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Motivating Action on Energy in the U.S.

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Abstract

When do citizens take action for the sake of a public good? Can rhetoric mobilize individuals to act for the benefit of the collective? Few studies in political science explore these questions in the context of non-electoral behavior. This working paper draws from framing theory and models of environmental political activism to provide a framework to understand how communications highlighting collective benefits (e.g., to the environment), selective costs (e.g., financial), and different accounts of who is responsible for dealing with the extant situation (i.e., individuals versus government) will affect individuals' decisions regarding (a) capital investments in home energy efficiency, and (b) actions to curtail home energy use. The researchers test their hypotheses with a survey experiment (n=1,600) that assesses behavioral intentions regarding energy conservation and information-seeking behavior. They find that rhetoric can play a crucial role in shaping behavior. When the government is portrayed as the agent responsible for addressing energy problems, people are less willing to act; however, emphasizing individuals' responsibility significantly increases action. They also find, through a content analysis of news articles on energy issues in the U.S. from 2001 to 2011, that government is the agent most often portrayed as responsible for dealing with the nation's energy problems. Their results highlight the challenges of inducing actions for the public good in this domain—because demobilizing messages are more prevalent than rhetoric that might increase individuals' contributions. This has implications for information campaigns promoting energy efficient behaviors.

A primary purpose of government is to enact policies that benefit the collective good. In doing so, governments may consider what actions citizens are willing or likely to take on their own volition for the public good. When will individuals act in environmentally friendly ways without selective benefits or sanctions, such as tax breaks or penalties? Can rhetorical appeals mobilize people to act for the benefit of the collective? These are important questions given that, in a democracy, individuals' decisions ultimately determine collective outcomes and the types of laws that need to be in place to promote the public good (Taylor 1987). However, few studies explore how persuasive appeals influence non-electoral-politically-relevant actions.

This paper explores how rhetoric can affect individuals' decisions about whether to take action for the public good. While a large body of existing research looks at how appeals to civic duty (Arceneaux and Nickerson 2009; Gerber and Green 2000a; 2000b; Green and Nickerson 2003; Michelson, Bedolla, and McConnell 2009) or social norms (Gerber, Green, and Larimer 2008) shape individuals' decisions regarding whether or not to vote in elections, scant work looks at the relative impact of appeals highlighting selective costs versus collective benefits of taking action. We do so in the context of decisions about home energy conservation.[1] These actions are a key component of energy polices, and the aggregation of individuals' choices can play a big role in the balance of national energy availability.[2] To explain how persuasive appeals may influence behavior, we draw from extant research which shows that collectively beneficial behaviors entail the calculation of costs and benefits (Finkel and Muller 1998; Lubell 2002;

[1] We focus on household energy conservation because this is a sector where investment inefficiencies as a result of imperfect information may be greatest (Allcott and Greenstone 2012). The U.S. Bureau of Labor estimates that in 2007, the average U.S. household spent $2,400 on gasoline for transportation and $1,900 on natural gas, electricity, and heating oil.

[2] The U.S. Department of Energy identifies four broad sectors of national energy use: transportation, residential, commercial, and industrial. Approximately one-half of U.S. energy consumption is controlled by individual consumers (U.S. Department of Energy, Annual Report, 2009).

Lubell, Zahran, and Vedlitz 2007). In deciding whether or not to take an action, individuals form an attitude toward a behavior that is the result of an assessment about its likely outcomes (Ajzen and Fishbein 2005). In doing so, salient dimensions – e.g., resulting from exposure to rhetoric - can play a critical role in driving attitudes and ultimately behavior (Chong and Druckman 2007; Lubell 2002).

We test predictions motivated by this work with an on-line experiment that involved recruiting a large sample (n = 1,600) demographically representative of the overall U.S. population. The experiment involved manipulating: (1) the value associated with the collective benefit by adding an argument about its value in some conditions (i.e., the behavior helps the environment); (2) attributions of responsibility for dealing with the nation's energy problems (i.e., individuals versus government), and (3) personal financial costs associated with taking action. We find clear evidence that rhetoric can play a crucial role in shaping behavior. For instance, attributing responsibility to government for dealing with energy problems demobilizes willingness to take action. Our results highlight the challenges of inducing actions for the public good in this domain, because demobilizing messages are more prevalent in the news relative to messages that might increase individuals' contributions.

Action on Energy for the Public Good

A key component of U.S. energy policy involves measures aimed at curtailing or encouraging individual behaviors (see e.g., Borenstein 2012; Knittel 2012; Smith 2002; Stern 2000, 2005). This includes actions such as purchasing fuel efficient vehicles, reducing gasoline usage, conserving energy at home, purchasing energy efficient appliances, and other related choices. A challenge in motivating these behaviors is that most actions aimed at conserving energy involve the promotion of a public good – that is, the payoff is, in part, a contribution to

the public good of energy conservation.[3] We distinguish between actions that involve capital investments - e.g., insulating homes, replacing automobiles, furnaces and appliances to achieve greater energy efficiency – and behaviors that are more day-to-day and involve curtailing personal energy use – e.g., driving less, adjusting ambient home temperature, and using appliances less – because prior research has shown that these actions are influenced by distinct factors (Black, Stern, and Elworth 1985; Stern 2005). Specifically, we look at weatherization and thermostat adjustment (see Lubell, Zahran, and Vedlitz 2007). Weatherizing, or insulating one's home, is an investment because it requires the immediate outlay of capital and effort. Although it may eventually save money, the initial impact involves assuming a direct financial cost.[4] In contrast, energy *curtailment* actions such as adjusting one's home thermostat, installing a smart energy meter, and obtaining more information about meters are all steps that could save money in the short-term *and* collectively benefit the environment in the long-term. In sum, the cost saving is more direct with respect to energy curtailment relative to capital investments.[5]

These actions receive attention, not only in policy bills (e.g., Knittel 2012; Smith 2002), but also in media coverage (Bolsen 2011; Bolsen and Cook 2008; Wagner 2007). To gauge the frequency with which individuals' conservation behaviors are covered by the news media, and to

[3] Allcott (2010: 5) states that "because some externalities, primarily from power plant greenhouse gas emissions, are not internalized in electricity prices, many consumers perceive that energy conservation helps provide a public good – e.g. more moderate global climate."
[4] Allcott and Greenstone (2012: 15) report that the average weatherization job costs $2,600 in upfront costs and "reduces natural gas use by 20 to 25 percent, or about $260 per year."
[5] There is some debate whether a Smart Energy Meter saves money, because the device can cost as much as $500 to install. "Smart meters" record the real time consumption of electricity and possess two-way communication capabilities that allow for real-time pricing tied to variations in the wholesale pricing of electricity. This allows consumers to shift their consumption patterns to off-peak hours when prices are lower (Joskow 2012). Utilities often provide these technologies to consumers and subsidize installation. As a result of federal subsidies and mandates, as many as 8.7 million smart meters have now been installed in residential and consumer locations – and the rate of adoption is increasing (Joskow 2012: 40-41).

identify prominent considerations associated with these actions in public discourse, we conducted a content analysis of articles related to U.S. energy policy appearing in the *New York Times* and *USA Today* between 2001 and 2011 (n = 301).[6] Table 1 reports our results. First, approximately 20% of the articles in our sampling frame include an explicit mention of actions such as purchasing a more fuel efficient vehicle, conserving or reducing gasoline use, purchasing energy efficient products and appliances, and reducing energy usage within the home. Thus these actions are included in public discourse related to the larger U.S. energy situation.

[Insert Table 1 About Here]

We also coded our media data for attributions of causal (blame) and treatment (dealing with, or fixing) responsibility related to the nation's energy situation. Table 1 shows that there is little explicit discussion of who is to blame for the existing situation, and when there is, government is the primary culprit (18% of the articles in our sample blame government, whereas 17% blame industry and only 5% blame consumers). The data also suggest that there is more discussion of whose responsibility it is to deal with the extant situation – i.e., *treatment responsibility attributions* – compared to attributions of causal responsibility. Again, government is explicitly portrayed as the primary actor responsible for solving energy problems (37% of the articles in our sample). A smaller percent of treatment frames associate responsibility for action with consumers (6%) and industry (10%). It is not surprising that the government is most often seen as the causal and treatment actor responsible for the extant

[6] To identify our sample of relevant news articles, we searched the Lexis-Nexis database using the search algorithm "energy policy" or "energy plan" or "energy crisis" or "energy shortage." Wagner (2007) employs this algorithm to content analyze articles on energy issues appearing in *Newsweek* between 1975 and 2000. Our guided search on Lexis-Nexis produced hundreds of potentially relevant articles, and from this sample, we selected the universe of articles that focused on energy policy in the U.S between 2001 and 2011. We focused exclusively on articles that included our search terms in the headline and/or lead paragraph.

situation because when attributions come up, they often reflect political jockeying by those out of office who criticize the current government for failed policy. This is a part of blame game politics.[7] We thus see political relevance in exploring the effects of attributions on individual behavior in the domain of energy. Finally, we also content analyzed each article for any discussion of the effects (positive and/or negative) resulting from individuals' actions – e.g., effects on the environment, costs to businesses and consumers, dependence on foreign oil, and several other outcomes. Interestingly, we find that the most prominent mentions related to the effects of action are on the environment (42%) and consumer costs (41%).[8]

How Frames Influence Action

A large literature shows that how behaviors or issues are described can influence the salience of particular dimensions in forming an opinion (Chong and Druckman 2011; Chong and Druckman 2007; Druckman 2001; Druckman 2004). The term *framing* has been used by scholars to refer to the process by which exposure to different types of communications – i.e., substantively different or logically equivalent – shapes individuals' attitudes and preferences (Druckman 2010).[9] *Emphasis framing effects* involve communications altering the salience and/or perceived strength of accessible considerations toward an issue or action (Iyengar and

[7] These strategic attribution claims are not likely to affect policy views per se – Malhotra et al. (2009: 7) explain, "Whereas party identification may provide substantive information about the content of policy proposals, information about who was to blame for a crisis [or who is responsible for addressing it] does not provide meaningful information about the merits of a specific solution proposed to address the crisis… [*but*] *competing blame judgments between the parties has been a central part of the debate* [emphasis added]…" The attributions may affect evaluations of the standing government, however.

[8] Our sample of news articles was content analyzed by three trained research assistants using an instrument we developed (available upon request). We report an inter-coder reliability statistic of .86 from a re-analysis of a random subsample of articles.

[9] An attitude is an evaluation toward an object – e.g. a policy, candidate, political issue, etc. (Chong and Druckman 2007). Preferences are comparative evaluations between such objects (Druckman and Lupia 2000).

Kinder 1987; Zaller 1992; Druckman 2001). Although the literature documenting these effects is quite large, fewer studies explore whether frames (embedded in persuasive appeals) directly affect political behavior.[10] This is unique because little work has explored framing in the context of energy policy and little work has looked at the direct effects of rhetoric on non-electoral behavior (although see Bolsen forthcoming; Brader, Suhay, and Valentino 2008; Gamson 1992; Miller and Krosnick 2004).

The framing literature provides clear evidence that salient dimensions can play a critical role in shaping *attitudes*. A matter of particular interest for us is how two types of frames that tend to vary across contexts influence *actions* regarding energy conservation (see Bolsen 2011). First is what we call an *effect frame*. That is, when an individual assesses whether or not to engage in a behavior, he or she develops an attitude toward the behavior (Ajzen and Fishbein 2005). That attitude consists of assessments on various dimensions related to the behavior (e.g., its effects), or considerations of frames (Chong and Druckman 2007). Those dimensions are evaluated on whether the behavior will result in positive or negative outcomes. When it comes to energy actions, relevant considerations include dimensions that may be affected by the behavior such as its effect on the environment and/or personal costs. For example, if the environmental consequences of a behavior are the focus of a communication, it may increase the likelihood of action because the individual would typically view such action as good for the environment. On the other hand, if the consumer costs dimension is most salient, it will likely decrease action because the individual would typically view such action as bad for his/her own costs (money, time).Thus, which effect dimension is most salient may carry the day. Effect

[10] The literature on social movements explores how frames serve as "interpretive packages" that activists use to mobilize potential adherents and constituents, appeal to authorities, and demobilize antagonists (Benford and Snow 2000; Gamson 1988; Polletta and Ho 2006).

frames work by increasing the salience of a particular behavioral outcome in forming an attitude toward a behavior, which in turn increases or decreases the likelihood of the individual taking action (contingent on belief content – i.e., the extent to which one thinks taking action to protect the environment is a good thing). Therefore, *we hypothesize that exposure to an appeal that increases the salience of the positive collective outcomes resulting from an action (e.g., benefits to the environment) will increase individuals' willingness to take energy investment and curtailment actions* (relative to a control group) (hypothesis 1a). Similarly, *we expect that exposure to an appeal highlighting the selective financial costs of taking action on energy will decrease individuals' willingness to take action* (relative to a control group) (hypothesis 1b). Importantly, we argue that the impact of exposure to an appeal highlighting the selective costs of these actions depends on the type of behavior in question. In the case of *capital investments*, we expect that increased investment behavior will require emphasis on *both* individual responsibility and the collective benefit (hypothesis 1c). Lacking either component may fail to motivate action - unless individuals already believe strongly that their own actions make a difference in terms of influencing collective outcomes, in which case we expect exposure to a frame highlighting the collective benefits will be enough to motivate action (hypothesis 1d).[11] In contrast, energy curtailment behaviors such as adjusting the thermostat, installing a smart energy meter, and obtaining more information about smart meters are all steps that could save money. As a result, exposure to a cost frame may be seen as leading to a positive outcome – that is, highlighting costs may encourage people to be more likely to engage in energy curtailment, regardless of attributions since these actions have selective benefits (hypothesis 1e).

Attributions of Treatment Responsibility

[11] Lubell, Zahran, and Vedlitz (2007: 395) explain that "the expected value of collective action increases as perceived personal influence increases."

We are not aware of any work that looks at the impact of attributions of responsibility on individuals' willingness to act for the public good. Attributions can be in terms of cause or treatment responsibility (e.g., Iyengar 1991). Iyengar (1991) finds that attribution of treatment responsibility is a critical mediator for the belief that the government should take action to address an issue – e.g., when experimental participants increased attribution of responsibility to societal factors (as a result of exposure to thematic news frames) their support for government policies to address the respective public issue increased. However, attributions can inadvertently affect behavioral choices. For example, as people think individuals are more responsible for collective outcomes, and they focus on that instead of selective costs or environmental benefits, they will be more likely to take action if they think those actions matter. This can be thought of as a dimension such that the more individuals see themselves as responsible for collective outcomes, the more they will take action for the public good. The cognitive dimension is the salience of individuals' contributions – i.e., will the behavior have a positive impact on the collective effort.[12]

We expect attributions of responsibility will affect behavior for two reasons. First, any public goods problem introduces disincentives to act, and communications that directly address the need for action may be critical (e.g., see Benford and Snow 2000; Gamson 1992, Polletta and Ho 2006). Second, related work on economic voting is telling. This research shows that individuals base their attitudes not on narrow economic standing but rather on their view of the collective economy, suggesting that behaviors (outcomes) need to be connected to societal impact (Brody and Sniderman 1977). Abramowitz, Lanoue, and Ramesh (1988) show personal considerations (e.g., economic conditions) can affect general attitudes (i.e., voting) when mass

[12] Of course, this depends on if individuals believe their actions matter, which in turn, is reflected, in collective efficacy beliefs (Lubell, Zahran, and Vedlitz 2007).

communications make the causal attributions clear – that is, when rhetoric portrays government as a cause of personal economic standing, personal standing matters in vote choice. In short, attributions of responsibility may affect individuals' willingness to take action for a public good, particularly when explicitly connecting individual behavior to collective outcomes.[13] These messages also may be strong insofar as individual responsibility may resonate with deeply entrenched values in American culture (Feldman 1988). We thus hypothesize that exposure to communications that focus on individual responsibility for collective outcomes will increase the salience of the collective efficacy of one's actions, and the greater one sees their actions as having an effect, the more likely he/she will act (hypothesis 2a). We compare messages highlighting individual attributions of responsibility to ones that de-emphasize individual impact by referencing the government's responsibility for the nation's configuration of energy resources. We expect in all cases that highlighting government's responsibility for solving energy problems will decrease participation, as it cancels out any value of the collective benefit (e.g., even if a collective benefit matters, if people do not think their action can affect it, they will not act) (hypothesis 2b). This is particularly important given the aforementioned media coverage that often associates government with responsibility for action. We expect de-mobilization because such arguments suggest there is little individual reason to engage in such behaviors, or there are high costs. In contrast, the curtailment behaviors of adjusting the thermostat, investing in a Smart Energy Meter, and obtaining more information about Smart Meters are all steps that could save money. As a result, the cost frame may be seen as positive – that is, highlighting costs may encourage people to be more likely to engage in these behaviors, regardless of attributions

[13] The economic voting literature in some sense is the reverse – in this case, societal attributions are critical in holding government responsible; whereas in the energy behavior case, it is personal attributions that will generate personal actions and not a reliance on government.

(see hypothesis 1e above). We see treatment attributions as comparable to effect frames (psychologically), but which is stronger in shaping individual behavior – attributions of responsibility or effect frames – is not a topic that has been explored (see Entman 2004). Thus, we have no clear predictions regarding how exposure to a mixture of competing frames regarding the cost / benefits and attributions of responsibility will influence action. In other words, which dimension is stronger (i.e., cost/benefits or attributions of responsibility) is not something that has been explored. Politically this is a relevant question since both attributions and effect frames are part of the public discourse on U.S. energy policy (see Bolsen 2011).

Experimental Participants, Design, and Procedures

To investigate our hypotheses, we conducted an experiment in the context of a survey in December of 2009 (n = 1,600). The study was part of a broader survey exploring citizens' knowledge, attitudes, and support for action regarding a variety of energy sources, new technologies, and polices. [14] We hired a private company, Bovitz Research Group (BRG), located in Palo Alto, CA, to implement the study. BRG uses an opt-in online consumer survey panel service that has more than 1 million respondents.[15] Participants are paid a small cash payment for completing surveys. This means that the overall sample, while matched on key demographics, consists of people who are online – i.e., have Internet access and a valid email address. The response rate of the initial invitation is typically 20% to 30%. Then, of those who agree to participate in the screening, about 80%-90% complete the survey. This results in a 15%

[14] The survey was funded through a grant from the Institute for Sustainability at Northwestern (ISEN).

[15] They draw a sample from that pool and invite the selected individuals to participate in a study via an email invitation letter. Taking into account response rate differences across demographic groups, the sample is drawn in a way to ensure that the set of potential respondents who complete the screener in order to qualify for the main questionnaire is representative of the U.S. population. The initial invitation to participate occurs via email and then participants click on a link within the invitation to complete the survey on a secure Internet site.

to 25% response rate range. The demographic and political profile of our sample is presented in Table 2 (we discuss the measures in Table 2 at length below).

[Insert Table 2 About Here]

We designed our experiment to test predictions about the effects of exposure to competing frames about the collective benefits and selective costs of action on energy, as well as frames assigning responsibility for action to the government or to consumers. All participants were informed that they would be asked about "some energy choices you may make." Respondents were randomly assigned to one of nine conditions. As shown in Table 3 (with Ns appearing in the cells), we crossed three frames having to do with effects resulting from actions (none, a financial/selective costs frame, and an environment/collective benefit frame) with three frames about attribution of responsibility (none, individual attribution, and government attribution). Participants were randomly assigned to a baseline control group (condition 1, Table 3) then proceeded directly to answer our dependent measures (described momentarily). In conditions 4 and 7, respondents received either a selective cost frame (condition 4) or a collective benefit frame (condition 7). These conditions mirror traditional studies on framing effects by exposing participants to opposing frames and measuring their impact relative to a control group (e.g., see Chong and Druckman 2007). Conditions 2 and 3 matched conditions 4 and 7, however, instead of being exposed to a frame regarding the cost or benefits of action, respondents were exposed to messages attributing responsibility for dealing with energy problems to individuals (condition 2) or to the government (condition 3). We anticipate that frames highlighting individual (or governmental) attributions of responsibility for action on energy will affect the likelihood of action, ceteris paribus, because they will increase the saliency of beliefs about the efficacy of one's own actions.

[Insert Table 3 About Here]

The other conditions combine multiple statements. Conditions 5 and 8 both attribute responsibility to individuals for collective outcomes, but this attribution frame is then paired with a selective cost frame (condition 5) or a collective benefits frame (condition 8). We anticipate that the combination of the individual attribution frame and the collective benefits frame should have a strong positive effect on willingness to act. Conditions 6 and 9, on the other hand, pairs the government attribution frame with a selective cost frame (condition 6) or a collective benefits frame (condition 9).

After completing a background questionnaire that included measures designed to tap existing attitudes and values related to action on energy and environmental issues, as well as a host of demographic and political characteristics we discuss momentarily, participants were exposed to one of nine experimental treatments (including the baseline control group, condition 1). To manipulate attribution of responsibility, we include an explicit statement (i.e., "*The ultimate success of our nation's energy policy depends largely on [individual choices about energy consumption / governmental decisions about energy supply]*), a reference to the need for action (i.e., "*[Individuals / Government] needs to step up to the plate*"), and a reference to an abstract general principle (i.e., *[something they have done throughout American history without having to rely on government / something they often do when individuals alone cannot solve a problem]*). Our collective benefit frame focuses on the "*important environmental consequences*" and the impact of action on collective outcomes – i.e., save "the world from millions of metric tons of greenhouse gases." In contrast, our selective cost frame highlights "*important economic consequences*" that require consumers to "pay a cost premium."[16] We pre-tested these treatments

[16] The wording of the treatments for each condition is listed in Appendix B.

on a sample of approximately 211 undergraduate students - who did not take part in the study conducted by BRG - to ensure the directionality and strength of the opposing cost / benefit frames, and to ensure the attributions portrayed either government or individuals as primarily responsible for dealing with the nation's energy problems. We find that the attribution frame significantly and effectively influences the agent perceived as responsible for dealing with the nation's energy problems, and that the cost / benefit frames are perceived directionally as intended (negative / positive) and equal in terms of strength (the pre-test analyses are available upon request from the authors).

Following exposure to one of our treatments, participants answered several additional questions designed to test our hypotheses about the effects of the various types of framing presented in the treatments. We focus on the impact of our treatments across three dependent measures for each type of energy action (i.e., behavioral intentions, willingness to pay to save energy, and information-seeking). To measure behavioral intentions, respondents were asked to rate on 7-point scales the likelihood that they will "invest in insulation or weatherization" or "lower your thermostat setting in the winter and/or raise the setting in the summer to save energy" (e.g., 1 = extremely unlikely, 4 = neither unlikely nor likely, 7 = extremely likely). Our *willingness to pay (WTP)* measure of support for investment / curtailment asked "What is the maximum amount you would be willing to pay to [insulate / weatherize OR for a Smart meter] save energy? Enter an amount ranging from 0$ to $500." Our third dependent measure is an actual behavior measure that first asks respondents if they would like more information about insulation / weatherization and then about Smart Energy Meters. If the answer to this question was "yes," then participants were asked to provide their email address to receive one email with the information (0 = did not enter email and 1 = entered email address). We focus on

participants who actually provided an email address, and do not include those who checked "yes" requesting more information and then chose not to provide an email address, because providing an email address requires more of an active commitment to receiving information.

We included measures for previously discussed attitudes, beliefs, and a host of other factors known to influence opinions about U.S. energy and environmental policy (note that these measures appeared prior to exposure to a treatment). We measured perceptions about the *personal influence* of a collective action by asking respondents the extent to which they agreed with the statement "Taking actions that reduce my own personal consumption have an impact on the nation's energy situation" (1-7 disagree/agree scale, see Lubell, Zahran, and Vedlitz 2007; Lubell 2002; Finkel, Mueller, and Opp 1989). We expect that higher scores on this measure will increase the likelihood of action because it will increase perceptions that the behavior will have a positive, or notable, impact on the likelihood of providing for a public good. To measure beliefs about the likelihood of *group success* we asked respondents to report the extent to which their actions "encourage others in my community to take similar steps" (1-7 disagree/agree scale) (see Lubell, Zahran, and Vedlitz 2007). We measured the importance associated with attitudes about the *environment* by asking respondents "how important to you is… the environment" (1-7 unimportant/important scale). We measured the importance of attitudes associated with the *costs* of action by asking "how important to you is… costs to businesses which are often passed on to consumers" (1-7 unimportant/important). We also asked respondents the degree to which government (*Gov. Response)* and consumers (*Cons. Response)* are responsible for dealing with, or addressing, the nation's existing energy problems on a 7-point scale with higher scores reflecting greater perceived responsibility. Finally, we asked respondents to rate the effectiveness

of approaches to energy policy that "induce consumers to shift their behavior" (1-7 ineffective / effective scale) (*Effectiveness Consumer Approaches)*.

The survey instrument also included measures for values that have been associated with environmental action, because acting in accordance with important values increases the selective benefits of an action (Inglehart 1997; Lubell 2002; Lubell, Zahran, and Vedlitz 2007). One item on our survey tapped *post-materialist versus materialist values* and asked respondents to rate what they think is more important "protecting the environment, even at the risk of curbing economic growth, OR maintaining a prosperous economy, even if the environment suffers to some extent?" (1 = definitely protect environment, 7 = definitely maintain prosperous economy) (see Chong and Druckman 2011). We expect lower scores on this measure (prioritizing the environment over the economy) will be associated with greater willingness to take action. For *hierarchical* (as opposed to egalitarian) values (see Kahan et al 2008, 2009), we asked respondents to rate the extent to which they disagree or agree that "We have gone too far in pushing equal rights in this country," on a 7-point scale with higher scores indicating increased agreement. A similar item gauged *individualism* (as opposed to communitarianism), but instead asked, "If the government spent less time trying to fix everyone's problems, we'd all be a lot better off?" In both cases, we expect greater action for the public good to be associated with lower scores on these measures (reflecting greater priority being given to egalitarian and communitarian values).

We measured a host of other factors that have been related to opinions on energy issues in surveys including: political knowledge[17], energy knowledge[18], party identification (7-point

[17] Our measure for political knowledge is an average of correct responses across four questions: (1) how much of a majority is required for the U.S. Senate and House to override a Presidential veto; (2) which party currently has the most members in the House of Representatives in

scale where 1=Strong Democrat, 7=Strong Republican), ideology (7-point scale with higher scores indicating conservativeness), trust in government (4-pt scale, 1= never, 4= always), and media use (see Lubell et al. 2007 for relationships between each of these measures and action on environmental issues). [19] In addition, the survey included demographic measures that asked respondents' gender (0 = male, 1 = female), minority status[20], education[21], age[22], income[23], whether they live in a house or an apartment (1 = house, 2 = apartment), directly pay their utilities (1 = yes, 2 = no), and live in a moderate or extreme climate relative to others living in the U.S (1 = moderate, 3 = extreme). The questions, response scales, and distributions for all measures we use in the analyses below are reported in Table 2.

Results

Table 2 provides the overall means (or in the case of e-mail, percentages) and standard deviations for each dependent measure for our sample at large. The means and standard deviations for each dependent variable by experimental condition are reported in Table A1 in Appendix A. We begin by reporting on the impact of our experimental treatments on capital investments in energy efficiency. We summarize the results in three figures that present the

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Washington D.C.; (3) whose responsibility is it to determine if a law is constitutional; and, (4) who is the current U.S. Secretary of State (open-ended)..

[18] The measure of energy knowledge is an average of correct responses across three items: (1) do you know what country is the world's largest exporter of crude oil; (2) which of the following is not a renewable energy resource; and, (3) is it true or false that most of the oil that the United States imports comes from the Middle East.

[19] Our *media* measure is an average of three individual items for news exposure (alpha = .54): (1) reading the newspaper (1-8 never / everyday); (2) watching news (1-8 never / everyday); (3) online information (1-8 never / everyday) (standardized 0 – 1 scale).

[20] We asked respondents to identify their ethnicity and classified African Americans, Asian Americas, and Hispanics as minorities (see Table 2).

[21] Respondents reported their highest level of completed education (see Table 2).

[22] Respondents entered their age (see Table 2).

[23] Respondents reported their income as one of five ranges (see Table 2).

results from difference of means tests (t-tests) between the control (baseline) and each other condition, for each variable.

[Insert Figures 1, 2, and 3 About Here]

The results are striking. First, there is support for both hypothesis 2a and 2b regarding the impact of attributions of treatment responsibility on willingness to act. Exposure to the individual attribution frame (condition 2) marginally increases one's likelihood of investing in insulation / weatherization ($p < .10$), while exposure to the government attribution frame (condition 3) significantly decreases one's likelihood of action across all three dependent measures ($p < .05$). Second, as we anticipated (see Black, Stern, and Elworth 1985; Stern 2000), mobilization on investment behavior is difficult because of the financial burden associated with these actions. In looking at the relative impact of highlighting selective costs versus collective benefits, we compare conditions 4 and 7 to our baseline control group. In support of hypothesis 1b, we find that exposure to a selective cost frame significantly lowers intentions to make investments across all three dependent measures ($p < .05$).

Third, to evaluate hypothesis 1a, which predicts that motivating investment behaviors will require both an appeal to the collective benefits and an individual attribution frame, we focus initially on the insignificant positive effects the collective environment frame alone (condition 7) across Figures 1, 2, and 3. Although highlighting the collective benefits to the environment has a positive effect relative to the control group across measures, the effects are not significant. However, in support of hypothesis 1a, we find that coupling the collective benefits appeal with an individual attribution of responsibility appeal significantly increases intentions to weatherize / insulate (6.38%, $p < .01$), willingness to pay for a Smart Energy Meter (10.85%, $p < .01$), and information-seeking behavior regarding insulation / weatherization

(10.41%, $p < .01$). On the other hand, exposure to the collective benefit appeal paired with a government attribution appeal (condition 9) significantly decreases willingness to act across dependent measures. Thus, de-mobilization appears to be quite easy – invoking costs or attributing responsibility for action to government decreases the value, significantly, on each of our three dependent variables relative to the baseline. In contrast, mobilization is challenging as only the use of the individual attribution and emphasis on the environment increases the value for each dependent variable. Interestingly, both conditions are needed – while referencing the environment without an attribution creates movement in a positive direction, it never does so significantly.

To test hypothesis 1d which predicts that individuals who have a greater sense of personal efficacy – i.e., who strongly believe their actions have an impact on collective outcomes (see Table 2) – will be more likely to take action in response to exposure to a frame highlighting the collective benefits to the environment (even in the absence of an appeal regarding the impact of individual contributions), we focus on our measure for *Collective Efficacy* which asked respondents "Do you think the success of energy policy depends on whether individual citizens take actions that reduce energy demand?" (1- 7 not at all / completely scale). High scores on this measure, indicating strong beliefs that individuals' actions matter in terms of collective outcomes, may moderate some of the experimental conditions effects on behavior – since the individual attribution may not be needed for individuals who score high on this measure. To test this prediction, we take a median split of below six and above five on *collective efficacy*. We then estimate basic regressions for each group including the experimental conditions for all dependent variables (and assessing the effects relative to the control group). In the interest of space, we do not report the results from these regressions (they are available upon request);

however, we do note several interesting findings that emerge from these separate regressions. First, the main result is that receiving a collective benefit frame significantly increases intentions to pay for insulation / weatherization and *WTP* for capital investments among participants who score high on *collective efficacy*, but this is an ineffective appeal among individuals who score below the median on this measure. This finding provides clear support for hypothesis 1d, and is sensible given that individuals who score highly on this measure do not need to be exposed to the individual attribution appeal because they already believe individuals' actions matter. A second notable result from these additional analyses splitting respondents into high and low collective efficacy groups is that with respect to our information-seeking behavior measure (email request) the treatment effects are concentrated among the high collective efficacy group. People who do not believe that individuals actions matter basically exhibit no response to the treatment.

Curtailment Behaviors

Curtailment behaviors include adjusting the thermostat, investing in a Smart Energy Meter, and obtaining more information about Smart Meters. All involve steps that could save individuals money. We begin by highlighting the distribution of each dependent variable for curtailment (see Table 2). The average support for each of these measures (compared to each investment measure, respectively) is (1) much higher intentions to take action; (2) much lower willingness to pay for a Smart Meter; and, (3) nearly identical percentages of respondents requesting an email by providing their personal address. We suspect the reason for greater intentions to take action to curtail use, again, are because doing the act has dual selective and collective benefits. Second, willingness to pay less for a Smart Meter to curtail use may be because the device is perceived as less necessary in order to curtail household usage (moreover,

people may suspect that the device should cost less than insulating their house). It perhaps also may reflect people's belief that they can adjust the thermostat without a Smart Meter.

As in the previous section on investment behaviors, we summarize the results from our experiment with three figures (Figures 4, 5, and 6) that report the results from a series of difference of means tests (t-tests) between the control (baseline) and each other condition, for each variable.[24] The results are again clear, but they are different from the findings for investment behaviors. An emphasis on the selective costs of action now increases intentions to curtail energy use (e.g., adjust thermostat to save energy). This is consistent with hypothesis 1e, which predicts that any reference to costs related to curtailment will increase action, since these behaviors are a cost-saving move, and thus, emphasizing a selective benefit. Interestingly, even the governmental attribution does not matter here (see condition 6 across Figures 4, 5, and 6). This makes sense since selective incentives have little to do with overall responsibility for a problem. In contrast, we find appeals to collective environmental benefits only work when paired with an individual attribution of responsibility frame (see condition 8 across Figures 4, 5, and 6). There is de-mobilization with governmental attributions either with no benefit appeal (condition 3) or when paired with the environment collective benefit appeal (condition 9).

[Insert Figures 4, 5, and 6 About Here]

Although the information-seeking results (Figure 6) perfectly mimic the results for our curtailment intention measure (Figure 4) – thus obtaining information which is free is something people will consider when they think about their intent to adjust - when it comes to paying for an energy meter (see Figure 5) we find the selective cost frame is not significant. We suspect this reflects people believing they may not need the meter to adjust and while they think adjusting

[24] Note that the means for each dependent variable by condition are reported in Table A1 in Appendix A.

will save money. They also may not want to spend money on installation. We continue to see government attributions decrease willingness to pay for a Smart Meter (see conditions 3 and 9 in Figure 5) as well as the collective appeal/individual attribution does mobilize (condition 8). In short, mobilization is easier with curtailment behaviors given their selective benefits. On the other hand, motivating action through rhetoric focusing on the collective benefits continues to be difficult – i.e., it requires either a selective cost benefit or multiple frames priming both collective benefits and the collective efficacy of individuals' actions (through an individual attribution of responsibility treatment). We estimated separate regressions for individuals high and low on our *collective efficacy* measure across dependent variables (with the conditions as independent variables). Similar to what we reported on capital investments, exposure to a collective benefit frame significantly increases behavioral intentions to invest in insulation / weatherization among the high efficacy group (but not the low group). On the other hand, we find no differences between the low and high efficacy group for the *WTP* and information – seeking behavior measures.

We next investigate the robustness of our observed treatment effects by regressing each dependent variable for both investment and curtailment behaviors on the experimental conditions as well as attitudes, values, political and energy specific knowledge, and other demographic variables.[25] Table 4 reports the results from six models predicting the determinants of support for each main dependent variable.

[Insert Table 4 About Here]

Most importantly, we find that the dummy variables for our experimental conditions are robust to the inclusion of a large number of other factors known to predict environmental

[25] The models predicting intentions in Table 4 assume support scores are measured on interval levels. The results are unchanged if we use OLS regressions.

activism. As illustrated in the Figures presented above, both the *capital investment* and *curtailment* models provide clear evidence that attributing responsibility for action on energy to government significantly reduces willingness to take action for the public good (see row 2, Table 4, *No-frame + Government Attribution*). Similarly, across all models, the combination of an appeal to the collective benefit paired with an individual attribution of responsibility significantly increases intentions, willingness to pay, and e-mail requests for more information on both insulation and Smart Meters. We also continue to observe that the impact of the cost frame depends on the type of behavior in question – reducing individuals' willingness to make capital investments but marginally increasing the likelihood of curtailing energy usage. In assessing the relative impact of attribution frames versus cost/benefit frames, the government attribution frame paired with a collective benefit message significantly reduces willingness to take action across all six models. However, any reference to cost with respect to capital investments reduces willingness to take action, even when paired with the individual attribution appeal.

In assessing the impact of the control variables included in Table 4, we highlight a number of interesting and sensible results. First, as suggested by the results previously reported, there is a highly significant and large impact across models in the belief that one's actions affect the national energy situation (see *collective efficacy*, Table 4) (this supports the collective interest model of environmental action discussed above, Lubell 2002; Lubell, Zahran, and Vedlitz 2007). The single exception is lack of significance for our willingness to pay for Smart Energy Meters measure, which may reflect the fact that people believe they can curtail energy usage without installing this device. Second, also supporting collective-interest models of behavior (Finkel and Muller 1998; Lubell, Zahran, and Vedlitz 2007), we find that perceptions about *group success* significantly increase intentions, willingness to pay, and information-seeking behavior across

five of six models in Table 4 (the exception is requesting an email regarding home insulation). Interestingly, the impact of many of the other control variables is spotty and in some cases have no effect. *Post-materialist* (as opposed to materialist) values increase willingness to make capital investments (the negative coefficients are because the measure is coded so that support for the environment over economic growth is associated with lower scores in making a tradeoff); however, it has no effect on curtailment behaviors. Political and energy knowledge tend to increase willingness to take action across models (with the exception of paying for a Smart Energy Meter), which is consistent with extant work on knowledge lowering costs associated with collective action (e.g., see Lubell, Zahran, and Vedlitz 2007). Finally, living in a house (as opposed to an apartment) significantly decreases action across many of the models in Table 4. There are several other significant variables that are significant in one or two models only; but, overall, the impact of the remainder of the control variables is not overwhelming. It is interesting that across both types of behavior party identification and ideology are insignificant predictor variables (except that liberals are marginally more likely than conservatives to request an email about Smart Energy Meters).

Conclusion

The question of what shapes citizens' willingness to make sacrifices for the sake of a public good is increasingly important as humanity faces the daunting challenge of maintaining an adequate energy supply and simultaneously mitigating the emission of pollutants associated with global warming. This paper draws from collective-interest models of environmental activism and research on framing and persuasion to explore how exposure to rhetoric highlighting factors believed to influence collective action behavior – i.e., collective benefits, selective costs, and attributions of treatment responsibility – affect individuals' intentions and actual behavior via an

email request. We test hypotheses motivated by this work in an on-line experiment (n=1,600) and find that rhetoric can play a crucial role in shaping behavior – e.g., when the government is portrayed as the agent responsible for addressing energy problems, people are less willing to act; however, emphasizing individuals' responsibility significantly increases action. Moreover, references to selective costs tend to decrease willingness to make investments but increase curtailment behaviors overall. We also find, through a content analysis of news articles on energy issues in the U.S. (2001- 2011), that government is the agent most often portrayed as responsible for dealing with the nation's energy problems. Our results highlight the challenges of inducing actions for the public good - because demobilizing messages are more prevalent than rhetoric that might increase individuals' contributions. This has implications for practitioners designing messages to promote energy efficient behaviors.

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Table 1. Media Content Analysis Results

	% of Total Sample (N=301)
Behaviors Mentioned	
Purchase more fuel-efficient vehicle	10%
Conserve or reduce gasoline use / Carpool	4%
Purchase energy-efficient appliance	3%
Conserve home energy	3%
Attributions of Causal Responsibility	
Government	18%
Industry	17%
Growing Demand	11%
Foreign Nations	6%
Consumers	5%
Natural Disasters	4%
Other	1%
Attributions of Treatment Responsibility	
Government	37%
Industry	10%
Consumers	6%
Foreign Nations	1%
Effect Frames	
Environment	42%
Consumer Costs	41%
Business Costs	38%
Foreign Dependence	31%
Business Behavior	22%
Supply	19%
Efficiency	11%
Consumer Behavior	10%
Government	5%

The percentages reported above are a count of whether each article in our sampling frame includes an explicit reference to a behavior, responsibility attribution, and /or effect frames. A single article could contain mentions of multiple actions, responsibility attributions, or effect frames. Our sample consists of 275 articles appearing in the *New York Times* and 26 articles appearing in *USA Today* between January of 2001 and August of 2011.

Table 2. Dependent Measures, Demographic, and Political Profile of Sample

Variable	Scale (Overall Distribution)	Average (std. dev.)
Dependent Variables		
Likelihood of investing in insulation / weatherization	How likely are you to invest in insulation or weatherization for your home or apartment? 1 = extremely unlikely (7%); 2 (8%); 3 (12%); 4 (21%); 5 (24%); 6 (18%); 7 = extremely likely (9%)	4.37 (1.66)
Maximum WTP for insulation / weatherization	What is the maximum amount you would be willing to spend to insulate or weatherize your home or apartment to save energy? Enter an amount ranging from $0 to $500.	213.77 (182.03)
Email request for information on insulation / weatherization	Would you be interested in receiving more information about how to insulate or weatherize your home or apartment? (26%); If "yes," then asked to provide their email address (19%)	.19 (.39)
Likelihood of adjusting home thermostat	How likely are you to lower your thermostat setting in the winter and/or raise the setting in the summer to save energy? 1= extremely unlikely (3%); 2 (2%); 3 (5%); 4 (12%); 5 (20%); 6 (27%); 7 = extremely likely (31%).	5.53 (1.46)
Maximum WTP for Smart Energy Meter	What is the maximum amount you would be willing to spend for a Smart Energy Meter that can automatically adjust your thermostat setting to save energy? Enter an amount ranging from $0 to $500.	82.79 (117.78)
Email request for information about Smart Energy Meters	Would you be interested in receiving more information about Smart Energy Meters that save energy? (yes = 24%). If "yes," provided email address (19%)	.19 (.39)
Beliefs		
Belief Importance (Environment)	Response to "When it comes deciding whether to insulate your home and/or lower your thermostat, how important to you is the effects of your decision on sustaining the environment?" (1= extremely unimportant (2%); 2 = very unimportant (2%); 3 = somewhat unimportant (3%); 4 = neither unimportant nor important (7%); 5 = somewhat important (18%); 6 = very important (29%); 7 = extremely important (39%)).	5.80 (1.39)
Personal Influence	Agreement with "taking actions that reduce my own personal consumption have an impact on the nation's energy situation." (1= strongly disagree (2%); 2= moderately disagree (3%); 3= slightly disagree (5%); 4= neither disagree nor agree (13%); 5= slightly agree (29%); 6= moderately agree (26%); 7= strongly agree (23%)).	5.34 (1.37)

Group Success	Agreement with "taking actions that reduce my own personal consumption have an impact on the nation's energy situation." (1= strongly disagree (3%); 2= moderately disagree (4%); 3= slightly disagree (6%); 4= neither disagree nor agree (19%); 5= slightly agree (29%); 6= moderately agree (22%); 7= strongly agree (17%)).	5.01 (1.46)
Belief Importance (Costs)	Response to "When it comes to deciding whether to insulate your home and/or lower your thermostat, how important to you is the cost involved?" (1= extremely unimportant (1%); 2= very unimportant (2%); 3= somewhat unimportant (4%); 4= neither unimportant nor important (10%); 5 = somewhat important (25%); 6= very important (32); 7= extremely important (25%)).	5.52 (1.32)
Values		
Post-Materialist Values	More important to "protect the environment" or "maintain prosperous economy"? (1= definitely protect environment (8%); 2= very likely protect environment (9%); 3= probably protect environment (10%); 4= equally important (43%); 5= probably maintain prosperous economy (13%); 6= very likely maintain prosperous economy (10%); 7= definitely maintain prosperous economy (7%)).	4.03 (1.55)
Heirarchialism /Egalitarianism	Agreement with "We have gone too far in pushing equal rights in this country." (1= strongly disagree (21%); 2= moderately disagree (9%); 3= slightly disagree (9%); 4= neither disagree nor agree (19%); 5= slightly agree (16%); 6= moderately agree (11%); 7= strongly agree (16%)).	3.95 (2.07)
Individualism/ Communitarianism	Agreement with "If the government spent less time trying to fix everyone's problem, we'd all be a lot better off." (1= strongly disagree (6%); 2= moderately disagree (6%); 3= slightly disagree (7%); 4= neither disagree nor agree (19%); 5= slightly agree (17%); 6= moderately agree (16%); 7= strongly agree (28%)).	4.96 (1.82)
Demographics		
Talk about politics	How many days a week, on average, do you talk about politics with your family and/ or friends? (0= never (17%); 1= 1 day/week (26%); 2= 2 days/week (17%); 3= 3 days/week (13%); 4= 4 days/week (7%); 5= 5 days/week (8%); 6= 6 days/week (3%); 7= every day (10%)).	3.53 (2.16)
Political Knowledge	Know majority required to over-ride veto (56% correct) Know which party has majority in U.S. House = (72% correct) Know whose responsibility it is to declare law unconstitutional = (76% correct) Know current U.S. Sec. of State = (67% correct)	.68 (.33)
Energy Knowledge	Know the world's largest exporter of oil = (63% correct) Know renewable energy sources = (63% correct) Know most U.S. oil not imported from ME = (24%)	.50 (.30)

Income	Estimate of family income (before taxes) < $30,000 (24%); $30,000 – $69,999 (42%); $70,000 – $99,999 (19%); $100,000 - $200,000 (13%); > 200,000 (2%)	N/A
Education	What is the highest level of education you have completed? (1 = Less than high school (1%); 2 = High school (16%); 3 = Some college (39%); 4 = Four year college degree (31%); 5 = Advanced degree (13%)).	N/A
Age	What is your age?	44.75 (16.43)
Female	Are you male (50%) or female (50%)	N/A
Minority	Which of the following do you consider to be your primary racial or ethnic group? (White = 73%; Minority = 27%).	N/A
TrustGov	How much of the time do you think you can trust the government in Washington to do what is right? (4 = just about always (2%); 3 = most of the time (18%); 2 = only some of the time (61%); 1 = never (20%))	2.02 (0.67)
Media	How often do you obtain energy information from… newspapers, TV, online (0-1 scale, alpha = .54)	.51 (.27)
Party Identification	Generally speaking, do you consider yourself a Democrat, Independent, or Republican? (1= strong Democrat (16%); 2= weak Democrat (9%); 3= lean Democrat (14%); 4= Independent (33%); 5= lean Republican (12%); 6= weak Republican (6%); 7= strong Republican(12%)).	N/A
Pays Own Utilities	Do you pay directly for the utilities in your home (e.g., gas and/or electric bill), or is this paid for by someone else (e.g., a landlord)? Pay directly = 90%; Do NOT pay directly = 10%	N/A
House or Apt.	Do you live in a house (73%) or apartment (27%)?	N/A
Government Responsibility	Listed below are different sources people tend to see as responsible for **addressing (or fixing)** the energy situation. Rate how responsible you think each source is for **dealing with** the U.S.'s energy problems.	5.35 (1.46)
Consumer (effectiveness) ApphConsum	Response to "Do you think the success of energy policy depends on whether individual citizens take actions that reduce energy demand?" (1= not at all (2%); 2 = not much (3%); 3 = a little (7%); 4 = somewhat (14%); 5 = a good amount (29%); 6 = a great deal (29%); 7 = completely depends (17%))	5.18 (1.38)
Climate warm	How would you describe the climate in which you live (relative to other parts of the U.S. (1= extremely cold (2%); 2 = relatively cold (10%); 3 = moderate (42%); 4= relatively warm (21%); 5 = extremely warm (25%)).	N/A

Table 3. Experimental Design and Predictions

	No Effect Frame	**Costs Frame (selective incentive)**	**Environment Frame (collective incentive)**
No Attribution	1 Baseline N = 179	4 Investment: Lower Curtailment: Increase N= 178	7 Higher only if high CE. N= 177
Individual Attribution	2 No Effect or slight increase. N = 178	5 Investment: Slightly lower. Curtailment: Increase N = 176	8 Higher N = 177
Government Attribution	3 Lower N = 177	6 Investment: Much Lower Curtailment: Increase N= 178	9 Lower N = 180

Table 4. Determinants of Support for Action

	Likely to Insulate[a]	Max WTP Weatherize[b]	Email on Insulation[c]	Likely to Curtail[a]	Max WTP Smart Mtr.[b]	Email on Smart Mtr.[c]
No Frame + Individual Attribution (Condition 2)	.01 (.11)	3.90 (17.21)	.08 (.16)	.08 (.11)	-16.06 (11.78)	-.13 (.16)
No-Frame + Government Attribution (Condition 3)	-.30*** (.11)	-42.82*** (17.26)	-.28* (.17)	-.24** (.11)	-25.18** (11.82)	-.64*** (.19)
Cost Frame + No Attribution (Condition 4)	-.32*** (.11)	-42.8*** (17.21)	-.25 (.16)	.37*** (.12)	-8.72 (11.78)	.29* (.15)
Cost Frame + Individual Attribution (Condition 5)	-.26** (.11)	-34.57** (17.32)	-.33* (.17)	.37*** (.12)	-6.03 (11.86)	.28* (.16)
Cost Frame + Government Attribution (Condition 6)	-.36*** (.11)	-49.99*** (17.21)	-.23 (.16)	.27** (.12)	-5.23 (11.78)	.31** (.15)
Environment Benefit Frame + No Attribution (Condition 7)	.07 (.11)	18.43 (17.22)	.20 (.15)	.16 (.11)	5.92 (11.79)	-.14 (.16)
Environment Benefit Frame + Individual Attribution (Condition 8)	.33*** (.11)	63.51*** (17.27)	.42*** (.15)	.31*** (.11)	33.71*** (11.83)	.37** (.15)
Environment Benefit Frame + Government Attribution (Condition 9)	-.30*** (.11)	-43.65*** (17.16)	-.17** (.16)	-.27** (.11)	-31.64*** (11.75)	-.45*** (.18)
Belief Importance (Environment)	.05* (.02)	7.24* (3.79)	-.03** (.04)	.03 (.03)	1.50 (2.60)	.01 (.04)
Belief Importance (Costs)	.03 (.02)	.303 (3.57)	.03 (.03)	.03 (.02)	1.17 (2.44)	.03 (.03)
Collective Efficacy (ActNatImp)	.12*** (.03)	14.83*** (3.96)	.14*** (.04)	.13*** (.03)	2.72 (2.71)	.08** (.04)

	Likely to Insulate[a]	Max WTP Weatherize[b]	Email on Insulation[c]	Likely to Curtail[a]	Max WTP Smart Mtr.[b]	Email on Smart Mtr.[c]
Group Success ActComImp	.09*** (.02)	10.14*** (3.66)	.01 (.03)	.10*** (.02)	7.67*** (2.51)	.07** (.04)
Post-materialism / materialism (Econ/Env)	-.04* (.02)	-10.79*** (3.08)	-.05* (.03)	-.02 (.02)	-2.54 (2.11)	-.03 (.03)
Hierarchialism / Egalitarianism (EqRgtsToofar)	.01 (.02)	-2.23 (2.40)	-.01 (.02)	-.00 (.02)	3.01* (1.64)	.01 (.02)
Individualism / Communitarianism (GovOut)	.03* (.02)	.03 (2.82)	-.00 (.03)	.03* (.02)	-2.80 (1.93)	.02 (.03)
Talk about politics	.05*** (.02)	2.96 (2.33)	.00 (.02)	.00 (.02)	3.19** (1.60)	.01 (.02)
Political Knowledge	.19* (.10)	47.56*** (15.49)	-.15 (.15)	.33*** (.10)	-18.57* (10.60)	-.05 (.14)
Energy Knowledge	.22** (.10)	26.36* (16.21)	.21 (.15)	.06 (.11)	-20.69* (11.10)	-.13 (.15)
Income	.00 (.03)	15.55*** (4.46)	-.00 (.04)	-.04 (.03)	15.26*** (3.05)	.05 (.04)
Education	.03 (.03)	11.21** (4.84)	.02 (.05)	.10*** (.03)	4.17 (3.31)	-.01 (.05)
Age	-.01*** (.00)	.00 (.28)	.00 (.00)	-.00 (.00)	-0.84*** (.19)	.00 (.00)
Female	-.01 (.06)	-27.13*** (8.62)	-.05 (.08)	.14** (.06)	-16.66*** (5.90)	-.14* (.08)
Minority	.07 (.06)	-17.78* (10.01)	.07 (.09)	-.03 (.07)	7.85 (6.86)	.10 (.09)
Trust Government	.05 (.04)	-3.49 (6.65)	.08 (.06)	-.03 (.04)	3.01 (4.55)	.15** (.06)
Media use	-.11 (.13)	2.39 (20.02)	-.05 (.19)	.02 (.13)	40.10*** (13.71)	.20 (.19)
Party ID	.02 (.02)	-.504 (3.19)	-.02 (.03)	.01 (.02)	1.34 (2.19)	.02 (.03)

	Likely to Insulate[a]	Max WTP Weatherize[b]	Email on Insulation[c]	Likely to Curtail[a]	Max WTP Smart Mtr.[b]	Email on Smart Mtr.[c]
Ideology	-.02 (.02)	-1.56 (3.72)	-.03 (.03)	-.02 (.02)	-1.51 (2.54)	-.05* (.03)
Pay own utility	-.20 (.09)	-9.99 (14.34)	-.29 (.15)	-.33*** (.09)	1.02 (9.82)	-.10 (.14)
House (1) or Apartment (2)	-.52** (.06)	-84.15*** (9.67)	-.15 (.09)	-.20*** (.06)	-9.64 (6.62)	-.19** (.09)
Government Responsible	.04** (.02)	.839 (3.11)	.04 (.03)	.05** (.02)	5.33*** (2.13)	.02 (.03)
Consumers Responsible	.01 (.02)	10.50*** (3.47)	.01 (.03)	.01 (.02)	3.19 (2.37)	-.02 (.03)
Effectiveness of Consumer Approaches	.03 (.02)	.61 (3.68)	.11*** (.04)	.06** (.02)	1.99 (2.53)	.04 (.04)
Climate warm	.03 (.03)	7.24 (5.08)	.05 (.04)	.09*** (.03)	5.94* (3.48)	-.00 (.05)
Constant	-----	51.28 (49.56)	-2.04 (0.48)	------	-41.25 (33.93)	-2.18 (0.47)
Log-likelihood / R^2	-2771.32	.23	-710.12	-2390.11	.14	-712.65
Number of observations	1600	1600	1600	1600	1600	1600

[a]Entries are ordered probit coefficients with standard errors in parentheses; [b] Entries are ordinary least squares (OLS) coefficients with standard errors in parentheses; [c] Entries are probit regression coefficients with standard errors in parentheses. *** $p < .01$; ** $p < .05$; * $p < .01$ (one-tailed tests).

Figure 1.

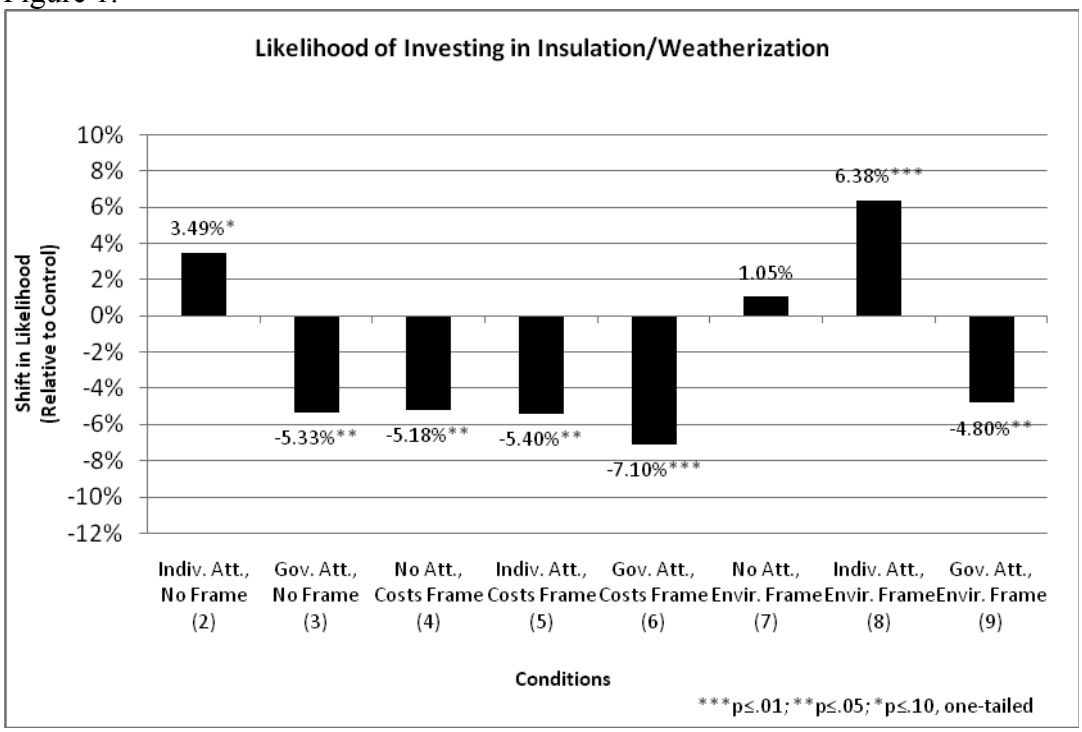

Likelihood of Investing in Insulation/Weatherization
Shift in Likelihood (Relative to Control)
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
3.49%*
-5.33%**
-5.18%**
-5.40%**
-7.10%***
1.05%
6.38%***
-4.80%**
Indiv. Att., No Frame (2)
Gov. Att., No Frame (3)
No Att., Costs Frame (4)
Indiv. Att., Costs Frame (5)
Gov. Att., Costs Frame (6)
No Att., Envir. Frame (7)
Indiv. Att., Envir. Frame (8)
Gov. Att., Envir. Frame (9)
Conditions
***p≤.01; **p≤.05; *p≤.10, one-tailed

Figure 2.

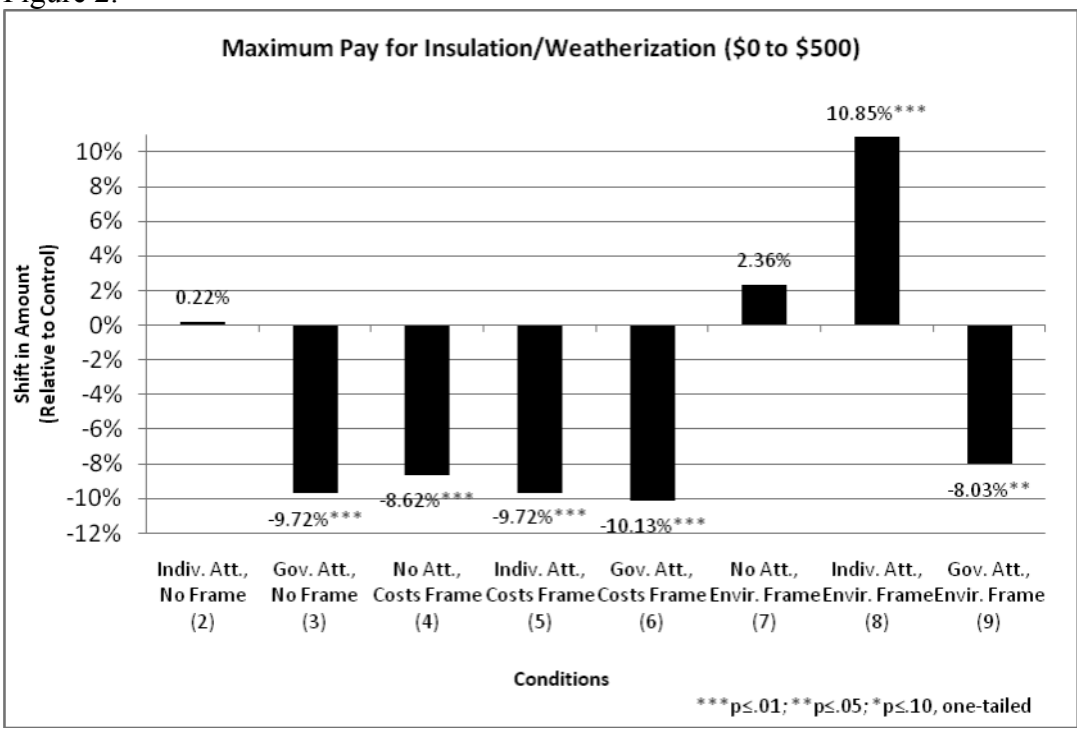

Maximum Pay for Insulation/Weatherization ($0 to $500)
Shift in Amount (Relative to Control)
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
0.22%
-9.72%***
-8.62%***
-9.72%***
-10.13%***
2.36%
10.85%***
-8.03%**
Indiv. Att., No Frame (2)
Gov. Att., No Frame (3)
No Att., Costs Frame (4)
Indiv. Att., Costs Frame (5)
Gov. Att., Costs Frame (6)
No Att., Envir. Frame (7)
Indiv. Att., Envir. Frame (8)
Gov. Att., Envir. Frame (9)
Conditions
***p≤.01; **p≤.05; *p≤.10, one-tailed

Figure 3.

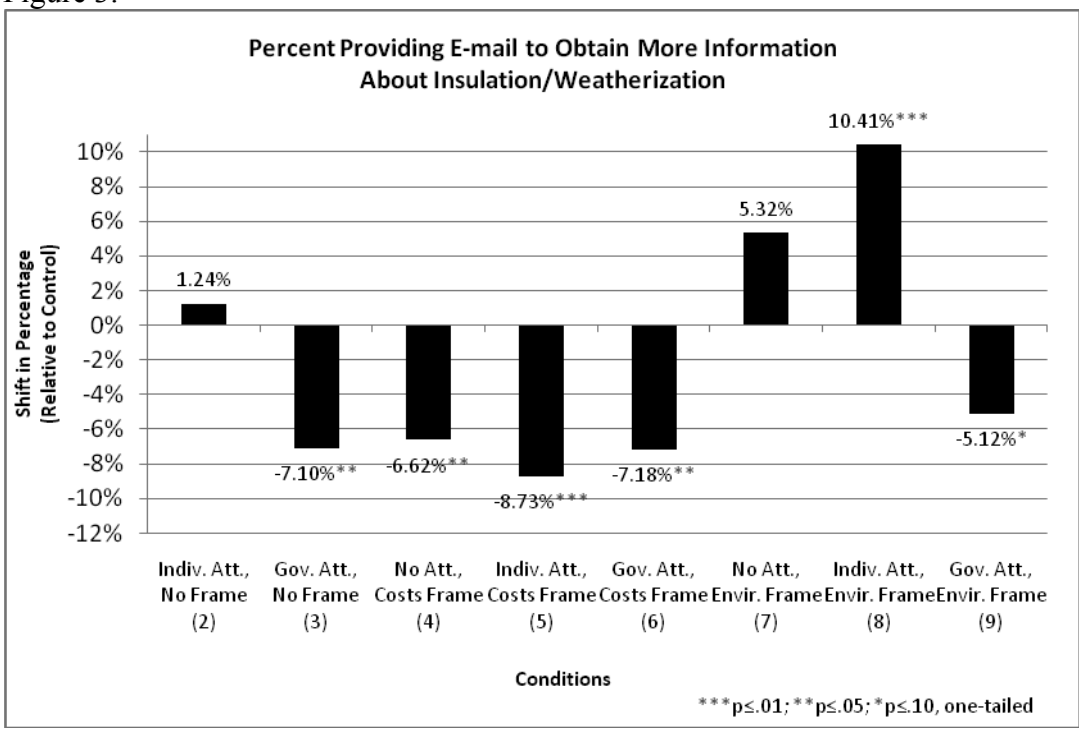

Percent Providing E-mail to Obtain More Information About Insulation/Weatherization
Shift in Percentage (Relative to Control)
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
1.24%
-7.10%**
-6.62%**
-8.73%***
-7.18%**
5.32%
10.41%***
-5.12%*
Indiv. Att., No Frame (2)
Gov. Att., No Frame (3)
No Att., Costs Frame (4)
Indiv. Att., Costs Frame (5)
Gov. Att., Costs Frame (6)
No Att., Envir. Frame (7)
Indiv. Att., Envir. Frame (8)
Gov. Att., Envir. Frame (9)
Conditions
***p≤.01; **p≤.05; *p≤.10, one-tailed

Figure 4.

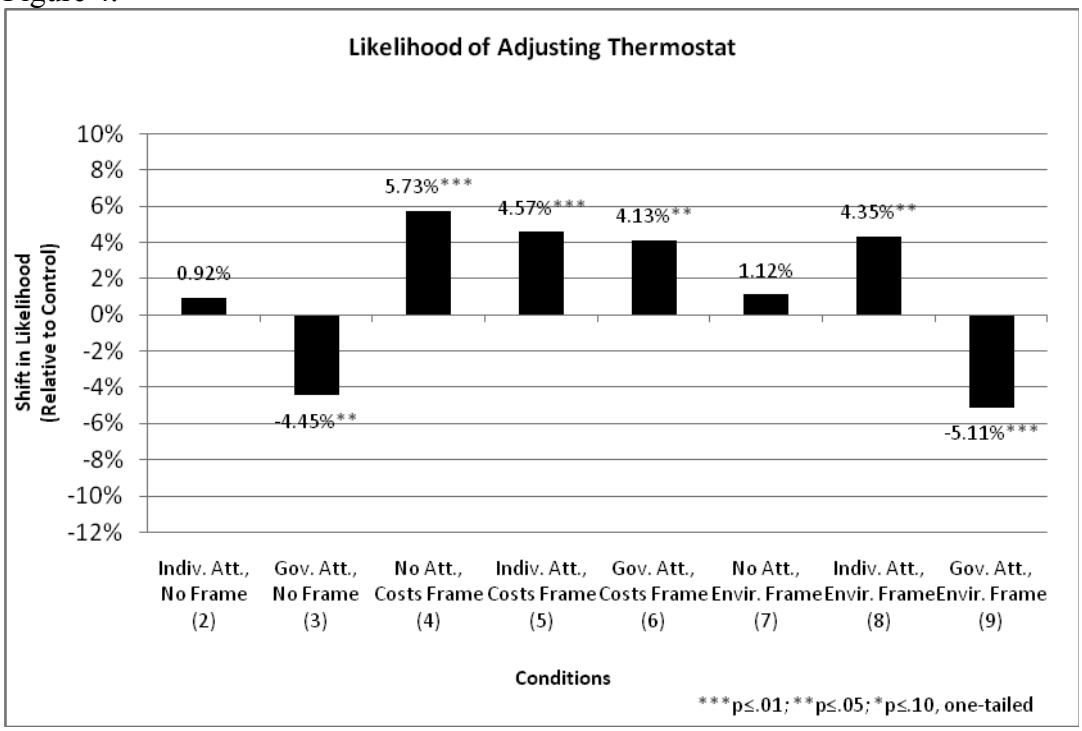

Likelihood of Adjusting Thermostat
Shift in Likelihood (Relative to Control)
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
0.92%
-4.45%**
5.73%***
4.57%***
4.13%**
1.12%
4.35%**
-5.11%***
Indiv. Att., No Frame (2)
Gov. Att., No Frame (3)
No Att., Costs Frame (4)
Indiv. Att., Costs Frame (5)
Gov. Att., Costs Frame (6)
No Att., Envir. Frame (7)
Indiv. Att., Envir. Frame (8)
Gov. Att., Envir. Frame (9)
Conditions
***p≤.01; **p≤.05; *p≤.10, one-tailed

Figure 5.

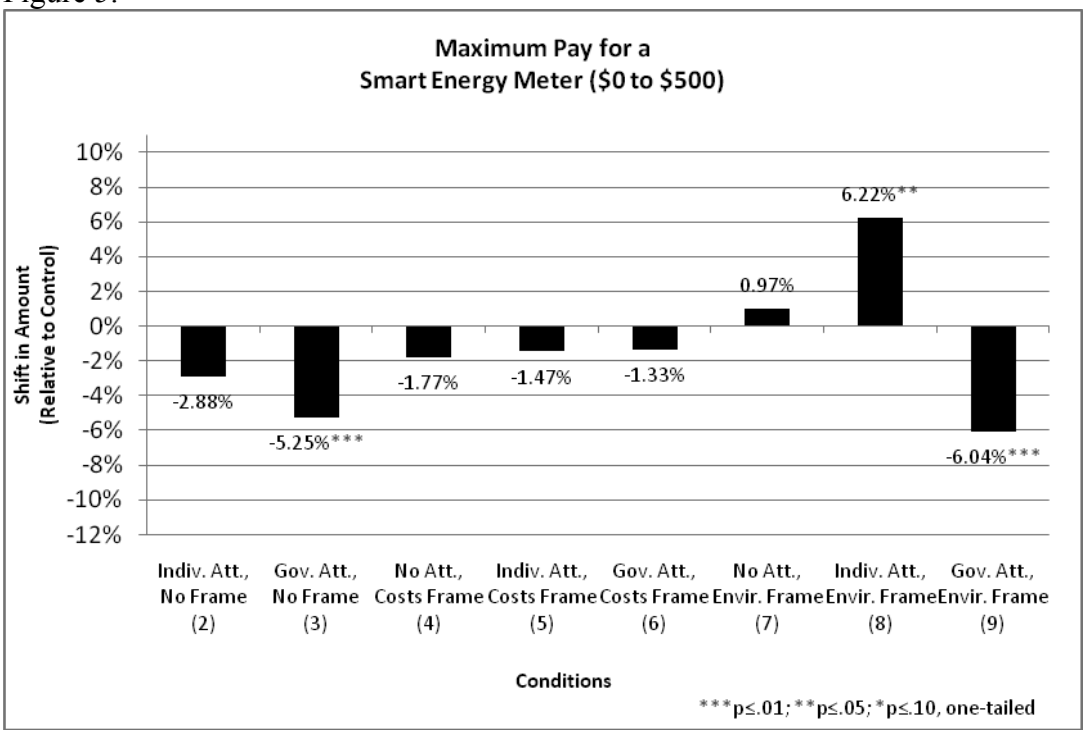
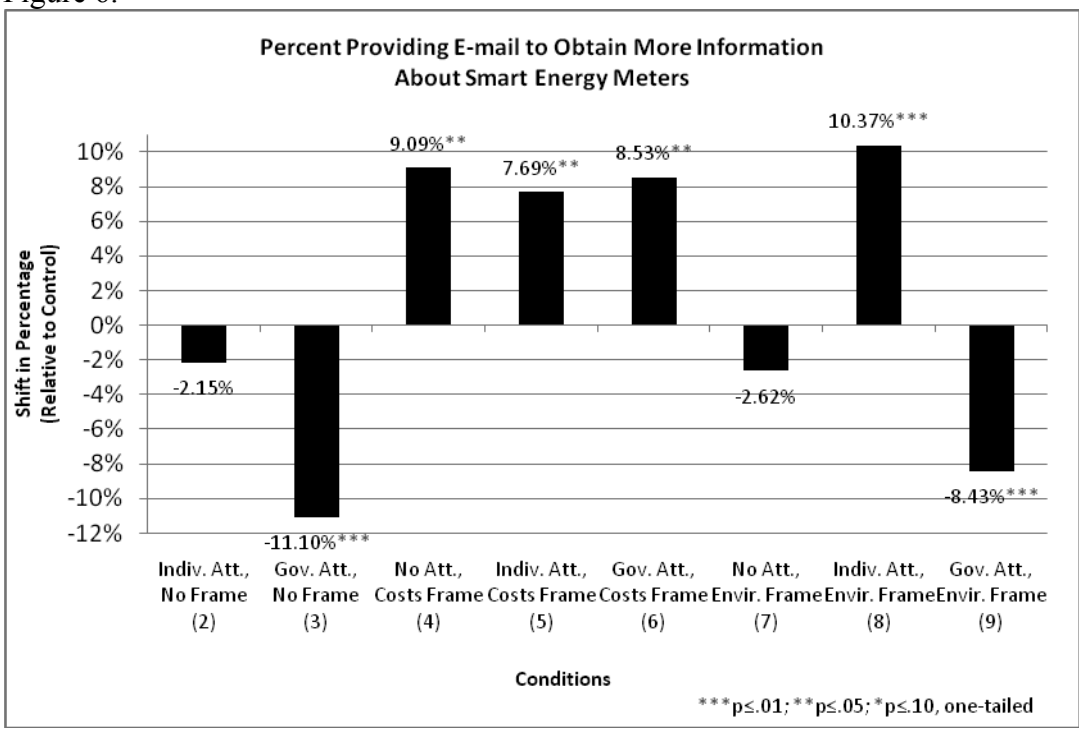

Maximum Pay for a
Smart Energy Meter ($0 to $500)
Shift in Amount
(Relative to Control)
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
-2.88%
-5.25%***
-1.77%
-1.47%
-1.33%
0.97%
6.22%**
-6.04%***
Indiv. Att., No Frame (2)
Gov. Att., No Frame (3)
No Att., Costs Frame (4)
Indiv. Att., Costs Frame (5)
Gov. Att., Costs Frame (6)
No Att., Envir. Frame (7)
Indiv. Att., Envir. Frame (8)
Gov. Att., Envir. Frame (9)
Conditions
***p≤.01; **p≤.05; *p≤.10, one-tailed

Figure 6.


Percent Providing E-mail to Obtain More Information About Smart Energy Meters
Shift in Percentage (Relative to Control)
10%
8%
6%
4%
2%
0%
-2%
-4%
-6%
-8%
-10%
-12%
-2.15%
-11.10%***
9.09%**
7.69%**
8.53%**
-2.62%
10.37%***
-8.43%***
Indiv. Att., No Frame (2)
Gov. Att., No Frame (3)
No Att., Costs Frame (4)
Indiv. Att., Costs Frame (5)
Gov. Att., Costs Frame (6)
No Att., Envir. Frame (7)
Indiv. Att., Envir. Frame (8)
Gov. Att., Envir. Frame (9)
Conditions
***p≤.01; **p≤.05; *p≤.10, one-tailed

APPENDIX A

Table A-1 *Scores by Condition*

	No Frame	**Cost Frame**	**Environment Frame**
No Attribution	(*Condition 1*)	(*Condition 4*)	(*Condition 7*)
	Likely to Insulate = 4.50 (SD: 1.87; n = 179)	Likely to Insulate = 4.13 (SD: 1.58; n =178)	Likely to Insulate = 4.57 (SD: 1.80; n =177)
	WTP to Insulate = 232.0 (SD: 1.89; n = 179)	WTP to Insulate = 188.90 (SD: 179.26; n =178)	WTP to Insulate = 243.81 (SD: 192.95; n =177)
	Email (Insulate) = .21 (SD: .41; n = 179)	Email (Insulate) = .15 (SD: .35; n =178)	Email (Insulate) = .27 (SD: .44; n =177)
	Likely to Curtail = 5.44 (SD: 1.48; n = 179)	Likely to Curtail = 5.84 (SD: 1.42; n =178)	Likely to Curtail = 5.52 (SD: 1.59; n =177)
	WTP (Smart Meter) = 89.25 (SD: 125; n = 179)	WTP (Smart Meter) = 80.38 (SD: 112.11; n =178)	WTP (Smart Meter) = 94.11 (SD: 133.51; n =177)
	Email (Smart Meter) = .17 (SD: 0.38; n = 179)	Email (Smart Meter) = .27 (SD: .45; n =178)	Email (Smart Meter) = .15 (SD: .36; n =177)
Individual Attribution	(*Condition 2*)	(*Condition 5*)	(*Condition 8*)
	Likely to Insulate = 4.74 (SD: 1.50 ; n = 178)	Likely to Insulate = 4.12 (SD: 1.56; n =176)	Likely to Insulate = 4.94 (SD: 1.63; n =177)
	WTP to Insulate = 233.10 (SD: 183.65; n =178)	WTP to Insulate = 183.40 (SD: 163.70; n =176)	WTP to Insulate = 286.24 (SD: 192.63; n =177)
	Email (Insulate) = .22 (SD: .42 ; n =178)	Email (Insulate) = .13 (SD: .33; n =176)	Email (Insulate) = .32 (SD: .47; n =177)
	Likely to Curtail = 5.51 (SD: 1.49; n =178)	Likely to Curtail = 5.76 (SD: 1.24; n =176)	Likely to Curtail = 5.75 (SD: 1.37; n =177)
	WTP (Smart Meter) = 74.85 (SD: 95.71; n =178)	WTP (Smart Meter) = 81.92 (SD: 114.91; n =176)	WTP (Smart Meter) = 120.33 (SD: 147.39; n =177)
	Email (Smart Meter) = .16 (SD: .37; n =178)	Email (Smart Meter) = .26 (SD: .44; n =176)	Email (Smart Meter) = .28 (SD: .45; n =177)
Government Attribution	(*Condition 3*)	(*Condition 6*)	(*Condition 9*)
	Likely to Insulate = 4.12 (SD: 1.51; n =177)	Likely to Insulate = 4.00 (SD: 1.72; n =178)	Likely to Insulate = 4.16 (SD: 1.52; n =180)
	WTP to Insulate = 183.42 (SD: 174.50; n =177)	WTP to Insulate = 181.35 (SD: 173.67; n =178)	WTP to Insulate = 191.88 (SD: 159.78; n =180)
	Email (Insulate) = .14 (SD: .35; n =177)	Email (Insulate) = .14 (SD: .35; n =178)	Email (Insulate) = .16 (SD: .37; n =180)
	Likely to Curtail = 5.13 (SD: 1.46; n =177)	Likely to Curtail = 5.73 (SD: 1.34; n =178)	Likely to Curtail = 5.08 (SD: 1.53; n =180)
	WTP (Smart Meter) = 63.02 (SD: 96.51; n =177)	WTP (Smart Meter) = 82.62 (SD: 121.99; n =178)	WTP (Smart Meter) = 59.05 (SD: 92.56; n =180)
	Email (Smart Meter) = .07 (SD: .25; n =177)	Email (Smart Meter) = .26 (SD: .44; n =178)	Email (Smart Meter) = .09 (SD: .29; n =180)

APPENDIX B

Condition 1 No Attribution / No Effect Frame
We are now going to ask you about energy choices you may make.

Condition 2 Individual Attribution / No Effect Frame
We are now going to ask you about energy choices you may make. The ultimate success of our nation's energy policy depends largely on individuals' choices about energy consumption. Individuals need to step up to the plate – something they have done throughout American history without having to rely on the government.

Condition 3 Government Attribution / No Effect Frame
We are now going to ask you about energy choices you may make. The ultimate success of our nation's energy policy depends largely on governmental decisions about the energy supply. Government needs to step up to the plate – something they often do when individuals alone cannot resolve a problem.

Condition 4 No Attribution Frame / Con Effect Frame
We are now going to ask you about energy choices you may make. These choices have important economic consequences. For instance, switching from regular light bulbs to energy saving bulbs will cost consumers, in general, billions of dollars each year by causing them to pay a cost premium.

Condition 5 Individual Attribution / Con Effect Frame
We are now going to ask you about energy choices you may make. These choices have important economic consequences. For instance, switching from regular light bulbs to energy saving bulbs will cost consumers, in general, billions of dollars each year by causing them to pay a cost premium. That said, the ultimate success of our nation's energy policy depends largely on individuals' choices about energy consumption. Individuals need to step up to the plate – something they have done throughout American history without having to rely on the government.

Condition 6 Government Attribution / Con Effect Frame
We are now going to ask you about energy choices you may make. These choices have important economic consequences. For instance, switching from regular light bulbs to energy saving bulbs will cost consumers, in general, billions of dollars each year by causing them to pay a cost premium. This is why the ultimate success of our nation's energy policy depends largely on governmental decisions about the energy supply. Government needs to step up to the plate – something they often do when individuals alone cannot resolve a problem.

Condition 7 No Attribution / Pro Effect Frame
We are now going to ask you about energy choices you may make. These choices have important environmental consequences. For instance, switching from regular light bulbs to energy saving bulbs will help ensure that individuals, in general, live in a healthy environment by saving the world from millions of metric tons of greenhouse gases.

Condition 8 Individual Attribution / Pro Effect Frame

We are now going to ask you about energy choices you may make. These choices have important environmental consequences. For instance, switching from regular light bulbs to energy saving bulbs will help ensure that individuals, in general, live in a healthy environment by saving the world from millions of metric tons of greenhouse gases. This is why the ultimate success of our nation's energy policy depends largely on individuals' choices about energy consumption. Individuals need to step up to the plate – something they have done throughout American history without having to rely on the government.

Condition 9 Government Attribution / Pro Effect Frame

We are now going to ask you about energy choices you may make. These choices have important environmental consequences. For instance, switching from regular light bulbs to energy saving bulbs will help ensure that individuals, in general, live in a healthy environment by saving the world from millions of metric tons of greenhouse gases. That said, the ultimate success of our nation's energy policy depends largely on governmental decisions about the energy supply. Government needs to step up to the plate – something they often do when individuals alone cannot resolve a problem.