



Hurst Hall; containing offices, classrooms and labs; was very much in need of an envelope upgrade. (Photo by Western State Colorado University)

Anyone who picks up an infrared (IR) camera quickly becomes aware of the possibilities of being able to “see” the temperature of objects. Some WAPA customers find that once they borrow a camera from our Equipment Loan Program, coworkers from other departments suddenly appear with ideas for their own projects, as happened at Western State Colorado University. (WSCU).

John Mason, an associate professor of physics in WSCU’s department of Natural and Environmental Sciences, recently borrowed an IR camera primarily for class demonstrations. He heard about it through a colleague who attended an energy fair in Gunnison, Colorado, where

then-Equipment Loan Manager Gary Hoffman had a display table for WAPA.

Showing, not telling

“The camera is great for making abstract concepts concrete to students,” Mason noted. “Take thermally

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Western State Colorado University is located in Gunnison, frequently one of the coldest areas in the 48 states. (Photo by Western State Colorado University)

induced electromagnet radiation, for example. Instead of trying to explain it to students, I can focus the camera on a black plastic trash bag, and it shows right through it. Then, I point it at a piece of glass and they can't see what is on the other side. The students perk right up when I bring out the IR camera," he added.

Other teachers found uses for the camera, too, but it was in the hands of the WCSU facilities manager that the loan really paid off for the school. "It didn't take long for word to get to facilities that we had an IR camera, and Bryce [Hanna] showed up asking to borrow it," Mason recalled.

Gunnison, always one of the coldest spots in the Colorado Rockies, was experiencing a particularly cold winter during the period of the camera loan. Facilities Manager Hanna saw the opportunity to show the administration why Hurst Hall, a building of classrooms, labs and

offices, needed a thermal envelope upgrade. The department performed an IR inspection of the building and shared the picture with the insulating contractors to get their input on what measures needed to be taken. "Then we showed the thermal images to the WCSU Sustainable Action Committee to get their approval to fund the project," he said. "The committee is the ultimate decision maker in terms of how—and whether—sustainability funds get spent."

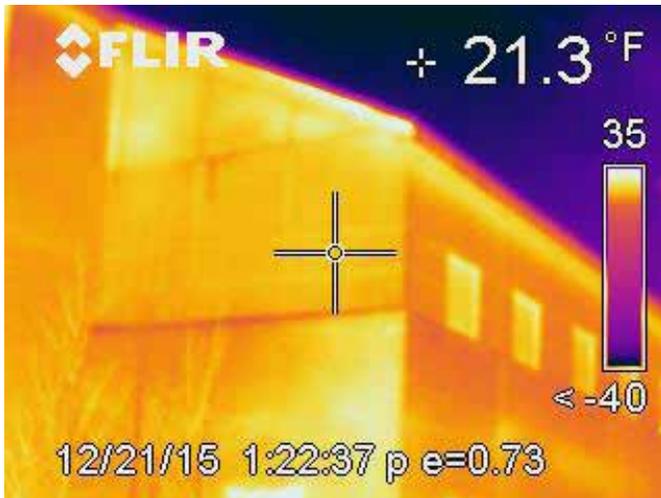
Finding, fixing

Hurst Hall's frigid upper floor and frozen water pipes were plenty of proof that the building had a leaky envelope. But the IR camera helped to pinpoint the areas that needed repairs and make the case for investing in the improvements. "The problems are not always where you expect them to be," Hanna pointed out.

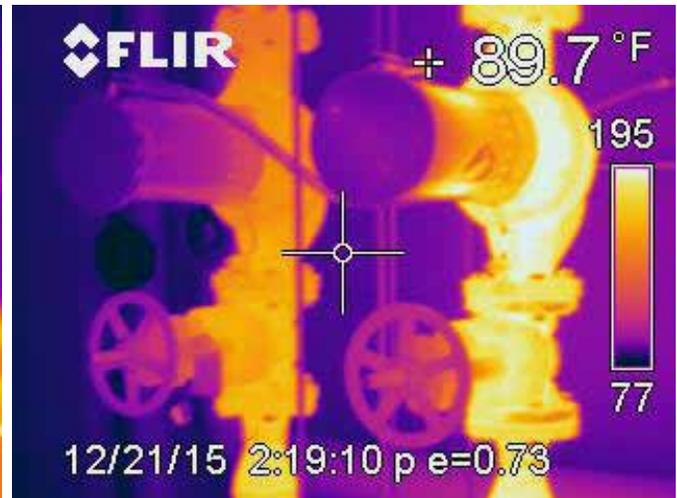
The camera uncovered a bad case of "gapisis" just below the roof where the exterior wall and insulation didn't quite meet the insulated roof. The opening allowed heat to escape while an uninsulated steel tube vented cold air into the building. Adding spray foam insulation to the gap raised the temperature by almost 40 degrees in some places. "Filling the big holes also helped us to locate the smaller leaks, which are just as important to sealing the building envelope," noted Hanna.

The results from the project are still coming in, as the heating system controls must be fine-tuned to adjust to the tightened thermal envelope. However, a normalized comparison of 2015 gas bills to 2016 indicated that the building used 20 percent less gas during the coldest month. Hanna explained that because of the low cost

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The lighter the window, the greater the heat loss. Windows on the bottom floor are new. The dark mound below the windows is snow. (Photo by WSCU Facilities Management)



Which water pump would you rather touch? This thermal image clearly shows the pump on the right overheating. (Photo by WSCU Facilities Management)

of natural gas, the return on investment for the upgrade is practically nonexistent. "We did it because it was the right thing to do," he said. "Not to mention, the building occupants are a lot more comfortable."



The light areas of the thermal image show where Hurst Hall is losing heat to air leaks and inadequate insulation. (Photo by WSCU Facilities Management)

even out-performing the stucco wall around them."

Many lessons to learn

This story offers more than one take-away besides the obvious, "Infrared cameras are awesome!" You might conclude that customer outreach can pay off in unexpected ways, or that facility managers can be a utility's greatest ally. You may decide that customer service representatives and key account managers need to take an IR camera along when they visit customers.

The Equipment Loan Program can help with that last one. Contact Chris Lyles, 720-962-7249, to reserve a camera for your next customer meeting or public event. And don't forget to tell us your story afterward. ■

Safe, efficient maintenance

As impressive as big upgrade projects are, keeping equipment and systems in good working order is even more important over the long term. While Hanna had the camera, he used it to detect and correct mechanical and electric issues. "If you are having a problem with a hard-to-reach piece of equipment like an inline water pump, you can see what is happening right away on a thermal imager," he explained. "If you are dealing with an electrical short, you don't want to be

handling it without knowing if it is live or not."

Instead of wasting a thousand words on the importance of efficient windows, Hanna simply compared a picture of recently installed windows to old windows. "We could see an immediate difference between the two," he declared. "The old windows appeared as bright in the picture, indicating high heat loss. The new windows were much darker, showing that less heat was escaping them. In some spots the new windows were

Tribal solar farm breaks new ground for Navajo Nation

The Navajo Nation, WAPA's largest tribal customer, is about to join the ranks of utility-scale renewable energy producers with the construction of a 27.5-megawatt (MW) solar farm at Kayenta, Arizona.



Residents of surrounding communities, tribal leaders and officials from the Navajo Tribal Utility Authority attended the groundbreaking ceremony for the Kayenta Solar Farm near WAPA's Kayenta Substation in Arizona. (Photo by Travis Weger, WAPA Public Affairs specialist)

WAPA Administrator and CEO Mark A. Gabriel and Chief Public Affairs Officer Teresa Plant attended the groundbreaking ceremony on the Navajo Nation, April 23. Also joining the ceremony were residents of surrounding communities, tribal leaders and officials from the Navajo Tribal Utility Authority, the primary power provider for the tribe.

The new facility, the largest Native-owned renewable project in the country, is expected to be operational by spring 2017. "We are excited to show that the Navajo Nation can develop an energy project on this scale," said Deenise Becenti, NTUA spokesperson.

Many reasons to build

In addition to valuable experience, the solar farm will also provide power to a northern section of the Navajo Nation at some of the "lowest consumer electric rates in the region," according to an NTUA press release. This is significant because of all the people in the U.S. who do not have electric power, 75 percent live on the Navajo Nation.

Other benefits of the project include promoting grid modernization and eco-

nomics development. Construction will require about 100 workers, and there are expected to be five permanent jobs managing the facility. "It may not sound like much," Becenti acknowledged, "but on the average, each employed tribe member helps to support eight others."

She added that some people who have left the area to find jobs will be able to return home.

Partnering to reach goals

NTUA has taken the lead on developing the \$64 million project, working out an agreement with Salt River Project for the energy credits. SRP's purchase of two years' worth of energy and environmental attributes from the Kayenta Solar Farm is helping to fund its construction. The project is also receiving tax credits and loans, mainly from the Cooperative Finance Corporation, You are leaving WAPA.gov. a finance cooperative run by a network of electric cooperatives.

The purchase of the attributes will help SRP meet its goal of getting 20 percent of its retail energy requirements from sustainable resources by 2020. The Arizona-based public power provider contracted in 2012 to buy renewable energy certificates from

solar arrays NTUA rents to low-income customers who do not have access to electricity. NTUA also sells SRP the credits from small solar installations on some utility facilities.

Bringing a large-scale renewable energy project to the Navajo Nation has been a long-time goal of the tribal utility, said NTUA General Manager Walter Hasse in a recent interview. "It is an important next step in the development of a green economy for the Navajo Nation," he stated.

WAPA pitches in

The solar farm will be connecting to the larger grid through WAPA's Kayenta Substation. WAPA has a long-standing relationship with NTUA, and has cooperated with the 55-year-old tribal utility on past projects.

At the groundbreaking ceremony, Gabriel said, "We hope to continue building this kind of mutually beneficial partnership well into the future, especially with our Native American customers. Changes in the electric industry are occurring rapidly and WAPA stands ready to continue providing technical assistance in power marketing, resource management and transmission services for the Navajo Nation." ■

Rocky Mountain Utility Efficiency Exchange a decade strong, growing

Sept. 28-30
Aspen Meadows Resort
Aspen, Colorado

To say that the utility landscape has changed since 2007 is a laughable understatement—new technologies, new regulations, new customer expectations and economic ups and downs challenge our industry like never before. But the Rocky Mountain Utility Efficiency Exchange, now in its tenth year, provides attendees with a touchstone for the evolution of their customer efficiency programs.

It seems like only yesterday that 92 Colorado utility program staff and allies gathered at Aspen Meadows Resort for the first Colorado Utility Efficiency Exchange. Programmable thermostats

were basically timers that controlled your furnace and there was little or no talk of micro-grids or data analytics. Compact fluorescent lights (CFL) were state-of-the-art lighting technology

and the centerpiece of many a utility energy efficiency initiatives.

Learning to share

In fact, the event grew out of a meeting UtilityExchange.org Executive Director Ed Thomas attended at Platte River Power Authority on the possibility of coordinating a statewide CFL retailer point-of-purchase promotion. Adam Perry, Platte River's customer services supervisor for energy efficiency, had just moved to Colorado from Oregon where he was accustomed to working with multiple utilities on customer

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The Doerr-Hosier Conference Center at Aspen Meadows Resort has been the “home” of the Rocky Mountain Utility Efficiency Exchange since 2007. (Photo by Aspen Meadows Resort)

programs. "I thought it was that way across the country," Perry admitted. "I wondered where Colorado utilities got together to talk to their peers about their programs and collaborate on regional programs. I soon found out that venue didn't exist."

The meeting also included Jeff Rice, then utilities efficiency specialist for the city of Aspen. Thomas asked the two if their utilities would be interested in supporting an event where program managers could exchange ideas on energy-efficiency programs and learn from each other. "The hope was that sharing would lead to regional and statewide partnerships and collaboration," explained Perry. "Looking back I can say that RMUEE has allowed me to build great friendships and relationships with my utility program peers. Being able to share ideas and our successes and failures in energy-efficiency program design and implementation has really benefitted both me and my utility."

The city of Aspen became the event host, in no small part because Rice had just received an energy-efficiency mandate and had no idea where to start. Gas utilities were also being required to launch demand-side management (DSM) efforts, and their program managers were equally eager to learn from others. Returning attendees acknowledge that their programs did, indeed, make "progress through poaching." Jim Dillon, Black Hills Energy senior manager for energy efficiency, has attended several exchanges over the years. "We feel that the ability to collaborate with our peers is instrumental in building a quality energy-efficiency portfolio that serves all customer classes and moves customers down the energy efficiency pathway," he said.

Attendees, issues have staying power

The event grew, attracting attendees from the wider region, and the name changed in 2011 to Rocky

Mountain Utility Efficiency Exchange to reflect this inclusive approach. This year, more than 120 attendees—many familiar faces—are expected to come together to grapple with underlying questions that are also all too familiar: How do we meet mandates? How do we increase the efficiency of the building stock? How do we educate and engage customers? How do we fund programs? How does new technology fit into the bigger picture?

The agenda puts a 2016 spin on these timeless issues, starting with a round table discussion based on topics suggested in a survey you can submit in advance (by Sept. 23). Presentations on Wednesday, Sept. 28, focus on teaching customers to take control of their energy use and integrating the most effective approaches to meet aggressive energy-efficiency goals. A case study on a good, old-fashioned municipal lighting upgrade—now with LED [light-emitting diode] technology—wraps up the first day's sessions.

The popular dual-track schedule on Thursday morning allows attendees to switch between residential- and commercial-focused sessions. On the residential side, speakers will share their experiences designing, financing, marketing and delivering programs to help homeowners save energy. Aspen Utilities Efficiency Specialist Ryland French will talk about the city's participation in the Georgetown University Energy Prize competition. The commercial track will cover strategies for motivating different types of business customers and ways to increase their satisfaction. The afternoon offers program snapshots and a look at market transformation and financing models.

Bryan Hannegan of the National Renewable Energy Laboratory (NREL) and Ben Bixby, energy products director for Nest Labs, will deliver the keynote speeches. Hannegan, NREL's associate lab director for energy systems integration, will talk about

integrating electricity, fuel, thermal, water and communication networks to achieve a more sustainable society. Bixby's keynote will explore business models and partnering strategies for utilities. Sneak Peek Preview webinars were conducted with the keynotes and advisory committee in August and the archived recordings are available on the event home page.

Eat! Drink! Network!

One feature that helps to keep the RMUEE fresh and growing is that as much "exchanging" happens outside the sessions as during. Presentations are where the conversations begin, but they continue, deepen and expand during refreshment breaks, meals and receptions.

Wednesday night's poster reception is like a private presentation where you can question the speaker one-on-one, with a beverage and snack in hand. The Thursday night networking event at the Limelight in Aspen is a chance to mix it up with the rest of the attendees in an even more relaxed setting.

Other things that haven't changed in 10 years include:

- The food at Aspen Meadows Resort is still delicious
- Aspen is still beautiful in the fall
- Dress is still casual (leave the tie at home)
- WAPA Energy Services representatives will be there

Yes, the Rocky Mountain Utility Efficiency Exchange gives us a chance to meet with you, our customers, in one place. We catch up on what is happening in your world, answer questions you might have and learn from you. Every year since 2007, we have returned from the RMUEE, impressed with your innovative ideas and commitment to doing the best for your communities. And we look forward to seeing what the next decade brings. See you in Aspen! ■

Meet Chris Lyles, new Equipment Loan manager

It is with a heavy heart that Energy Services must bid Equipment Loan Manager Gary Hoffmann farewell as he moves into a well-deserved retirement. Hoffmann was a tireless champion of our Equipment Loan Program and we will miss his customer service skills, “interesting” theories on how the world works and his tasty vegan recipes (ok, maybe only the *Energy Services Bulletin* editor will miss the food). The silver lining in this loss is that we gain Chris Lyles, the new Equipment Loan manager.

Learning new business

When Lyles joined WAPA’s Desert Southwest office in 2008, it was the Energy Department veteran’s first utility industry job. He had been working on environmental cleanup on Super Fund sites but wanted a more people-oriented position. “There seemed to be a lot of job opportunities in the field and I liked the idea of working in a stable industry that provided society with an important product,” Lyles recalled.

Working as project manager in charge of transmission line and substation construction gave Lyles plenty of chance to work with people. He had to help facilitate the selection of capital projects that would best meet the needs of WAPA and its customers’ transmission needs. And since such projects affect customers’ rates, he had to explain the need for them to the customers, too. “When people who have been in the business for 40 years are asking you questions about a transmission project, you had better understand the details and have answers for them,” noted Lyles. “It was a real learning experience.”

Fortunately, Lyles is a quick study and has exceptional listening skills, which came in handy when he visited customers in the field. “That is where

they really open up and share their concerns about WAPA and about the industry in general,” he said. “Those meetings really helped me to identify projects that could make a positive difference for our customers.”

Growing on job

WAPA Administrator and CEO Mark A. Gabriel was another person who found those one-on-one meetings valuable. When he visited the DSW region, Gabriel often accompanied Lyles on his visits to small utilities. While the administrator was learning more about the specific needs of the region, he was also discovering an employee with exceptional customer service skills. When there was an opening at WAPA headquarters in Lakewood, Colorado, for an acting chief of staff, Lyles was selected to fill it.

Filling the temporary position gave Lyles the chance to work with WAPA senior management and learn more about WAPA’s broader mission. One thing that impressed him was how diverse our customer base is. “Each region has different needs and each customer is facing different challenges,” he said.

Finding new ways to help

Lyles also came to appreciate



Chris Lyles, the new Equipment Loan manager, wants to hear your suggestion for tools to add to the Equipment Loan Program.

the need to maintain our aging grid infrastructure, an area where he sees potential for the Equipment Loan Program to grow. “We have equipment that can be particularly useful for finding problems on distribution systems,” he pointed out. “One of my goals is to make sure our customers know all the different uses for our tools.”

The distribution system is being used differently now than it ever was before, Lyles added, and Energy Services and the Equipment Loan Program can help customers manage those changes. “For example, distributed generation causes back-feed into the system that can potentially lead to power quality issues,” he said. “We’ve been getting a lot of phone calls from customers who see a blip on their system, and need help to track down the issue.”

Lyles is looking forward to learning what is important to customers, and one way to do it is to put equipment into the hands of customers who have not borrowed from the program before. “I would like them to get a chance to play with our tools and discover new uses for them,” he said.

That will also help with another goal Lyles has for the program: modernizing the fleet of equipment. “Our equipment inventory should reflect that WAPA understands the changes going on in the industry and that we know how to help our customers deal with them,” he explained.

To that end, Lyles is eager to hear suggestions from customers about tools that could be added to the program. Contact him at 720-962-7249 with your ideas. ■

Blackouts looming, California speeds battery deployment after Aliso Canyon gas leak

A recent article in *Utility Dive* explores the steps California is taking to mitigate the repercussions of the massive Aliso Canyon methane leak in the Los Angeles Basin last October.

Aliso Canyon is a repurposed oil field north of the San Fernando Valley that can store up to 86 billion cubic feet (bcf) of gas to distribute to homes, businesses and power plants. It took owner Southern California Gas four months to plug the leak, leaving only 15 bcf of gas in the field, and now there is a moratorium on further drilling. The loss of the ability and capacity to store gas, as well as the stored gas itself, has created reliability concerns for both gas and electric customers.

The California's Public Utilities Commission (PUC) issued a directive in May, freeing up utility funds that could be used to increase energy-efficiency programs. The state's action plan includes asking electric customers to reduce consumption, expanding demand response programs and calling for revised tariffs to encourage gas shippers to more tightly match supply and demand, thus reducing the need for storage.

Bringing storage online

Fast-tracking plans to build energy storage may be the most intriguing measure state agencies are pursuing to prevent possible service interruptions. In May, the PUC began the process for an expedited procurement solicitation for energy storage that could be in service Dec. 31, 2016.

At the time, San Diego Gas and Electric was already far along on a request for offers to fill its 2016 Preferred Resource Local Capacity Requirement. The PUC modified its original resolution, which did not mention SDG&E, to help the utility to find projects that could come online by the December deadline.

In the end, SDG&E selected a 30-megawatt (MW), 120-megawatt-hour (MWh) project in Escondido, and a 7.5-MW, 30-MWh project in El Cajon. The locations were chosen to alleviate electric reliability concerns associated



Before the natural gas leak last fall, the Aliso Canyon Gas Fields in Southern California could store up to 86 billion cubic feet of gas. The loss of the facility threatens to affect reliability in the region. (Photo by California Governor's Office of Emergency Services)

with Aliso Canyon.

AES Energy Storage will build both utility-owned projects, and has a long-term service contract with SDG&E covering the first 10 years of operation, to begin before Jan. 31, 2017. The projects will bid into the California ISO market.

The article is long, but is well worth your time to read. If successful, the Aliso Canyon Energy Storage Project would demonstrate a number of aspects of energy storage that utilities elsewhere might apply in their own regions. The circumstances that made the projects possible are specific to California, but utilities should be aware that energy storage offers them another potential tool for delivering reliable service. ■