

## Consumer-Centric Programs that Promote Electrification: *Leasing Water Heaters and Other Strategies to Meet Consumer Needs with Electric Water Heaters*

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### ARTICLE SNAPSHOT

#### ***What has changed in the industry?***

Water heating is an important year round energy use in homes and buildings that provides stable and reliable load for electric systems when a member-consumer chooses to use electricity to meet water heating needs. Water heating is becoming a more important tool for demand response because of smart, new technology; an increased interest in home/premises energy management; and the growth in regional wholesale markets. Managing water heating load has the potential to smooth out the growing supply of intermittent solar and wind generation. A new development is a multimillion dollar campaign by the propane industry to encourage consumers to unplug electric water heaters and replace them with propane water heaters. This not only has implications for load control programs, but also could affect an important revenue source for electric cooperatives.

#### ***What is the impact on cooperatives?***

According to Forbes, 63 percent of Americans do not have enough savings to cover a \$500 emergency. Unfortunately, replacing a failed water heater can be \$1,000 or more, which gives co-ops an opportunity to provide some assistance and make a meaningful improvement to the member-consumer's quality of life. Co-ops that are proactive about helping their member-consumers install electric water heaters with load control abilities can make progress toward demand response and member satisfaction goals. Co-ops that do not proactively address water heating could see more water heating load converted to propane or natural gas — or members installing electric water heaters that cannot be easily controlled. A consumer who switches water heater load away from electricity also may choose to switch other products like space heating and cooking equipment.

*Continued*



**ARTICLE SNAPSHOT (CONT.)*****What do cooperatives need to know or do about it?***

Co-ops desiring to grow or even maintain the flexible and stable water heater load should have a strategy to help members make a well-informed choice when they replace a water heater. Programs that offer assistance with upfront costs and maintenance of water heaters ease the pain members feel when faced with the expensive but necessary replacement of a water heater. Many co-ops are already leaders in promoting water heaters to their member-consumers. Co-ops should also consider the role of water heater programs as part of an evolution toward home or premises energy management in partnership with interested member-consumers. This article describes several controllable water heater programs that reduce upfront and ongoing costs to their members, as they help co-ops meet demand response challenges. Considerations for launching a controllable water heater program are also offered.

**THE CASE FOR CONTROLLABLE WATER HEATER PROGRAMS**

Consumers have many choices when it comes to selecting a water heater. Water heaters can use on-site fossil fuels like propane and natural gas, be tied into the electric grid, or be heated with solar energy. If they are electric water heaters, they can be electric resistance storage water heaters, on-demand tankless water heaters, or increasingly, heat pump water heaters (see textbox on *Large-Capacity Grid-Enabled Water Heaters*).

**LARGE-CAPACITY GRID-ENABLED WATER HEATERS**

In 2015, new efficiency standards for water heaters went into effect that would have essentially required any electric water heater over 55 gallons to be heat pump-enabled. This change would have hampered many co-ops' demand response programs, which rely on large storage electric resistance water heaters as grid assets. However, in 2016, NRECA and other stakeholders were able to successfully push for legislation that established a new product category for large-capacity (75+ gallons) electric resistance 'grid-enabled' water heaters for residential demand response applications. These grid-enabled water heaters will be made available starting in 2017 and many co-ops will likely want to promote these water heaters at the point of replacement. NRECA will provide more guidance on this new product in a future *TechSurveillance* update.

There are three primary reasons why a co-op may want to offer a program that reduces the upfront cost of an electric resistance storage water heater either via a leasing program or another offering:

**1. Water heater replacement support is a valued member service**

Eighty-two percent of all water heater sales are emergency replacements (E Source, 2016). At a failure rate of about 8 to 10 percent per year for standard water heaters, most co-ops will have hundreds of members dealing with emergency replacements of their water heaters each year (NEEA, 2015). In an emergency replacement scenario, consumers want to restore their hot water quickly and are often overwhelmed by the large unexpected expense — and costs are growing. On a national level, the average cost of a water heater replacement and install is between \$725 and \$1,261 (HomeAdvisor, 2016). Because it is an unexpected and relatively high expense, many co-op members, especially lower income members, are likely to be highly receptive to water heater programs that help reduce or eliminate the high upfront cost of replacing a water heater. As stated earlier, 63 percent of Americans do not have enough savings to cover a \$500 emergency. Due to these factors, co-ops with water heater programs report high levels

Staying with or switching to electric water heaters has benefits for members, the co-op, and the environment.

Water heaters offer significant demand response potential and are one of the most cost-effective energy storage solutions currently available.

of member satisfaction with the programs, as illustrated by the examples provided starting on [page 4](#).

## 2. Water heater programs help maintain electric load

Water heaters comprise approximately 17 percent of household energy use, making them the second-largest source of residential energy consumption (E Source, 2016). Water heaters are an important part of most co-ops' electric load; however, more and more co-ops are seeing competition from natural gas and propane for water heating load. For example, in early 2016, the Propane Education & Research Council launched a \$10 million campaign to steer consumers away from electric water heaters (ECT, 2016). If buying a natural gas or propane water heater is an option for a co-op member, they may explore other fuel options at the point of replacement — even if their previous water heater was electric. However, there are benefits

to staying with or switching to an electric water heater for the member, the co-op, and the environment:

- For the member, use of a less price-volatile fuel source;
- For the co-op, a strengthened electric load that helps maintain the distribution system; and
- For the environment, water heaters are using an increasingly clean energy-based electric grid, instead of fossil fuel.

Co-ops can proactively communicate this range of benefits to member-consumers to convince them to stay or switch to an electric water heater.

## 3. Water heater programs offer co-ops demand response and energy storage benefits and are a key component of home/premises energy management

Water heaters offer significant demand response potential and are one of the most cost-effective energy storage solutions

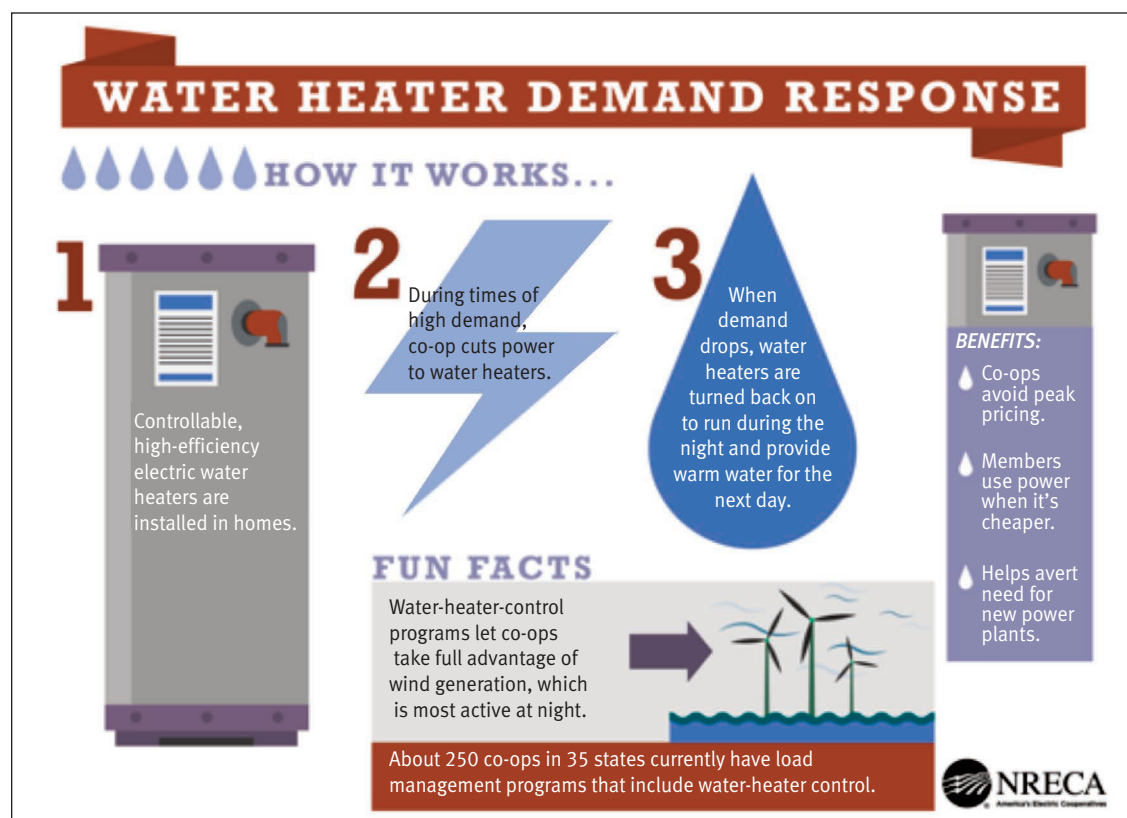


FIGURE 1: Illustration of Water Heater Demand Response and Its Benefits

currently available: water can be heated at any time of day, remain hot for many hours, and be used at a later time (E Source, 2016).

To reap demand response, or load control, benefits from water heaters, many co-ops curtail power to electric water heating, either on an ad-hoc basis or on a daily basis. Programs interrupting power to water heaters typically install a load control device on the water heater that responds to a radio or power line carrier signal. In turn, members receive a financial incentive for participating in the load control program. NRECA estimates that over 250 co-ops in 35 states use large-capacity electric resistance water heaters to reduce demand by an estimated 500 megawatts (MW), resulting in hundreds of millions of dollars in cost savings to co-op members (ECT, 2016). For example, building a 175 MW natural gas peaker plant to help meet peak demand would cost between \$100 and \$200 million — co-ops implementing these demand response programs can help avoid these high costs. NRECA has worked with utility groups, environmental groups, and manufacturers to promote water heating as a “community storage” technology that can help keep costs to consumers low (see Figure 2).

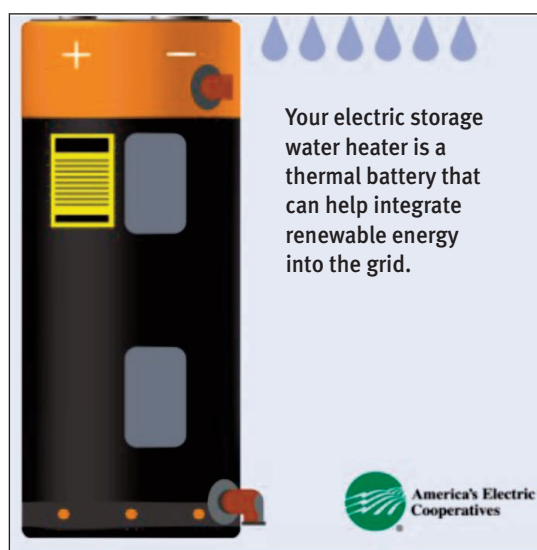


FIGURE 2: Example Messaging From NRECA

Another *TechSurveillance* article, [Implementing Community Storage Programs](#), describes different approaches to managing community assets, including water heaters.

Some utilities are also considering how to use water heaters to store increasingly available renewable energy resources. According to a recent report from the Rocky Mountain Institute, “water heaters charging up at night could use wind energy that would otherwise be curtailed, or daytime solar that would otherwise be exported for less-than-retail compensation in certain markets (RMI, 2016).” For example in Hawaii, which has some of the highest concentrations of distributed solar photovoltaic (PV) in the United States, utilities are piloting grid-enabled water heaters to increase daytime minimum load to align with PV output.

### EXAMPLES OF CO-OP WATER HEATER PROGRAMS

Co-ops can use various program models — leasing and financing offerings, rebates, and giveaways — to promote efficient electric storage water heaters that can be used for load control. These program models also help bring down the initial cost of the water heater for member-consumers. The following are examples of some co-ops around the country offering water heater programs to their member-consumers.

#### Leasing Can Be a Tool to Incentivize Electric Water Heaters

Some co-ops lease water heaters to their member-consumers. Though the water heater is in the member-consumer’s home, the co-op owns the water heater and provides it as a service, either for free or for a low monthly fee. The co-op covers the installation cost and any needed maintenance on the system. Leasing programs can quickly put a new water heater in the home of a member-consumer with little to no upfront investment and strengthen the connection between the co-op and the mem-



**NAEC highlights the benefits to consumers of a quality, energy efficient water heater at an affordable monthly fee, and peace of mind with co-op installation and repairs.**

ber-consumer by setting up an ongoing maintenance relationship.

The following are examples from three co-ops with water heater leasing programs.

#### ***North Arkansas Electric Cooperative (Arkansas)***

North Arkansas Electric Cooperative (NAEC) serves approximately 36,000 members in Northern Arkansas. The co-op launched a water heater leasing program in 2001, in response to a proposal from an equipment manufacturer. The lease payment is \$12 per month for a 50 gallon or less water heater, and \$15 per month for an 85 gallon or larger water heater. As of October 2016, more than 4,000 members had participated in the water heater lease program, or over 10 percent of the co-op membership, and over 2,500 members were currently leasing water heaters from the co-op, representing about \$30,000 in monthly revenue to the co-op. NAEC's CEO, Mel Coleman said, "North Arkansas Electric Cooperative's water heater leasing program provides our members with an invaluable service. For an affordable monthly fee, they receive a quality, energy efficient Marathon water heater and the peace of mind knowing that their co-op has a stress-free process to take care of the installation and any future repairs."

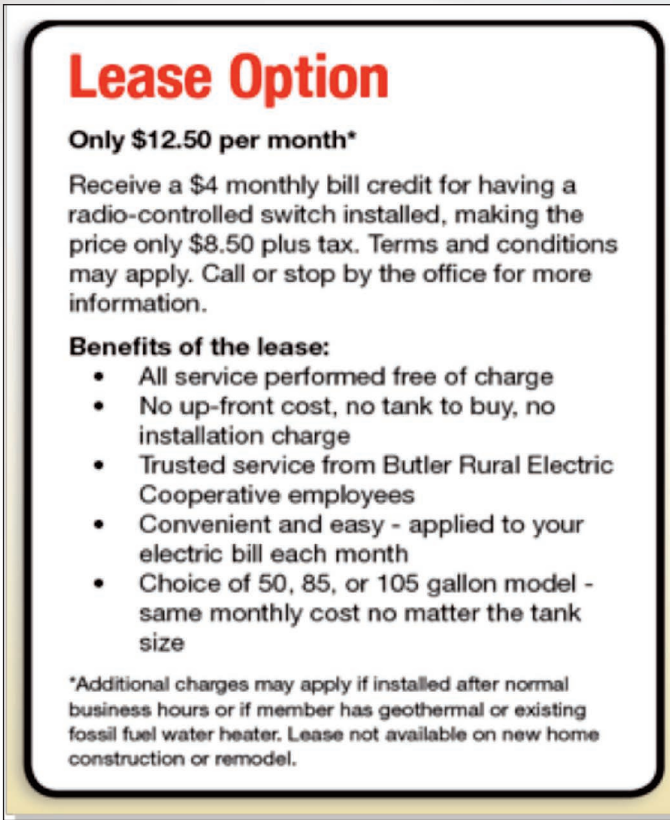
Leased systems are also enrolled in the co-op's demand response program, which credits members \$2.25 per month during the peak months of June through September. During these months, the co-op can turn off the water heaters for up to four hours during peak periods; generally, there are 10 to 20 peak events annually. Overall, the co-op's demand response program controls approximately 7,500 electric water heaters and, in combination with load control on central air conditioners, the program saves the co-op approximately \$400,000 per year.

NAEC sometimes purchases water heaters through Arkansas Electric Cooperative, their G&T, but otherwise implements the program

without G&T involvement. NAEC relies on local plumbers to help promote and implement the water heater leasing program. The co-op contracts with plumbers in the service area to perform water heater change-outs and ongoing maintenance. Any additional installation service (e.g., moving a water heater and piping from one location to another) is paid by the member directly to the contractor. This relationship between NAEC and its contractors has been positive for the co-op and a benefit for members — generally, plumbers are able to get a new water heater to a member within 24 hours of a member signing a lease agreement with NAEC, with little to no upfront cost required of the member. Sherry Jackson, Member Service Coordinator at NAEC, shared that member-to-member promotion of the program, in addition to co-op advertisements, has also prompted many member-consumers to participate — sometimes even ahead of their water heater failing (NAEC, 2016/Jackson, 2016).

#### ***Butler Rural Electric Cooperative (Ohio)***

Butler Rural Electric Cooperative (REC) serves more than 11,500 member-consumers in a four-county region of Southwestern Ohio. Since the 1970s, Butler REC has run a load-control program for electric water heaters: electric water heaters can be turned off during peak hours for just a short interval or through the entire peak period, which could be more than four hours, depending on the system peak situation. Switching the water heater off between 2:00 p.m. to 6:00 p.m. is fairly typical (Snyder, 2016). Butler REC determines the incentive after looking carefully at the importance of managing water heater load and how the demand savings compare to other programs. Member-consumers receive a \$4 monthly bill credit. As of October 2016, 5,671 member-consumers participated in the load control program, or almost half of the co-op's membership, and in 2016, there were 19 peak load events that triggered the load control switch. The co-op's power supplier estimates that



**Lease Option**

**Only \$12.50 per month\***

Receive a \$4 monthly bill credit for having a radio-controlled switch installed, making the price only \$8.50 plus tax. Terms and conditions may apply. Call or stop by the office for more information.

**Benefits of the lease:**

- All service performed free of charge
- No up-front cost, no tank to buy, no installation charge
- Trusted service from Butler Rural Electric Cooperative employees
- Convenient and easy - applied to your electric bill each month
- Choice of 50, 85, or 105 gallon model - same monthly cost no matter the tank size

\*Additional charges may apply if installed after normal business hours or if member has geothermal or existing fossil fuel water heater. Lease not available on new home construction or remodel.

**FIGURE 3: Excerpt from Butler REC Bill Insert**

**Butler REC member services representatives mention their water heater program as a benefit when members sign up for service or call with questions.**

each water heater that participates in the program has a reduced load of approximately 0.25 kW during a typical late summer peak period.

Since 2001, Butler REC has offered a coordinated program in which a member-consumer can purchase or lease a Marathon electric water heater from the co-op. Butler REC's G&T, Buckeye Power, sometimes supplies water heaters and offers incentives, but was not involved in the development of the lease program. With the lease option, member-consumers do not pay any installation fees or other up-front costs. Butler REC employees install the water heaters and provide any needed maintenance. A member-consumer who chooses to lease the water heater from Butler REC pays a monthly fee on their electric bill and is enrolled in the load control program. As of October 2016, 867 member-consumers are participating in the

leased water heater program, or about eight percent of the co-op's membership. Co-op member-consumers know to call the co-op about this program when their water heater fails: the co-op markets the water heater program through its website, bill inserts (see Figure 3), and monthly magazine. In addition, member service representatives mention the program as a benefit when a member signs up for service or calls with a question relevant to water heaters.

"We started offering the water heater leasing program as a way to provide a value-added service to our membership," shared Lisa Staggs Hermann, Manager of Member & Community Relations at Butler REC. Member-consumers do not pay any initial cost when replacing their electric water heater and do not have to factor in additional costs of installation and maintenance. In addition, the co-op is able to provide quick service — generally, member-consumers who participate in the program are replacing a failed water heater and are thus looking for a quick restoration of service. If the member-consumer calls during a weekday, Butler REC is generally able to send their installer for a change-out on the same day. Member-consumers have also expressed confidence that the water heater is installed correctly because of the co-op involvement — co-op staff electricians install the systems. An added benefit is that these staff electricians can complete other small home electrical projects.

### **High West Energy (Wyoming, Nebraska, Colorado)**

High West Energy is a co-op serving approximately 6,500 member-consumers in Wyoming, Colorado, and Nebraska. Prompted by Brian Heithoff, the co-op's CEO and General Manager, and his past experience with successful water heater programs, High West consulted with their Relationship Manager at Tri-State G&T and launched its WATT-ER WISE program

**“Members appreciate that, through this program, they can help lower their direct costs, as well as the co-op’s costs — which also helps the members.”**

*— Joy Manning,  
Energy Management  
Advisor at High West.*

in February 2015. High West Energy analyzed costs and benefits to determine a win/win scenario for the co-op and for its members. Under this program, a member converting from a natural gas or propane water heater can receive a 50- or 85-gallon Rheem Marathon electric water heater from the co-op. High West’s subsidiary, High West Wiring, which was created to address a shortage of qualified electricians in the area, installs and maintains the water heater. High West Energy owns the system and was shutting off the water heaters for a few short intervals each day. In January of 2016, the co-op changed their approach and now switches off the systems from 3:00 p.m. to 10:00 p.m., Monday through Saturday. High West Energy has not received a single complaint about the new approach. Participants even promoted the program to other members at the annual meeting. Moving kilowatt-hours off the peak has helped save the co-op \$31,000 annually in power costs.

The co-op does not market the water heater program as a leasing program, but as the co-op owns the water heater and provides it as a service to member-consumers, it operates in the same fashion. (Member-consumers who need to replace an existing electric water heater can purchase a new discounted Rheem Marathon water heater from High West and can choose to participate in the co-op’s load control program, paying a reduced off-peak electric rate.)

High West markets the program on its website and social media outlets, through bill inserts, and in its monthly newsletter. Since the program launched in early 2015, 57 member-consumers have switched from a fossil fuel water heater to an electric storage water heater. Co-op staff considers the program successful so far, both in terms of helping member-consumers switch from a price-volatile fuel like propane and in educating member-consumers about peak usage hours. “Members appreciate that,

through this program, they can help lower their direct costs, as well as the co-op’s costs — which also helps the members,” shared Joy Manning, Energy Management Advisor at High West.

### **Other Program Models for Water Heater Promotion**

There are other water heater program promotion strategies that can help member-consumers receive new storage electric water heaters at a lower initial cost: giveaways, rebates, and financing. A co-op could offer these incentives in conjunction with a value-added service like installation or ongoing maintenance and can connect participation in these programs to water heater load control programs. Below are some examples of co-ops implementing different electric water heater promotion programs around the country.

#### **Water Heater Giveaways**

With a water heater giveaway program, a co-op provides the member-consumer a new water heater, in exchange for participating in the co-op’s demand response program. For example:

- Northwestern Rural Electric Cooperative in Pennsylvania will install a new Marathon water heater in the home of a member and provide 24/7 service in exchange for participation in the co-op’s peak demand response program (King, 2016).
- Steele-Waseca Cooperative Electric in Minnesota links its G&T’s thermal storage water heater control program with the co-op’s community solar program. Steele-Waseca will provide a free 105-gallon water heater to any member-consumer who participates in the thermal storage program and also allows the member-consumer to purchase a panel in the co-op’s community solar garden at a substantially discounted price (Briggs, 2016/RE, 2015).

Note that state law may impact a co-op’s ability to provide this offering.

### ***Rebates or Discounted Purchase***

With a rebate or discounted purchase program, the co-op is able to bring down the upfront cost of a new electric water heater, whether purchased from the co-op or elsewhere. For example:

- Butler REC, discussed above, also offers a purchase option. Member-consumers who purchase their water heater from Butler REC can do so at a lower price than at a local hardware store. A member-consumer switching from a fossil-fuel water heater can purchase the water heater at an even lower price, if they agree to participate in the co-op's demand response program (Butler, 2016).
- Jasper County Rural Electric Membership Cooperative in Indiana will provide a \$250 bill credit to any member-consumer who installs a 30-gallon or larger electric water heater. The co-op will further provide free parts and service to these water heaters, if the member-consumer allows the co-op to install a demand response switch (Jasper, 2016).

### ***Financing and Payment Plans***

With a financing program or payment plan, the co-op is able to break the initial high cost of a water heater into manageable payments. These programs differ from a lease program in that the homeowner owns the water heater and the co-op may not provide free maintenance on the system. For example:

- Horry Electric Cooperative, Inc. in South Carolina provides no-interest on-bill financing for 12 months to qualifying member-consumers who install a 50-gallon or larger electric water heater with a load control device (Horry, 2016).
- North Arkansas Electric Cooperative, discussed above, will allow member-consumers who instead want to purchase an electric water heater to use its on-bill financing program, which finances a purchase at three percent for up to five years (NAEC, 2016/Jackson, 2016).

## **IMPLEMENTING A CONTROLLABLE WATER HEATER/"COMMUNITY STORAGE" PROGRAM**

More than 250 co-ops around the country control water heaters for demand response. Many of these co-ops offer incentives to encourage member-consumers to stay with or switch to a highly efficient electric storage water heater. If your co-op is considering starting a controllable water heater program, below are considerations and questions that could help as you design and implement your program:

### **Designing and Launching Your Program**

#### ***Determine your need for a controllable water heater program***

- Does your co-op/G&T need more controllable load?
- When your member-consumers need to replace a water heater, what other fuel options do they have? Is there a marketing campaign in your service territory promoting propane water heaters?

#### ***Consider program costs and revenue streams***

- What are the likely major cost components of your program (e.g., cost of the water heaters, staff time)?
- What are the major revenue recovery components (e.g., revenue from leasing payment, increased electricity sales, reduced wholesale power expenses)? Will your G&T reap an additional benefit if peak use is reduced? Does the G&T sell aggregated demand response resources or capacity through wholesale markets?
- What is the life cycle over which you would load control systems, considering when they might obsolete as technology advances?

#### ***Consider program design and implementation support resources***

- Would your G&T help with the design or implementation of your program? Are there other co-ops in your region that you could collaborate with on program design or implementation?



- Water heater manufacturers may be able to help you design and launch your program. For example, some manufacturers have provided program business plans, leasing agreements, and plumbing guidelines that co-ops customized when creating their own programs. Some manufacturers, such as Rheem Marathon, will also rebate a percentage of water heater sales for use in co-op advertising.
- Will your program be open to all member-consumers, or just a subset? For example, High West Energy originally only had incentives for member-consumers switching from propane and natural gas water heaters, but those replacing existing electric water heaters had heard about the program and were also interested in participating in the co-op's load control program. High West now offers these member-consumers a discount on the purchase of a new water heater and the opportunity to participate in the load control program.
- Determine if your program will involve working collaboratively with contractors and plumbers and/or hiring an on-staff installer, and what kind of agreement needs to be developed. As you consider this point, keep in mind that plumbers influence about 60 percent of all new water heater sales (E Source, 2012).
- Determine any advertising or promotions through local water heater retailers.
- If operating a lease or financing program, determine what happens to the water heater if the homeowner sells their home during the lease or financing period. For example, the water heater could be paid off as the home is sold, a new homeowner could assume the lease or finance charge, or the co-op could remove it from the home.
- Co-ops should consider the possibility that a member may finance or lease a water heater (assuming a co-op chooses that option) and then not pay their bill, even to the point of

disconnection of service. A leased piece of equipment in a default payment situation adds another layer of complication to billing.

### Preparing Your Staff for Program Launch

- All member services staff should be trained to answer questions about the program and it is helpful for them to have some basic understanding of how water heaters work. For example, North Arkansas Electric Cooperative requires member service representatives to have a basic training related to plumbing and water heaters.
- Your co-op's accounting department will need to be involved in order to do utility bill history checks, track lease agreements, issue payments to contractors/plumbers, and issue rebates or add a leasing or financing line item to bills or separate statements.
- Many co-ops with water heater leasing programs buy water heaters in bulk and then store them, which means a co-op staff person would need to be responsible for inventory management and storage.

### Marketing your Program

- Develop a webpage on your co-op's website that describes the program and gives clear information about how the member can participate in the program and eligibility requirements.
- Many water heater programs report very high levels of member satisfaction. Gathering testimonials from member-consumers may be one of the best ways to promote your program.
- Develop bill inserts and advertisements for any newsletters that co-op member-consumers receive.
- Provide stickers that co-op members or co-op energy auditors can affix to an existing water heater to suggest calling the co-op if a replacement water heater is needed. (See [Figure 4](#); East Central Energy)

- Educate any local plumbers or other relevant contractors your co-op works with about your program so that they can educate their customers.



**FIGURE 4: East Central Electric Water Heater Sticker**

- Educate local water heater retailers and explore marketing opportunities.

#### Evaluating your Program

- How will you measure the success of your program? Will you track changes in energy use, demand savings, financial benefit to the member-consumer, financial benefit to the co-op, or changes in member satisfaction?
- Post-installation surveys are a great way to evaluate the impact of your program and identify process improvement opportunities. For example, how did member-consumers hear about the program? How satisfied were they with the installation process and any follow-up maintenance appointments? ■

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### BUSINESS AND TECHNOLOGY STRATEGIES END USE/ENERGY EFFICIENCY WORK GROUP

**The Business and Technologies Strategies — End Use/Energy Efficiency Work Group** is focused on identifying the opportunities and challenges associated with electricity end-use and demand-side management strategies. *TechSurveillance* research relevant to this work group looks at the various aspects of energy efficiency technology, including market status, related policies and regulations, and business models. For more information about technology and business resources available to members through the End Use/Energy Efficiency Work Group, please visit [www.cooperative.com](http://www.cooperative.com), and for the current work by the Business and Technology Strategies department of NRECA, please see our [Portfolio](#).

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