

# BULLETIN

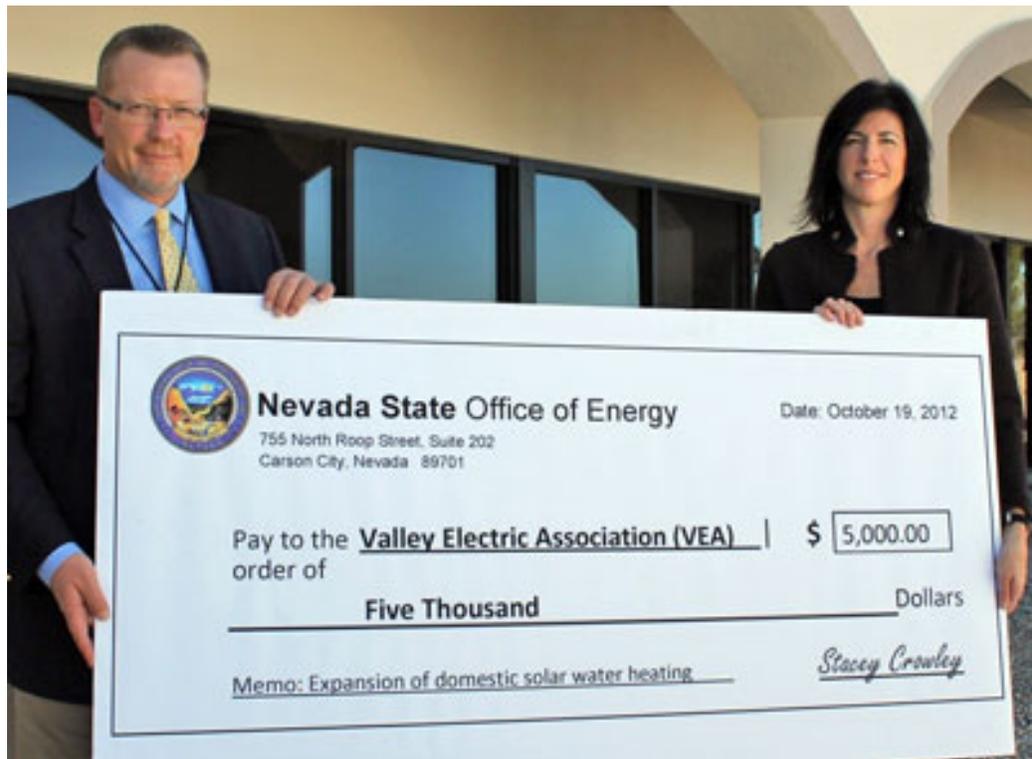
Western's monthly energy efficiency and planning newsletter dedicated to customer activities and sharing information.

## SOLAR WATER HEATING BUILDS NEVADA CO-OP'S RENEWABLE PORTFOLIO

Valley Electric Association (VEA) in Pahrump, Nev., is emerging as a leader in the next big trend in demand-side management (DSM) by doing a very old-fashioned thing—listening to its members.

“Our members wanted renewable energy, and solar water heating was the most cost-effective way to add renewables to our portfolio,” explained VEA Marketing Manager Tom Polikalas.

Since the co-op launched its innovative, “no money down, zero percent interest” loan program three years ago, 680 VEA members have installed solar water heaters (SWH) in their homes. Homeowners make the monthly loan payment on their systems with the savings over using either electricity or propane to heat water. The program is a saver for VEA, too, with the systems installed to date now shaving an estimated 340 kilowatts (kW) from the co-op’s peak load.



Valley Electric Association CEO Tom Husted accepts a \$5,000 check from Nevada State Energy Office Director Stacey Crowley. The state funds will help offset the slightly higher cost of upgrading homes from propane to solar water heating. (Photo by Valley Electric Association)

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### MEMBERS DRIVE PILOT

Polikalas attributes the program’s genesis—and its success—to VEA’s strong relationship with its members. The co-op has an Ambassador Program that boasts more than 200 members. The group works directly with the staff on policies, procedures and programs; enlists member support in shaping policy; and learns how legislation affects the utility and its members. Polikalas, a public

power veteran, observed, “I don’t think I’ve seen a membership group this active at other places I’ve worked. It is definitely not something a big investor-owned utility could replicate.”

Yet, initially, VEA’s size, non-profit status and low rates seemed to be a barrier to developing the large renewable energy projects that interested members. The Ambassadors brainstormed ideas with the VEA board,

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and determined that solar water heating was the renewable technology with the most potential to benefit both members and the co-op.

An 18-month pilot program VEA initiated in 2006, with Cooperative Research Network and 40 participants from the Ambassadors, confirmed that belief. Monitoring SWHs with TWACS (two-way automatic communications system) and Btu (British thermal unit) meters, the study found that each unit reduced coincident peak demand by .5 kW. Installing 1,000 units could shave half a megawatt (MW) off of VEA's peak.

Homeowners fared well, too, seeing an average 11-percent reduction in their annual electric bill. The system provided 85 percent of their hot water needs, and families using more than 60 gallons daily saved even more money. Those numbers looked good enough that 61 percent of the members who responded to VEA's survey about SWHs said they would want a unit within six months. It was time to put together the program.

### ASSEMBLING THE PIECES

The Ambassadors' Conservation Renewable Energy Committee (CREC)

played a central role in designing the program, researching business models, equipment and manufacturers, and presenting recommendations to VEA's board.

Rheem, a Minnesota-based manufacturer of high-efficiency heating and cooling equipment, was chosen to provide the active solar systems. The program offers a choice of four models—a 65-gallon unit for manufactured homes and three models for site-built homes ranging from 80 to 120 gallons.

Loan financing is coming from the National Rural Utilities Cooperative Finance Corporation. Rural electric utilities formed the financial cooperative in 1969 to raise funds from capital markets to supplement the utilities' loan programs. "CFC is an extremely valuable resource. As a co-op, it shares VEA's values of delivering outstanding service to its members at the lowest possible cost," Polikalas said.

Homeowners make their loan payments through on-bill financing for energy services. "This is VEA's first foray into on-bill financing, but utilities across the country are offering it more and more as a way to encourage and support deeper energy-efficiency improvements," noted Polikalas.

VEA retains the renewable energy credits (RECs) to offset its operating cost. The value of the RECs improves the economics of the program for the co-op itself. Nevada's Public Utilities Commission (PUC) administers the REC market, which was established as part of Nevada's renewable portfolio standard.

### CHOOSE CONTRACTORS WISELY

Encouragement and support notwithstanding, a utility energy-efficiency program needs qualified installers if it is to succeed. VEA CEO Tom Husted took on the task of selecting a general contractor. "The choice can make or break a program, so finding a committed, highly qualified general contractor is absolutely worth the time and attention of a utility's

senior managers," noted Husted.

That is no overstatement, given that the general contractor functions as the member's point of contact for the program. Providing the installation estimate, hiring all subcontractors, ensuring that certification and permitting requirements are met, assisting with system design and invoicing VEA are all part of the general contractor's responsibilities.

The general contractor hires local plumbers who employ certified solar water installers—of which there weren't many in Pahrump prior to the program. VEA and Great Basin Community College teamed up to change that with a training and certification program. So far, 11 trainees have graduated, and VEA estimates that its SWH program could create 40 to 60 jobs over the next 20 years. "Every single job is important to our community now. Part of a co-op's mission is local economic development, and we are proud that this program is creating jobs," said Polikalas.

### BIG AND GETTING BIGGER

Jobs are just part of the picture—VEA estimates that the 680 SWHs installed so far eliminate more than 2,000 tons of CO2 emissions annually. The program has kept hundreds of thousands of dollars in sales, payroll and tax revenue in the local economy, and drawn the praise of state and Federal officials, and even Ed Begley Jr.!

State agencies in particular have taken notice. The Nevada PUC asked the co-op to organize a workshop in October. Utility professionals came from as far away as Maryland to learn more about creating a domestic solar water-heating program. VEA is already planning another workshop for next fall.

By that time, even more members will be saving money with SWHs, thanks to a \$5,000 grant from the State of Nevada Office of Energy. The funding is specifically for replacing propane water heaters, and should help VEA reach its

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## ENERGY SERVICES BULLETIN

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Editor: Kevon Storie

Designer: Grant Kuhn



# CASS COUNTY ELECTRIC SUPPORTS CUSTOMER SOLAR PROJECT

John Bagu and his wife, Robyn, of Fargo, N.D., are taking personal energy independence very seriously, and their utility Cass County Electric Cooperative is helping them.

Since the Bagus fired up their 7.4-kilowatt (kW) solar array with storage batteries in September, most days it generates about 10 percent more electricity than they need. The surplus energy has been going on the local grid, thanks to Cass County's net metering and net billing policies. Customers with renewable systems can offset their electricity use, export the surplus and receive 5.25 cents per kilowatt-hour—the current rate paid by Minnkota Power Cooperative, Cass County's wholesale power supplier.

Bagu estimates a 20-year payback on his \$35,000 investment in energy independence, but the project is not about money—it's about living a net-zero carbon lifestyle. "We are trying to show that we can break our addiction to fossil fuels, even in winter in North Dakota," he explained.

## EFFICIENCY FIRST

Reaching such a lofty goal takes lots of preparation, and the North Dakota State University scientist did his homework. "When the Bagus first started looking into the idea, we went over their energy use," recalled Cass County Distributed Generation Engineer Troy Knutson.

Focusing on direct electrical consumption, Bagu monitored household energy use for a year with a BlueLine PowerCost Monitor. The device fits on top of the utility meter and displays energy use data. The information is also sent to a website where users can compare their use with each other. "The monitor gave us a very good idea of how much power each appliance used," Bagu said. "Our air conditioner turned out to be much more efficient than it was rated," he added proudly.

Lighting was a big user, so it was

out with the old 60- and 100-watt incandescent bulbs and in with new 6- and 7-watt LEDs, a move that saved more than 200 kWh per month. Although their furnace is a natural gas unit, covering the basement windows with a window cover helped cut down how often the electric fan kicked on. The Bagus also plan to upgrade to a high-efficiency electric water heater. "That was about the only measure left for them," said Knutson. "They managed to get their energy use down by about 20 percent or better."

"But most people can cut their use down by about 10 percent, just by being aware of it," Bagu pointed out.

## BUILDING THE BEAST

The efficiency measures weren't cheap—the lighting upgrade cost about \$1,000, and the window covers were a further \$700—but the investment paid off when it came to designing the solar array.

"After reducing our energy use, we were able to size the inverter smaller and use fewer panels," explained Bagu. "That saved us three or four times more than we spent on the lighting."

The Bagus' power system consists of 30 245-watt solar panels, along with the necessary inverter and controllers. In the basement, four 200-amp-hour sealed lead acid batteries are storing power for overnight and cloudy days. "The sealed batteries were more expensive but much safer, which was a big consideration since they are inside the house," said Bagu.

In its first 40 days of operation, the system has averaged about 30 kWh daily, a third of which goes back to the grid. Bagu is monitoring his generation closely and has identified some issues where the efficiency needs to improve, especially before taking the house off the grid. A simpler, grid-tied 5-kW system would probably be half the



The BlueLine Power Monitor helps consumers to better understand their home energy use. The Bagus identified behavior and appliance changes that allowed them to install a smaller solar array. (Photo by BlueLine Innovations)

price and more efficient under the right circumstances, he acknowledged, but the Bagus wanted the ability to go off-grid in an emergency.

## THE FUTURE

Bagu admits that he is less interested in leaving the grid now than when he started the project, though. "I like the idea of being able to produce electricity for my neighbors," he said. "It would be great to get a community mini-grid going someday where people had renewable energy generation units at their homes. Neighbors could send and receive excess energy from each other, depending on who needed it at the time."

There are other projects that must come first in the Bagus' quest to be fossil fuel-free. Replacing his home's natural gas furnace is one—Bagu is weighing options such as electric plenum heaters, solar thermal systems and electric space heaters. The house's shell might need some upgrades, too, he said, noting, "Although it was built in 2009, even new houses have a lot of room for improvement."

Replacing their gas-powered cars with electric vehicles is another high

See CASS COUNTY ELECTRIC, page 8

# HOLIDAY LIGHTS FACT SHEET GETS A FACELIFT

Of all the fact sheets Energy Services publishes, Holiday Lights is our most popular. Maybe it's because it offers a way to save money at a time of year when we seem to spend so much. It could be that switching to energy-efficient decorations is something consumers can do right now to conserve resources, without calling a contractor or applying for a loan. On the other hand, people may love the sparkly, sturdy lights for looks and convenience alone, and the energy savings are just gravy. Or maybe the answer is "all of the above."

## CORN BELT'S LED TRADITION

Whatever your customers' reasons, we update the fact sheet each year so that they have the latest information, and we want to make sure you know about it. Some of our customers don't need to be reminded, though. Jim Sayers, Energy Services director at Corn Belt Power Cooperative, is more likely to remind us. He gets in touch with Energy Services in early November to find out when the latest edition will be available. "We always include a link to it in our email newsletter for our member cooperatives around the holidays," Sayers explained.

The generation and transmission cooperative is a long-time champion of LED decorative lights, having offered rebates on them for five years. "The lights were much more expensive when we started, but members still like to save a little money on new decorations," said Sayers.

Corn Belt also uses the energy-efficient decorations as an incentive to participate in its annual "holiday lights" energy-efficiency campaign and survey. The survey explores consumers' interest in programs and measures to reduce energy use, and consumers who complete it are entered in a drawing for free lights,

such as an LED wreath, tree or light strings.

## LIGHT AT SPEED OF CHANGE

The marketplace has changed a lot since the first publication of Holiday Lights, and Energy Services tries to keep pace with those changes. The lights themselves have become more efficient, more durable and more affordable each year. Industry experts predict that LEDs are on to track to be the general lighting standard by the end of the decade—and not just for the holidays.

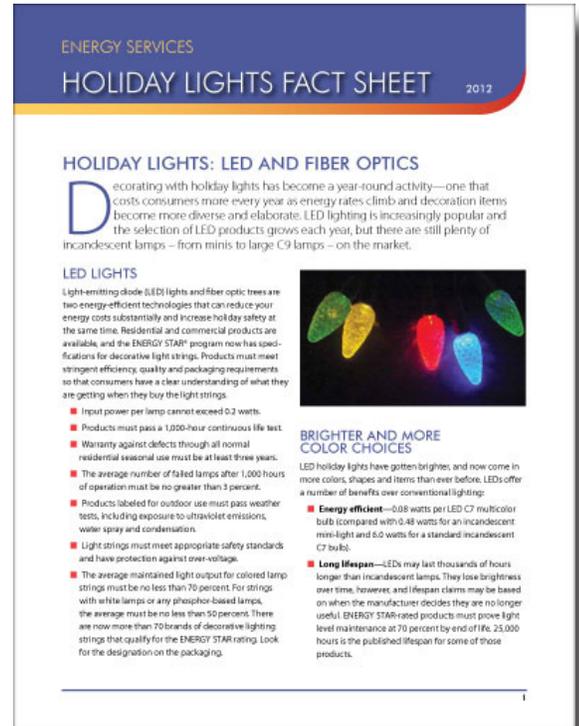
LED products are easier to find now than they were just a few years ago. Where the fact sheet once listed websites that sold the lights as a specialty item, it now provides a link to Energy Star's lengthy list of qualified brands. Just since our 2011 update, the list has grown from a little over 50 brands to more than 70, and includes many stores familiar to shoppers everywhere.

As for variety, consumers can choose from a wide range of bulb shapes and colors, string lengths and styles and specialty ornaments. There are LED decorations for Halloween, patriotic holidays or just to light up your next party.

## NEW LOOK, GREAT RESOURCES

Communications have changed, along with the marketplace. Energy Services used to print hundreds of fact sheets each year to make sure we had enough for customer requests. Now, most Western customers download the fact sheet from our website and print only as many as they need. There is space on the back page to imprint the utility logo and contact information, or you can send Energy Services

your information and we can set up a customized PDF for your utility. Or take a tip from Corn Belt and post the link in your online newsletter. No reason to cut down one more tree...



You might notice something else different about the 2012 Holiday Lights—the stylish new look. Over the next few months, Energy Services will be updating its publications with a sleek, modern design. Don't be surprised if you download an old favorite publication and it looks very different. The content is still the same carefully researched information, designed to help your utility meet its energy goals.

If you can't wait for a particular fact sheet in the updated formatted, let us know and we will move that one to the top of our list. Don't forget to send us your logo and contact information if you want a customized version. Happy holidays from Western's Energy Services! ⚡

For links to more resources, visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb3.aspx>

## TECHNOLOGY SPOTLIGHT:

# CONSIDER HIGH-PERFORMANCE WINDOWS FOR RESIDENTIAL APPLICATIONS

Homeowners often want as many windows as possible to frame views and bring light inside. Unfortunately, traditional windows literally create holes in the walls that protect the home from outdoor conditions. Many consumers are rightly concerned that older, code-minimum windows raise the price of keeping a home comfortable, but window performance is rapidly improving. Talk with your utility customers about high-performance window technologies currently on the market or coming soon—it could save them money and help you toward your load control goals.

Windows are a big investment that adds value and comfort to a home, so it is worth choosing carefully. Energy efficiency may not be most consumers' primary concern when "window shopping," but it is still likely to strongly influence their purchasing decisions. Help your customers by familiarizing them with the terms used to evaluate windows: U-factor, visual transmittance, window performance standards, and quality and workmanship.

### U-FACTOR

The amount of heat window glass transmits—the U-factor—measures the energy efficiency of windows. The lower the U-factor, the less heat moves through the window, meaning that less energy is needed to maintain the building's indoor temperature. A small difference in U-factor can have a big impact on energy use: customers who choose windows with a U-factor 0.2 instead of 0.3 can reduce the amount of heat loss through the windows by 33 percent.

Applying special coatings called low-emissivity, or low-E, to a window pane reduces the amount of heat that transfers through the glass, further lowering the window's U-factor.

### VISUAL TRANSMITTANCE

When choosing new windows, customers should also consider visual transmittance (VT), which indicates how much visible light the window transmits. A window with VT rating of 0.5 will let in only 50 percent of the visible light. High-performance windows with a VT rating lower than 0.5 are available for situations that call for low lighting, but to gain the benefits of daylighting, most homeowners will prefer windows with a VT of at least 0.5.

### PERFORMANCE STANDARDS

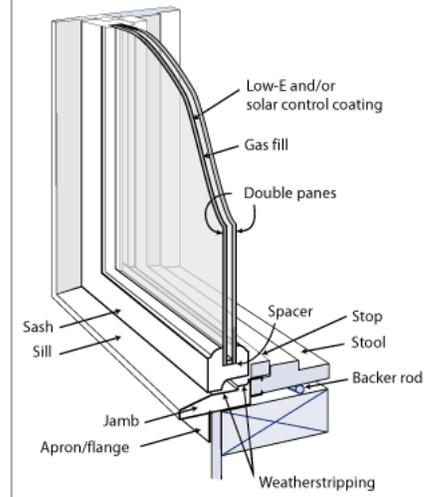
State and local building codes for homes dictate the minimum efficiency standards for windows, or the worst allowable performance. Performance standards are generally higher for homes that are part of energy-efficiency programs, or where the homeowner wants to qualify for utility incentives.

Yet even windows that meet all applicable standards may not provide the best performance. Remind your customers about these important considerations:

- Window size and type, solar orientation and micro-climates created by wind, shade, reflective surfaces, weather patterns and solar heat gain affect each window's energy performance. Encourage homeowners to hire a designer who can identify the best window specifications on different sides of the house to optimize performance.
- Occupant behavior determines how windows are used and how much energy is needed to maintain the desired temperature inside a home. Even the best high-performance windows will not help save energy if the homeowner leaves them open on a winter night.
- High-performance windows must be installed correctly to perform as

### Window Technologies

Energy-efficient window technologies are available to produce windows with the U-factor, SHGC, and VT properties needed for any application.



(Artwork by Energy Star)

intended and deliver the promised benefits.

### QUALITY, WORKMANSHIP

The quality of materials and workmanship used to assemble a window unit greatly affect its performance. The Efficient Windows Collaborative provides valuable information about how window components (glass, low-E coatings, frames, gas fills, spacers and operating types) contribute to window performance.

### MORE OPTIONS COMING

The high-efficiency window market is getting more crowded, as super windows will soon be sharing shelf space with smart windows and zero-energy windows. Compared to code-minimum windows, these new technologies can reduce heating and cooling losses by up to 50 percent annually.

Super windows, available now, have a U-factor of 0.20 or lower. They typically use three panes of glazing

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# UTILITY SOLAR HOT WATER INITIATIVE

<http://www1.eere.energy.gov/buildings/ush2o/>

According to the Department of Energy, solar water heating (SWH) can save consumers up to 50 percent on annual hot water bills compared to a standard efficiency water heater. Utilities with established SWH programs report demand savings in the hundreds of millions of kilowatt-hours (kWh). Even so, the technology has yet to gain widespread penetration in the U.S. market. DOE's Building Technologies Program is out to change that with the Utility Solar Water Heating Initiative (USH2O).

USH2O works with a coalition of utilities and the solar thermal industry to increase the use of solar thermal technologies on a large scale. The two-year-old initiative advocates applying solar water heating programs to meet renewable portfolio standards, and including the water heating systems as an option in green pricing programs.

## UTILITIES GET INVOLVED

The fastest uptake of SWH technology is currently at the utility level, and USH2O seeks to encourage that trend by enlisting more utilities as partners. Western customers Sacramento Municipal Utility District and Salt River Project are on that growing list. These utilities are piloting SWH programs and are ready to share their experiences with other power providers.

Some forward-thinking utilities have moved past the pilot stage to offer residential customers solar water heating options. Valley Electric Association in Pahrump, Nev., has garnered a lot of attention for its three-year-old program, while Hawaiian Electric Company has enjoyed success—and savings—since 1996.

SWH systems are not only for residential customers—businesses that

use lots of hot water can be some of the biggest savers. USH2O's list of commercial projects gives a comprehensive picture of the types of large industrial customers who could benefit from the application.

Collecting feedback from utilities on their experiences with the technology is another important part of USH2O's outreach. Visitors can submit descriptions for both residential and commercial projects to the initiative's database.

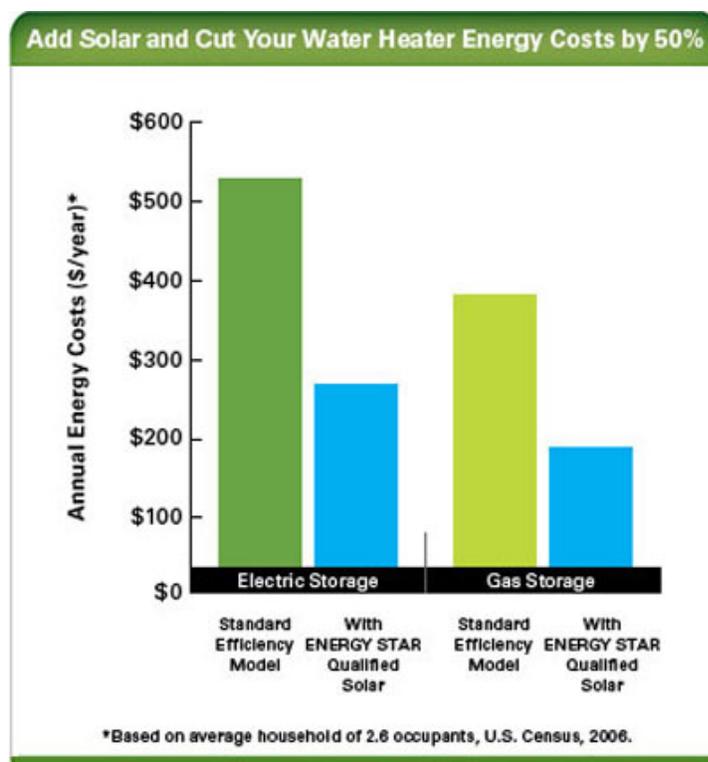
## EDUCATE YOURSELF

For utilities that want to learn more about SWH before launching programs, USH2O's publications library offers technical briefs, case studies and business plans. Visitors can also

download presentations from past USH2O meetings and conferences, and DOE workshops.

If your utility is ready to take the next step in creating a SWH program, you can obtain a copy of the software USH2O developed to provide utilities with a preliminary financial analysis of the benefits. Contact Chip Bircher, the USH2O coordinator, at 920-498-7100 for more information.

In addition to assisting utilities with designing programs, USH2O is working with stakeholders to lower costs, improve the technology and build a qualified workforce. To explore these issues in depth, visit the Solar Rating and Certification Corporation and Solar Energy Industries Association, two active partners in the initiative. ⚡



Residential customers can save money by adding a solar water heating system to their homes. (Artwork by Energy Star)

For links to more resources, visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb5.aspx>

## Technology Spotlight

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and are highly insulative compared to standard or even ENERGY STAR-rated windows, which have U-factors between 0.30 and 0.60. Some extremely high-performance windows, such as those serving the Passive House market, are in this category.

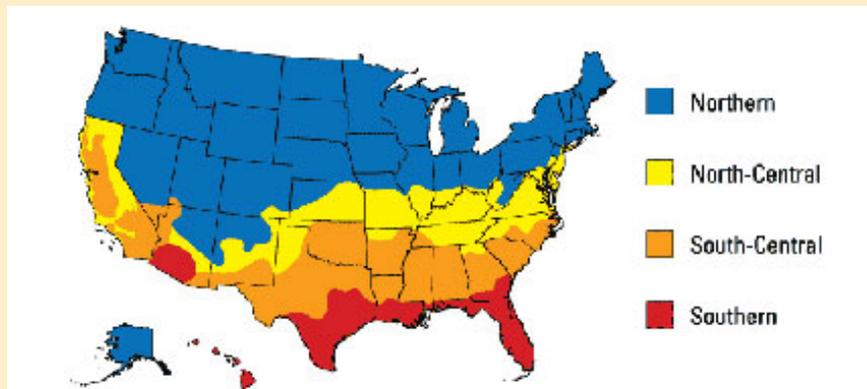
Smart windows, or dynamic windows, are expected to enter the residential market within the next few years. The special glass in these windows changes tint or reflectivity using one of three technologies:

- Electrochromic glass, which employs a small electric current
- Thermochromic glass, which automatically responds to the sun's heat on the glass
- Photochromic glass, which responds when sunlight hits the glass

Net-Zero-energy windows, with a U-factor of 0.1, control energy gain and loss with technologies that can adjust to weather and light conditions. In the right application, these windows can save, or sometimes produce, as much energy as they use, hence, "zero energy." Developers are currently working to overcome manufacturing and cost challenges.

### WINDOWS IN BULK

The Department of Energy's Windows Volume Purchase Program encourages higher production of efficient windows at more affordable prices. The windows in this program have a U-factor of 0.2 or less, and low-E storm windows are also available. Targeting contractors primarily, the program has a minimum purchase requirement. However, the minimum quantity may be as few as 15 windows, so the purchase for some single homes could qualify.



Windows and skylights protect you from the elements just like a winter coat. But like a winter coat, you should pick the windows and skylights that make the most sense for your climate. While some windows and skylights are better at keeping you warm, others excel at keeping you cool. Performance criteria for windows and skylights are based on these climate zones and NFRC-certified ratings. (Artwork by Energy Star)

### ADDITIONAL INFORMATION

- *Zero Energy Windows*  
Lawrence Berkeley National Laboratory and U.S. Department of Energy, May 17 2006
- *The Efficient Windows*  
Collaborative window selection guides by state and code factsheets
- *Windows, Doors & Skylights*  
U.S. Department of Energy
- *High Performance Windows Volume Purchase Program*  
U.S. Department of Energy
- *Windows and Doors R&D*  
U.S. Department of Energy
- *Database of State Incentives for Renewables & Efficiency*  
Passive House Window Suppliers
  - Zola European Windows
  - H Window
  - Fibertec
  - Serious Windows
  - Thermotech

### U-FACTOR VS. R-VALUE

Customers sometimes ask why the insulation value of windows is expressed as U-factor or U-value, while the insulation value of walls, ceilings and floors is called R-value. The U-factor is the important number for calculating heat loss. The R-value is the inverse of the U-factor. That is,  $R=1/U$ , and  $U=R/1$ .

In describing insulation effectiveness, R-values are easier for customers to remember and understand, and they are additive. If you put an R-13 ( $U=0.077$ ) batt over an R-19 ( $U=0.053$ ) batt, that equals R-32 insulation. U-factors do not add so easily:

$$1/U_{eq} = 1/U_1 + 1/U_2 \text{ or}$$
$$U_{eq} = (U_1 + U_2)/(U_1 \times U_2).$$

The National Fenestration Rating Council (NFRC) provides ratings that apply to the entire window assembly and calculate a composite rating based on the U-factor of the center of the glass and at the frame. This rating can help consumers accurately compare window options.

For links to more resources,  
visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb4.aspx>

## Nevada co-op

from page 2

goal of installing 1,000 residential solar units. "Propane is a little more expensive to convert than conventional electric," Polikalas explained.

Either way, members, the community, the environment and Valley Electric Association win with

solar hot water heaters, and the co-op is more than willing to share what it has learned. Obviously, VEA's model isn't going to work for every utility, but it shows that size doesn't have to stand in the way of developing clean energy. With a little creativity and a lot of member support, even small co-ops and municipalities can become renew-

able energy leaders.

Utilities that can't make it to Pahrump, Nev., or can't wait to learn more about residential and commercial solar hot water programs, should check out Department of Energy's Utility Solar Water Heating Initiative. ⚡

For links to more resources, visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb1.aspx>

## Cass County Electric

from page 3

priority, along with installing home charging stations. "You can't get to zero carbon unless you do something about transportation," Bagu stated.

He calculated that two gas cars using 40 gallons of gas per month, consume more energy than his whole house does. Electric cars are around 90 percent efficient, compared to the 30-percent efficiency of gas cars, so they use a lot less energy to go the same distance.

However, the Bagus would need to add more generation to charge electric cars at home—this time, wind. Residential wind turbines are not uncommon in Cass County's territory, and the utility has a small wind cash flow calculator on its website. "Of the 28 renewable energy systems customers have installed, 17 are wind turbines," said Knutson. "Most of them are on farms, though."

With the help of NDSU students, Bagu set up an Urban Green Energy anemometer and weather station on his roof. Over the last year, the station measured wind speeds

averaging 8 to 11 mph. He calculates the resource would generate enough electricity to charge two cars and supplement his home power supply on cloudy days and during the evening.

### WINTER IS COMING

In the near term, however, the Bagus' solar array must take them through the North Dakota winter. Their routine of not using multiple large electrical appliances at once should help. Also, the dark-colored solar panels absorb heat, so snow accumulation shouldn't be a big problem. "Germany is one of the top solar power producers in the world," Bagu said. "If they can do it there, we should be able to do it in North Dakota."

Cass County will be watching, too. Knutson plans to monitor the Bagus' energy use and production throughout the winter. "This is an opportunity to increase our understanding about residential solar power in our territory," he said. "We'll be able to share what we learn with other customers who are interested in solar, even if they don't plan to go off-grid."

### AN EDUCATIONAL EXPERIENCE

The Bagus are happy to share their experiment in solar self-sufficiency with Cass County Electric. "North Dakota utilities don't have to accept renewable energy generation from their customers, but Cass County has been very accommodating," said Bagu.

The Bagus are excited to be pioneering what they see as the next step in the evolution of modern energy use, not just personally, but also professionally. "I just found out that I will start teaching a new renewable energy and electric vehicle course at NDSU in the spring semester," he said.

Bagu added that it's time for society to move away from fossil fuels and toward the more sustainable direction of renewable energy. "Education is essential for changing directions," he declared.

Energy Services will be following the Bagus through the winter, too. Watch for updates on Breaking News, or bookmark their blog, Glad to be Green. ⚡

For links to more resources, visit <http://ww2.wapa.gov/sites/western/es/pubs/esb/Pages/esb2.aspx>