

# BULLETIN

The energy and planning resource for Western utilities

## SOUTH SIOUX CITY, NEBRASKA, DREAMS BIG, ACHIEVES MUCH

**M**ove over, New York City, Chicago and Los Angeles. There is another, different kind of economic capital on the map. Located on the northeastern Nebraska-Iowa border, South Sioux City, Nebraska, is doing big things.

That is what former Nebraska Governor Dave Heineman called the Western customer in an address to the city. Upper Great Plains Customer Service Representative Tracy Thorne is also impressed. "This is an incredibly innovative community for one of its size," he observed.

Although the city is Nebraska's 14th largest, South Sioux City has a modest population of 13,353 citizens. Its municipal utility provides electricity, water, sewer and fiber optics services to 4,500 meters. "Our fiber optic network is 15 years old, and we have 99.9 percent penetration," stated City Administrator Lance Hedquist proudly.



South Sioux City Mayor Rod Koch kicks off the groundbreaking ceremony for a new methane digester that will turn food processing waste into natural gas. (Photo by South Sioux City)

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### Sustainability creates jobs

South Sioux City also boasts higher employment than the state average, thanks in part to an active manufacturing sector that includes a thriving food processing industry. The waste stream from turning soy, oats, corn, dairy and meat into value-added products is what brought Big Ox Energy to town. The waste recycling provider is building a \$40 million methane digester to convert industrial food waste into renewable gas. "Manufacturers used to have to pay to have byproducts removed from the waste before sending it to the regional sewage treatment plant," Hedquist said. "The digester will help the industry reduce its waste treatment and disposal costs."

When the digester is completed later this year, it will add 30 permanent jobs to the local economy, and that is only

the beginning of the benefits. Big Ox is planning for more digesters in the area to meet the strong demand for renewable digester gas from businesses that use it to meet environmental goals and mandates. Having a sustainable waste management system in place will also make South Sioux City attractive to other food processing companies.

### Demonstrating leadership

The anaerobic digester project is only the latest coup for a city that is proving that small towns can be environmental leaders. Hedquist attributes the city's forward-looking attitude to enlightened mayors and city council members. "When they go to conferences to learn about best practices, they have to come back with ideas," the city administrator explained, "and they do!"

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## South Sioux City from page 1

Among the ideas that the city has implemented are an all-electric city car fleet, Nebraska's first paperless city council and an eco-bike path made entirely of recycled material. Those last two projects earned South Sioux City an award from the National Recycling Coalition.

Recently, the city undertook a "campground electrification" project, leveraging funds from the Nebraska Department of Environmental Quality and the Department of Agriculture. The new electric generator uses wood waste from industry and untreated, ground wood from city cleanups to light up the city-owned campground. "It's a small unit that we can expand as needed," commented Hedquist.

Perhaps most impressive, South Sioux City has paid off its property tax debt, meaning that infrastructure improvements are pay-as-you-go, noted Hedquist. "That's practically unheard of," he added.

### Secret is partnership

One way South Sioux City has been able to stay property tax debt-free is to partner with other municipalities and agencies on projects that meet mutual goals. The city Parks and Recreation Department worked with South Sioux City Community Schools to create an arboretum along the extensive local trail



Kevin Bradley, business development director of Big Ox Energy, and his assistants begin construction on the methane digester. When completed, the unit will add 30 jobs to the local economy and reduce waste treatment costs for local food processing businesses. (Photo by South Sioux City)



Rob and Amanda Beller and son Max cut the ribbon on the Express Laundry Center. When the South Sioux City Chamber of Commerce (red coats) team up with the Sioux City Chamber (green coats), local, family-owned businesses win. (Photo by South Sioux City)

system. The South Sioux City Community Development Agency, South Sioux City Chamber of Commerce, Dakota County and the school board collaborated with the city on redeveloping the riverfront area along the Missouri River with a drive-in movie wall and a stage for concerts and dancing.

Being a member of the Siouxland Economic Development Corporation, which covers a ten-county area in Iowa, Nebraska and South Dakota, facilitates inter-local agreements with neighboring towns. Collaborations have resulted in tax revenue-sharing plans from economic development efforts and a project to build more electric vehicle charging stations in the tristate area.

Interconnecting the public water system to the Dakota County Rural water system—a first for Nebraska—ensures that South Sioux City residents have a redundant water supply in case anything happens to the local water

supply. "Always have a backup plan," said Hedquist. "That's the secret to success."

### Keeping citizens happy

That philosophy extends to new energy resources as well. This month, South Sioux City is accepting bids on the purchase of wind power and proposals for a 3- to 4-megawatt solar installation. "I don't see how this can't be a way to reduce costs," Hedquist said.

Hedging fuel costs with renewable energy makes good sense, which may be the true secret behind South Sioux City's success. Behind all the big dreams is careful planning, long-term thinking and an effort to make sure that nothing goes to waste, including the trust of residents. "The community knows we listen to them every step of the way," Hedquist acknowledged. "They have seen the results and they like them." ⚡

## ENERGY SERVICES BULLETIN

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# WESTERN CUSTOMERS RECOGNIZED FOR CONTRIBUTIONS TO UTILITY INDUSTRY

**A**t Western, we know our customers are hardworking, talented and dedicated to the utility industry, so it makes us feel good when other industry organizations take notice, as the American Public Power Association (APPA) did this year. During the APPA national conference in June, the association honored Brad Roos of Marshall Municipal Utilities and Walter Wolf of the Navajo Tribal Utility Authority with its James D. Donovan Individual Achievement Award.

The award, named for one of the founders and first president of APPA, recognizes those who have made great individual contributions to the electric utility industry and to public power.

## Family history in public power

Brad Roos, general manager of Marshall Municipal Utilities in Marshall, Minnesota, is a third generation public power utility professional whose father and grandfather were utility managers in Iowa. In addition to serving on APPA's board and several committees, Roos is also a past president of Mid-West Electric Consumers Association, which protects the interests of federal power customers in the Missouri Basin. "Brad has been a vocal advocate for Western and a tireless public servant," noted Energy Services Manager Ron Horstman.

Roos, who attended the annual meeting to accept the award in person, acknowledged that he shares the honor with the utilities and organizations he has worked for, past and present. "I am honored to receive the James D. Donovan award, and I believe it also recognizes the municipal electric utilities I worked for in Denison, Iowa, and Marshall, Minnesota, and their involvement in our regional, state and national utility organizations," he said. "Although our individual

consumer-owned utilities may be small and spread out all over America, when we work together, our collective voices are heard on the issue under consideration."

## Bringing power to Navajo Nation

As chief legal counsel for the Navajo Tribal Utility Authority since 1959, Walter Wolf has been instrumental in developing electric resources in the southwest. Electrification of the Navajo Nation's 27,000-square-mile service area is an ongoing challenge due to a lack of infrastructure and consistent funding, but Wolf has worked tirelessly to extend electric service to remote customers. He also helped to create the Native American Power Pool with Western, a power allocation sharing system that allowed tribes to benefit from low-cost hydropower even if they didn't have an operating utility.

Brent Osiek, Contracts and Energy Services manager in Western's CRSP Management Center, said, "Walter Wolf has been a wonderful collaborator over the years in solving problems with patience, wisdom and common sense. He's been a great partner in working with Western."

"Energy distribution was an unexplored possibility for Navajo leaders at the time Walter was hired," recalled Navajo Tribal Utility Authority General Manager Walter W. Haase. "It seemed completely out of reach, until Walter presented to tribal leaders a plan whereby they can create an electric tribal utility."

Since then, he added, Wolf has written almost every significant document relating to the development and progress of NTUA. "We sincerely congratulate him as he deserves this recognition," said Haase.

"Every power line that we build is an achievement, and every family that we connect is a success story," said Wolf.



**Brad Roos, general manager of Marshall Municipal Utilities, is a third generation utility professional. (Photo by Marshall Municipal Utilities)**



**Walter Wolf has served as chief legal counsel of the Navajo Tribal Utility Authority since 1959. (Photo by Navajo Tribal Utility Authority)**

"I'm happy that I have accomplished something this significant in my lifetime. I am very lucky."

Western is lucky to count such committed and innovative professionals among our customers. We congratulate Roos and Wolf for the well-deserved recognition of their achievements in the industry and their communities. ⚡

# INCREASE YOUR ENERGY EFFICIENCY IQ AT TWO FALL EVENTS

Maybe it is the debate over the administration's clean power plan or Tesla's announcement of a new consumer energy storage system or the media buzz around the "Internet of things." Whatever the reason, consumers—both residential and commercial—are thinking and talking more about energy use and management. Despite a lot of gloomy prognosticating, that is good for utilities. Two upcoming conferences, one new and one established, can help you to turn this growing consumer interest in energy use to your advantage.

## Spanning Western territory

The Rocky Mountain Utility Efficiency Exchange is now in its ninth year of bringing together utility program managers and industry allies to explore the many facets of energy-efficiency programs. Aspen Meadows Resort in Aspen, Colorado, will host conference veterans and newcomers Sept. 30 to Oct. 2 for in-depth discussion, discovery and networking.

Does your service territory look more like prairie than mountain? Then consider attending the Introduction to Demand Response training, Integrating Energy Efficiency with Demand Response in the Midwest workshop and networking reception in Chicago, Sept. 15 to 16. These three separate events have a slightly different focus than the RMUEE, but still provide an outstanding learning opportunity for utility professionals involved in energy efficiency and demand response.

## Hear from leaders

Western customers are involved in both events, so you can expect to hear a frontline perspective on program creation, management and evaluation. The City of Aspen Utilities, Holy Cross Energy and Platte River Power Authority are long-time sponsors of RMUEE. Representatives from those



Energy Services Manager Ron Horstman passes the microphone. RMUEE is a "share, not stare" event where every attendee is encouraged to speak up. (Photo by Tiger Adolf)

utilities will moderate panels and give presentations alongside many other Western customers.

At the workshop portion of the Chicago event, Ken Glaser of Connexus Energy, a member cooperative from Great River Energy will participate in a demand response roundtable. Representatives from Consumers Energy and Duke Energy are also on the panel.

Event sponsors Peak Load Management Association (PLMA) and Midwest Energy Efficiency Alliance (MEEA) chose speakers with hands-on experience in creating and implementing demand response (DR) and demand-side management (DSM) programs. Gary Connett, demand-side management director at Great River and PLMA member noted that cooperatives and municipal utilities are leaders in load management. "They are

a great resource for power providers who are just getting their programs started."

## Start your programs right

The event is specifically for utilities that are new to DSM and DR, added Connett. "The workshop is designed for people who are considering their first program and are looking for models and ideas," he explained. "Attendees will learn the fundamentals of each strategy, the benefits and how to implement a program."

Introduction to Demand Response is a good place for newcomers to begin. The one-day course provides a comprehensive overview of demand response topics. Current issues will be explored from the perspectives of utilities, retail energy providers, customers, independent system operators, and

*See ENERGY EFFICIENCY EVENTS, page 5*

## Energy efficiency events

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other demand response technology and services providers.

After a day of intensive training, attendees can unwind at a networking reception on the roof of MEEA headquarters. There is nothing like sipping, nibbling and chatting with colleagues in the presence of one of America's great skylines to get the ideas flowing. The Wednesday workshop, "Integrating Energy Efficiency with Demand Response in the Midwest," is tailored to the specific goals and challenges facing midwestern utilities. The first two sessions separately address DR and energy-efficiency professionals, and the third covers program models that successfully combine the two points of view.

You may register for all three events as a package or in any combination, including just the reception. Hotel accommodations must be reserved separately and are not included in event registration.

### Efficiency issues, conference evolve

Much has changed and much has stayed the same in nearly a decade of talking energy efficiency at RMUEE. Stubborn challenges persist, such as program evaluation, reaching low-income customers and creating a trusted contractor pool, although each year brings clever and creative local solutions. On the positive side, utilities can choose from a variety of mature behavior-based programs for engaging customers, and have plenty of data to make the selection easier.

Technology, always a hot topic, keeps challenging utilities to keep up with it. Lighting upgrades continue to offer the most bang for the buck, but LED, or light-emitting diode, lamps have displaced compact fluorescent lights as the state-of-the-art in efficiency. Automated systems to manage home energy use are still popular, but programmable thermo-

stats seem almost quaint compared to smartphone apps that allow people to control multiple systems remotely. The cost of solar panels has dropped sharply in nine years, making distributed generation a more pressing issue, and carbon emissions regulations now seem closer than ever.

The RMUEE agenda covers all these topics and more, with presentations by your colleagues—the people who design and implement customer programs. You will also hear from trade allies who offer energy products and services and from government agencies that work with utilities to meet efficiency goals.

With so much experience in one place, networking usually turns out to be the star of the RMUEE. Attendees will have plenty of time to make new contacts and compare notes with old friends during meals, breaks and receptions. For a change of pace this year, the final day will be dedicated to outdoor teambuilding activities, including a guided hike and a bike ride to the Maroon Bells. That is, weather permitting, of course, but the fall weather in Aspen is generally cooperative.

There is still time to register for RMUEE, and rooms at the Sky Motel in Aspen are available at a special



Midwest Energy Efficiency Alliance headquarters is located in the Historic Civic Opera Building, about 20 minutes from either Chicago Midway International Airport or O'Hare International Airport. (Artwork by Midwest Energy Efficiency Alliance)

conference rate. The motel is only a short drive from the Aspen Meadows Conference Center, and will also host the Thursday evening reception.

The Rocky Mountain Utility Efficiency Exchange and the Midwest regional workshops differ in focus. One explores the broad range of customer efficiency programs while the other hones in on two specific strategies. The target audiences deal with different geographic challenges. But the events are tied by the belief that the real experts on the utility industry are the utilities themselves. We will discover all the expertise we need to deal with environmental, regulatory and technological changes if we just talk to our neighbors. ⚡



## HOW DOES DEMAND-RESPONSE AFFECT CONTROLLED EQUIPMENT?

**W**estern customers use our Energy Experts hotline, 800-769-3756, to ask questions about how programs or technology works in a utility setting. Recently, we heard through the grapevine that some customers have been talking among themselves about a particular topic. We assume there are others wondering about the same things, so Energy Services Manager Ron Horstman posed the question to the Energy Experts:

### Question:

I would like to know if utility demand-reduction (DR) programs that remotely control end-use water heaters and HVAC [heating, ventilation, air conditioning] systems could potentially damage that equipment or void manufacturers' warranties. Also, do DR programs create distribution system voltage sags when a large number of appliances resume full operation at the same time?

### Answer:

Based on initial research and discussions with experts in the field, it appears that DR controls have minimal effect on equipment:

- End-use equipment nearly always survives occasional power outages without serious damage, and power outages are much more severe and widespread than demand response programs.
- A search of literature in the Energy Experts database revealed little documentation of this as an issue.
- DR specialists at companies including energy data analyst E Source and energy management technology provider Converge noted few if any reports of such problems. However, one

cautioned that equipment owners do need to be aware of conditions that can void manufacturer's warranties, such as restricting shut-off times to a minimum of five minutes.

- Demand response control may increase or decrease the number of operation cycles—the number of times the equipment turns off and on—depending on the length of time during the DR event the customer agrees to allow interruption of operation. As long as the equipment has time to cool down between interruptions, the change in the number of operation cycles during a DR event represents a tiny percentage of the equipment's annual cycles, so it is unlikely to "wear out" the system.
- Because peak demand programs are a common and widespread load management strategy, manufacturers have designed their equipment to accommodate remotely controlled cycling.
- "Smarter" grids bring more nuanced capability for equipment control.

### Changing with times

Nevertheless, because many

customers and some utility professionals continue to be concerned about the effects of DR on equipment, the issue is worth exploring further. DR control can range from an add-on Wi-Fi kit to a thermostat with additional useful features to a fully integrated appliance. Utilities find it challenging to interface with the wide variety of HVAC control system makes and models, but technology and experience are improving.

More and more manufacturers are offering equipment specifically designed to interact with peak demand control systems. This includes a control input on the device that allows utilities to easily connect it to a compatible DR communication module. These more sophisticated interfaces facilitate smoother load shedding, as well as load-shifting strategies like precooling a space or preheating a water tank in preparation for a peak-demand event.

### Controlling air conditioners

The most common DR approach to HVAC equipment is controlling the condensing unit outside the building, so the supply fans continue to operate. The fan uses just a fraction of the energy of the compressor. Shutting the unit off by remotely setting back the thermostat is another simple control method.

On some equipment, the condenser and thermostat are not separately powered. Window air conditioners are one example, and these units account for 58 percent of air conditioning in the U.S., according to the U.S. Energy Information Administration. ThinkEco, a smart-control developer and provider, offers a Wi-Fi-connected Smart AC kit that is installed between the electrical

*See DEMAND-RESPONSE, page 7*

outlet and the plug-in air conditioner. The company reports that the kit works with 90 percent of window air conditioners. On the remaining units, the compressor either did not come back on after power was restored, or came back on after several minutes.

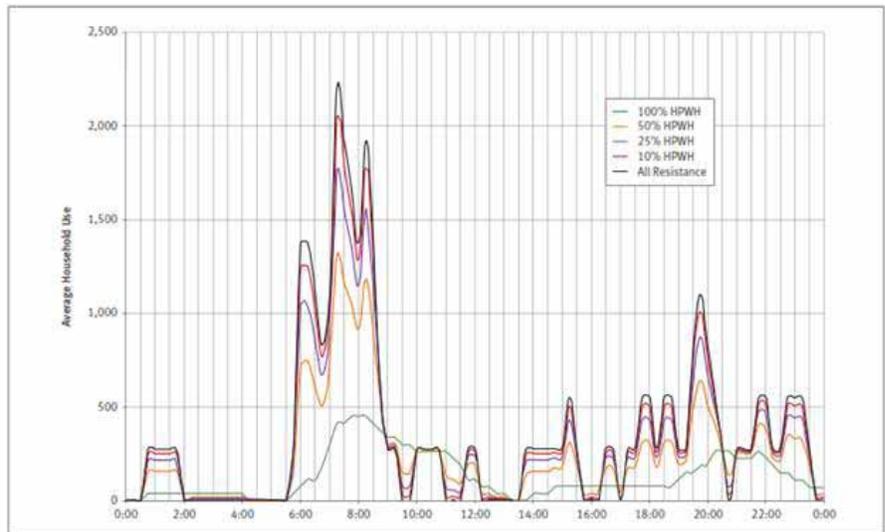
ThinkEco and Carrier teamed up to integrate Carrier's Comfort-choice thermostats and ThinkEco's Modlet (modern outlet) cloud platform. This gives utilities access to real-time load data for window air conditioners and real-time demand-response control capabilities, while giving users control of all aspects of their air conditioner through their smart phone. Another ThinkEco partnership with Frigidaire integrated the same capability into a window air conditioner that retails for \$270. New York City, which has the largest stock of window AC units in the U.S., offers a \$125 rebate to residents for installing this air conditioner.

### Motor issues

Electric motor damage is another concern for program managers and equipment owners. It is true that turning a motor on and off many times per hour without allowing time in between for cooling can damage the windings. However, in a demand response scenario, utilities don't cycle controlled equipment that frequently. Customers can typically choose to have their equipment turned off 50, 75 or 100 percent of the time during peak events.

### What about water heaters?

Regarding heat pump water heaters (HPWHs), a paper by the National Rural Electric Cooperative Association's Cooperative Research Network compares the performance of HPWHs in a demand response scenario with an electric resistance water heater. "How Will Heat Pump Water Heaters Perform in Demand Response Programs"



**FIGURE 1: Impact on Peak Load by Percentage of Customers That Use Heat Pump Water Heaters**  
Source: The Center for Energy and the Environment in Minnesota

mentions the possibility of damage to compressors due to cycling and product warranty voids. Authors also suggest that the cost-effectiveness of using HPWHs in a DR program calls for more study.

The graph below indicates that HPWH energy use doesn't peak nearly as much as electric resistance water heaters during typical times of utility peaking events, and they use considerably less energy. So the best solution to those possible issues may be to simply not include the systems in DR programs.

Water heater manufacturers have begun to include a port for grid connection using Modular Communications for Energy Management (CEA 2045), a common communications protocol established in 2013. Even before that, the Department of Energy found that some water heater manufacturers not only supported grid-connected appliances, but were already developing the devices.

### Designing for unique customer

Industrial equipment requires a different approach to demand response. These customers use much more energy than residential or commercial customers, making them an attractive target when utilities need to shed a lot of load quickly. However, abruptly interrupting production can cost plants

hundreds of thousands of dollars. Utilities must work with industrial facilities managers on an individual basis to minimize the effect of DR programs on operations.

### Powering back up

Finally, there is not a significant risk of creating a distribution system voltage sag when the DR event ends and the utility brings the controlled loads back online. Although an AC motor can have inrush currents of six to eight times more than full load, utilities plan demand response to bring groups of customer loads offline and online in stages. The impact of restoring isolated equipment to a subset of customers and in stages is far less severe than restoring full power to all customers all at once after a power outage.

Ultimately, most HVAC and water heating equipment can handle demand response controls—either by power interruption or by on-site controls—without damage or voided warranty, as long as the interruption allows enough to allow the unit to cool down. Manufacturers typically specify a minimum time of five minutes. A safer approach is controlling HVAC systems by setting back web-enabled thermostats, allowing the on-site control system to ramp down and ramp up in a normal way rather than by a sudden power interruption. ⚡

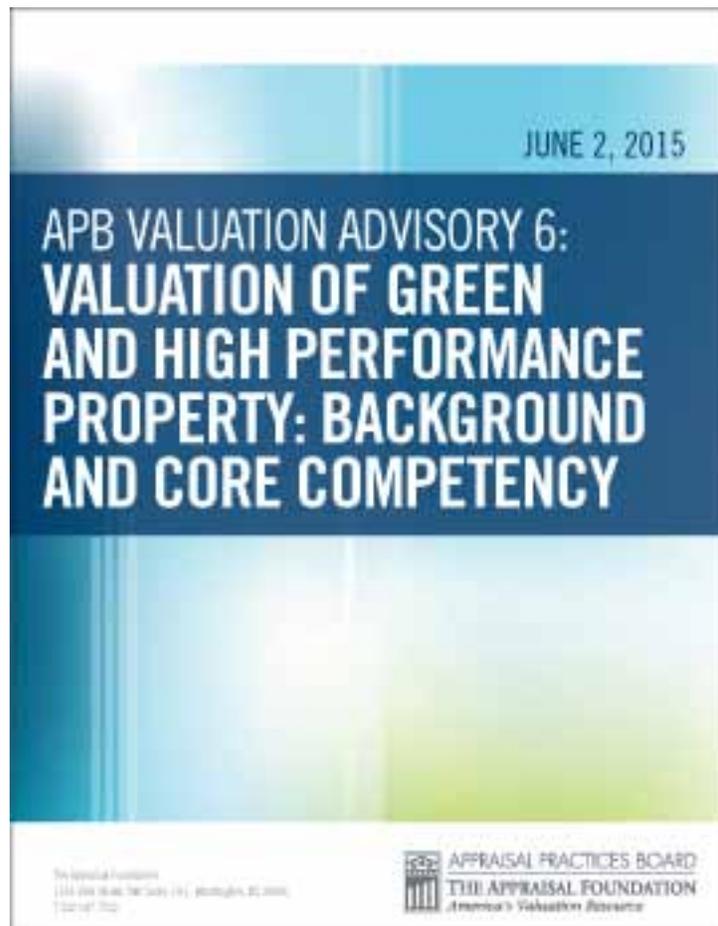
# DOE, APPRAISAL FOUNDATION TO DEVELOP RESOURCES FOR GREEN BUILDING APPRAISERS

When it comes to educating customers about the value of energy efficiency in buildings, building owners are not the only group utilities need to keep in mind. Real estate appraisers in your territory may well need a crash course in the benefits of high-performance buildings, too. The Energy Department (DOE) and the Appraisal Foundation are working on resources to help the real estate industry figure out what sustainability is worth.

“Green” features can lower a building’s operating cost and make it a less financially risky investment, as shown in a case study by the Institute for Market Transformation. A commercial building in Wilmington, North Carolina, that implemented energy conservation measures reduced its annual energy costs by nearly \$11,000, increasing the building’s valuation by up to \$275,000. The study also showed that installing a renewable system has a similar effect. Buildings in California with solar panels can be valued at a premium as high as \$5,911 per kilowatt of energy capacity.

Yet building owners often worry—with reason—that they will not recoup their investment in energy-efficiency upgrades when it comes time to resell the building. If appraisers are not educated about green strategies, they might overlook some of the benefits that could make the building more marketable, such as reduced operational and environmental risks. And that adds just one more barrier to getting customers to implement such measures.

To address this concern, DOE has teamed up with the Appraisal Foundation to improve resources for appraisers who are involved with energy-efficient buildings. The first of these resources, the *Appraisal Practices Board (APB) Valuation Advisory #6: Valuation of Green Buildings: Background and Core Competency*, is available to download.



Technical experts and industry leaders collaborated on the APB Valuation Advisory to give appraisers a basic educational background on green or high-performance buildings. Two upcoming resources will build on this guide’s foundation with methodological guidance for valuing residential and commercial buildings.

DOE supported this work by providing subject matter experts and soliciting feedback from members of the Better Buildings Alliance. Appraisers can also find software tools, databases and education courses on the website that they can use to better evaluate green buildings.

Key account representatives should consider sharing the APM Valuation Advisory with local realtors’ associations. Municipal utilities in particular are in the position to bring these new resources to the attention of the appropriate city departments. Utilities might understandably see market transformation of the real estate industry as outside of their scope. On the other hand, it could be an opportunity to create new allies who can make the business case for energy-efficiency improvements for you. ⚡

## MORE CITIES, DATES ADDED TO CALIFORNIA WATER CODE SEMINAR SCHEDULE

The schedule for a seminar covering plumbing code changes in California has been expanded into the fall, and water utilities throughout the state will have more opportunities to attend.

Green Technology has added four new dates for Reducing Potable Water Use: Understanding Opportunities in Recent Plumbing Code Changes.

- Oct. 9 – Los Angeles
- Nov. 6 – San Mateo
- Nov. 20 – Ventura
- Dec. 4 – Oakland

To deal with the ongoing drought, California has passed mandatory restrictions on urban potable water use—a first in state history—and water utilities have their work cut out for them. This five-hour seminar from Green Technology offers an in-depth look at the code specifications and helps building, design and construction professionals successfully navigate the design, permitting and inspection process. Utilities, especially municipal water providers, will find ideas and opportunities for managing their water supply more efficiently and for helping their large key accounts.

The fee for the seminar is \$265, with discounts for groups of four or more. Continuing education credits are available. Please contact Cindy Dangberg at 626-577-5700 if you have any questions. ⚡

## FREE WEBINAR LOOKS AT BUILDING CODE FOR MANUFACTURED HOUSING

Sept. 10  
12 p.m. Pacific Time

Many parts of the West are grappling with a housing shortage—particularly a shortage of affordable homes—so utilities can expect to see more manufactured houses in their service territory. Power providers can wait and see how these buildings affect their load or they can take action to encourage buyers to choose safer, more efficient homes. Learn about efforts to increase energy efficiency in manufactured housing Sept. 10 when the Emerging Technologies Showcase webinar series presents “Manufactured Homes – New Efficiency for the Lowest Cost Housing Option.”

Manufactured homes—those built in a factory and moved to a site—conform to federal code set by Housing and Urban Development (HUD) construction and safety standards rather than local building codes. Energy Star provides manufacturers with a higher voluntary standard they can meet to receive an Energy Star certification.

In anticipation of HUD updating its code to match the current voluntary efficiency standards, a partnership of utility and building industry professionals completed a study to develop the next generation of voluntary standards. Bonneville

Power Administration, the Building America Partnership for Improved Residential Construction and Northwest Energy Works teamed up to collect and evaluate energy use data on eight high-performance manufactured homes.

This webinar will present the study’s findings and look at ways utilities could incorporate the higher standards into incentive programs for customers buying manufactured homes. Participants will also learn about different state and federal regulations governing manufactured housing. A question-and-answer session will follow the presentation.

Participation is free but registration is required. All webinars are recorded and available from Energy Efficiency Emerging Technologies and Conduit, an energy-efficiency forum for the Northwest.

Bonneville Power Administration sponsors the Emerging Technologies Showcase series with support from Western Area Power Administration. ⚡

