, page 8

Website of the month:

E3T Connect www.E3Tconnect.org

Professionals who like to keep on top of the latest in energy-efficiency technology should check out the new online networking community, Energy-Efficiency Emerging Technology, or E3T Connect.

Co-sponsored by Western and Bonneville Power Administration, E3T Connect brings together engineers, utilities, designers, policy-makers and others interested in energy efficiency to share resources and knowledge to advance emerging technologies. The open social network grew out of a formal program Bonneville sponsored to identify, evaluate, rank and recommend promising energy-saving technologies that are not yet in common use in the Pacific Northwest.

Joining, posting

While any visitor can browse the content, as a social networking site, E3T Connect makes most of its interactive features available only to members. Anyone with an interest in emerging technologies in the energy-efficiency arena can become a member at no cost. All members are able to post and comment in forum discussions, blogs, groups, videos, events and pictures. When you join, you get your own page that consolidates your discussions, blogs and activities.

To build site content, members are encouraged to create their own blogs, discussions and groups, and invite their colleagues to join. They are also welcomed to post, read



and add comments to other blogs, forums, discussions and member pages.

With the goal of promoting peer-to-peer interaction, E3T content is geared toward energy professionals, rather than consumers. However, the guidelines state that members are not to use their posts to sell their products or promote their companies. Washington State University Extension Energy Program (WSU) which manages E3T Connect, monitors the site for inappropriate postings.

Sharing, discussing

New members can begin to connect with other professionals in groups and the Forum. In the Forum, anyone can start a discussion, and anyone can respond. This is the place for posting items and information on general topics of broader interest.

Before starting a new discussion, it is a good idea to see if someone already has created a related topic where you can add value. If you don't see your question or idea, start a new discussion on the Forum. Once you post, follow the discussion and continue to contribute. Each new response brings the discussion back to the top of the forum list on the home page, so you can keep an eye on the latest debate and feedback!

Groups give members a gathering point to focus on a specific topic. Discussions in the groups tend to get more technical. There are currently seven technology groups within E3T Connect, although the number will increase as more members join the network.

Utility members are most likely to be interested in HVAC Technologies, Energy Management, Motor & Drives and Lighting Technologies. Only group members can start and respond to group discussions, so you need to join the groups in which you'd like to participate. Or, if you don't see a particular technology you would like to explore represented, you may start your own group.

If the brief exchanges in discussion groups only leave you with more to say, E3T Connect provides blog hosting for all its members. Blogs give members the opportunity to expand on their opinions and share insights gained from experience with energy-efficient systems and equipment. Blogs should be geared toward peers and professionals in the energy efficiency arena, and not be consumer-oriented. Each week, the E3T Connect home page will feature a few member blogs.

See WEBSITE OF THE MONTH, page 8

Website of the month *from page 7*

Learning

Websites of the month that feature resources on programs, policies and implementation cover more familiar territory for utility business managers and customer service representatives. With its focus on technology, E3T Connect offers non-technical utility professionals a chance to join in a conversation from which they can't afford to be excluded. The most useful sections of the site for these members may be Resources and New Tech.

Links listed under Resources are grouped into two different

categories. ET Links feature organizations whose activities focus on energy efficiency emerging technologies, while Efficiency Links are organizations promoting energy efficiency in general. E3T Connect encourages members to suggest other sites that the community might find valuable.

New Tech highlights lighting and HVAC technologies that have been favorably evaluated by E3T's technical advisory group. WSU invites experts from the research community, utilities and other organizations to contribute their knowledge to the advisory group. The publications page will feature reports and white papers from

such sources as WSU, Bonneville and the Emerging Technologies Coordinating Council based in California.

Ron Horstman, Western's Energy Services Director, urges Western customers to visit E3T Connect and check out the resources. "This is a great opportunity for Western and our customers to gather insights and contribute to the evaluation process for energy-efficient emerging technologies," he said. "Utility professionals have a big stake in moving forward technologies that help consumers become partners in energy management. Western believes that E3T Connect can provide our customers with an entry into that discussion." ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2011/jun/jun15.htm

Technology Spotlight *from page 6*

in the winter than you might think, though turning the black surface so it faces out improves solar heat gain compared to the reflective side. Any solar radiation that strikes the window surface would have made it into the building's interior anyway, so the black surface may actually reduce solar heat gain, since some of the energy absorbed by the black surface will re-radiate to the outside. The perforated

surface will also reduce visibility. For heating-season applications, a radiant barrier window insulator is probably no better than a good quality interior storm window.

In conclusion, before investing in radiant barrier window insulators to save energy, carefully analyze the costs and other considerations presented here, and explore all your options. Often, you can replace existing windows with good quality double-pane windows for not much more than some window

insulators cost. And in most cases, the new windows will be a better investment, if your goal is to save energy.

Have questions on these products or technologies? Call Western's Energy Experts at 800-769-3756. ⚡

Want to know more?

Visit www.wapa.gov/es/pubs/esb/2011/jun/jun14.htm