Encouraging Energy Efficiency Through Competition

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It is a challenge in Iowa, along with the rest of the United States, to find effective tactics to change behavior to increase energy efficiency and conservation. Iowa has long been a leader in energy efficiency program spending, but huge potential remains to reduce our electricity use. New methods of encouraging energy savings through behavior change show significant promise. In particular, Department of Energy Secretary Chu recently referred to the potential to reduce energy consumption by the power of harnessing people's competitive spirits. This report looks at how energy-reduction competitions have encouraged behavior changes that save energy and money, at little cost.

Many of Iowa's investor-owned utilities, rural electric cooperatives (RECs), and municipal utilities have programs that provide monetary incentives to customers interested in improving the efficiency of homes and businesses, mostly as rebates for appliances, weatherization or insulation upgrades. In a striking example of the popularity of such programs, the state's 2010 appliance rebate program exhausted its funding within hours of opening. While such incentives have succeeded in reducing energy consumption and lowering monthly utility bills, programs to encourage community-wide improvements through changes in behavior may have a more widespread and longer lasting effect on consumption.

Examples of Competitions

Recently, friendly competitions or challenges have begun to be used to encourage energy-saving behavior change. The largest and best known was conducted in Kansas between six towns. Organized by a nonprofit group in partnership with local governments, investor-owned and municipal utilities, the 2009 competition was designed to determine which town could reduce its energy usage by the highest percentage over the course of a year. The entire population of each town was encouraged to participate. Organizers performed energy audits, provided tips and information about the best ways to save energy, assisted in installing technologies to improve efficiency, updated participants on progress and held events to motivate and educate participants about issues of energy independence, environmental quality, and the financial savings potential.[1]

Though one of the main goals of the Kansas competition was to reduce greenhouse gas emissions, organizers found that mentioning "climate change" deterred participation because the term and issue have been politicized. There was a wide range of ages, income status, ethnicity and cultures among the participants, and organizers sought to emphasize values with broad appeal. Competition organizers found the following messages resonated: patriotism (not relying on foreign energy sources), frugality (saving money on utility bills), and civic pride (winning the competition).[2]

The combined use of these motivators yielded unprecedented involvement with over 11,000 people participating. Over 6 million kilowatt hours of energy were saved during the yearlong event and an additional 7 million kilowatt hours of future savings were put in place. Participants saved over $1.2

million in avoided energy costs, which exceeded the investment in supplies and volunteer hours for the competition by a factor of 27.[3] Overall energy savings in the victorious community were over 5 percent. The Kansas competition is now in its second year and has grown to include 16 communities.

Yearlong Kansas Energy Challenge Yielded Big Savings

Participating Towns	Population	kWh Saved during Competition	kWh Savings Locked in for Future	Total kWh Savings	Dollars Saved
Merriam	11,008	5,953,119	1,000,940	6,954,058	$91,586
Quinter	961	180,984	198,152	379,136	$18,131
Kinsley	1,658	260,746	300,249	560,994	$27,473
Salina	46,140	0	3,722,125	3,722,125	$340,574
Mount Hope/Haven	2,005	0	269,717	269,717	$24,679
Wellington	8,647	0	1,609,231	1,609,231	$147,245
Total	**70,419**	**6,394,848**	**7,100,414**	**13,495,262**	**$649,688**

Source: Climate and Energy Project

Competitions are becoming popular on college campuses, with competitions between college dormitories, buildings or between colleges themselves. In Iowa, Luther College's sustainability coordinators and Environmental Concerns Organization (ECO), a student environmental group, have organized monthlong competitions between campus residence halls to see which can reduce electricity consumption the most. Students participate by signing the Energy Conservation Pledge, which is found on the Luther Sustainability website. The website also has links to energy-saving tips for dorm residents, a "dashboard" where students can check their teams' progress, opportunities to volunteer and information about other student and community competitions throughout the country. Competition organizers found the use of social media such as Facebook was instrumental in recruiting participants, as was the $1,000 cash prize awarded to the winning residence hall.[4]

As of November 2010, the Luther competitions saved 7,014 kilowatt hours of energy. In November 2010, Luther participated in the Campus Conservation Nationals (CCN), an energy competition between 40 colleges around the country. Over the three-week competition, participating institutions saved a total of 500,000 kilowatt hours of energy equal to $50,000.

Loras College in Dubuque recently began a similar energy competition among dormitory residents. In four residence halls, monitors track the use of electricity, steam and water. Dorm residents will be exposed to educational programs regarding behavioral and technical methods to save energy, and the dorm that saves the most will be awarded a prize. At the University of Northern Iowa, individual dorm floors have competed against each other as well.

Minnesota has used competition since 2006 to reduce energy use. The Minnesota Energy Challenge has over 27,000 participants on 1,100 teams.[5] Minnesotans can join teams online, where they can also sign up to engage in specific energy-saving actions, get technical assistance and connect with other participants. Thus far, the challenge has led to a pledged reduction of 216,550,759 pounds of carbon dioxide. This reduction would save Minnesota residents almost $13 million annually.[6]

Dubuque has tried competition to reduce water use. Working with IBM Research division, the city performed a pilot study that allowed volunteer residents to see their water consumption in near-real time. They could also compare their use with other Dubuque residents participating in the pilot and compete

with them to reduce their water consumption each week. Usage information was available to participants through a website. Over the course of nine weeks, participants used an average of 6.6 percent less water than nonparticipants.[7]

The Psychology of Competitions

Competitions build upon people's innate desire to do "better" than others, or at the very least to not do worse, or to "keep up with the Joneses." This can manifest itself as neighbors wanting to have better lawns, bigger houses, newer cars, or, in this case, lower utility bills. One key element to this is knowledge, so people must have access to information about how their performance or behavior compares to that of others.

Using social conformity to foster a competitive spirit among participants is an important aspect of competitions to reduce energy or other resource usage. More formally known as descriptive norms messaging, this tactic highlights the "standard" behavior of a given population in order to encourage other individuals to behave similarly. In study after study, people are more influenced by what their neighbors or peers are doing than by other means of persuasion.[8] Whether it's switching to compact fluorescent light bulbs from incandescent, or using a fan instead of air conditioning, or reusing hotel towels rather than getting a new one each day, people want to do what others are doing, or do it better.

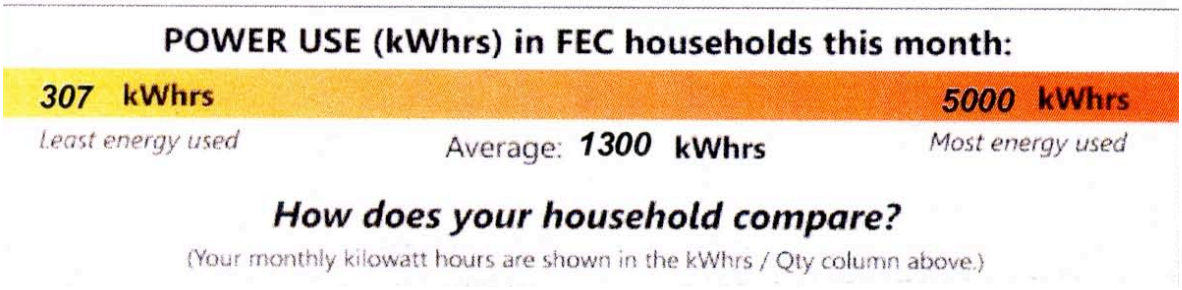
Appealing to a Team Effort: It Works

Placards were placed in hotel bathrooms asking guests to reuse bath towels rather having them washed after every use. Half of the placards asked guests to reuse their towels to "help save the environment." The other half were asked to "join fellow guests in saving the environment."[9] The result? Twenty-five percent more guests reused their towels if they were in a room with a placard that asked them to do as their fellow guests were doing, compared to guests who only received the environmental messaging.[10]

Companies such as OPOWER, Microsoft and IBM are taking advantage of this understanding of human nature to design products that Iowa utilities could take advantage of to help reduce energy demand. OPOWER, for instance, has developed a user interface allowing clients to monitor their household energy consumption and compare it to that of similarly sized "efficient" and "average" households in their geographic regions using the web, mail or phone. This multichannel communication allows for exchange of personal and comparative energy use data with a wide range of customers. Thus far, OPOWER has seen consistent and long-term reductions in energy consumption across all geographic regions, ages, and income brackets monitored, averaging a 2.5 percent reduction in energy use.[11] IBM has invested heavily in researching water use in Dubuque and will be moving beyond its water pilot project into energy and transportation as well.

Iowa utilities, too, are taking advantage of this understanding and giving their customers information about average energy use. In 2011, Kalona-based Farmer's Electric Cooperative began including a graphic on monthly bills that shows the range of residential electricity usage among FEC customers for the month. It also lists the average kilowatt-hour usage and asks customers to notice how they compare. When the "Power Usage Indicator" was introduced, FEC encouraged customers to challenge themselves to reduce their usage to reduce FEC's peak demand and keep rates low. If it is indeed human nature to want to do want to keep up with what friends, neighbors and peers are doing, then including this information will drive continual reductions in energy usage at virtually no cost to the utility.

Farmer's Electric Cooperative's Power Usage Indicator on Customers' Monthly Bills



Lessons Learned

There is tremendous potential to make use of competitions and other tools to influence Iowans' resource-consuming behaviors, especially when used in conjunction with existing utility programs such as rebates and energy audits and with state and federal tax credits for energy efficiency and renewable energy. Iowa utilities moving in this direction should keep in mind some of the lessons learned from the groundbreaking competitions.

Individual commitments are important — Information campaigns and promises of lower energy bills are often effective at encouraging participation, but organizers of past competitions have found that seeking individual commitments from participants leads to more significant and lasting reductions in energy use. Whether in the form of signing pledges or establishing personal milestones, individual goal-setting makes energy efficiency more approachable and practical.

Be specific and targeted — The more specific the better in giving advice to homeowners about how to reduce energy use. Many local utilities perform free energy audits for residential and commercial customers, and similar audits can be used in energy contests to perform pre- and post-competition assessments of home or building energy efficiency. Audits also can be used to recommend efficiency upgrades that are the most cost-effective and provide the biggest return on dollars invested. People produce greater short- and long-term savings when they can target the greatest sources of energy waste in their own homes, rather than when they follow general energy saving guidelines (Crane-Smith, 2011).

It's important to be fair — Teams need to know they are competing on a level playing field. It is not fair to compare a community where a large industrial facility has very inefficient lighting that could be easily replaced against a community that does not. Also unfair would be comparing a community with new housing stock vs. a town full of century-old homes. A community with a utility that offers excellent energy efficiency programs is likewise at an unfair advantage over one that has only minimal offerings. Therefore it is important to have the right teams and participants in a competition from the beginning.

Contests can increase knowledge about utility programs — From the utility's perspective, investing time and labor in energy contests may be useful, as interaction with customers can lead to better working relationships with the public. Such interaction can increase participation in a utility's energy efficiency programs, as citizens become more knowledgeable about and interested in responsible energy use.

Websites are important tools — Initially competition websites were used to inform people about energy-saving steps, events and other news, but they have become more interactive. Signing pledges, online communicating with team or community members via blogs and social networking features or even accessing real-time energy use data are all valuable uses for the internet in competitions. Websites can set the tone and brand the competition with colors, logos and other graphics. Because of the ability to update websites quickly and easily they can be very important for updating participants with new information and news. However, it is also important to realize that internet access may be limited in some rural communities and some people may not be connected or be comfortable using online tools.

There are different ways to measure success — Monitoring and informing teams of their progress can be a source of motivation for participants, but only if success is measured in a meaningful and relatable way. Competitions have measured progress in terms of kilowatt hours of energy reduced, dollars saved in energy costs and pounds of avoided carbon dioxide emissions. Depending on the audience, one of these methods may be more relevant than the others. Other ways to measure success include simple attendance at educational events or counting the number of energy audits performed.

Community is key — The force holding any energy contest together should be the community on which it is centered. Although responsible energy use is the ultimate goal of a competition, the focus should be more about community building and stewardship than energy and the environment. Whether towns divide themselves into teams or consolidate into one, the formation of teams can allow participants to unite based on common identities and to act collectively in pursuit of a common goal. Whole-town events provide opportunities for citizens to gather, and organizers can have a presence at existing community festivals to further incorporate energy efficiency into civic values. Every town is different, and organizers that tailor their competition to meet the needs of each community and have input from community leaders from the beginning will have greater success.

The language used matters — Choice of language can have a significant impact on participant responses to competition leaders. Many issues related to energy and the environment are politically charged, and certain words or phrases can quickly quell participants' interest in energy efficiency and the leaders' credibility, ultimately jeopardizing the goals of the competition. Mentioning climate change or global warming may be particularly detrimental. Energy independence, reducing costs, doing the right thing and reducing waste are other potentially effective ways to frame the issue, but it is important to remain flexible depending on the target audience.

Information Sharing and Competition Could Yield Significant Savings

If Iowans and Iowa utilities were to embrace this fast growing field of practices to reduce energy use, the results could be significant. With just the change of sharing information on bills about others' energy use, OPOWER has shown energy can be reduced by 2.5 percent and others have shown average savings of nearly 2 percent.[12] The winning town in the Kansas challenge reduced their consumption by 5.5 percent. For comparison, Iowa's investor-owned electric utilities have a goal of reducing consumption with their energy efficiency programming by about 1.5 percent annually.

As more states and communities try to harness peoples' desire to conform and to out compete, more and better practices will continue to emerge. Iowans could learn from the lessons of completed trials and adapt to incorporate emerging ideas and set a goal of 5 percent electricity use reduction through changing behavior. This would save over 2 million MWh of electricity annually, or nearly 40 percent of the output of the Duane Arnold nuclear power plant near Palo.[13] Five percent is an aggressive target, but by layering an improved knowledge of what drives consumers' behaviors on top of existing utility programs, it may indeed be possible.

Conclusion

As utilities search for ways to lower energy demand, they may find it useful to understand the increasing volume of research on how to change behaviors in energy use, including studies of competitive drives and the desire for social conformity, and how these can encourage sustainable choices. Competitions can be powerful motivators, whether organized as events with prizes or as personal competitions stoked by utility bill or website notices comparing household energy use with that of neighbors. These efforts are capable of driving significant reductions in energy usage. This potential should be explored further and, where possible, utilities should implement changes that will save energy and money.

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Editor's Note: The page 2 reference to Minnesota competition has been revised from the original to correct a typo. The Minnesota Energy Challenge has over 27,000 participants on 1,100 teams. The paragraph also has been clarified to note the savings are projections of pledged reductions.