Working Together to Transform the Market for Water Heaters

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ABSTRACT

This paper will explain how a unique coalition was created to address the market barriers hindering acceptance of higher efficiency water heaters by consumers and installers. These barriers include higher upfront cost, lack of consumer awareness of the benefits of higher efficiency, the high proportion of emergency replacements, the absence of an objective source for information, and the lack of appropriate marketing skills or tools by installers. No individual market actor has the necessary relationships or credibility to fully address these barriers.

Energy efficiency program administrators, water heater manufacturers and the Air-conditioning Heating and Refrigeration Institute have formed a coalition to address these barriers through a joint marketing campaign. This coalition serves as an objective, third party source of information. As such it seeks to improve consumer awareness of higher efficiency water heaters and enable installers to better communicate their benefits. The coalition also seeks to promote the stocking of higher efficiency water heaters by wholesale distributors.

This marketing campaign is one step in an effort to transform the market for water heaters towards super efficiency. In addition to technological innovation, market transformation requires a critical mass of energy efficiency programs, consistent messaging among market actors, production and stocking of higher efficiency water heaters, trained installers, and consumer valuation of more efficient water heaters. Once these elements have been achieved it will enable a new business model for the trades in which the added installation time and higher investments in inventory will be profitable

Introduction

Water heating represents a major use of energy in North American homes with the potential for significant natural gas savings. In the U.S., water heating accounts for approximately 15 percent of residential energy consumption, making it the third largest energy end-use in homes behind space heating (47 percent) and lighting and appliances (24 percent). It is estimated that 54 percent of U.S. water heaters are heated with natural gas, 38 percent are heated with electricity, 4 percent are heated with oil and less than 3 percent are heated with LPG (EIA 2001). Gas tank-type water heaters are installed in approximately 58.2 million homes in North America (VEEC 2006). In Canada, water heating is estimated to be the second largest residential energy end-use behind space heating, accounting for nearly 22 percent of household energy consumption. It is estimated that 35 percent of Canadian water heaters are fueled by electricity and 59 percent are fueled by natural gas, with oil and propane accounting for the remaining 6 percent (Aguilar et. al. 2005).

Storage units dominate both the gas-fired and electric water heater markets, with shipments of 8.2 million for gas and electric units combined in the U.S in 2008 (AHRI 2010), down from approximately 9.8 million units in 2006 (DOE 2008). Storage water heaters account for over 95 percent of the market share for water heaters in North America (GAMA 2007). Tankless water heaters accounted for approximately 1 to 2 percent of the market in 2004 (Davis

Energy Group 2007). Solar and heat pump water heaters account for a small minority of annual sales, with about 8,500 and 2,000 units shipped per year, respectively (DOE 2008, 1). In 2008, the percentage of gas-fired and electric resistance storage water heater shipments was nearly equal in the U.S., with gas-fired units having slightly less market share than electric resistance units (4.0 million units and 4.2 million units, respectively) (AHRI 2010). These estimates do not include tankless water heater shipments, but there is indication that the percentage may be growing quickly. Unit sales of gas tankless water heaters are reported to be 254,600 in 2006 (DOE 2008). This is equal to 2 percent of sales for gas storage water heaters.

As of 2005, data indicates that water heating market share in Canada favors gas (59 percent) over electric (37 percent) water heaters (Aguilar et. al. 2005). Previous data had indicated that the market favored electric over gas, but cited that the trend was declining over time and increasing for gas. The general trend in Canada is for new homes to increasingly use natural gas as opposed to electricity for their water heating needs. Regional trends within Canada illustrate that primary fuel sources can differ significantly by province due to availability, efficiency, equipment cost and price. Preliminary evidence from the Canadian EnerGuide for Houses Database shows that in retrofit situations fuel switching from gas to electric is not very prevalent on the whole, but can differ significantly by province (NR Can 2004).

Currently, the majority of residential gas-fired water heater sales in both the U.S. and Canada are for minimum-efficiency tank-type models with Energy Factors of 0.58 and 0.59. Sales and availability of high-efficiency units are in the minority, but major manufacturers are slowly beginning to produce these units in larger quantities and retailers and plumbers are offering these units on a more frequent basis (AHRI 2010b).

Efficiencies of electric tank-type water heaters are generally between 0.90 and 0.95 EF, with slightly higher efficiency for electric tankless water heaters between 0.95 and 0.99 EF (AHRI 2010b). It is important to note that despite the appearance of higher Energy Factor ratings, electric water heaters typically suffer from cost-to-operate concerns because of fuel price differences in many regions. In addition, overall efficiency of electric units is not fully represented by efficiency ratings, as the source energy needed to generate electricity is not taken into account and has the potential to increase overall energy consumption (DOE 2008).

Highly efficient electric models, called heat pump water heaters, are beginning to develop market traction. In 2008, sales of heat pump water heaters were estimated to be less than 2,000 units per year. However, with the introduction of the ENERGY STAR label for this category and with major manufacturers now offering this technology, availability and sales are likely increasing. Similarly, sales of solar water heating systems, which were estimated to be less than 8,500 units per year in 2008, are likely to see an increase as major manufacturers are beginning to offer products on the market with more frequency (DOE 2008).

The challenge that energy efficiency programs face is to transform this market towards higher efficiency. Minimum efficiency gas and electric storage water heaters dominate the market (AHRI 2010b), despite the technological feasibility of a variety of paths to higher efficiency, including gas and electric tankless water heaters, heatpump water heaters, gas condensing storage water heaters, and solar water heating systems. Manufacturers until recently have not widely produced these technologies, and a mass market of consumers have not demanded them. The structure of the market has made new technologies difficult for consumers to access. Tankless water heaters have shown that there are consumers who are willing to invest more time, effort and money in obtaining new water heating technology (Rodgers and O'Donnell 2008), but in order for new, higher efficiency products to be successful, a variety of market

barriers need to be addressed. The water heater market is not a simple matter of manufacturing new technologies, rather, there is a real possibility that new products will be offered and they will not be widely sold unless plumbing contractors, plumbing supply distributors and retailers are supportive of the effort and consumers understand the new technologies. Energy efficiency programs have reported to the authors that even 0.62 EF storage water heaters are unavailable at distributors and retailers in some regions of the country despite the fact that there are many products certified by AHRI at this efficiency level.

Market Barriers to and Opportunities for Improved Efficiency

There are systemic reasons that consumers have not adopted and manufacturers have not produced higher efficiency water heaters despite the technical feasibility of doing so. These barriers must be surmounted before highly efficient water heaters can become widely available in the market place.

Common Barriers

Several common barriers to efficiency exist:

Potential for higher upfront cost. High-efficiency water heaters can be more expensive compared to standard efficiency storage water heaters. Despite lower annual operating costs, the initial purchase price can deter potential buyers. The addition of increased insulation, power venting, or condensing technologies can add significant cost to gas tank-type water heaters, and tankless water heaters are, on average, more costly than standard efficiency water heaters (CEE 2008). In addition, installation costs for high efficiency water heaters may be higher than standard efficiency water heaters, especially in retrofit situations. Higher efficiency water heaters can require larger gas lines, special venting, and condensate drains. These can represent additional material costs, additional labor, and in retrofit situations, may require extensive changes to existing walls, venting and other structures (Lutz 2009). Consumers also may not appropriately value the financial impact of reduced operating costs throughout the life of the product in comparison to the higher initial cost.

Emergency replacement. The majority of water heater replacements occur on failure. Since consumers are generally unwilling to be without hot water for more than a few hours, consumers put a premium on water heaters that can be delivered quickly. Also, since emergency replacements are unplanned expenses, consumers also prefer low cost bids from plumbing contractors (VEEC 2006). This in turn may reinforce a notion among plumbers that all consumers value the lowest cost water heaters possible. This belief may mean that plumbers do not take the time or effort to try to sell consumers higher efficiency water heaters because they do not believe that consumers will buy them.

Lack of consumer awareness. Given the unplanned nature of many water heater replacements, consumers often lack information to make informed decisions on equipment and rely on the plumbing contractor or retailer as an expert to guide them through the purchase. Water heaters

are also generally a low-involvement product area where consumers do not often take the time to research different options or learn about how efficiency can relate to lower operating cost (VEEC 2006).

Lack of reliable and objective sources of information. It can be difficult for consumers as well as trade allies to determine what water heater model is the right choice for a given application. Both plumbing contractors and manufacturers may be viewed as biased sources since they are trying to sell consumers on water heaters. The internet offers a wide variety of sources with information on water heating, but upon occasion it is factually incorrect. For example, one poorly written blog post about ENERGY STAR water heaters claims that homeowners can "save up to $200 at the time of buying," but it is unclear whether the author is referring to energy savings which occur over the life of the product or to rebates and incentives. The article also incorrectly states the expected savings and poorly describes the types of water heaters available. (GEI 2010). Posts like this can only serve to confuse consumers more. The ENERGY STAR label, now available for water heaters, is a widely recognized and relied upon label (EPA 2009), but given the number of water heater categories covered and the fact that they may not all be suitable to a given home, consumers may feel overwhelmed and confused.

Lack of marketing skills by installers. In general, there are three types of plumbing contractors: 1) independent plumbing contractors who install water heaters in addition to other services, 2) franchise plumbers or water heater installation specialists and 3) plumbing contractors who are also distributors. Plumbers are a key link in the sales chain because they have direct contact with the end-users and have the opportunity to influence equipment purchases because of the nature of water heater purchases. Plumbers often make suggestions or decisions for a homeowner on either replacement units or new installations. Most plumbers receive their water heaters through distributors (although some work with retailers as well) and market their services through the phone book or the internet (KEMA 2006).

The water heating equipment sales industry is strongly driven by lowest-bid quotes (VEEC 2006). However, plumbers, builders, developers and retailers have an opportunity to sell high-efficiency equipment (which can be a higher value and profit opportunity) by educating consumers about the life-cycle benefits of that investment. These sales channels can lack the training and tools to effectively educate the consumer and promote the benefits and cost-effectiveness of high-efficiency equipment (CEE 2008).

Why No One Actor Can Affect These Barriers

As energy efficiency programs are facing higher savings targets, they are looking for ways in which they can gain increased savings from residential customers. Water heating is a particularly attractive end use because it represents such a large energy use, and to date there have been relatively few options for saving energy. This is particularly true of natural gas efficiency programs, which are limited in the number of end uses within the home they can address, and focus primarily on heating and water heating. Water heating is further attractive because large savings can be reaped even in warmer climates where highly efficient heating systems may not be cost effective. Therefore, natural gas energy efficiency programs are particularly interested in increasing the number of high efficiency models available, increasing the percentage of sales of high efficiency equipment, building a market of sufficient size to

achieve a scale of production that will reduce the cost of high efficiency equipment, and increasing the number of plumbing contractors, builders, retailers and distributors who promote high efficiency equipment.

Energy efficiency programs can work to address these market barriers to some extent. Rebates and incentives can help reduce the first cost of efficient equipment, promotional materials and activities can help consumers better understand the water heating products, and educational programs for installers can enable them to better convey the benefits of high efficiency water heating. However, efficiency programs are accountable to their regulators for how much they spend and how they spend it, are focused primarily on their service territories, and can have difficulty reaching consumers during an emergency replacement. Efficiency programs need to be able to expand their communications scope in order to get more attention from consumers and plumbers.

Efficiency programs are not the only voice that a consumer hears on water heating. Manufacturers, plumbers, and even the federal government through the ENERGY STAR® Program provide consumers with messages about water heating. By aligning and coordinating messages, these groups can transform the market more quickly than they would be able to on their own.

The Role of the Coalition and Its Strategy to Address Market Barriers

Formation and Purpose

In 2008, CEE adopted its High Efficiency Residential Gas Water Heating Initiative as a way to help natural gas efficiency programs find residential savings by building a market for higher efficiency water heaters (CEE 2008). This effort was aided when the Department of Energy announced the ENERGY STAR label for water heaters in 2008 to be effective January 1, 2009 (DOE 2008). However, due to the barriers described above, CEE members were concerned that common efficiency specifications and the ENERGY STAR label would not be enough to transform the market, and began seeking further ways to support that transformation.

The fact that consumers do receive information on water heaters from multiple stakeholders inspired CEE to consider how, by bringing those diverse groups together to align messages, market transformation could be effected more quickly. CEE manages another example of a multi-stakeholder communications campaign called *Motor Decisions Matter*℠ (MDM), and this quickly became an inspiration for efficiency program managers when considering water heating.

MDM was launched in 2001 “to improve the way in which industrial motor repair-replace decisions are made by promoting the financial and performance benefits of ‘sound’ motor management to industrial managers” (CEE 2010, 7). This campaign was sponsored by efficiency program administrators, motor manufacturers, sales and service centers, and trade associations to develop messages, communications tools, and to support delivery of that message. Over the past nine years, this campaign has created a common platform to deliver a complex message about motor repair and replacement decisions to operations and financial staff at industrial facilities (CEE 2010). In 2009, MDM Sponsors recognized the forward-looking opportunity to build upon the Campaign’s existing infrastructure and expand the motor management platform and message to address larger savings opportunities available through motor system management.

While the messages and target audiences are very different for a campaign supporting industrial motor management, the need to communicate a common message about residential

water heating through a number of stakeholders was similar enough that MDM has proved to be a compelling model. This logic has lead the Consortium for Energy Efficiency to bring together energy efficiency program administrators, manufacturers, the Air Conditioning, Heating and Refrigeration Institute, Natural Resources Canada, the U.S. Department of Energy and the U.S. Environmental Protection Agency to create a marketing and awareness campaign called *The Coalition for ENERGY STAR Water Heaters* ("the Coalition"). See Table 1 for a complete list of Coalition sponsors.

Table 1. Sponsors of the Coalition for ENERGY STAR Water Heaters

Coalition Sponsors	Website
A. O. Smith Water Heaters	www.hotwater.com
Air Conditioning, Heating, and Refrigeration Institute (AHRI)	www.ahrinet.org
Bay State Gas Company	www.baystategas.com
Bradford White Corporation	www.bradfordwhite.com
Cascade Natural Gas Corporation	www.cngc.com
Consortium for Energy Efficiency	www.cee1.org
Enbridge Gas Distribution Inc.	www.enbridge.com
MidAmerican Energy Company	www.midamericanenergy.com
National Grid	www.nationalgridus.com
NSTAR Electric & Gas	www.nstar.com
Pacific Gas and Electric Company	www.pge.com
Puget Sound Energy	www.pse.com
Rheem Water Heating	waterheating.rheem.com
Rinnai Water Heating	www.foreverhotwater.com
Southern California Gas Company	www.socalgas.com
Terasen Gas Inc.	www.terasen.com
Union Gas Limited	www.uniongas.com
Xcel Energy	www.xcelenergy.com
Natural Resources Canada*	www.nrcan-rncan.gc.ca
U.S. Department of Energy*	www.energy.gov

* Sponsors in kind

[CESWH] Coalition for Energy STAR(R) Water Heaters. 2010. *Sponsors.* http://www.eswaterheaters.org/sponsors.aspx. Boston, Mass: Consortiumg for Energy Efficiency

The purpose of the Coalition is to increase consumer and installer *awareness* and distributor *stocking* of efficient water heating options through national coordination of common messaging. This will be achieved using the existing messaging platforms of energy efficiency programs and manufacturers by making sure that messages are aligned and mutually reinforcing. Having the same messages coming from different sources is expected to increase the credibility of the overall message that energy and money can be saved by installing an ENERGY STAR water heater.

The Coalition provides the vehicle through which these messages can be aligned. Sponsors meet regularly to identify messages that can be agreed on by energy efficiency programs and manufacturers. These communication efforts are supported through a public relations (PR) campaign targeted towards the trade and consumer media, a central public website, and by tools developed centrally that support individual sponsor marketing efforts. The PR campaign will focus on building and reinforcing the reputation of high efficiency water heaters through as many trade and consumer outlets as possible.

Messages

The marketing toolkit, the PR campaign and the website all emphasize three key messages:

ENERGY STAR has a trusted reputation. Each year, CEE conducts a survey to track brand equity. This survey is sponsored by members, and the U.S. Environmental Protection Agency (EPA) conducts and publishes a national analysis of the data. Of all households shown the ENERGY STAR label, 77 percent recognized it and 81 percent understood the purpose of the label. The majority of those surveyed, 60 percent, associated the label with energy savings. Many consumers, 33 percent of those surveyed, knowingly purchased an ENERGY STAR product within the year prior to being surveyed. Of those that knowingly purchased ENERGY STAR products, 80 percent reported being influenced by the label, and 79 percent reported that they were likely to recommend ENERGY STAR products to a friend (EPA 2010, ES-1-2). The high recognition and understanding are a measure of the value of the ENERGY STAR brand. They indicate that it is a very powerful tool that needs to be carefully applied to water heaters as a category.

Water heaters are a new category to ENERGY STAR, and while ENERGY STAR is widely understood by consumers, water heaters are not. The ENERGY STAR label is a recognizable factor in the midst of what can be a confusing product category. It also gives some assurance to a consumer who is unsure whether he or she should trust a recommendation from a plumber. With the ENERGY STAR label, it's not just an individual plumber recommending a particular water heater; it is the entire federal government.

This trusted reputation provides the perfect platform on which to talk about the benefits of an ENERGY STAR water heater. Consumers already have an understanding of ENERGY STAR as denoting products that save energy, save money and are of high quality. The next step is to talk about the specific benefits offered by ENERGY STAR water heaters, but at the same time, in order for consumers to receive the full benefit of ENERGY STAR's trusted reputation, they must have a deeper understanding of the benefits and risks associated with each category of ENERGY STAR water heater.

There are multiple water heater types available to meet consumers' diverse needs. The ENERGY STAR label has been awarded to five categories of water heater: higher efficiency gas storage, gas tankless, gas condensing storage, electric heat pump, and solar thermal water heaters. The program has been designed in this way because there is no one-size fits all solution for water heating. There are multiple options for various homes and lifestyles, and the Coalition is working to help consumers understand the factors that may make one category of ENERGY STAR water heater more suitable for a particular home than another and encouraging them to seek the guidance of a professional plumber.

The Coalition will also reach out to plumbers to help them understand the important role that they play in this process. Manufacturers have told the authors that plumbers want to see themselves as offering good service to their customers, and the Coalition is seeking to help them understand that offering consumers the most efficient water heater that meets their needs and budget is good service. This will in turn encourage them to request high efficiency water heaters more often from their distributors.

Distributors are another important target for this message. This diversity of brand offerings creates complexity for distributors in their stocking practices and potential higher inventory carrying costs. The Coalition is seeking to help distributors understand that ENERGY STAR water heaters offer value that is commensurate with the additional costs that may be incurred by increased inventory. This will be reinforced by rebates and incentives offered by energy efficiency programs and the federal government.

ENERGY STAR water heaters are a conscientious choice. The Coalition will continue to tell consumers that purchasing an ENERGY STAR water heater is the right thing to do because reduced energy consumption is better for the environment. While this may not convince consumers who do not already value saving energy for the environmental reasons, this message has the potential to resonate with consumers with green values.

Strategies

These three key messages are being incorporated into three main strategies: building the reputation, driving inquiry to key resources, and both by building resources and content. Various marketing tactics are employed to deliver the messages to the target audiences, but these tactics will support the three unifying strategies.

Build reputation, promote benefits and shift perceptions. This strategy is being used as a core theme to tie together public relations activities, development of public service announcements and creating marketing tools such as a customizable brochure that energy efficiency programs can give to trade allies to distribute to consumers. When applied to consumers and consumer media, this strategy should help address the lack of awareness of the benefits of ENERGY STAR water heaters, and can provide objective and credible information, and may even help consumers to begin thinking about replacing water heaters before an emergency occurs. When applied to contractors, it can provide support to their selling skills to consumers by reinforcing what they tell consumers.

Drive interest and inquiry to key resources. The Coalition for ENERGY STAR Water Heaters serves as a credible and objective source of information that can support claims made by energy efficiency programs, manufacturers and plumbing contractors. This then in turn supports improved consumer awareness of the benefits of ENERGY STAR water heaters and efforts to move consumers away from emergency replacement. This information is available to energy efficiency program administrators who do not have the resources to develop their own content to be incorporated into their efforts to transform the market. It also serves to help orient and align the communications efforts of all sponsors.

The primary vehicle for this information is the Coalition for ENERGY STAR Water Heaters website, www.eswaterheaters.org. The Coalition sponsors are working to build content for the website including a database of incentives offered by energy efficiency program administrators, a cost calculator for consumers to compare water heating options, and other guidance relevant to consumers and contractors. Sponsors of the Coalition for ENERGY STAR Water Heaters will help develop the credibility of this source and help to drive consumers and

contractors to it by linking to it on their own websites. By providing consistent messaging across all parties, this website provides an important nexus point for those interested in supporting ENERGY STAR Water Heaters.

Support the PR campaign with stories, content, and referrals. This process of building credibility will need to be a continuous effort of developing content that is relevant to the target audiences. Case studies and testimonials provide examples to which consumers and installers can relate. The Coalition also provides a source of material that energy efficiency program administrators can use in their ongoing efforts to reach the ratepayers they support. In addition to providing content to energy efficiency programs and sponsors, the Coalition for ENERGY STAR Water Heaters is exploring how this content could be distributed through active green bloggers and through the use of social media such as Twitter, Facebook, and YouTube.

Conclusion

The goal of all this effort is to make high efficiency water heaters more widely available in the United States and Canada. Achieving this goal will require action on the part of many parties, but also has the potential for a large impact. The Coalition has taken as a pattern the Motor Decisions Matter^{SM} (MDM). MDM has proven to be a valuable asset for improving the efficiency of motors and motor systems used in industrial applications. These efforts have lead to increased participation in energy efficiency programs and increased energy savings (CEE 2010). The Coalition is seeking to accomplish similar impacts within the market for residential water heaters

The barriers found in the market for highly efficient residential water heaters are common to the markets for many efficient products, but the structure of the water heater market necessitates greater investment in communications than many other markets. In particular, it is the emergency nature of most water heater replacements that means that consumers are relatively uninformed of the most efficient options and has caused plumbing contractors to find value in selling at the lowest cost. This campaign seeks to transform this market by encouraging consumers to demand highly efficient water heaters. Simply addressing consumers may not be enough however, so the campaing also seeks to help installers, retailers and distributors promote water heaters on the basis of differentiated efficiency.

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