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Public Discourse in Energy Policy Decision-Making: Final Report

August 2010

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Public Discourse in Energy Policy Decision-Making: Final Report

Investigating how information and public discourse influence citizens' preferences for various electricity generation options in Idaho.

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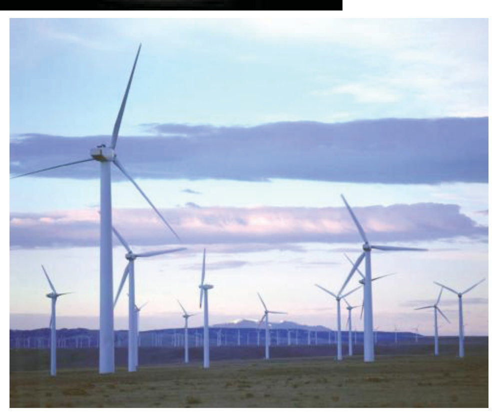

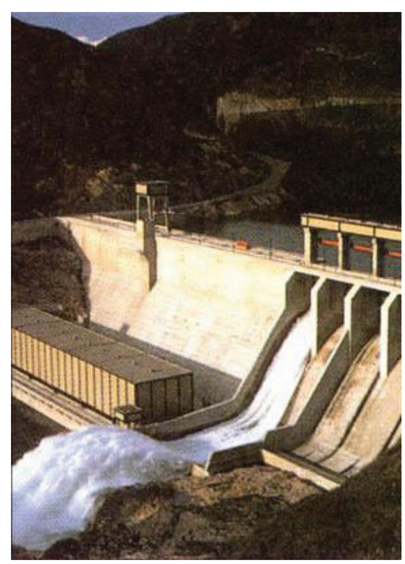

The Effects of Public Discourse in

Energy Policy Decision-Making

INL report number INL/EXT-10-19546

Abstract

The ground is littered with projects that failed because of strong public opposition, including natural gas and coal power plants proposed in Idaho over the past several years. This joint project of the Idaho National Laboratory, Boise State University, Idaho State University and University of Idaho has aimed to reduce project risk through encouraging the public to engage in more critical thought and be more actively involved in public or social issues.

Early in a project, project managers and decision-makers can talk with no one, pro and con stakeholder groups, or members of the public. Experience has shown that talking with no one outside of the project incurs high risk because opposition stakeholders have many means to stop most (if not all) energy projects. Talking with organized stakeholder groups provides some risk reduction from mutual learning, but organized groups tend not to change positions except under conditions of a negotiated settlement. Achieving a negotiated settlement may be impossible. Furthermore, opposition often arises outside pre-existing groups.

Standard public polling provides some information but does not reveal underlying motivations, intensity of attitudes, etc. Improved methods are needed that probe deeper into stakeholder (organized groups and members of the public) values and beliefs (sometimes called heuristics) to increase the potential for change of opinions and/or out-of-box solutions. The term “heuristics” refers to the mental short-cuts, underlying beliefs, and paradigms that everyone uses to filter and interpret information, to interpret what is around us, and to guide our actions and decisions.

This document is the final report of a 3-year effort to test different public discourse methods in the subject area of energy policy decision-making. We analyzed 504 mail-in surveys and 80 meeting participants in deliberation groups on the Boise State University campus for their (a) reflective preference (off-the cuff answers), (b) financial support, or allocation of a hypothetical $100 among energy options, and (c) evaluations of eight attributes for five energy options: energy conservation and efficiency, fossil fuels, nuclear energy, hydropower, and renewable energy. All meeting participants saw a 7-person diverse energy expert panel. Some participants attended deliberation discussion sessions; some received a 35-page briefing document that included pros and cons of the different energy options. Of those who received the briefing paper, 90% viewed it positively, meaning our multi-discipline and multi-viewpoint approach to preparing the briefing paper achieved credibility among those with different energy option preferences.

Compared with the average Idahoan, and due to self-selection versus the commercially-prepared demographically-balanced mailing list, respondents to the survey were more male (78% vs. 49%) , more formally educated (50% with 4-year degree vs. 16% of Idahoans in general), and more engaged (96% claimed to have voted in an election in the past two years vs. 61% that voted in the 2008 general election). Respondents were older, more Caucasian, and had lived in the state longer than the average Idahoan.

The percentage of all respondents with reflective preference for (positive scores on a scale of -5 to +5) each energy option was 92% for renewable energy, 92% conservation, 87% hydropower, 69% nuclear, and 47% fossil fuels. The distribution of answers for nuclear and fossil fuels showed polarization, with “strongly support” and “strongly oppose” the two most common answers (+5 and -5 on the 11-point scale). All of the energy options had positive mean reflective preference (>0 on the 11-point scale), although that of fossil fuels was quite low (0.06).

Turning from reflective preference to financial support, we asked respondents and participants how they thought a power company should allocate a hypothetical $100 to buy energy to meet electricity demand. People did not want to put all their eggs in one basket. Only about 3% would give all $100 to a single energy option. Few respondents would put more than 50% of the $100 to a single energy option. “Few” is 10% for renewable energy, 8% nuclear energy, 7% hydropower, 2% conservation and efficiency, and 0% for fossil fuels. A significant fraction (but still a minority) would give no financial support to fossil fuels (48%) and nuclear energy (34%).

Of course, no one wanted to provide financial support for an option they opposed. On the opposite side of the scale, it is striking that people appear to require a very strong preference (a +5 on the -5 to +5 scale) before they wanted to provide more than average (>$20) financial support as indicated by the consistent fraction of +5 preference with >$20 financial support. Responders tended to give the average $20 support to energy options they gave a +4 support.

Respondents differentiated among which of the eight energy attributes fit each energy option.
For both renewable energy and “energy conservation and efficiency,” the attribute that respondents most thought fit these two energy options was “safety and security”. In contrast, the attribute least matching these energy options was “cost.” That is, cost was not typically viewed as a positive attribute of these two energy options.

For hydropower, the best-matched energy attribute was “safety and security” and the least-matched was “responsiveness and adaptability”. In contrast, one of the seven energy panelists argued that the key disadvantage of hydropower was “impact to the environment.”

For nuclear energy, the best-matched energy attribute was “reliable and predictable” and the least-matched was “cost.” It wasn’t “impact to the environment” (e.g. waste) nor “safety and security.”
For fossil fuels, the best-matched energy attribute was “reliable and predictable” and the least-matched was “impact to environment.” Based on written comments on the surveys and the follow-up telephone interviews 8-months later, the latter is often associated, at least in part, with climate change.

We had hypothesized that reflective preference (off the cuff answers) resulted from a “formative preference” that people (generally unconsciously) create by their weighted evaluations of the attributes among energy options. We found that that indeed reflective preference (off the cuff answers) was positively correlated with formative preference. Reflective preference was also correlated with financial support of energy options, as noted above. That is, mail-in respondents and deliberation participants were generally internally self-consistent in their simple reflective preference, allocation of utility bill, and detailed assessments of energy options.

We found several other things of note. For example, 38% want energy policy decisions made by citizens. The rest chose business and industries (22%), government agencies (22%), elected officials (16%), and advocacy groups (4%).

Those who chose to participate in the deliberative sessions on the Boise State campus were slightly more knowledgeable than the average mail-in survey respondent. We asked “Of the electricity that Idaho produces, the majority comes from what one source? “ The percent of mail-in respondents answering correctly (hydropower) was 86%; of those who came to the deliberative event was 97%. (This rose to 99% after the event.) And, we asked “Within its borders, Idaho has abundant resources of which of the following?” The percent of mail-in respondents answering correctly (hydropower) was 68%; of those coming to the deliberative event was 93%. (This rose to 99% after the event.)

Those who came to the event increased knowledge. We asked “Of the electricity that Idaho consumes, the majority comes from what one source?” The correct answer is fossil fuels, the source of most of the electricity we import from out of state; Idaho imports one-half to two-thirds of its electricity. The percent answering correctly rose from 17% pre-test to 53% post-test.

We asked participants to evaluate the seven energy panelists. The participants’ tended to rank each of the energy experts about the same whether the question was credibility, trustworthiness, knowledge, and likability. For example, they didn’t like someone they viewed as less credible. Evaluations of panelists differed both systematically (i.e. some were viewed more positively than others independent of energy preference) and by participants’ energy preference. Statistically, it appears that there was a trend of participants rating their regard for a panelist based on the extent to which that panelist agreed with the participants’ prior positions.

Although knowledge was gained by those participating in the event, reflective preference, formative preference, and financial support all changed very little, independent of the discourse treatment. Our analysis indicates that people had strong mental models or heuristics before the deliberation event and were not given sufficient reason to change during the event.

Acknowledgements

This research project was made possible by the Idaho National Laboratory (INL) through the lab directed research funding (LDRD) mechanism. The research team recognizes and thanks INL for grant funding to support the resources required for this multi-year project.

The Center for Advanced Energy Studies (CAES), a consortium of three Idaho public universities and the INL, provided the impetus for this study's partnership of Idaho State University, the University of Idaho, Boise State University, and the INL. The three universities provided direct and indirect support for the research team, as well.

Principal Investigators included: Steven J Piet, INL; Ann Hunter, ISU; and Patrick Wilson, UI. Researchers on the project included Jeffrey Joe, INL; Troy Hall, UI; Michael Louis, BSU; Carole Nemnich, BSU. Graduate student research assistants included Eileen Deshazo, BSU; Paulina Starkey, UI; Carine DeSy, ISU; Deborah Allan, BSU; Steven Sorenson, ISU; Sheila Anderson, ISU, Tina Giannini, ISU, Jennie Newman, UI; and Kendelle Vogt, BSU. Additional contributors included Teri Peterson, ISU; John Freemuth, BSU; Brett Engels, BSU; Mark Bathrick, BSU; Lisa Wennstrom, BSU, and Kristof Bihari, BSU.

The project team also must acknowledge the survey respondents, the deliberative poll attendees, the subject matter experts, the deliberation facilitators and the myriad of people who helped conduct the deliberation event. Additionally, the American Democracy Project, in conjunction with Stanford University's Center for Deliberative Polling, provided training and technical expertise for the deliberation event.

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The ground is littered with projects that failed because of strong public opposition, including natural gas and coal power plants proposed in Idaho over the past several years. This joint project[1,2] of the Idaho National Laboratory, Boise State University, Idaho State University and University of Idaho has aimed to add to the tool box to reduce project risk through encouraging the public to engage in more critical thought and be more actively involved in public or social issues. Early in a project, project managers and decision-makers can talk with no one, pro and con stakeholder groups, or members of the public.

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Background and Motivation

A traditional project approach for many public agencies is Decide-Announce-Defend (DAD) as seen in Figure 1. The traditional approaches to engaging stakeholder groups and individuals are neglect, education, or to negotiate. “Neglect” is based on the premise that it is right (ethically) and safe (project risk) to ignore those stakeholders potentially impacted by a decision and/or maintain that they have nothing to contribute to a decision. We believe it is neither right nor safe and that diverse stakeholders can meaningfully contribute, and there are ways to gain understanding of stakeholders’ reasons for supporting or opposing a project.

“Education” is based on the premise that “if only they understood, they would agree” and that many stakeholders are paying attention and are willing and able to change their positions. “Negotiation” is based on the premise that a straightforward in-between compromise between two opposite positions is worth pursuing and that those without prior positions or organized groups representing their positions can be left out.   History shows that simple “negotiation” is often inadequate to bridge on complex polarized issues such as nuclear energy.

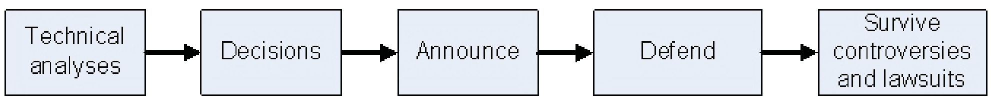

Figure 1. The traditional DAD project approach.

To go deeper than platitudes or superficial findings, we have to ask the reader to dive into some social science. In fact, one value of this project has been cross-discipline learning throughout the team of engineering, public policy, political science, sociologists, and human factors experts. A warning to non-social scientists: there are several individual disciplines and schools of thought, each of which can have its own terminology. We have found it unavoidable to shift among these, with different concepts more appropriate for different parts of the overall challenge and diagnosis of what we saw in our experiments.

The literature and common experiences indicate that people are, and must be, “cognitive misers”; they only devote as much time to an action or decision as they perceive is required. The types of potential behavior have been described by human factor and safety experts as follows, with increasing cognitive effort required in going down the list:[3]

- Skill-based (mental auto pilot): Do it the way it has always been done; interpret new information on the basis of existing heuristics. Appropriate for a familiar task or situation. Low attention required.
- Rule-based (if this, then do that): Recognize when to apply a different heuristic or weight heuristics differently.
- Knowledge-based (think it through): Analyze the situation and develop a new approach or new heuristics if needed. Appropriate for unfamiliar task or situation. High attention required.

A telephone poll tends to invoke skill-based behavior based on existing opinions, mental models, paradigms, and heuristics; there is no time for assimilation of new information or use of potential rule- or knowledge-based behavior. A simple poll tells us whether a project or energy option is supported, but does not tell us how those being sampled will respond to new information and discussion over the required years or decades of a project or R&D program. That would require understanding how people are currently processing information and how that processing may change.

We are then left with a trap: we need to understand values and beliefs and how they may change, but this requires more probing than simple polling. Change of deep-seated opinions is difficult to induce and it is difficult to measure what is really happening and why. Focus groups and other deliberative methods can trigger rule-based and knowledge-based behavior and probe into and possibly change deep-seated opinions. Even better would be longitudinal observations to measure time-dependent changes.

Why do we care about potential change in deep-seated opinions? Albert Einstein said, "Problems cannot be solved at the same level of awareness that created them." In other words, sometimes out-of-box thinking is the only pathway to a sustainable solution. Secondly, if opinions are already polarized (as they tend to be in energy matters), only some type of change can lead to a sustainable solution that is not sabotaged by one side or the other. Third, energy projects require years if not decades to complete; knowledge, stakeholder values, and available resources often change significantly over such periods. Options that are initially in agreement or convergence with knowledge, values, and resources can drift out of convergence, leading to failure. (Piet, et. al, 2003).

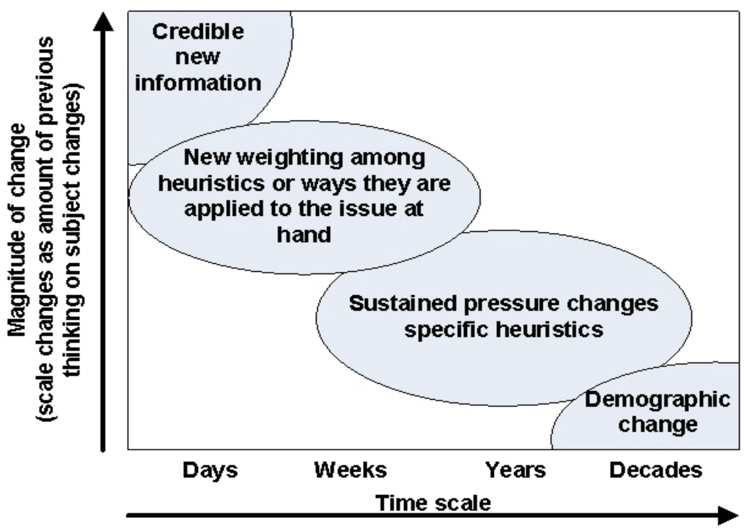

Figure 2. Changing heuristics, heuristic weighting, or how heuristics are applied to an issue is difficult.

Another school of thought uses different terminology and a subtly different construct, but for our purposes they are very similar. Griffin (2003) describes the *Elaboration Likelihood Model of Persuasion* (ELM) as positing that people can use two processing routes:

- "The central route involves message elaboration. Elaboration is 'the extent to which a person carefully thinks about issue-relevant arguments contained in a persuasive communication.' In an attempt to process new information rationally, people using the central route carefully scrutinize the ideas, try to figure out if they have true merit, and mull over their implications." (Petty and Cacioppo, 1986, p. 198.)
- "The peripheral route offers a shorthand way to accept or reject a message 'without any active thinking about the attributes of the issue of the objective of consideration.' Instead of doing extensive cognitive work, recipients rely on a variety of cues that allow them to make quick decisions." (Petty and Cacioppo, 1986, p. 198.)

Todorov and Chaiken (2003) draw equivalence between systematic/detailed processing and the central route and between heuristic processing and the peripheral route. They also note that one difference between these two schemes is that the central-peripheral model supposes that the processing routes are exclusive for a given circumstance and individual; whereas the heuristic model does not make that assumption.

By any lingo, the above discussion provides the answer to what sometimes can appear to be a mystery.

> "The mystery is...how people manage to have opinions about matters about which they lack the most elementary understanding" (Gamson, 1992)

What determines what processing route(s) is used? Figure 3 provides one set of answers, starting with motivation. Does the person feel the issue has personal relevance, sometimes called short psychological distance? Does the person feel a need for cognitive effort? The literature describes some sorts of situations that promote the need for cognitive effort, such as expecting to be judged on one's decision (by peers, or a survey, or teacher/facilitator), dissonance between some new information and one's existing heuristics (inducing a person to resolve that dissonance by either rejecting the new information or changing heuristics), whether the effort will have a payoff (will anyone care or listen?), or basically is the person open-minded on the issue? Of course the evaluation of motivation is not necessarily a conscious decision.

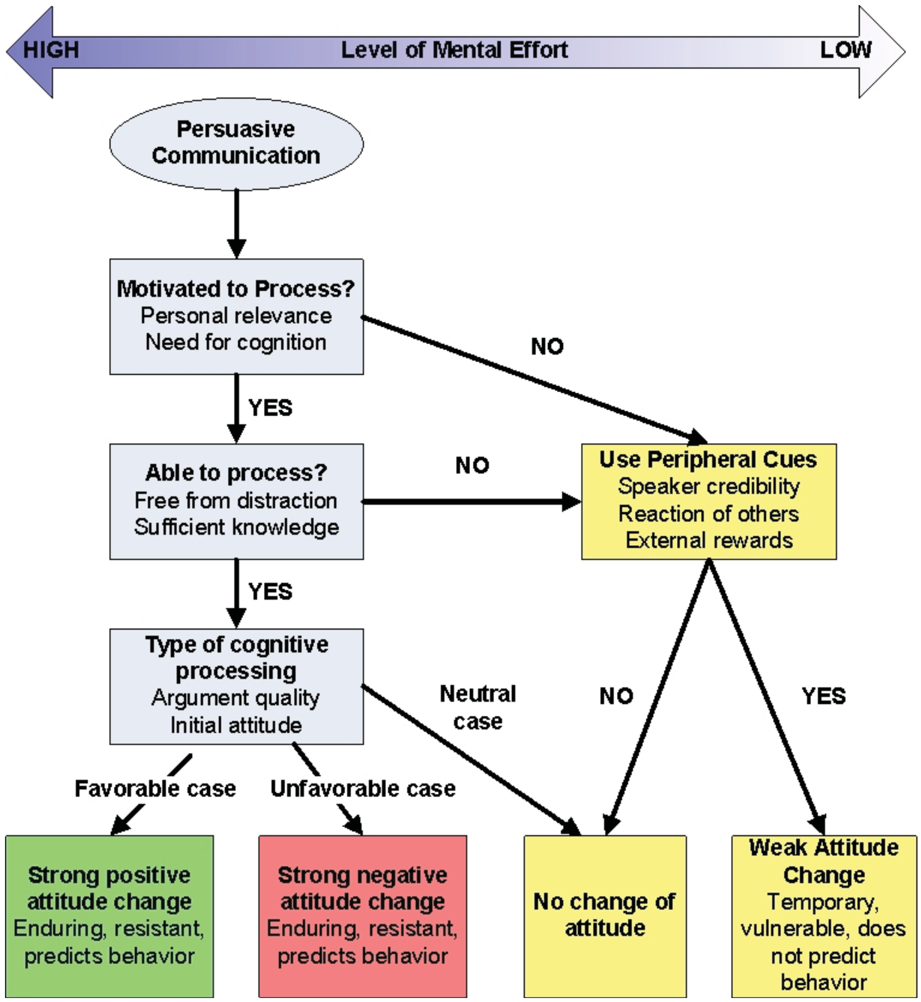

Figure 3. The Elaboration Likelihood Model (Chaiken and Trope, 1999).

As Figure 3 illustrates, a high cognitive effort (“central route” or detailed) might change underlying mental models and opinions, but not necessarily in the direction desired by a communicator. Arguments can backfire, e.g., if they appear weak, incorrect, or unconvincing. A relatively low cognitive effort (“peripheral route” or heuristic-driven) is unlikely to change deep-seated opinions.
Petty and Cacioppo (1986) provide the following practical advice to would-be persuaders. First, determine the likelihood that listeners will give their undivided attention to evaluating the information, proposal, etc. If they are likely to have both motivation and ability to process, then plan for “central route” and high mental effort – “come armed with facts and figures to support [the] case. A pleasant smile, emotional appeals … won’t make any difference.” If not, plan for the peripheral route and emphasize emotions, smooth presentation, etc.

However, these two processing routes are not mutually exclusive; they can operate sequentially or in parallel. (Todorov and Chaiken, 2003). We note they could reinforce or clash with each other. We also note that in a given audience, there may well be a mix of people, those prone toward detailed processing and those prone toward peripheral/heuristic processing. Furthermore, people can shift back and forth as they are distracted or parts of a presentation argument shift from one subtopic to another. As a practical matter, one must generally plan for a mixture of detailed and heuristic processing.

Idaho

In planning this project for CAES, we naturally chose energy as the issue topic. Energy policy in Idaho is a timely topic for the four Idaho institutions in this project as well as those members of the public we contacted. Historically, Idaho has had inexpensive electricity generated by hydroelectric facilities. As the population has grown, electricity needs have been met by importing power (typically from fossil fuels) into the state. Currently, Idaho needs to develop new sources of electricity generation for economic development. At the national level, energy policy is evolving with the objective of decreasing our dependence on foreign sources of energy, including fuels for electricity generation. The national dialogue includes concerns about the impact of fossil fuels on greenhouse gas emissions and other environmental concerns.

Using electricity generation options for Idaho as a topic, the research team wanted to learn if different modes of one and two-way communication (information and interactions) would influence or change citizen preference and support for various types of electricity generation options. (The study was designed to use factual information that was as unbiased as possible, in part because the purpose of CAES is not persuasion per se, but to be a trustworthy and credible source of information and discussion.) The results of the study might benefit project managers, policy makers and citizens by effectively bringing citizens into complex and value-laden policy discussions as they consider future problems, such as energy, that are complex and involve trade-offs among competing values.

Forms of Citizen Deliberation

Around the world, various forms of citizen involvement have been developed to inform policies. These include citizen's juries, consensus conferences, collaborative polls, interactive panels, town meetings, focus groups, and research panels. (Crosby, 1995 & 1999; Fishkin, 1995 and various; Gallup, 1938; Gastil, 2000; Grimstone, 2002; and Yankelovich, 1991). They have been suggested as an alternative to traditional public comment periods and opinion polls to enhance democratic decision-making across a wide variety of public issues. However, Deliberative Polling as conceived by Fishkin (1995) is thought to be one of the more innovative methods because, under some circumstances, the results from a relatively small sample of citizens can be generalized to a wider population.

Fishkin has claimed that Deliberative Polling induces both mutual learning and consensus building. Since a group of diverse people faced with complex topics typically does not have pre-defined consensus, the claim of consensus building requires that some or all of participants change their opinion as a result of Deliberative Polling. An assumption of Deliberative Polling is that participants may change their point of view when supplied with unbiased information or facts. This means that (a) participants must be both motivated and able to process information and (b) their assessment of the arguments presented lead in a common direction.

We structured our project to test the potential for change via Deliberative Polling in comparison with other approaches or "treatments" which are described below. One benefit of Deliberative Polls over a traditional public opinion poll is that it is assumed that policy decision makers can gather opinions from a better informed public. However, it has seen limited use due to the amount of time required and higher cost compared with traditional opinion polls.

Deliberative Polling entails a high level of resource commitment compared to a typical public meeting. Scientists, policy makers, and those interested in democracy and citizen engagement are unsure if the deliberative polling method works ‘better’ than other ways of informing citizens or shaping public policy. There is a need for evaluation of the degree to which Deliberative Polling fulfills its promise.

Two sets of Deliberative Polls had been conducted by Fishkin, as a consultant from the Center for Deliberative Democracy at Stanford University prior to this study. Both were used to gather public opinion on energy alternatives. The two studies informed the design of the deliberation in this study. One set of deliberative studies was conducted from 1996 to 1998 by several public utilities in Texas (Luskin, Fishkin & Plane, 1999) and the other was performed in 2003 by the Nebraska Public Power District (Lehr, Guild & Thomas, 2003).

Objectives and Approach

The objectives of this research project were to answer the following questions:

- How do different types (“treatments”) of public discourse affect the public’s preference and resulting support for different options to meet electricity demand?
- How do different types of public discourse affect the public’s support for technical research or policy alternatives that could eliminate or improve different options for meeting electricity demand?
- How do participant characteristics affect their preference and support for different options for meeting electricity demand and their preference/support for improvements in energy options?
- How do participants’ evaluations of the expert speakers affect their support for different options for meeting electricity demand?

Our underlying model is shown in Figure 4. The survey instrument was designed to measure **reflective preference** (directly expressed), importance among attributes, evaluation of energy options for each attribute (the weighted sum of attributes gives us the **formative preference** for each participant), and **support** measured by how much of a $100 utility bill should be given to each energy option—fossil, nuclear, hydro, renewable, or energy conservation and efficiency. The survey instrument then asked participants to imagine a key improvement to each energy option and how that key improvement would change their preferences. This was posed to obtain “actionable” information in the sense of probing changeability of preferences and importance of potential R&D achievements. We also asked standard demographic questions, political viewpoint, and evaluation of energy expert panelists.

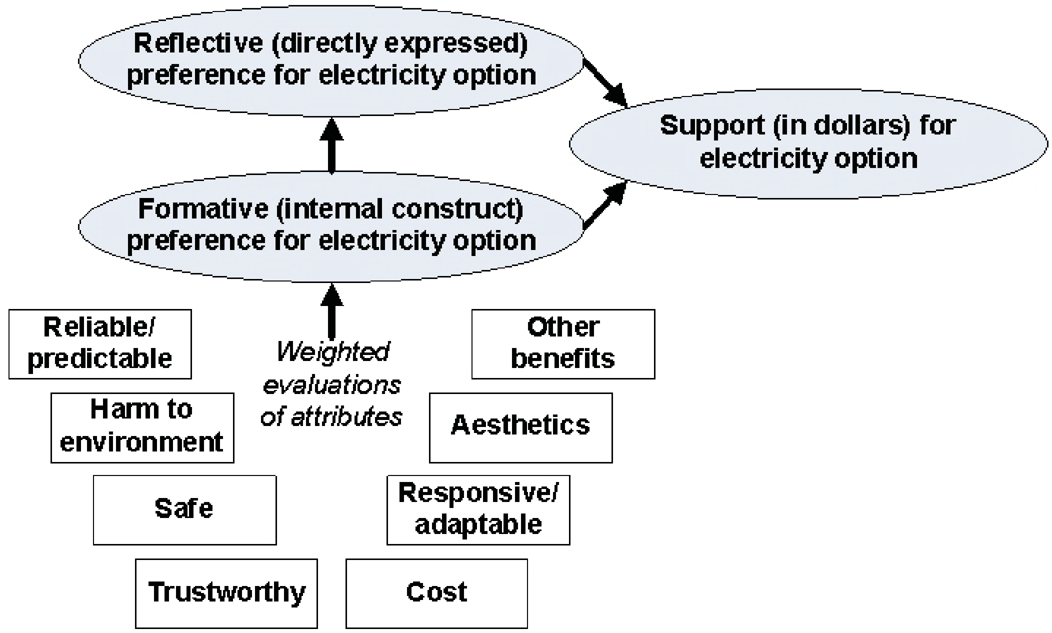

Figure 4. The model motivating our experimental design, differentiating among reflective preference, formative preference, and support

We obtained a random sample of 5,000 residents from a 7-county area in the Treasure Valley, the largest metropolitan area in Idaho with approximately 600,000 residents. Of these, 504 returned mail surveys sent to them in January, 2009. We then asked a subset of responders to attend a Deliberative Poll event on April 18, 2009, at the Boise State campus. Participants were assigned to different activities and "treatments." For instance, some received a detailed 35-page "briefing document" that included pros and cons of the different energy options. Some participated in small group "deliberation" sessions with other citizens. All the participants at the Deliberative Poll heard an overview presentation by Michael Louis, which described Idaho's energy situation and highlights about the pros and cons of the five energy options. The participants also attended a luncheon panel with seven experts who responded to questions developed by the small group deliberations. Participants in the Deliberative Poll event completed surveys after the day's activities, which included the same key questions as on the "pre-test" mail survey from January. The experimental matrix of the focus groups' varied discourse methods or "treatments" was as follows:

- Mail survey only—control group
- Mail survey and briefing paper
- Attendance at the Boise State campus, April, 2009, including session with panel of seven experts
    - No briefing paper, no deliberation sessions
    - No briefing paper, attended two deliberation sessions (before and after the expert panel)
    - Received briefing paper, no deliberation sessions
    - Received briefing paper, attended two deliberation sessions

Results from the Pre-survey

Research Question: ***What are participants' preferences and support for five energy options for Idaho?***

The mail surveys provided the critical baseline for understanding citizens' perceptions, and also shed light on motivation to process information.

Respondents to the survey were predominantly men (78%); women respondents were quite under-represented (only 20%) in comparison to the population of Idaho (51%). Most of the respondents reported being White/Caucasian (91%) and less than 1% of respondents indicated Hispanic or Latino ethnicity.

Survey respondents were older than the general population of Idaho. Participants have lived in Idaho for more years than the average. Respondents to the pre-survey were typically better educated than Idaho citizens as a whole. Slightly more than 50% of respondents reported that they had obtained a 4 year college degree or additional higher education, much higher than the general population. Only 1% of respondents reported less than a high school degree. Sixteen percent of Idaho residents 25-64 years old hold bachelor's degrees and 7.1% hold graduate or professional degrees. (U.S. Census Bureau, 2000).

We could speculate that older Caucasian males with more formal education and longer-than-average residence in Idaho were more likely to feel that their opinions mattered in this situation, that they would be talking to like-minded people, or that they had the time to fill out the survey. That is, our participants better reflected the demographics of state-wide elected office holders than the population of the Treasure Valley or Idaho in general. This is a common finding in evaluations of other Deliberative Polling and related citizen engagement processes.

To gauge prior civic engagement, respondents were asked about their voting history. Ninety-six percent of respondents claimed to have voted in an election within the past two years. This self-reported participation is much higher than the actual number of eligible voters for any election. Survey respondents in Idaho typically report around an 80% voting rate (Boise State University, 2007) although actual voting rates are usually around 50% for general elections in Idaho. In the 2008 Idaho general election, 61% of the voting age population voted.

As shown in Figure 5 below, the Renewable Energy option, and Conservation and Efficiency option had the strongest support of the five electricity generation options. The Fossil Fuel option had the least support. Reflective preference was the respondent's 'gut level' response.

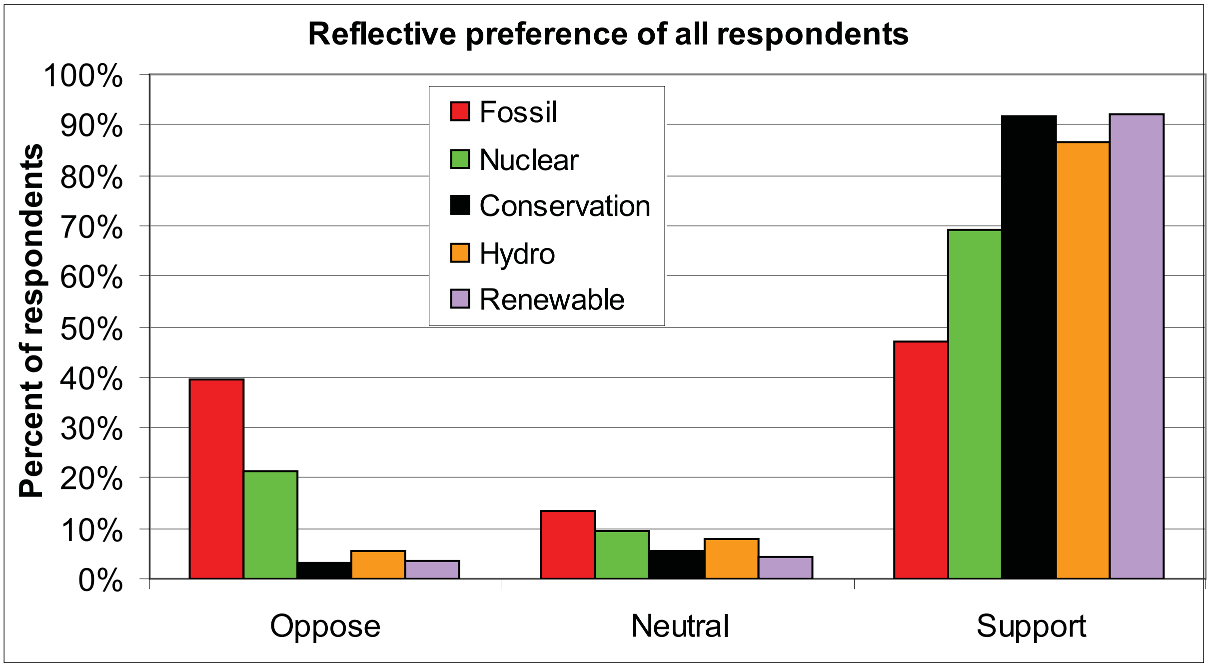

Figure 5. Summary of Reflective (Directly Expressed) Preference for Electricity Generation Options

The mail surveys asked about eight attributes for each of the five energy options. Figure 6 summarizes the mean responses from the 504 mail-in surveys, using a scale from +5 to -5 (very to not at all) in all cases. The importance of attributes across all energy options were combined, and the reflective preference for energy options across all attributes combined are denoted in grey. The percentage of all respondents that expressed a preference for (+1 to +5) an energy option was 92% for renewable energy, 92% conservation and efficiency, 87% hydropower, 69% nuclear energy, and 47% fossil fuels. The distribution of answers for nuclear and fossil fuels showed polarization, with "strongly support" and "strongly oppose", the two most common answers (-5 and +5 on the 11-point scale). All of the energy options had positive mean reflective preference (>0 on the +5 to -5 scale), although that of fossil fuels was quite low (0.06).

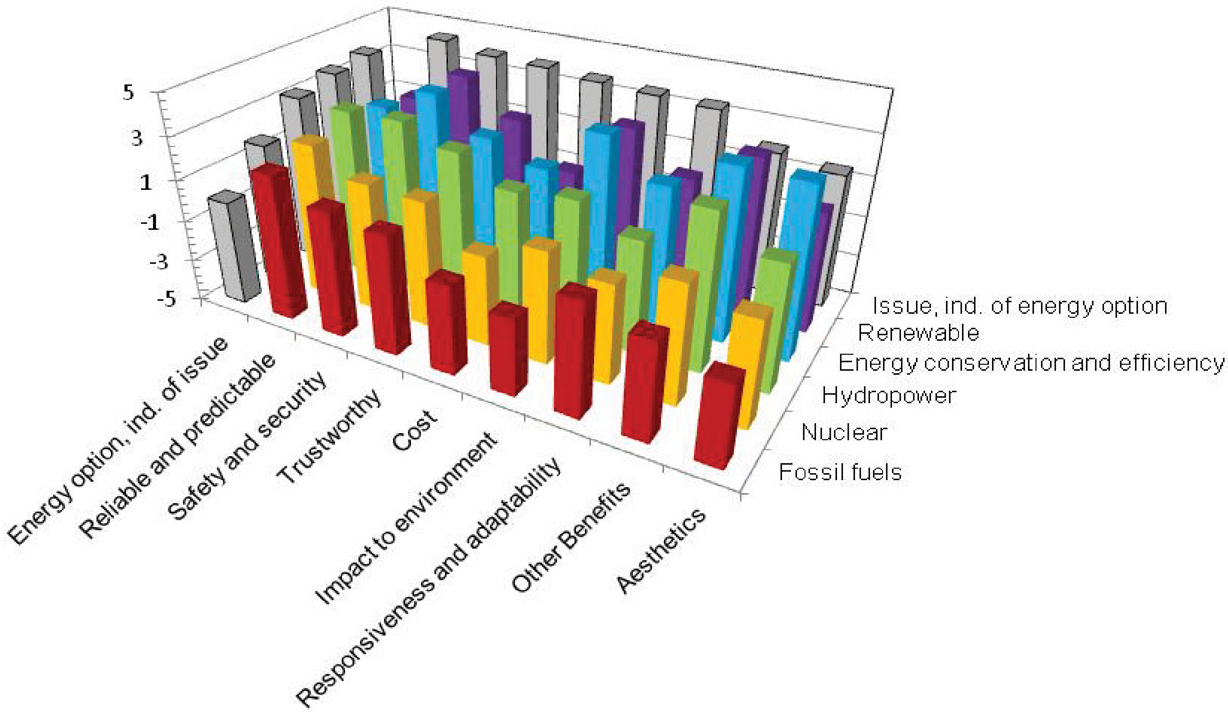

Figure 6. Summary of Mean Responses to Energy Option and Attributes (scale +5 to -5)

The eight attributes (see Figure 4) were independent of each other except for some clustering revealed by a factor analysis: safety, trustworthiness, environmental harm clustered for fossil fuels and nuclear energy (indicating that these reflect a combined underlying view of each technology), and safety, environmental harm, aesthetics, and other benefits clustered for hydropower.

Six of the attributes had similar importance; the two outliers are “other benefits” and “aesthetics” ranked significantly below the other six. All of the energy options had mean positive evaluations on all attributes with six exceptions: nuclear had a mean negative evaluation on cost and responsiveness/ adaptability and fossil fuels had a mean negative evaluation on cost, impact to the environment, other benefits, and aesthetics.

Table 1 summarizes the mean values of each of the eight attributes by electricity generation option.

Table 1. Summary of Mean Responses to Energy Option and Attributes (scale +5 to -5)

	Attribute importance, independent of energy option	Renewable energy	Energy conservation and efficiency	Hydro power	Nuclear energy	Fossil fuels
Energy option importance, independent of issue		3.87	3.64	3.24	1.81	0.06
Reliable and predictable	4.36	2.08	2.49	3.10	2.44	2.03
Safety and security	3.98	3.71	3.67	3.21	1.24	1.06
Trustworthy	3.90	2.08	2.07	2.37	1.12	0.74
Cost	3.66	0.06	1.22	1.18	-0.67	-0.72
Impact to environment	3.53	2.81	3.45	1.49	0.39	-1.33
Responsiveness and adaptability	3.41	1.03	1.74	0.41	-0.26	0.39
Other Benefits	1.93	2.69	3.29	2.51	0.67	-0.36
Aesthetics	1.52	0.85	3.23	1.01	0.01	-1.15

The attributes ranked highest for each energy option were as follows:

Renewable energy: safety and security (3.71), impact to environment (2.81)

Conservation and efficiency: safety and security (3.67), impact to environment (3.45)

Hydropower: safety and security (3.21), reliable and predictable (3.10)

Nuclear energy: reliable and predictable (2.44), safety and security (1.24)

Fossil fuels: reliable and predictable (2.03), safety and security (1.06)

The attributes ranked lowest for each energy option were as follows:

Renewable energy: cost (0.06), aesthetics (0.85)

Conservation and efficiency: cost (1.22), responsiveness and adaptability (1.74)

Hydropower: responsiveness and adaptability (0.41), aesthetics (1.01)

Nuclear energy: cost (-0.67), responsiveness and adaptability (-0.26)

Fossil fuels: impact to environment (-1.33), aesthetics (-1.15)

Figure 7 shows the distribution of preference scores. Most participants supported most options, with fossil fuels receiving the lowest support. The most polarized distribution was for nuclear energy with relatively high fractions of participants at +5 and at -5. Fossil fuels had a larger faction of strongly oppose responses (-5), but relatively few strongly prefer responses (+5).

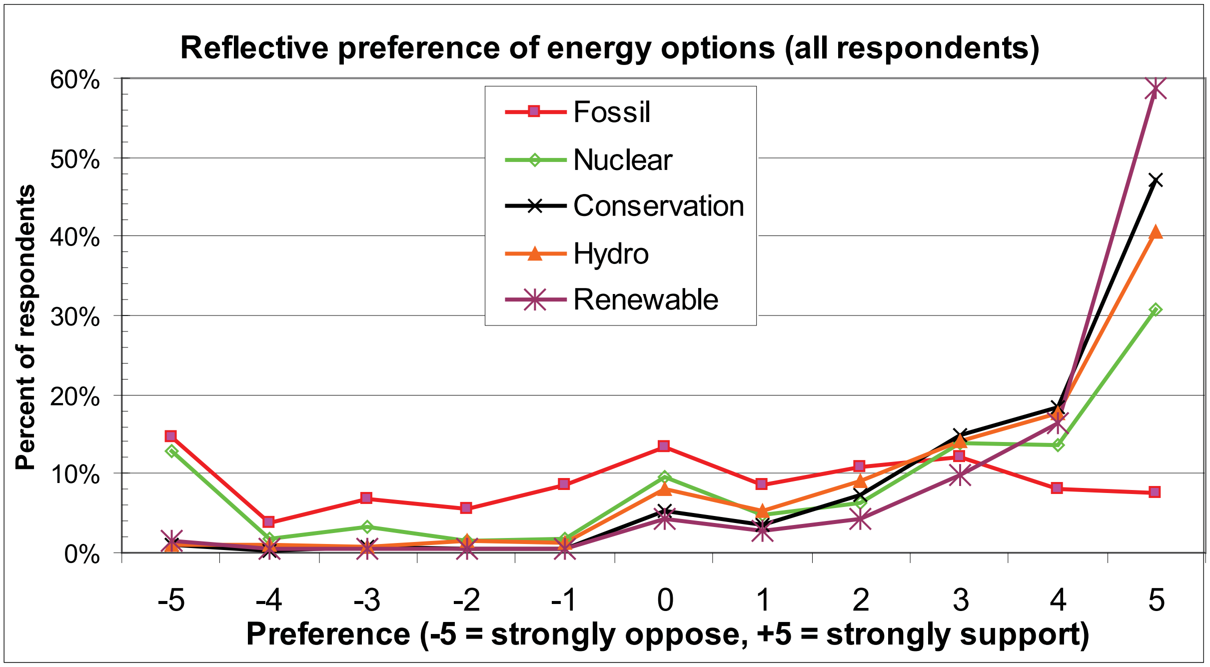

Figure 7. Distribution of reflective preference among energy options

Figure 8 (on the following page) shows the result for the question asking how the power company should allocate a hypothetical $100 to buy energy to meet electricity demand. Respondents could allocate the money in any combination that totaled $100; for instance, with five choices, an allocation of $20 per option would indicate that the support was the same for each option. Nearly half of the participants said they would allocate no money for fossil fuels, and approximately one-third would allocate no money for nuclear energy. However, most people put some money towards more than one option; only a few said they would fund just one type of electricity generation. Renewable energy and conservation and efficiency received the largest shares.

Figure 8 also shows how reflective preference maps with (financial) support. Mapping reveals the following:

Oppose or neutral reflective preference = $0 support (color red)

1 to 3 reflective preference = $5-15 support (color yellow)

4 reflective preference = $20 support (color green)

5 reflective preference = Over $20 support (color cyan)

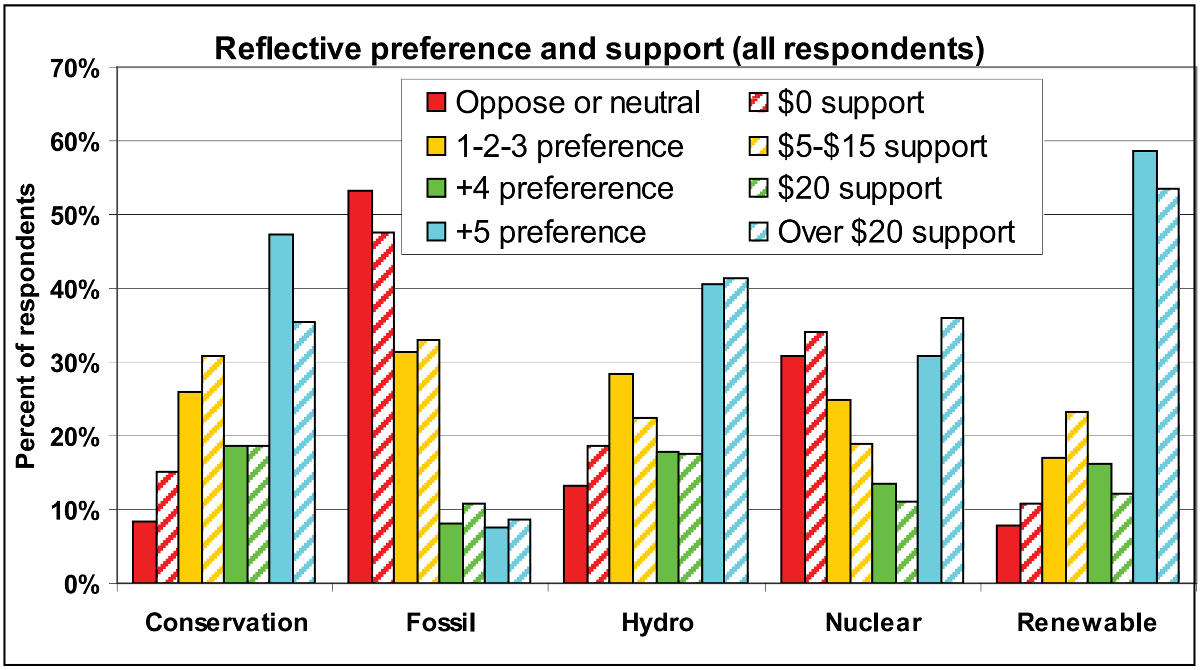

Figure 8. Distribution of reflective preference and financial support

As expected, those that did not prefer a particular option at all did not allocate support to that option (e.g. solid red and striped red bars.) Respondents required a very strong preference (+5) before providing more than the average (>$20) support for an option (e.g. the solid blue and striped blue bars). An average level of support ($20) was allocated to energy options that received a high level of preference (+4) (e.g. solid green and striped green bars.)

Figure 9 (on the following page) shows results for support expressed in the allocation of $100 question across the energy options. An allocation of $20 per option would indicate that the support was the same for each option. Notably, only a few percent would give all $100 to a single energy option. A fraction (but still a minority) would give no financial support to fossil fuels (48%) and nuclear energy (34%).

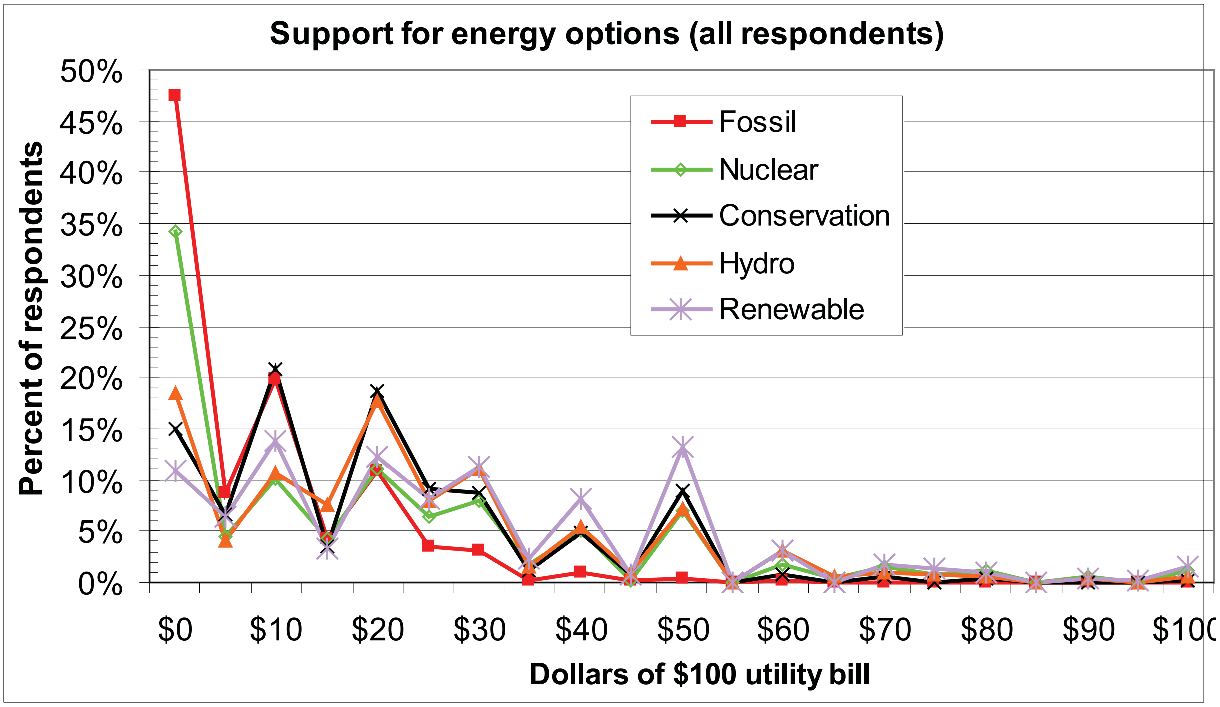

Figure 9. Percent of respondents supporting each energy option by allocation of $100 utility bill

Formative preference measures were lower and less sharply peaked than reflective preference, but followed the same patterns. The eight factors that made up formative preference, when combined into a single measure, are comparable to the reflective preference measure. The distribution of formative preference measures are shown in Figure 10, on the following page.

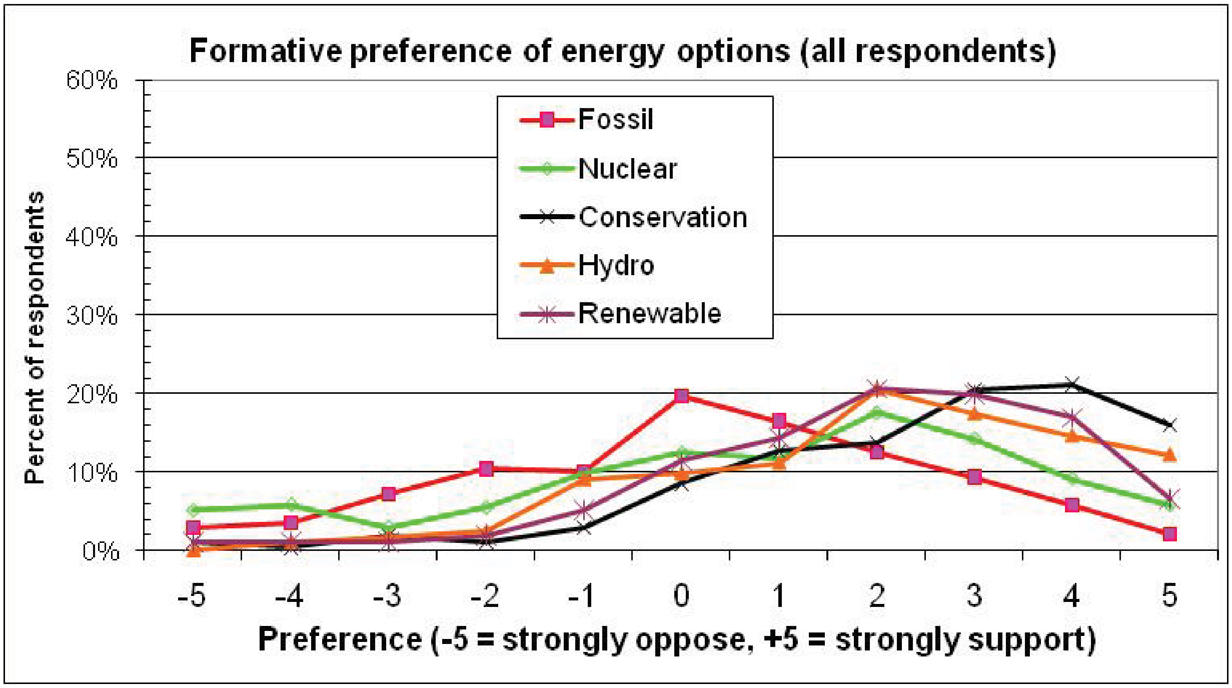

Figure 10. Distribution of formative preference

Table 2 summarizes reflective preference, formative preference, support for energy options, support for funding R&D toward potential solutions, and the likelihood of finding successful solutions. Reflective preference, formative preference, and support were not entirely consistent with each other, although there were positive correlations among them.

The treatments and expression of importance of attributes were designed to test the relationships among these three preference/support measures. The percentages of all respondents that would put a non-zero amount of their $100 toward each of the energy options were as follows: 89% renewable energy, 85% conservation and efficiency, 81% hydropower, 66% nuclear energy, and 52% fossil fuels. Few respondents would put more than 50% of their $100 to a single energy option. "Few" is 10% for renewable energy, 8% nuclear energy, 7% hydropower, 2% conservation and efficiency, and 0% for fossil fuels. That is, 10% of respondents would put $100 of $100 into renewable energy.

Table 2. Summary of Mean Responses for Preferences and Support by Energy Generation Option (scale +5 to -5)

	Renewable energy	Energy conservation and efficiency	Hydro power	Nuclear energy	Fossil fuels
Reflective preference	3.87	3.64	3.24	1.81	0.06
Formative preference	1.94	2.46	2.00	0.79	0.22
Level of support	$28.35	$20.09	$23.13	$20.14	$ 7.22
Level of support for solutions	$25.92	$17.09	$13.36	$25.08	$13.27
Likelihood of successful solution	1.25	0.96	-0.60	-0.55	-0.38

Table 3 shows substantial evidence of support for our underlying model (see previous Figure 4). The correlations are strong between reflective preference and formative preference for all respondents, by energy type. The positive correlations imply that these preferences are related to each other. The correlations ranged from 0.64 to 0.83.

Table 3. Comparison of Correlation Measures between Reflective and Formative Preferences by Energy Generation Option

		Reflective Preference				
		Conservation & efficiency	**Fossil fuels**	**Hydro power**	**Nuclear energy**	**Renewable energy**
Formative Preference	**Conservation & efficiency**	.64				
	Fossil fuel		.72			
	Hydropower			.65		
	Nuclear energy				.83	
	Renewable energy					.65

Figure 11 shows who respondents believed should have primary responsibility for making energy policy decisions. While citizens' preferences were divided, 38% of respondents said they would prefer citizens to drive the decision making. This conforms to the state's conservative political culture and the concept of the "rugged individual" in the mountain west. (Piet, Brown, et. al, 2007).

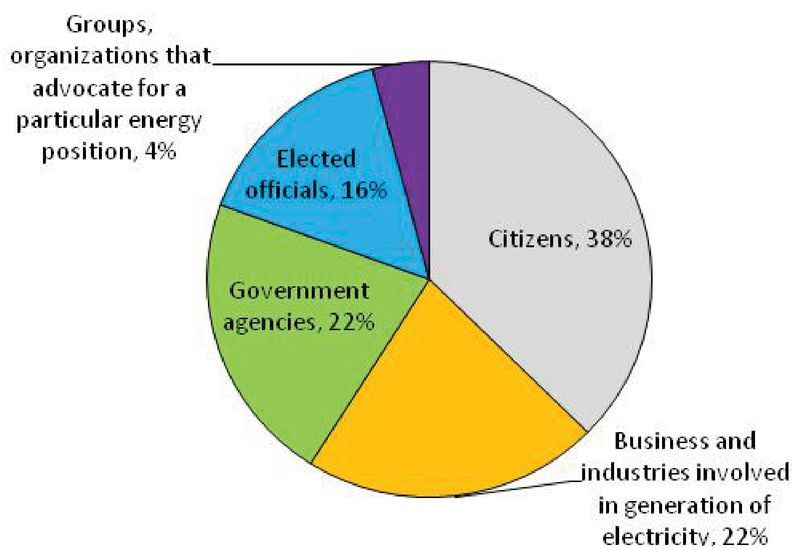

Figure 11. Energy policy decision should primarily be made by …

Finally, 90% of those who received the briefing paper viewed it positively, meaning our multi-discipline and multi-viewpoint approach to preparing the briefing paper achieved credibility among those with different energy option preferences.

Results from April 18, 2009 Deliberation Event

The non-representative character of the mail-in survey participants became slightly exacerbated among the subset of people who told us they would participate and those that actually came to the deliberation event.

In general, the changes observed from the study were subtle and conclusions are limited by the statistical power of the data from the treatment groups.

Research Question 1: ***What effect do different types of public discourse (treatments) have on the public's preference and resulting support for different options to meet electricity demand?***

Hypotheses

It is believed that increasing the level of public discourse (i.e., ranging from no discourse to full deliberation) will on average lead to the following:

- increasingly higher levels of change in study participants' preference for each of the five energy options, which will affect (change) participants' level of support for each option;
- increasingly smaller differences between *Reflective Preference* and *Formative Preference* from pre to post, across all electricity option categories; and,
- increasingly smaller variation among participants for both measures of preference across all energy option categories.

These results indicate that our main independent variable, public discourse treatment, had no statistically meaningful effect on **reflective** or **formative preference**. Participants' preferences changed very little, or not at all, from pre to post test.

For **support**, when looking at the results of all 5 analysis of variances between groups (ANOVAs) together (for the various treatments), the results indicate that there were three significant main effects from pre to post. Support for fossil fuels and hydropower went up, and support for renewable energy went down, but there were no significant changes in support for the other two ways to meet electricity demand (i.e. nuclear energy and conservation and efficiency).

While these changes in support from pre to post are significant, the change in support did not associate with public discourse treatments. In other words, having a briefing document, participation in the small groups, or hearing the expert panel did not have unique effects on the average preference rating. The overall changes for fossil fuels, renewable energy, and hydropower may be due to common elements experienced by all participants (e.g., hearing the morning briefing presentation) or, perhaps, to some general social events – apart from the Deliberative Poll – that occurred between the January pre-survey and April post-survey.

A priori, we did not expect that every treatment group would change in a similar direction, because the different treatments (e.g., small group discussions for some, but not others) might lead to different types of information being shared and affecting support. However, the finding of a common main effect may suggest that some shared experience, such as the hour-long overview presentation in the morning session, influenced people in a consistent direction.

The results for this research question are not supportive of our hypotheses. The finding of no main effect or interactions between public discourse treatment and reflective preference, formative preference, or support, but a clear difference in preference for ways to meet electricity demand, indicates that our participants had strong prior attitudes (about what ways they preferred to meet electricity demand) and that the intervention of public discourse, at any level of civic engagement, did not change their attitudes.

Reflective preference and formative preference showed the same pattern of results: no change was measured from pre- to post-test. However, there was distance, or 'separation', between the types, meaning that some energy types were more preferred than others. The order of preference for energy type was the same for both reflective preference and formative preference. Energy conservation & efficiency and renewable energy were most preferred, hydropower ranked next, then nuclear energy, and fossil fuel was preferred the least of any type.

Research Question 2: *What effect do different types of public discourse (treatments) have on the public's support for technical research or policy alternatives that could eliminate or improve different options for meeting electricity demand?*

Hypotheses

It is believed that by increasing the level of public discourse (i.e., ranging from no discourse to full deliberation), it will on average:

- cause an increasingly higher level of change in the level of support for different policy alternatives or technological research tied to the improvement of options for meeting electricity demand.
- cause lower levels of variation between participants in their levels of support for different policy alternatives or technological research tied to the improvement of options for meeting electricity demand.

The results were consistent with results from analysis of the first research question. There was no effect of public discourse treatment on support for any of the ways to solve problems associated with electricity demand. Another question on the surveys asked people to instruct the government to allocate $100 toward developing solutions to the challenges of each energy option. The different public discourse treatments did not affect support for funding ways to solve problems associated with electricity demand.

Overall, support for funding solutions to nuclear energy increased slightly, and support for funding solutions to renewable energy challenges went down. These marginally significant effects did not interact with public discourse treatments. As such, there is no indication that changing the level or amount of public discourse participants were encouraged to engage in had any effect on their willingness to support technical research or policy alternatives that would improve any of the ways to meet electricity demand.

As an example, consider Figure 12a, which shows the reflective preference for nuclear energy. It is tempting to speculate that the change in the +5 score from pre-test to post-test reflects some doubts entering the minds of pre-test supporters. While these changes in support from pre- to post- are significant, the change in support did not associate with public discourse treatments. In other words, having a briefing document, participation in the small groups, or hearing the expert panel did not have unique effects on the average preference rating. Figures 12b through 12e provide cumulative measures for the balance of the electricity generation options.

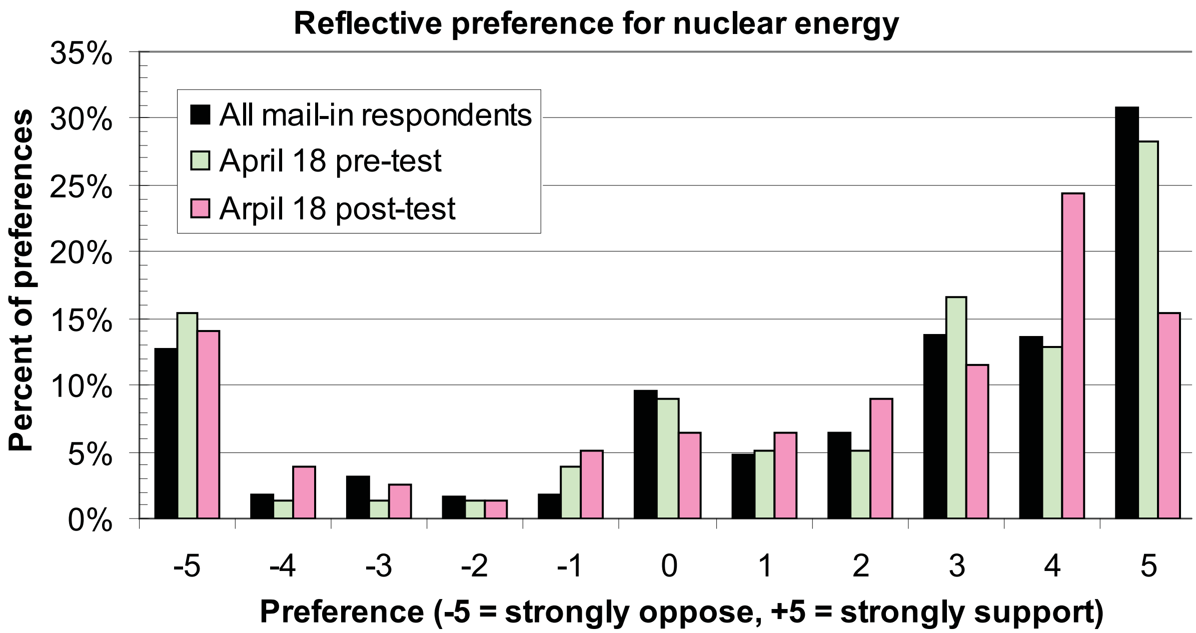

Figure 12a. Reflective preference for nuclear energy

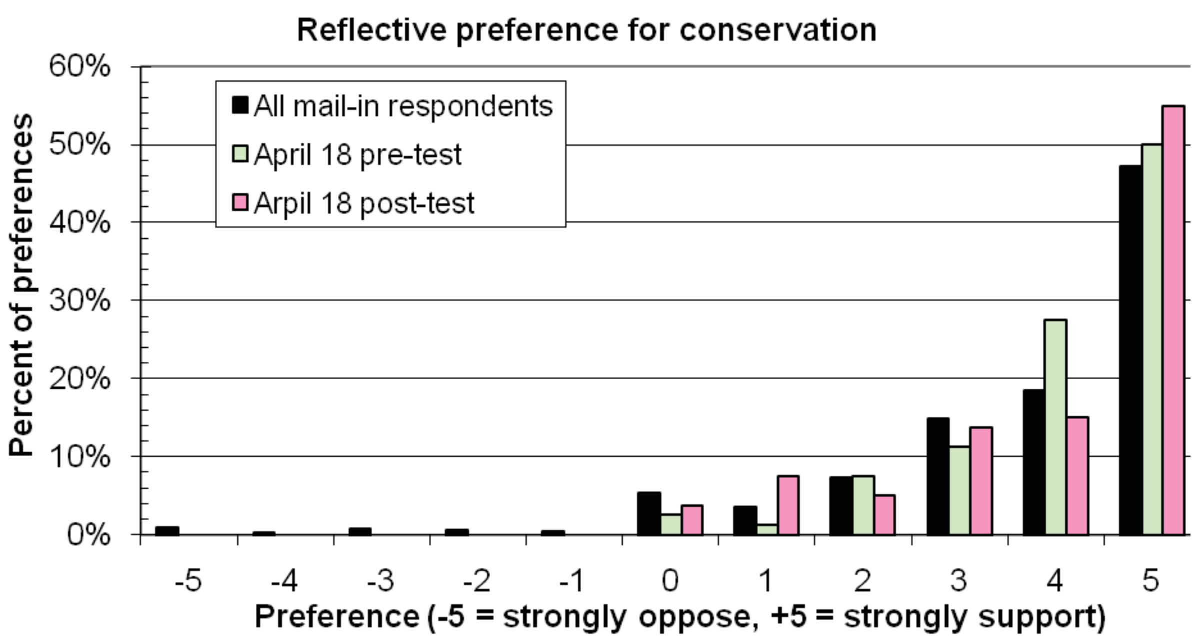

Figure 12b. Reflective preference for conservation and energy efficiency

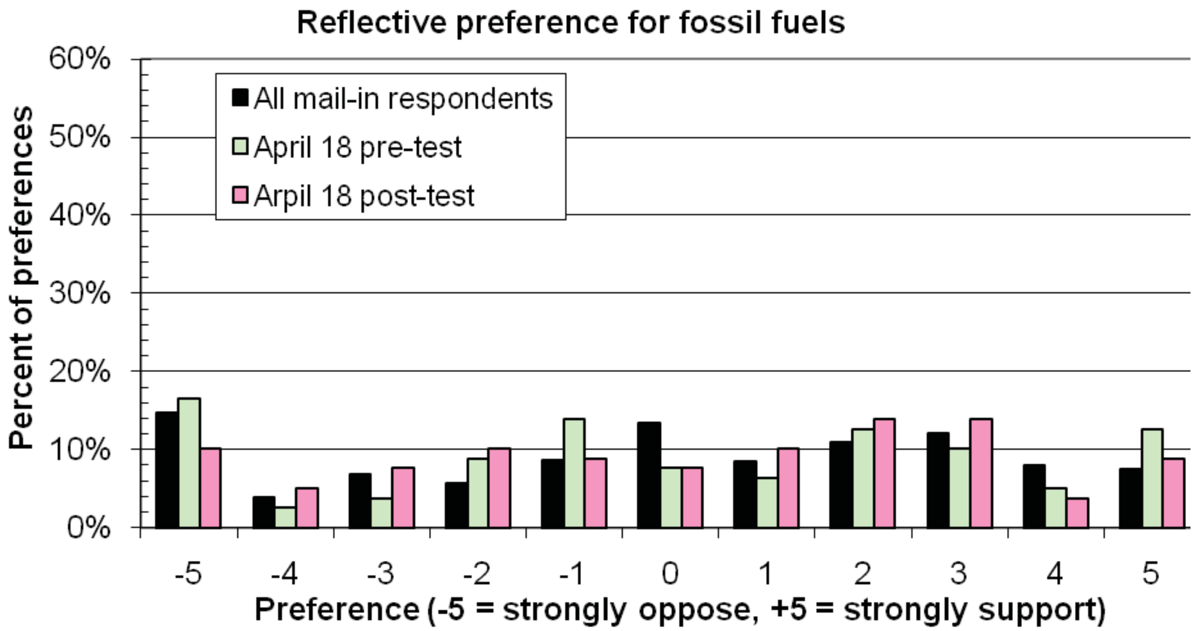

Figure 12c. Reflective preference for fossil fuels

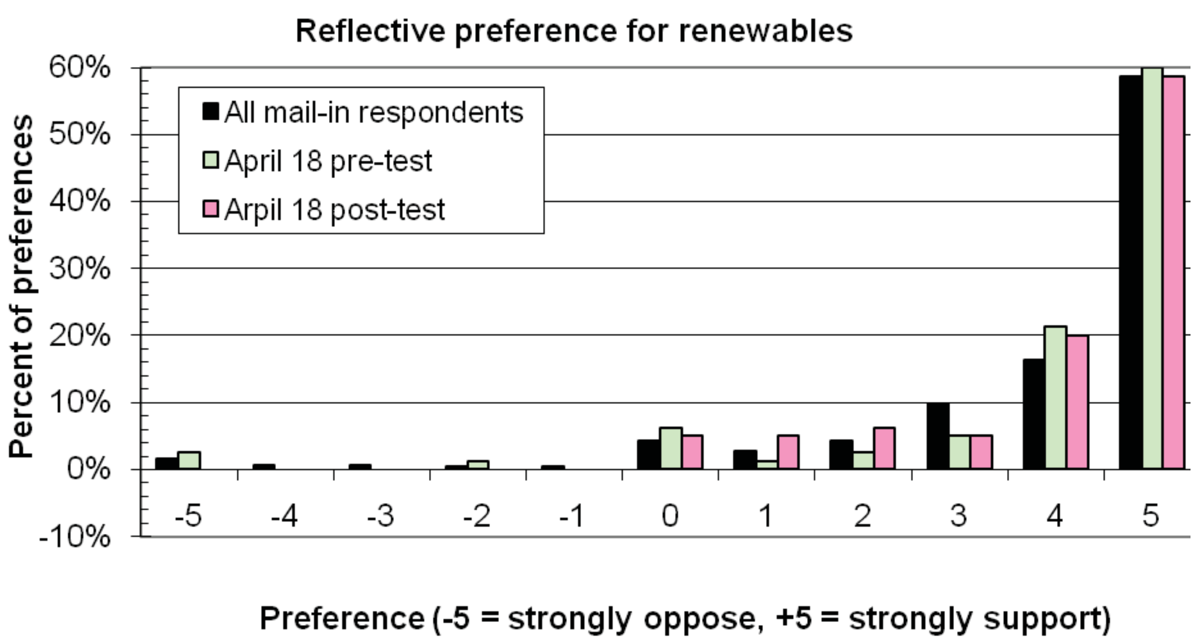

Figure 12d. Reflective preference for renewable energy

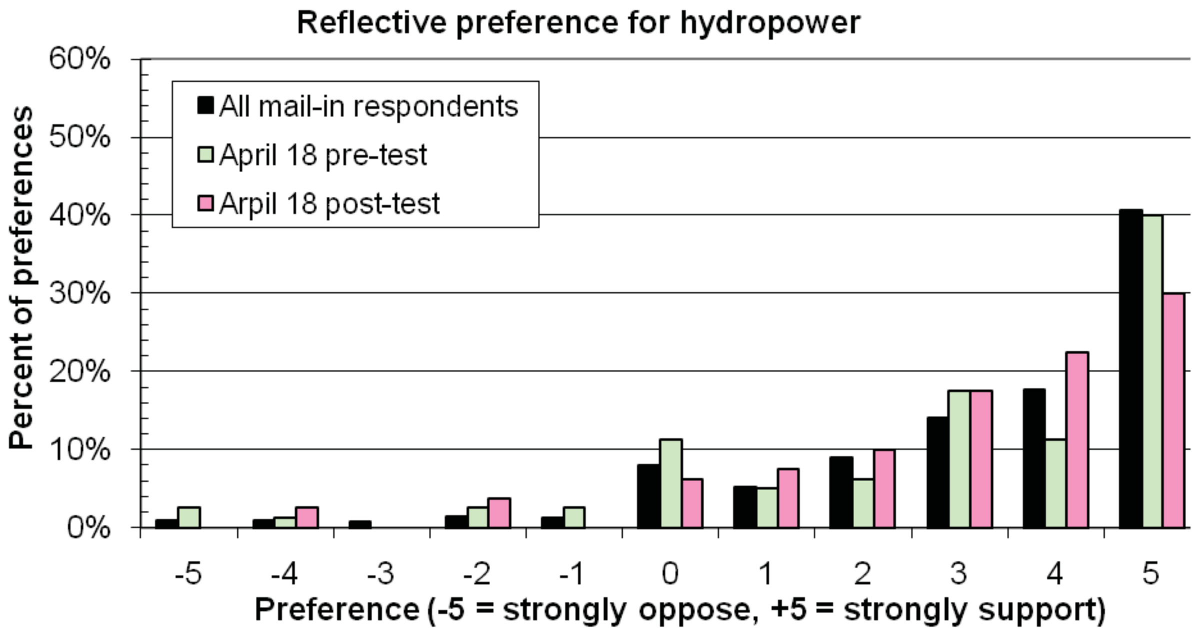

Figure 12e. Reflective preference for hydropower

Research Question 3*: What effect do different types of public discourse (treatments) and the public's intensity of opinion, psychological and demographic factors, social values, environmental factors, and assumptions have on their preference and level of support of different options for meeting electricity demand as well as the likelihood and level of support/preference for improvements in energy options?*

Hypotheses

It is believed that the different types of public discourse will affect participants' preferences for different energy options differently as a function of individual differences that exists between participants. As such, these hypotheses will test for the statistical interaction between level of public discourse and factors such as:

- Political affiliation/ideology
- Education
- Profession
- Civic Engagement: Highly involved in issues vs. apathetic (as measured by common measures of civic engagement, e.g. voting, writing a letter to congressperson, signing a petition, etc.)
- Gender
- Age
- Length of time in Idaho
- Marital status
- Income level
- Number in family
- Home ownership

Public discourse treatments failed to display a clear statistical pattern of effects on preferences, the support for energy options, on beliefs that negative outcomes can be resolved, and on support for funding solutions to problems associated with each option, when controlling for socio-demographic characteristics.

Idiosyncratic (e.g. not systematic) effects did emerge, and researchers carefully considered whether findings yield firm information leading to recommendations for *actions*. However, after considering the noticeable absence of a clear pattern as well as the small size of individual treatment groups and the ensuing lack of statistical power, we decided to allow readers to come to their own conclusions. Persons interested in the findings of the elaborated analyses may refer to the full report displayed in the Chapter 4 and Appendices B and C.

Research Question 4*: What effects will the participants' evaluations of the different treatments (e.g., the deliberative polling process vs. plenary only vs. only briefing materials), the conference speakers, (e.g., their knowledge, interaction styles, etc.) have on their support for different options for meeting electricity demand?*

Hypotheses

This research question may be seen as testing an alternative hypothesis. One alternative hypothesis is that some characteristics of the speaker may "trump," or at least provide additional explanatory power over and above that of energy preference on the dependent variables, as hypothesized in Research Question 1. As such, it is prudent to check if factors such as differences between the treatment conditions, the interaction styles of the speakers, facilitators, and moderator affect the support participants have for an energy option, or affect the level of change that occurs in participants' support for an electricity option.

Correlation does not mean causation, but considering our findings from Research Question 1 helps us interpret the results obtained for Research Question 4. Results from Research Question 1 show that our sample of participants had strong prior attitudes with respect to which ways to meet electricity demand. Moreover, these strong prior attitudes clearly showed that some ways to meet electricity demand were more highly preferred (e.g., renewable energy and conservation and efficiency) than others (e.g. fossil fuels).

Given that participants had these preferences before meeting the experts, the most logical explanation for the significant correlations is that participants rated their regard for the panelist based on the extent to which that panelist agreed with the participant's prior attitude (e.g., position on the matter). That is, those participants who preferred renewable energy and conservation and efficiency prior to meeting the panelists ended up saying they regarded the panelist(s) who shared their views as being more credible, trustworthy, knowledgeable, and likable.

However, it is also possible that a person striving to be open-minded may have found some speakers' arguments compelling, which influenced his or her preference and support for energy options. The fact that there were several significant correlations, and these were among the more prominent findings of the study, suggests that further investigation of the effects of interaction with experts on people's policy attitudes is warranted.

See Chapter 4 for the full analysis.

Results for Changes in Knowledge

One of the primary measures used in the Deliberative Polling model used by Fishkin is an analysis of change in knowledge about the topic of discussion measured before (pre-survey) and after (post-survey) the deliberation event. From the outset, the participants at the event believed they had more knowledge of energy issues, and, actually *were* more knowledgeable then the general population. This supports the idea that the participants who agreed to come to the event did have strong prior knowledge and beliefs about energy options.

As shown in Table 4, survey respondents were asked to self-report their level of knowledge about energy issues, those that attended the deliberation event were more likely to say they were 'somewhat' or 'very' knowledgeable about energy issues, versus those who did not participate.

Table 4. Summary of Self-Reported Level of Knowledge of Energy Issues

	Pre-survey (No Treatment group) n = 398	**Pre-survey Treatment Groups n = 75**
I am **very knowledgeable** about energy issues	14.9%	24.0%
I am **somewhat knowledgeable** about energy issues.	70.2%	69.8%

When asked specific *factual* questions, those that attended the deliberation event chose the correct answer more often than the general survey respondents. The event attendees were also less likely to answer 'Don't know/not sure' to the knowledge questions than the general sample

Table 5. Summary of Knowledge Question Results

Knowledge Questions (Correct answer choice in boldface)	**Pre-survey (No treatment group)**	**Pre-survey Treatment groups**	**Post-survey Treatment groups**
	n = 393	n = 67	n = 69
Within its borders, Idaho has abundant resources of which of the following?	67.9% correct 23.7% don't know	92.5% correct 0 % don't know	98.6% correct 0% don't know
	n = 401	n = 70	n = 81
Of the electricity that Idaho *consumes,* the majority comes from what one source?	14.9% correct 10.2% don't know	17.1% correct 0% don't know	53.1% correct 0% don't know
	n = 403	n = 72	n = 81
Of the electricity that Idaho *produces*, the majority comes from what one source?	86.1% correct 10.7% don't know	97.2% correct 0% don't' know	97.5% correct 0% don't know
	n = 397	n = 64	n = 71
Which one of the following is the fastest to implement?	44.3% correct 30.0% don't know	71.9% correct 0% don't know	81.7% correct 0% don't know

The participants at the event did augment their knowledge in the areas of Idaho's energy production and consumption, and some corrected their misperceptions of the sources and potential solutions to energy issues. Table 5 shows a knowledge gain of 35 percentage points on the 'energy Idaho consumes' knowledge question, and 10 percentage points on 'speed of implementation' was measured pre- to post-survey.

See Chapter 5 for the full analysis.

Results for Post Event Follow-up

Given the theory of deliberative democracy (see page 14 for descriptions of citizen participation and deliberative democracy) , it is also surprising that very little attention has been devoted to examining the effects of participation on participants' subsequent political engagement (Abelson, et al, 2003). In one of the only studies we found, Eggins, et al (2007) examined how deliberative polling affected participants' intended political engagement (intention to discuss the issue with others and hope to play an active role in development of others' views). They found a fairly strong relationship, with much of the variation in political engagement explained by people's feelings of pride in participating and their sense of being a community representative. Unfortunately, their study did not include a follow-up component to assess whether such intentions were borne out. Another study of actual behavior (Andersen & Hansen, 2007) found that the participants became only slightly more politically active after a deliberative poll, so it remains unclear how those processes actually increase civic engagement. Our study sought to investigate this issue through interviews conducted several months following a deliberative poll.

Eight months after the event we interviewed about half of the April participants by phone to analyze the longer-term consequences of the event. In the discussion below, we provide excerpts from the interviews to illustrate the findings.

Twenty individuals (approximately half of the follow-up participants) said that they had learned new information, but nevertheless did not shift their preferences for energy options in Idaho.

> *I think it expanded my knowledge to some degree. There were certain aspects of our energy policy, for example, the quantity of energy that we import into this state. The fact that we're opposed to coal fired plants in Idaho, yet we'll buy energy from coal fired plants across our border. I wasn't aware of that prior to that conference. In terms of changing my opinion, I don't think so.*
>
> *I'm sure that it has enhanced my knowledge on it. I'm not sure that it changed my stance any, but I would say that it probably has enhanced my knowledge.*
>
> *I thought it was informative too. I wasn't aware of how much…actually that coal and the resources that provided power in the state… No, it didn't affect my opinions, but it did make me think a little bit more about what is out there. It didn't change my position any.*
>
> *Well, yeah I'd have to say I learned some little things that you don't tend to think about. The wind power… the wind blows it… it's renewable… but the finer points that come up that you don't really think about that… yeah, we learned some things… Maybe it reinforced my feelings a little bit concerning wind power and hydroelectric and the renewable end of it. I think there are more options… more of a availability than we're taking advantage of. It didn't change it as much as it reinforced it a little bit.*

Many of these people recognized that their opinions were well established and unshakeable prior to the event:

> *It made me aware that there's a lot of things going on in Idaho that I was not aware of. Like, the fact that we share all of our power with all the different states… I learned more stuff, but it didn't affect my outlook… I'm pretty stubborn.*
>
> *Knowledge? I got some good knowledge out of it. My options or my thoughts on it, they will never change… I went in there with one track mind and left with a one track mind.*

Twelve people reported that they had learned new information and as a result changed their attitudes toward one or more of the energy options. As evident in the following excerpts, people picked up on different bits of information:

> *I think the conference was excellent as far as getting… to increase my knowledge of the pros and cons of all the different options available to us… Maybe just safety as a nuclear power industry…The exposure to expenses on some of the nonrenewables and conservation alternatives…Transmission lines and how that impacts energy costs… It increased my acceptance of nuclear power industries. I began to see that maybe it's a more viable alternative.*
>
> *I learned some things. Particularly about the renewable energy sources. And, I think I came with much more of an impression that renewable energy sources are much more viable than I thought they were… It shifted me more towards that the renewable options are a lot more feasible than I thought. And that it should be something that we should be pursuing. I remain open to the idea of nuclear power options, but [now] I don't see that as the only solution.*
>
> *I just had it in the back of my mind [before the deliberative poll] that because it [natural gas] was fossil fuel that it wasn't good. And I learned that it wasn't quite that cut and dry for me. I learned a lot... And, did it sway me? I think I had a real negative thought about certain fossil fuels for generation, like natural gas, that even though it's a fossil fuel… maybe it's not as bad as I thought it was.*
>
> *[I learned] some advantages of some options less obvious than I thought…It reduced my support for hydroelectricity and increased my support for nuclear slightly. And reinforced my opinions about fossil fuels and my support for renewables…it increased my support for conservation.*
>
> *I learned a few things at the conference… I learned from the meeting that we had here that one of the great advantages of gas fired electric generation is its versatility. We go into heavy load times… they're reluctant to jack up nuclear output or they don't have any water behind any dams that they can release or whatever… gas fired power plants come online. If I understood them correctly, a lot of these gas fired plants stand idle most of the time. And when peak loads come along, they can light them off in a very short time and pick up load with them. So I think that's a great plus… A question was asked at the luncheon down here by someone and it took me about 3 milliseconds to come up with the same answer that the panelists came up with. The question was: which form of power do you think will be the solution to this? And the answer was: all of them. I didn't have that feeling going in. I thought nuclear could do it all. And I walked out and thought, nuclear can't do it all, and neither can any of the rest of them.*

Apart from the effects on specific knowledge or attitudes, eleven people reported that the deliberative poll event had changed the way they think about energy, generally making them more aware of the complexities of the issues.

> *I think it made me realize what I don't know. And so then that makes you more curious about what's out there. You know, want to learn more about it.*
>
> *Well, the way it affected my knowledge it is that I got to hear other people's views and opinions on it. My attitude…I think maybe it just allowed me instead of just kind of thinking one dimensionally for myself, you know I can see what other people are thinking… It would definitely…that would definitely changed my attitude because like I said, instead of just thinking about myself, I can think about other people.*
>
> *I would say I came away with an overall positive feeling. But, it's a very complex problem that we are faced with. There's reasons I think that we should use nukes and there are reasons we should not use nukes. That's obvious. It's a trade off.*
>
> *It very much opened up my mind to thinking about the need for options and of the need for information about all the options. It let me know that the issues were more complicated than I thought.*

In going around with that group, I think we all came to the conclusion that we were all misinformed in some way or another… I think what I learned was some of the qualifications that stand in the way of any one of these things being "the solution." So in that sense, let's say I earned more respect for the arguments of others.

See Chapter 6 for the full analysis.

Discussion of Results

In general, our sample of participants already had strong prior attitudes on energy. They showed a clear preference for some ways to meet electricity demand over others. Moreover, their preferences changed very little, or not at all, in the post-test results. Our intervention did very little to change people's preferences for any one of the five energy options.

Individual elements of the Deliberative Poll, such as the briefing documents or small group deliberations, did not have different effects on participants' support for options, on beliefs that negative outcomes can be resolved, and on support for producing solutions to problems associated with each option.

Public discourse treatment groups failed to display a clear statistical pattern of effects on the intensity of support, on beliefs that negative outcomes can be resolved, and on support for producing solutions to the challenges associated with each option when controlling for socio-demographic characteristics.
The participants demonstrated high levels of motivation (e.g. attentively listening, actively participating) and were more highly educated than the general population, and demonstrated high levels of knowledge. However, the results suggest that participants relied on prior values, beliefs, and opinions, or did not find convincing arguments to change preferences or support for any option dramatically.

Social psychological theories suggest that individuals, who are motivated to process information in an open-minded way, may be influenced by strong arguments and evidence if they do not have high levels of personal interest or strong prior attitudes. We assess motivation and ability for the participants as follows:

- The participants had already decided that the issue was of sufficient important and relevance to them to devote most of a Saturday to the event.
- They knew we would ask them to complete a survey after the experience.
- They were free of observable distractions.
- Given the multitude of ways that information was presented among the diverse treatment groups, we believe that they had sufficient exposure to a common pool of knowledge.

The minimal change or movement toward consensus positions therefore suggests that one or more of the following may have occurred.

- Insufficient numbers of participants were open-minded or undecided enough to change their preference or level of support. Deliberation group facilitators reported that most people had an opportunity, and were willing, to talk. The facilitators noted that a few groups did have a few personalities that dominated the discussion (and the way issues were framed in that group) that may have precluded open discussion.

- The balanced and neutral presentation of information (which was not designed to advocate for one position or another) 'canceled out', giving even open-minded detailed-processing people insufficient reason to change a position.

- Despite the different modes of presentation and discussion, it could be that none of them imparted complex multi-discipline information in a way that sufficient numbers of participants could understand.

- The challenges of meeting electricity demand may be sufficiently 'wicked' and/or complex to preclude consensus on any specific energy type.

- Changes might occur over time, but this appears doubtful, as evidenced by the post event follow-up months after the event.

- Changes occurred but the statistical power of the experiments was not powerful enough to draw any firm conclusion.

The self-selected nature of the sample we recruited meant that many participants tended to have strong prior attitudes and a high level of knowledge about energy, as evidenced in their responses during the follow-up interviews. The Elaboration Likelihood Model of Persuasion (Lien, 2001; Petty & Wegener, 1999) and Heuristic-Systematic Model (Todorov, et. al, 2003) both argue that such individuals are unlikely to change their attitudes, and our general findings are consistent with this conclusion.

Perhaps if we had been able to recruit a representative sample of citizens, there would have more substantial shifts in preferences, although there is no reason to expect that shifts would have been in a consistent direction, given the balanced information presented and the complexity of arguments in support and against each option.

None of the treatments used in the experiment “shocked” the participants’ existing values or beliefs enough to cause cognitive dissonance. Any dissonance increases the likelihood for participants to change their preferences or level of support. We did not see this in the analysis of the data. Idiosyncratic (e.g. not systemic) effects did emerge, and researchers carefully considered whether findings yield firm information leading to recommendations for actions. However after considering the noticeable absence of a clear pattern as well as the small size of individual treatment groups and the ensuing lack of statistical power, we decided to allow readers to come to their own conclusions in this report.

Previous Figures 12a through 12e show the patterns and examples of reflective preference.

Another example of inconclusive data is the measure of individual participants’ regard for subject matter experts. Generally, when the subject matter expert represented opinions that agreed with the participants’ prior position, or when there were slight changes in some individual participants’ preference and support for a given energy type, this reflected movement toward those experts the participants regarded more highly.

Those findings aside, there is substantial evidence to support our underlying model (Figure 4). The correlations are strong between reflective preference and formative preference for all respondents, by energy type. The positive correlations between reflective and formative preference for an energy type imply that these preferences are related to each other. As shown is Table 3, correlations ranged from 0.64 to 0.83.

In addition, as shown in the analyses of Research Question 1, reflective preference and formative preference showed the same pattern of results. That is, no change was measured from pre- to post-test (See Chapter 4). However, there was distance, or 'separation', between the measures, meaning that some energy types were more preferred than others. The order of preference for energy type was the same for both reflective preference and formative preference. Energy conservation & efficiency and renewable energy were most preferred, hydropower ranked next, then nuclear power, and fossil fuel was preferred the least of any type.

According to the ELM model (see Figure 3) and Fishkin’s work, some differences between reflective preference and formative preference are expected. Reflective preference, in this study was design to be the 'off the top of your head' judgment (i.e., peripheral route process). Fishkin’s work discounts the value of a response based on one’s reflective preference because it is not always a reliable predictor of one’s future support. In this study, formative preference was intended to be the thoughtful evaluation or judgment (i.e., akin to central route processing), which is thought to be a better predictor of a person’s actual support in the treatment groups where participants were asked to think more about the issue (e.g., read a briefing document, hear a presentation, talk to experts, and meet together in small groups).

We also hypothesized that a participant in a treatment condition where they were not asked to think as much (e.g. control groups) would show that their reflective preference was a better predictor of their subsequent support. Just as the ELM hypothesizes and has demonstrated different outcomes (i.e., different amounts and kinds of attitude change) based on whether the person being persuaded is processing the information peripherally or centrally, we expected something similar for those in our different treatment groups.

The research team did not necessarily think our underlying model (Figure 4) would provide a 'one size fits all' explanation of the cognitive processes we hypothesized would occur. What the model does not express well is the idea that we expected different kinds of cognitive processes to occur (i.e., peripheral and central) depending on the kind of experimental treatment condition randomly assigned to the participant. Unfortunately, the statistical power of the data did not support an analysis to assess whether this happened.

Future

For those contemplating future research, deliberative sessions, public hearings, etc. on topics such as energy, we offer the following thoughts.

What segments of the population do you care about? If you want to understand the broad diverse public, you will have to work harder than we did to get a representative sample, which will require over selecting those segments of the population that were underrepresented in our work. Anticipate that every step of the process will lead (at least in Idaho) to an older, more male, more formally-educated, longer-Idaho-resident, more Caucasian group of participants. If you want to understand those more likely to participate actively in politics, then a demographically-balanced group is probably not what you want, instead, see who answers your call to participate as that provides information in and of itself. The latter path, of course, increases the risk that some segment of the population not initially interested might become interested once they felt that a condition invoking non-participation changed, e.g., if something that did not appear personally relevant became relevant. This can of course occur if what is viewed as a theoretical exercise transforms into a specific proposal to build or change something that directly impacts them.

Probe preferences in multiple ways – reflective, formative, and support (such as via $100 utility bill allocation). These provide different insights and are not equivalent. For example, it typically took a +5 preference for participants to give more than the average ($20 = $100/5 options) support; of course neutral or opposition led to no financial support. The financial support question appeared to better provoke realization that more than one option needs support. Few put all of their dollars in a single basket.

Are you trying to inform? If so, why? Are you trying to inform about the people engaged in a project, e.g., whether they are caring and competent, i.e., trustworthy? Are you trying to provide new information? In our busy society, you cannot assume people will process the information other than comparing it quickly against existing heuristics.

Are you trying to persuade? If so, would you be satisfied by short-term shifts of opinion? If so, then heuristic-based/peripheral route processing could be sufficient. If you want long-term shifts of opinion with staying power, then one or more changes in heuristics are likely required. That will require people having the motivation and ability for detailed processing of information as well as convincing arguments.

Plan to measure changes in opinion after your initial meetings or engagement. The literature has surprisingly little data on time-dependence of opinions. (See Chapter 6.) The types of issues likely to warrant complicated Deliberative Polling or analogous approaches are not resolved quickly. Rome wasn't built in a day. Any power plant will require years to proceed through planning, licensing and environmental and water resource approvals, and construction. Understanding how opinions change over time is vital, yet under explored.

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[1]These four institutions have formed the Center for Advanced Energy Studies (CAES). One arm of CAES is the Energy Policy Institute (EPI), which has supported this work.

[2] This paper was prepared for the U.S. Department of Energy Office of Nuclear Energy, Science, and Technology under DOE Idaho Operations Office Contract DE-AC07-05ID14517.

[3] For example, some of this team previously conducted focus groups for the potential next generation nuclear plant, which would produce hydrogen as one of its products. One participant considered hydrogen from his personal experience—the practice of making gas in his home safer by adding an odorant—and wanted to know if this would be used for hydrogen from the power plant. The "experts" had no answer.

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Chapter 1. Background, Scope of Research and Methodology

Background

When a policy issue requires a high level of technical expertise for thorough understanding, citizens are often excluded from the debate. In the political realm, policy choices often require citizens to choose a course of action without an understanding of the potential unintended consequences of a choice. Since most policy choices must trade off one set of the publics' values vs. an opposing set of values, the political will to make a choice may not arise. Sometimes, the technical experts attempt to "**decide** (a course of action), **announce** (the best technical solution) and (then) **defend"** the solution. None of these methods of arriving at public policy is optimal. Deliberative Polling is a citizen engagement process that has shown promise in engaging citizens in policy debates over such "wicked problems".

Forms of citizen deliberation – including citizen's juries, consensus conferences, collaborative polls, interactive panels, town meetings, focus groups, and research panels – are not new (Crosby, 1995 & 1999; Fishkin, 1995 and various; Gallup, 1938; Gastil, 2000; Grimstone, 2002; and Yankelovich, 1991). They have been suggested as an alternative to traditional public comment periods and opinion polls to enhance democratic decision-making across a wide variety of public issues. However, Deliberative Polling as conceived by Fishkin (1995) is thought to be one of the more innovative methods because, under some circumstances, its results can be generalized to a wider population.

One benefit of Deliberative Polls over a traditional public opinion poll is that it is assumed that policy decision makers can gather opinions from a better informed public. However, it has seen limited use due to the amount of time required and higher cost compared with traditional opinion polls.

Deliberative Polling entails a high level of resource commitment compared to a typical public meeting. Scientists, policy makers, and those interested in democracy and citizen engagement are unsure if the deliberative polling method works 'better' than other ways of informing citizens or shaping public policy. An assumption of Deliberative Polling is that participants may change their point of view when supplied with unbiased information or facts, developing more informed and less self-interested positions.

Deliberative Polls on energy alternatives had been conducted by Fishkin, as a consultant from the Center for Deliberative Democracy at Stanford University, prior to this study. This work provided a template for the design of the deliberative poll and the deliberation event in this study. (Luskin, Fishkin & Plane, 1999; and Lehr, Guild, & Thomas, 2003).

The research team was interested in exploring the effects of specific elements of the deliberative poll. Fishkin's methodology uses a pre/post-test design, in which the entire sample experiences the same set of activities, namely reading materials, development of questions for experts to discuss, and deliberation among the participants in small groups. This type of design does not allow researchers to isolate the individual effects of specific activities or treatments. The present study was designed as an experiment to separate the different activities to explore their individual effects on attitudes, as well as interactions.

The research team wanted to understand if citizens exposed to balanced (non-advocacy) information and involved in various types of public discourse made different policy choices than those who make choices based on their preexisting mindsets and worldviews. In addition, random sampling survey methodology allows results to be generalized to a broader population. In principle, this design should differ from a typical public hearing about a contentious issue or policy where only entrenched or extreme views may be represented.

Energy policy in Idaho is a timely topic. Historically, Idaho has had inexpensive electricity generated by hydroelectric facilities. As the population has grown, electricity needs have been met by importing power (typically from fossil fuels) into the state. Currently, Idaho needs to develop new sources of electricity generation for economic development. At the national level, energy policy is evolving with the objective of decreasing our dependence on foreign sources of energy, including fuels for electricity generation. The national dialogue includes concerns about the impact of fossil fuels on greenhouse gas emissions and other environmental concerns.

The issue of energy options was highly relevant to Treasure Valley residents. Within a 100-mile radius of the region, there were three large power plant proposals: two nuclear and one coal-fired. These proposed plants received considerable attention in the press because of the perceived benefits and dis-benefits they could bring to the state. Proponents of the coal-fired power plant and one of the nuclear power plants withdrew their proposals. However, the region continues to promote economic development that will require additional power generation capacity. At least two potential employer siting opportunities were lost in the area due to a lack of reserve electricity generation capacity. Using electricity generation options for Idaho as a topic, the research team wanted to learn if different modes of one and two-way communication (information and interactions) would influence or change citizen preference and support for various types of electricity generation options. The population for the study was adult residents in seven counties in southwest Idaho. A subset of participants was recruited for the deliberation event as an 'opt-in' by the survey respondents.

The research team also anticipated that the results might guide future research about citizen participation in the democratic process of policymaking. By investigating the effects of the different components of the Deliberative Poll, the research could provide insights into which aspects of information and/or deliberation have the greatest effect, and these findings could help shape information and dialog processes for other policy issues. The study was designed to use factual information that was as unbiased as possible. In this way, the presentation of the material would not become more important than factual information. The results of the study might benefit scientists, policy makers and citizens by effectively bringing citizens into complex and value-laden policy discussions as they consider future "wicked problems". (Allen & Gould, 1986; and McKinney & Harmon, 2008)

The research questions for this study were designed to measure both formative and reflective preference and level of support for an option before and after deliberation, by different treatment groups (e.g. type of information and discussion). Reflective preference, as used in this study, is simply one's stated preference measured in the pre- and post-surveys. Formative preference is preference that comes from considering different factors that might influence one's preference. Formative preference in this study was measured as a computation of various importance factors. Questions to test general knowledge level before and after were included for comparison with prior deliberative poll work by Fishkin.

This research was broadly conceived as an effort to help scientists (particularly at the INL) understand which modes of information will be most efficient in helping citizens to understand new energy generation types under consideration by policy makers (e.g. Is the model of 'decide', 'announce', and ‘defend’ the ‘best’ way?). In our democracy, it is thought that policy makers should use appropriate levels of citizen engagement and discourse when making important policy choices. Researchers interested in citizen participation in difficult policy choices may be able to use this study to further their knowledge and help shape future research.

The findings from the pre-survey (pre-test) attitudes (preference and support for energy alternatives) are presented in Chapter 2. A discussion of the effects of the different informational treatments is found in Chapter 3. The models for measurement of formative and reflective preferences are found in Chapter 4. The results of the ‘knowledge’ questions are found in Chapter 5. The results of a post-study of event participants are found in Chapter 6.

Scope of research

The research focused on electricity generation options and resources for Idaho, specifically hydropower, fossil fuels, nuclear power, and renewable energy (wind, solar, and geothermal). It also included energy conservation and efficiency because this is a viable option to enhance available supply relative to demand. The materials developed and presented did not advocate any one particular type of energy generation. Communications were designed to be factual and as unbiased as possible, focusing on how the electricity system works, provide an overview of the energy situation in Idaho, and the benefits and problems of each potential energy option. Each option was discussed in terms of safety and security, reliability and predictability, public trust, impact to the environment, cost, responsiveness and adaptiveness, aesthetic considerations, and additional benefits beyond energy supply. The materials discussed ancillary benefits attributed to specific electricity generating options or resources (e.g., process heat for bio-fuel production from thermal power plants, or electricity generation for transportation) only when those benefits were readily recognizable. For example, for hydropower, dams create recreation opportunities that would otherwise not exist. Such issues may have been considerations for participants.

The research did not include any energy options that were not related to electricity generation. For instance, options related to the production and use of transportation fuels, the direct use of fuels for home heating, or the generation of process heat for the primary purpose of providing for a variety of industrial or commercial activities, were beyond the scope of this study.

Participants were recruited from the highest population area of the state (where over 40 percent of the state’s population resides). In addition to the counties recently involved in the application process or hearings proposing citing nuclear facilities, the state’s legislature had also embarked on an effort to re-write the state’s energy plan. Anecdotally, it appeared that citizen interest in energy issues was high, also. During the recruiting process for participants to the deliberation event, many respondents claimed to have been following the news and energy issues more so than in the past.

Background Research

The literature reviewed for this study was far ranging and covered a myriad of topics. For example, a literature review for the technique of deliberative polling examined the publications of Fishkin and others to serve as a basis for that aspect of the mixed-methods research design. However, at the time, the existing literature for deliberative polling studies was not sufficient to fully develop the proposed experimental research.

As a member university of the American Democracy Project, Boise State University was able to use make use of the principals and consulting staff of The Center for Deliberative Polling at Stanford University. Drs. Fishkin and Luskin, and the staff of the Stanford center, were personally available to the team for consultation during the design of this project.

Additionally, literature discussing the merits of neutral vs. 'advocacy-oriented' information was included as the team sought to create a 'briefing document' for a portion of the research endeavor. Then, a literature review across a wide range of sources was necessary as the content for the neutral briefing document was developed. Similarly, literature from a variety of disciplines, including the legal field, was reviewed to develop a method of recruiting subject matter experts for the panel discussion at the deliberative event.

As the research questions were developed, and models for analysis of preference and support constructed, literature relevant to that aspect of the project was reviewed and analyzed for appropriateness. The survey instruments were developed with guidance from diverse sources of literature (e.g. published prior studies, textbooks, journal articles, interviews, etc.)

Because prior research and literature reviewed to develop the study was extensive, the literature review for each element of the research is included as a section for that document or section of this report. A comprehensive review of all relevant literature is not included here.

Methodology

The sample

The sample frame (population studied) consisted of adults in Idaho who resided in the seven county area encompassing Ada, Boise, Canyon, Owyhee, Elmore, Payette, and Gem Counties. Nine counties were included in the initial mailing list. However, two counties, Valley and Washington, had few address records and were ultimately not included. The nine counties were chosen to limit the number of miles a potential subject would need to travel to an event hosted on the Boise State University Campus. A mailing list of 50,001 names in this specified geographical region was purchased from *InfoUSA*, a recognized list vendor.

Random numbers were generated and attached to all 50,001 records along with a unique prefix 'code'. From the initial list, 5,000 records were then chosen using a systematic sample of every 10th name. The pool of 5,000 was then re-randomized and a list of 2,500 records generated through a systematic sample of every other name.

Five hundred records were randomly pulled from the pool of 2,500, and the remaining 2,000 were used to generate a mailing list. (The 500 records pulled from the 2,500 were to be used if the initial mailing did not generate a large enough response. These 500 were not used.) The person residing in the household with the most recent birthday was asked to complete the pre-survey as a means to further randomize the sample.

A minimum of twenty-two participants was desired for each treatment group to obtain a power of 80 percent on both the main and interaction effects and to obtain a "medium effect size", which translates to 0.5 standard deviations on a 7-point question response scale. According to Cohen (1988), this is a norm for social science research. For the six treatment groups (including the pre-survey only control group), this required a total sample size of 132. The goal was to oversample up to 200 complete and usable observations to ensure sufficient completed responses for each treatment group. We anticipated that the sample of 2,000 would generate these numbers. Unfortunately, attendance by participants at the actual event did not meet the sample size goal. Table 1.1 details the step-wise approach to the sample.

Table 1.1. Initial population sample through event treatment group counts

Action	Quantity	Notes
Initial list	50,001	Sample list from vendor for 9 counties in southwest Idaho
Random sample list	5,000	Pulled using a systematic sample of every 10^{th} name, with a random start; 7 counties represented
Pre-survey mailing list	2,500/2,000	2,500 records pulled from random sample pool; 500 of these set aside for potential augmentation of mailing if need based on response rate (not used).
Pre-survey response rate 29% overall; 25% useable	559/504	559 surveys returned in total/504 useable cases; 18 surveys not deliverable; 8 surveys returned unusable, blank or mangled.
Pre-survey respondents opting in to future contact/event	140	'Yes' responses = 78; and 'more information needed' responses = 62.
Phone calls made to recruit participants	350*	Obtained commitment to participate from 'opt in' respondents. Called survey respondents who did not 'opt out' to further contact.
Recruited for a treatment group	95	Includes event participants, those in the study and not attending the event. Does not include control groups.
Attended event/completed surveys	85	Attendance recorded at event.
Total cases post-survey responses in database	504	Includes all responders (and control groups)

*best estimate from call logs

One limitation to randomization resulted from the list acquired for the survey mailing. The list, compiled from a variety of sources over time by the vendor, often contained only the 'head of household' or male residing at the address in the case of a married couple. It is unknown if the addressee actually passed the survey off to the adult with the most recent birthday. No measure was implemented to assess this. Additionally, it is thought that any resident who had lived a short time at the current residence was less likely to be on a compiled commercial list. Thus, these mobile or new residents may have been under-represented in the sample.

Non-deliverable mailed surveys were 0.9% of the 2000 mailed; 18 were returned as undeliverable). No undeliverable surveys were re-sent. All records underwent an update through the NCOA (National Change of Address) database prior to delivery.

The pre-survey was mailed during the first two calendar weeks of January, 2009. Since the returned and complete pre-surveys generated a typical response (25%), no additional follow up pre-survey mailing was done. Eight spoiled (missing pages or mangled in mail delivery) or wholly incomplete surveys were not used.

The study materials and events were in the English language only. Limited resources precluded preparation and dissemination for Spanish-language-only speakers.

Event Recruitment

A postcard (with prepaid postage) was included in the pre-survey mailing. The postcard was designed as an 'opt in' to future contact and an invitation to the deliberation event of April 18, 2009. Respondents were instructed to mail it back separately (from the survey) to assure confidentiality of their survey responses. The treatment groups recruited for the deliberation event answered the post card insert questions, "Yes, I'm interested in participating", or, "Maybe, please give me further information". The post card collected contact information for the potential attendees. Seventy-eight people indicated that they would come to the event and 62 asked for more information.

Those respondents interested in the deliberation event were recruited by student staff to attend via scripted phone call. As many as three contacts by phone were attempted to gain commitment to attend. Since the 'opt in' postcards did not yield sufficient numbers of event participants, over 350 survey respondents were contacted via phone (those who did not 'opt out' via postcard) to increase participation in the event. Once a commitment was made to attend, the individual was logged into an event database. These names were randomized on an nth name basis from the raw list and then randomly assigned to one of five treatment groups. Further contact to confirm attendance or answer questions related to the event was maintained separately from the treatment group database to prevent any staff intervention in assignment to a group. Calls were made in early March through April of 2009, up until the week of the event.

Prior to the event, follow up calls were made to remind attendees of the event and cover logistics of the day. Event attendees were promised a small stipend ($75) to offset the expense of attending the day-long event. Control groups and one treatment group (receiving information only but no deliberation day treatment) were also recruited from the pre-survey respondents who opted in to future contact.

Ultimately, 95 subjects were recruited to the event. Eighty-five subjects actually attended and completed the event. This fell short of the required number of participants in each treatment group 'cell' (22) to meet the statistical power desired.

Recruitment of individuals was challenging. Even though some survey respondents were very interested in energy generation options in the state, and indicated willingness for future contact, actually getting people to commit to a Saturday in spring was difficult. Many of those contacted explained that they had family obligations, had to work, or were unsure if they were free for the entire day. Some survey respondents asked to send their spouse/partner/friend/adult child to the event. These 'stand-ins' were declined. The actual event day also proved a challenge for getting those who had committed to attend to show up for the event. (The day was sunny and unseasonably warm, and too difficult for outdoors-oriented Idahoans to resist.)

Anecdotal evidence suggests that potential respondents who did not have ‘any’ or ‘enough’ prior knowledge about energy generation or energy policy were more likely not to respond or attend the deliberation event.

All materials sent to recruited participants were customized for the particular treatment they were to experience. Participants were not informed of their treatment group placement prior to the event, nor at the event. However, participants who attended the deliberation event were informed that different people had received different information prior to the event and would participate in different activities during the day.

The treatment group receiving only a briefing document received that document and a post-survey approximately the day prior to the April 18 event. Instructions in the cover letter asked them to reply right away and promised a stipend once the survey was returned with appropriate paperwork. Post surveys were sent to the second control group (post-survey only treatment) to arrive on approximately April 17, 2009 with instructions to return the survey right away. Examples of the materials used to communicate with potential participants may be found in Appendix G.

Research Design

This study used a mixed-method research design and incorporated an experimental design with survey research. It leveraged much of Fishkin’s Deliberative Polling methodology (1996 and various). The most important similarity to the Fishkin model was the initial random sample survey so that results may be generalized to a broader population.

However, there were important differences in the design of the experiment between this research and Fishkin’s Deliberative Polling. This design separated the effects of written one-way communication (briefing documents), one-way communication by experts (similar to a conference experience), and the deliberation process used by Fishkin. His model typically uses briefing documents, plenary sessions with experts, and deliberation sessions. Unlike Fishkin’s model, this research measured the effects of each treatment separately and in combination. The research design allowed for the study of each treatment alone, various combinations of treatments, or the cumulative effect of treatments. By isolating the effect of one-way communication, both written and oral, from two-way communication and deliberation, we hoped to better understand the effect of social interaction about an important issue.

Another difference was that, unlike Fishkin’s method, the goal of this citizen deliberation was not to seek consensus in the small group discussions. During deliberation, facilitators encouraged participants to exchange opinions about the various types of electricity generation and come to some broad agreement, if possible, about the best options for future energy development. In the deliberative groups, comparisons of options occurred openly so that reasons for individuals’ positions were discussed.

The study used a quasi-experimental design similar to an equivalent time series design, but with different groups being subjected to different sets of public involvement and discourse methods. Two control groups were included in the design; the first control group to eliminate alternative explanations, and the second to control for external events that could alter perceptions over the event weekend.

Two types of preference were measured pre- and post-event. To determine formative preference for the various types of electricity generation options, eight factors were chosen by the research team as representative of the competing values or criteria a person might use to determine their overall preference for an option. Definitions of those factors were developed by the team and provided to the survey respondents to maintain consistency of the meaning across the survey sample. The factor choices were presented on an 11-point scale of negative (-5) to positive (+5) with neutral (0) as a choice, to allow respondents to rate each factor. Respondents were initially asked which of these factors or criteria were most important when meeting the electricity needs of homes and businesses. This importance rating was designed to develop a weight or index for each factor of formative preference. The definitions of the factors of formative preference may be found in the survey instrument in Appendix A.

The other measure of preference was a reflective preference. For this study, 'reflective' refers to the preference the respondent gave top-of-mind without much thought or input externally. This might be a gut-level reaction, or based on knowledge or beliefs previously determined (i.e. opinion) by the individual. The index for formative preference could then be compared to the reflective preference measure to determine differences pre- and post- study, and between and within subjects.
The attributes, or factors, chosen to build a 'formative' preference were chosen by the research team. All relevant factors to inform a preference could not be included due to the constraints of survey space. However, the team reviewed many information sources to narrow the choices to ones that were relevant to most consumers and could be defined in fairly simple terms. Definitions, or constructs, were devised for each of the factors and printed in the survey instrument.

The types of energy generation types chosen for inclusion in the study were not exhaustive, again for the constraints of a survey instrument. The team chose energy types that were commonly known for electricity generation and/or available locally. These options were also defined in the survey instrument for the respondents.

The unit of analysis for this research was the individual. Opinion about different types of electricity generation options were measured at the individual level and then aggregated for each treatment group population. Demographic variables provide a basis for deeper analysis and are control variables for this research. To a limited extent, the pre-survey demographic questions provided context for the individual's beliefs about the role of the public in policy decision making. To generalize to the population in the region, individual data were aggregated.

Resource constraints and practical considerations narrowed the potential number of participants to the deliberation event. Random probability sampling dictates the need for a sufficient population of adults living in Idaho who are also willing to participate. To meet the population size need and fall within reasonable proximity to the deliberative event, the "Treasure Valley" area of Southwest Idaho was chosen for the study. This area consists of nine counties, seven of which were represented in the pre-survey results. The population and density of the Treasure Valley is the highest in Idaho. This was a consideration in maximizing the response rate – and ultimately, attendance at the deliberation event - by ensuring participants had a relatively short trip to attend the deliberation event. This also minimized reimbursement costs paid by the study's sponsors.

Once at the event, depending upon the treatments pre-assigned for a particular cohort of participants (i.e. a research cell), participants were exposed to basic information, after which some attended a lecture, similar to what one would experience at a 'conference', and some participated in deliberation groups. Table 1.2 shows the treatment groups and interventions that each group experienced.

Table 1.2. Event treatment groups and interventions

		Treatments by Event Group				
				"Conference"	"Deliberation"	
Treatments received	**Treatment Group Label, where n = final number in cell**	**Pre-survey**	**Briefing Docu-ments**	**Presentation & noon plenary**	**Presenta-tion, small group breakout & noon plenary**	Post-survey
Came to 4/18 event, NO briefing document, NO deliberation (conference only)	Treatment Group I	Yes	No	Yes	No	Yes
	n = 15					
Came to 4/18 event, NO briefing document, full deliberation	Treatment Group II	Yes	No	Yes	Yes	Yes
	n = 14					
Came to 4/18 event, GOT briefing document, NO deliberation (conference only)	Treatment Group IV	Yes	Yes	Yes	No	Yes
	n = 14					
Came to 4/18 event, GOT briefing document, full deliberation	Treatment Group V	Yes	Yes	Yes	Yes	Yes
	n = 18					
Did NOT come to event, Briefing Document only	Treatment Group VI	Yes	Yes	No	No	Yes
	n = 20					
Pre and post surveys only, no attendance, no briefing document	Control 1	Yes	No	No	No	Yes
	n = 23					
Post survey only, no attendance, no briefing document	Control 2	No	No	No	No	Yes
	n = 28					

The study used a quasi-experimental design similar to an equivalent time series design, but with different groups being subjected to different sets of public involvement and discourse methods. Two control groups are included in the design; the first control group to eliminate alternative explanations, and the second to control for external events that could alter perceptions over the event weekend. The design is depicted in Table 1.2 above.

Variables

The dependent variables are the preferences and support for five different electricity generation options with regard to the risks and tradeoffs associated with each. Preference and support were measured in both the pre- and post-surveys. The pre-survey established a baseline for measurement of the effect(s) of the treatments.

Three treatments or independent variables are used to understand the main and interaction effects on the dependent variable(s). Two of the treatments are commonly used in public policy discourse: (1) one-way written communication in the form of the briefing document; (2) a conference using a panel of subject matter experts with knowledge in the various alternatives to generate (or conserve) electricity. These two treatments were chosen to measure the effect of traditional forms of communication that are familiar to the public when informing opinions on matters of public policy.

The third treatment is the facilitated citizen deliberation among members of the public with access to subject matter experts who answer questions posed by the deliberators. In the citizen deliberation, the facilitator engages the participants in a dialogue to weigh different alternatives and develop questions for the expert panel. At the end of the deliberation (which consists of two sessions in this study), a final survey questionnaire was completed by the participants to measure attitudes.

The Deliberation Event

Prior to the actual event, the team developed a briefing document to inform participants about electricity generation options in a factual, neutral manner. This document was used in three treatment groups to provide a base of knowledge. This document was available for use by those treatment groups during the event. The briefing document also became the basis of the first informative session at the event. The briefing document is found in Appendix F.

At the deliberation day event, the pre-assigned participants in each treatment group were provided with a customized agenda for the specific treatments they were to participate in. Each treatment group also received a customized post-survey to query only treatments relevant to their participation. They were instructed not to complete the survey until the end of the day.

The deliberation event was hosted on the campus of Boise State University on April 18, 2009. Staff at the event ensured that participants participated in the correct treatments by way of color coded badges. A sample agenda for the deliberative event is included as Appendix F.

The presenters at the event (the initial information presentation and the expert panel) were videotaped for potential content analysis at a later time. Attendees at the event were not videotaped since they were assured confidentiality. The deliberation group proceedings were also videotaped to record the questions that were generated by the group and scribed for group view, and record the audio of the conversations. (No video taping of the participants was attempted.)

The morning plenary session convened with general housekeeping items, and the experimental nature of the study was disclosed (e.g. participants would have different experiences and no change of group assignment was allowed). A presentation based on the briefing document designed for the study was made to everyone. Those treatment groups that were to deliberate were then sent to assigned rooms to deliberate and develop questions for a noon panel discussion by subject matter experts. The number per deliberation group ranged from 7 to 10 people. These groups were moderated by trained facilitators, who strove to keep the discussions on topic, ensure that everyone had an opportunity to speak, and keep the discussion respectful and open. Those participants in treatment groups that were not assigned to deliberate attended a presentation about civic engagement and democratic participation in the policy process (i.e. a non-energy related lecture).

All attendees convened over lunch for the panel discussion. The subject matter experts on the panel addressed questions developed in the deliberative groups. The experts were each limited to a 60-second response to any given question, and all experts who so desired were permitted to respond to each question. No presentation by the subject matter experts was allowed and debate was not permitted. Following the subject matter expert panel, those in treatment groups assigned to deliberate reconvened in assigned rooms to discuss the information they heard at the panel. Those in treatment groups not deliberating were asked to complete the post-survey and were dismissed. After the conclusion of the final deliberation discussion groups, the remaining participants were asked to fill out their post survey and were dismissed.

Facilitators for the deliberation event were trained prior to the event. Materials were developed to guide and direct the facilitators and scribes in the process of deliberation and to develop questions for the expert panelists. These facilitators and scribes were recruited from the university's conflict mediation program and all held current certifications. They participated on a pro-bono basis (although they were paid a small stipend after the event). They attended a debriefing after the final deliberation to share observations about their groups' experience. (Training materials and guidance for facilitators is found in Appendix F.)

The Deliberative Polling literature did not address recruiting of experts to a panel discussion. Therefore, the research team developed a process of recruiting, vetting, and choosing appropriate subject matter experts (see Appendix F). The seven subject matter experts at the noon panel discussion were recruited from Idaho and Utah. To ensure a non-biased approach, a rigorous process of vetting these experts was developed to avoid pure advocacy-oriented information. The subject matter experts also reviewed the briefing documents during development to assist in the factual explanation of energy types and options, as well as the pros and cons of each energy generation type. These panelists met prior to the event to be coached in the deliberation model and appropriate levels of engagement at the event. During this time, the subject matter experts were given an opportunity to 'dry run' questions for unrehearsed brevity when answering deliberation group questions. The expert panelists were provided with a stipend, and travel and accommodation for the weekend, as appropriate. (See Appendix F for expert biographies.)

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More information about the Center for Deliberative Democracy may be found at http://cdd.stanford.edu/polls/

Chapter 2. Pre-survey Results

This section provides an overview of the baseline findings (pre-survey results) for the whole sample (n=504 complete and usable responses). Respondents could choose not to answer any question, and most questions included “Don’t Know/Unsure” as an answer choice for all non-demographic questions. The percentages reported here are based upon all responses (i.e. those who answered ‘don’t know’ or ‘other’ are included in the total responses per question) unless indicated (n = less than 504).

Analysis

Socio-demographic characteristics

Demographic information was asked of survey respondents to determine the representativeness of the population to known population demographics for the state of Idaho. Tables of frequencies and descriptive statistics for the pre-survey are found in Appendix A.

Respondents to the survey were predominantly men (78%); women respondents were quite under-represented (only 20%) in comparison to the population of Idaho (51%). Most of the respondents reported being White/Caucasian (91%) and less than 1% of respondents indicated Hispanic or Latino ethnicity. All non-white ethnic choices were under-represented in the sample relative to the state population.

Survey respondents were older than the general population of Idaho. The youngest respondent was 25 years old and the oldest was 95. Twenty-five percent of the respondents were between 55 and 64 years old, and only fifteen percent were 44 years old or younger. Sixty-seven percent of respondents reported 2 members in their household and 16% reported 1 person.

Many of the respondents had lived in Idaho for many years. Fifty-six percent had lived in Idaho 26 years or more. Only 17 % had lived in Idaho less than 10 years. The pre-survey respondents’ length of residency does not reflect the population influx into Idaho for the past decade. The US Census Bureau (2000) considers the majority of southwest Idaho’s population to reside in urban areas; about 40% of the population resides in the Boise MSA. Only 30% of survey respondents reported living in an urban area. Thirty-eight percent considered their residence to be in a suburban area and 28% reported living in a rural area.

Respondents to the pre-survey were typically better educated than Idaho citizens. Slightly over 50% of respondents reported that they had obtained a 4 year college degree or additional higher education, much higher than the general population. Only 1% of respondents reported less than a high school degree. Sixteen percent of Idaho residents 25-64 years old hold bachelor’s degrees and 7.1% hold graduate or professional degrees. (US Census Bureau, 2000)

Household income is one method of determining if a sample is, generally speaking, like the population from which it is drawn. In 2008, Idaho’s mean household income (based on USDA data) was $47,561. The mean income of the pre-survey respondents is $67,027. In contrast, the *median* household income for the 7 counties in the study was $35,313. Twenty-two percent of pre-survey respondents reported annual household income in excess of $100,000. Most of the respondents reported home ownership (90%) and very few (5%) indicated that they rent.

To gauge prior civic engagement, respondents were asked about their voting history. Ninety-six percent of respondents claimed to have voted in an election within the past two years. This self-reported participation is much higher than the actual number of eligible voters for any election. Survey respondents in Idaho typically report around an 80% voting rate (Boise State University, 2007) although actual voting rates are usually around 50% for general elections in Idaho. In the 2008 Idaho general election, 61% of the voting age population voted. (Idaho Secretary of State, 2010).

To benchmark the pre-survey sample against other general polling data in Idaho, respondents were asked to identify which political party best represents them and which ideology was the best fit for them. Republicans typically comprise 35-40% of residents in these counties. Forty percent of the pre-survey sample self-reported the Republican Party and 22% reported the Democratic Party. Typically, 33% of Idahoans indicate that they are 'independents' as to party identification; 24% of the pre-survey sample reported this affiliation. Forty-five percent reported themselves to be somewhat or very conservative. Twenty-seven percent said they were 'middle of the road' and 20% somewhat or very 'liberal'.

The estimate of respondents' average electricity bill ranged from $12 to $400 per month. Sixty-five percent reported an average electricity bill of under $100 per month. Only 5 percent reported monthly electricity bills in excess of $200 per month.

Over one-third of respondents reported working for private, for-profit employers. Eighteen percent reported self-employment, 15% work for a unit of government, 6% for non-for-profit employers, and 6% 'other'.

Table 2.1. Selected Summary Descriptive Statistics for Pre-survey Respondents

	Mean	**SD**	**Minimum**	**Maximum**	**N**
Income	$67,027	$30,264	$4,500	$104,500	467
Years in Idaho	32.03	20.76	0	93	530
Education (years)	15.29	2.34	8	20	530
Age	59.14	13.81	25	95	493

Involvement in the policy process

The policy process for energy decision making is not always straightforward, and is often clouded by competing values that may overlap other issues. Several rancorous debates about siting of generation facilities had been in the news in southern Idaho in the year prior to the study. Idaho does not have a central siting authority (county commissioners currently make that decision), nor does it have a body that adjudicates competing land or resource uses (e.g. energy production vs. competing water uses).

Respondents were asked to provide an opinion about which person or entity should make energy generation and siting decisions for the state. While citizens' preferences are divided, 38% of respondents prefer citizens to drive the decision making (Figure 2.1). This conforms to the state's conservative political culture, where local control is viewed by many to be the best level for governance. Government agencies and businesses and industries involved in generation of electricity each garnered 22% of responses. Elected officials were chosen 16% of the time.

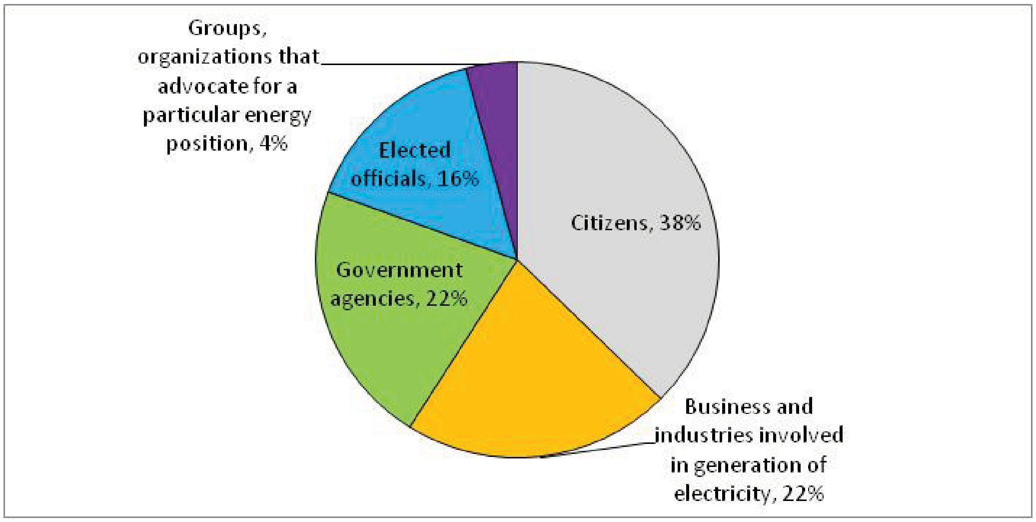

Figure 2.1. Energy policy decision should primarily be made by …

Descriptive statistics for all questions are found in Appendix A.

Formative and reflective preference measures

To determine formative preference for the various types of electricity generation options, eight factors were chosen as representative of the competing values or criteria a person might use to determine their overall preference for an option. The choices were presented on an 11-point scale of negative (-5) to positive (+5) with neutral (0) as a choice, to allow respondents to rate each factor.

Respondents were initially asked which of these factors or criteria were ***most important*** when meeting the electricity needs of homes and businesses. A scale from -5 (least important) to +5 (most important) allowed respondents to plot each factor and see the relative position with all other factors. Of the eight factors given, 'reliability and predictability' garnered the highest mean score and 'aesthetics' had the lowest mean score (Table 2.2). Only 'reliability and predictability' scored neutral to positive for every respondent. (See Appendix A for descriptive statistics for importance factors).

Table 2.2. Summary of Mean Responses to Energy Option and Attributes (scale +5 to -5)

	Attribute importance, independent of energy option	Renewable energy	Energy conservation and efficiency	Hydro power	Nuclear energy	Fossil fuels
Energy option importance, independent of issue		3.87	3.64	3.24	1.81	0.06
Reliable and predictable	4.36	2.08	2.49	3.10	2.44	2.03
Safety and security	3.98	3.71	3.67	3.21	1.24	1.06
Trustworthy	3.90	2.08	2.07	2.37	1.12	0.74
Cost	3.66	0.06	1.22	1.18	-0.67	-0.72
Impact to environment	3.53	2.81	3.45	1.49	0.39	-1.33
Responsiveness and adaptability	3.41	1.03	1.74	0.41	-0.26	0.39
Other Benefits	1.93	2.69	3.29	2.51	0.67	-0.36
Aesthetics	1.52	0.85	3.23	1.01	0.01	-1.15

A reflective preference for the five types of electricity generation was measured. For this study, this measure 'reflects' what a person would choose without qualification, as a top-of-mind choice, or a reaction without external input. Respondents were asked to report preference along a scale of -5 (least preferred) to +5 (most preferred). 'Renewable' electricity generation was the top choice, (mean of 3.87), followed by energy conservation and efficiency measures (mean of 3.64, Table 2.2). Fossil fuels were the least preferred alternative (mean of .06). The large standard deviations for nuclear and fossil fuels indicate division among the participants regarding the preference for these options. Each generation type had ratings from -5 to +5, indicating positive and negative preferences for each energy type (and no general consensus on preference.) Table 2.3 summarizes the high and low mean scores by attribute.

Table 2.3. Summary of mean scores for reflective preference factors

Factor (for reflective preference)	Electricity generation option and high mean score	Electricity generation option and low mean score
Safety and security	Renewable 3.71	Fossil fuels 1.06
Reliable and predictable	Hydropower 3.10	Fossil fuels 2.03
Trustworthy	Hydropower 2.37	Fossil fuels 0.74
Harm to the environment	Energy conservation and efficiency 3.45	Fossil fuels -1.33
Cost	Energy conservation and efficiency 1.22	Fossil fuels -0.72
Responsiveness and adaptability	Energy conservation and efficiency 1.74	Nuclear -0.26
Harm to aesthetics	Energy conservation and efficiency 3.23	Fossil fuels -1.15
Extra benefits	Energy conservation and efficiency 3.29	Fossil fuels -0.36

Once the importance of each factor was measured, and a baseline preference for electricity generation options was established, respondents were asked to rate each generation option on each of the factors, using a scale of -5 to +5 scale -5 (least preferred) to +5 (most preferred). The following table shows the option with the highest and lowest mean score for each of the factors. Energy conservation and efficiency received the most positive scores, while fossil fuels scored uniformly low. The mean ratings for reliability/predictability, trustworthiness, and cost did not differ substantially (less than 2 points) among the energy options. However, there were large differences (more than 4 points) for harm to aesthetics and harm to the environment. See Appendix A. for detailed descriptive statistics.

Formative preference was measured for each energy generation option. The eight factors of preference were measured separately and then combined into a single new variable. This new variable takes all the factors that 'form' this measure (safety, cost, harm to environment, etc.) and combines them.

Table 2.4. Summary Table of Descriptive Statistics for Formative Preference by Energy Type

Formative Preference					
Descriptive Statistics	N*	Mean	Std. Deviation	Minimum	Maximum
Formative Pref for Energy Con & Efficiency	269	2.46	2.03	-5	5
Formative Pref for Fossil Fuel	279	0.22	2.29	-5	5
Formative Pref for Hydropower	287	2.00	2.04	-4	5
Formative Pref for Nuclear power	274	0.79	2.65	-5	5
Formative Pref for Renewables	272	1.94	2.00	-5	5
***Valid N reflects cases eliminated for any missing data**	244*				

See Appendices B and C for additional details.

Table 2.4 is a comparison of the mean values by preference type and energy generation type. Variation between the two measures of the means indicates that respondent preferences were subject to differences when the eight factors were considered for formative preference.

Table 2.5. Summary of Mean Responses for Reflective and Formative Preferences by Energy Generation Option (scale +5 to -5)

	Renewable energy	**Energy conservation and efficiency**	**Hydro power**	**Nuclear energy**	**Fossil fuels**
Reflective preference	3.87	3.64	3.24	1.81	0.06
Formative preference	1.94	2.46	2.00	0.79	0.22

Measures of support

Once reflective and formative preferences were measured, survey respondents were asked to indicate their level of support for the five electricity generation options by allocating a hypothetical $100 among them. Any amount could be allocated for each type, in any combination, yielding a potential minimum and maximum value of $0 and $100 respectively (Table x). The 'renewable' option received the most support at a mean allocation of $28.35. Hydropower was second at $23.13, followed by nuclear at $20.14 and energy conservation and efficiency at $20.09. Fossil fuels garnered the least support, with a mean allocation of $7.22. The maximum allocation for fossil fuels was $60. All other options had a range of allocation from $0 to $100. The data indicate that most participants supported a combination of options. The large standard deviations for each option indicate a lack of consensus among participants at the time of the pre-survey.

Following the base measure of support (the allocation of $100 by generation type), subjects were presented hypothetical solutions to the potential problems associated with each of the five types of electricity generation. (For example, hydroelectric generation creates difficulties for salmon returning to spawn, and ultimately restoring native salmon stocks. The hypothetical solution asked respondents to allocate the $100 once that problem is solved.) This exercise followed the method of the prior question, asking the subject to allocate up to $100 to any one or combination of types to gauge support.

Once the problems associated with an option were mitigated, the $100 allocation changed. The renewable option retained the highest level of support, with a new mean value of $25.92, which is a decline of $2.43 from the unmitigated mean value. Nuclear gained support (new mean value of $25.08) an increase of $4.94. Hydropower lost support (new mean value $13.36), a decline of $9.77, and energy conservation and efficiency lost support as well (new mean value $17.09), a decline of $3.00. Support for fossil fuels gained support (new mean value $ 13.27), an increase of $6.05 A summary of the mean values for formative and reflective preference, and the levels of support (by allocation of $100) in the three scenarios, is found in Table 2.6.

Table 2.6. Summary of Mean Responses for Reflective and Formative Preferences and Support by Energy Generation Option (scale +5 to -5)

	Renewable energy	**Energy conservation and efficiency**	**Hydro power**	**Nuclear energy**	**Fossil fuels**
Reflective preference	3.87	3.64	3.24	1.81	0.06
Formative preference	1.94	2.46	2.00	0.79	0.22
Level of support	**$28.35**	**$20.09**	**$23.13**	**$20.14**	**$ 7.22**
Level of support for solutions	**$25.92**	**$17.09**	**$13.36**	**$25.08**	**$13.27**
Likelihood of successful solution	**1.25**	**0.96**	**-0.60**	**-0.55**	**-0.38**

Changes in the level of support were likely to occur between the pre- and post-tests (due to treatments). Table 2.7 shows that support rose for some options and declined for others.

Table 2.7. Change in mean values of support & likelihood of solution

Energy option	**Mean value allocation of $100 (level of support) $**	**New mean value allocation of $100 with solution (new level of support) $**	**Change in mean value $**	**Likelihood of finding a solution to overcome problem (mean value measure)**
Renewable	$28.35	$25.92	-$2,43	Somewhat likely (+1.25*)
Hydropower	$23.13	$13.36	-$9.77	Slightly unlikely (-.60)
Nuclear	$20.14	$25.08	+$4.94	Slightly unlikely (-.55)
Energy conservation & efficiency	$20.09	$17.09	-$3.00	Slightly likely (+.96)
Fossil fuels	$7.22	$13.27	+$6.05	Slightly unlikely (-.38)

*Where -5 is very unlikely, 0 is neither likely nor unlikely, and +5 is very likely

Following the reallocation of support dollars, which assumed a solution to the problems of each generation type, subjects were asked to rate the likelihood that such solutions would be found on a scale of -5 (no solution is likely) to +5 scale (a solution is very likely). Respondents were most optimistic about renewable electricity generation (mean of 1.25) and energy conservation and efficiency (mean of .96) as shown in Table 2.7. Respondents were least optimistic about nuclear (mean of -.55) and hydropower (mean of -.60). However, the fact that the mean values were close to the neutral point and the standard deviations were large relative to the means suggests that participants had quite different views and there was little consensus.

Analysis of the changes in formative and reflective preferences for the event treatment groups are found in Chapter 4.

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Chapter 3. Discussion of Non-representative Sample, Descriptive Statistics of Event Treatment Groups, and Comparison of Pre-survey and Event Treatment Groups

A Non-representative Sample

The Problem of Non-response Bias

The pre-survey respondent group did not mirror the population characteristics of the seven counties from which the sample was drawn, as expected in a random sample. Differences in the pre-survey respondents were further exacerbated in the self-selected group that agreed to participate in the deliberation event. Non-response bias may be a serious issue when attempting to project results to the general population.

A comparison of the demographic characteristics of pre-survey respondents and event group participants reveals many differences between the overall population of the geographic region under study, and the responding population. Table 3.1 shows the differences in demographics between the general population and the study participants.

Table 3.1. Demographic characteristics of population, sample, and treatment groups

Demographic variable	Idaho statewide	4 county population**	Pre-survey respondents	Treatment groups*
Age **18-64** **65 and older**	 53% 12%	 62% 10%	 64% 36%	 61% 39%
Male - % of adult population	50.2%	50.5%	79.4%	82.5%
Educational attainment of bachelor's, or higher	24%	28%	51%	55.7%
Median Household income	$47,331	$52,672 (wt av)	$67,000 (Note: The mode of the distribution was +$100,000)	$60,000 (Note: The mode of the distribution was +$100,000)
Average household size	2.62	2.64	2.51	2.45
White race	92.4%	91.4%	97.1%	96.1%

* No control groups included. (Sources: US Census Bureau, American Community Survey, 3 – year estimates 2006-2008). **Ada, Canyon, Elmore and Payette Counties have US Census Bureau data available. (These four counties represent 95% of the population sample.)

A non-responder study for the pre-survey sample was not implemented at the conclusion of this research. A review of the demographics of the general population and the pre-survey responders shows a predominance of older, Caucasian males who have above average education attainment and household income.

Characteristics of the Event Treatment Groups

The event treatment groups were composed of pre-survey respondents who 'opted in' to event participation; they were randomly assigned to treatment groups. Although a minimum 22 subjects was the target for treatment group size, the actual numbers ranged from 14 to 20 per group, not a sufficient sample size to statistically analyze the findings by individual treatment group. See Table 3.2 for a description of the treatment groups.

The research questions in this study focused on the changes (pre- and post-test) by event group based on the treatments given to each group. To establish baseline measures, the characteristics of each treatment group are described and compared to the total pre-survey group. Tables of the descriptive statistics for each treatment group are found in Appendix B.

The demographics of each treatment group display similar patterns of non-representation of gender, age, race/ethnicity, income level, and educational attainment.

Table 3.2. Selected Descriptive Statistics for Event Groups Participants

Variable	N	%	Mean	Standrd Dev.
Gender (males)	81	79.4		
Age	98		58.72	13.45
Years Living in Idaho	101		32.56	20.36
Political Affiliation				
Democrat	27	26.0		
Republican	32	30.8		
Other	45	43.3		
Professions				
Manager/Professional/Related	41	39.4		
Service	14	13.5		
Sales/Office	8	7.7		
Farming/Fishing/Forestry/Mining	10	9.6		
Construction/Extrac/Mainenance	7	6.7		
Production/Transportation	6	5.8		
Government	9	8.7		
Other	9	9.6		
Marital Status				
Married	79	78.2		
Divorced	10	9.9		
Widowed	3	3.0		
Single, never married	9	8.9		
Income	90		$63,277.7	$28,711.18

1 Index (Cronbach's alpha=.748) of Questionnaire items 40 (A-D), 41 (A-d) and 42 (A-D).

Comparison of Pre-survey Respondents and Event Treatment Groups

A comparison of the pre-survey responses of the general sample and the pre-survey responses of the treatment groups reveals little difference. Table 2.3 - 7 compares selected survey questions where some differences occurred. Little difference between the groups is expected in a random population sample. However, because respondents self-selected to participate, some differences could exist. The comparison of responses is only for the pre-survey. Change that occurred from pre-to post-event is addressed in Chapter 3.

A first step to understanding the effects of the interventions is an analysis of the general differences between the pre-survey (baseline) measures (for the sample that was not included as a treatment group subject), and the treatment group subjects (the sub-population who were treated to the various interventions).

Generally speaking, both groups' response frequency distributions were similar (e.g. no difference larger than +/- 5 percentage points for positive, neutral or negative answers.) However, as seen in Table 2.3 through 6, participants at the event were more likely to rate environmental issues as more important than the general sample. For example, the treatment groups said 'impact to the environment' was important 96.3% of the time (vs. 88.2% of the general group). Participants were likely to rate energy conservation and efficiency as less harmful to the environment (96.5%) than the general population (82.5%), and fossil fuels as more harmful to the environment (75.9% v. 62.5%).

Table 3.3. Pre-survey & Treatment Group Comparison of Responses –Environmental

Survey question	Scale rating	Pre-survey group only % of responses	Treatment groups only % of responses
How important is impact to the environment…?	-5 through -1 Neutral (0) +1 through +5	4.7% 3.6% 88.2%	0% 2.5% 96.3%
How would you rate your preference of energy conservation and efficiency?	-5 through -1 Neutral (0) +1 through +5	3.6% 5.7% 90.6%	0% 2.5% 97.6%
How would you rate your preference of fossil fuel electricity generation?	-5 through -1 Neutral (0) +1 through +5	38.9% 14.1% 47.1%	45.6% 7.6% 46.9%
How much harm to the environment do you think energy conservation & efficiency has? (Where much harm = -5, no harm = +5)	-5 through -1 Neutral (0) +1 through +5	4.2% 13.4% 82.5%	2.6% 3.9% 93.5%
How much harm to the environment do you think fossil fuel electricity generation has? (Where much harm = -5, no harm = +5)	-5 through -1 Neutral (0) +1 through +5	62.5% 6.6% 30.9%	75.9% 1.3% 22.1%
How much harm to the environment do you think hydroelectricity generation has? (Where much harm = -5, no harm = +5)	-5 through -1 Neutral (0) +1 through +5	26.0% 7.3% 66.7%	32.5% 5.0% 62.6%

Aesthetics generated more consistent differences in responses than other factors. As Table 2.4 shows, 74.3% of the treatment group participants said that aesthetics was important, while the general sample rated aesthetics important 63.4% of the time. Fossil fuel electricity generation was deemed harmful to aesthetics by 61.1% of the general survey respondents compared to 72.5% for the treatment groups. Hydropower (dams) were said to be harmful to aesthetics 56.0% of the general sample but only 46.1 % of the treatment groups. Participants were more likely to say nuclear electricity generation was less harmful to aesthetics (34.2%) than the general sample (43.0%).

Table 3.4. Pre-survey & Treatment Group Comparison of Responses – Aesthetics

Survey question	Scale rating	Pre-survey group only % of responses	Treatment groups only % of responses
How important is aesthetics…..?	-5 through -1 Neutral (0) +1 through +5	15.4% 21.2% 63.4%	14.1% 11.5% 74.3%
How harmful to aesthetics is fossil fuel electricity generation? (Where -5 = much harm, +5 = no harm)	-5 through -1 Neutral (0) +1 through +5	61.1% 10.9% 28.0%	72.5% 5.0% 22.6%
How harmful to aesthetics is hydropower electricity generation? (Where -5 = much harm, +5 = no harm)	-5 through -1 Neutral (0) +1 through +5	30.7% 13.4% 56.0%	38.5% 15.4% 46.1%
How harmful to aesthetics is nuclear electricity generation? (Where -5 = much harm, +5 = no harm)	-5 through -1 Neutral (0) +1 through +5	42.1% 14.9% 43.0%	54.4% 11.4% 34.2%

Treatment group responders typically said that fossil fuel, nuclear and renewable electricity generation were more costly (as a preference factor) than the general pre-survey group.

Table 3.5. Pre-survey & Treatment Group Comparison of Responses – Cost

Survey question	Scale rating	Pre-survey group only % of responses	Treatment groups only % of responses
How costly is fossil fuel electricity generation? (Where -5 = very costly, +5 = least costly)	-5 through -1 Neutral (0) +1 through +5	51,5% 13.5% 35.0%	60.0% 12.0% 27.9%
How costly is nuclear electricity generation? (Where -5 = very costly, +5 = least costly.)	-5 through -1 Neutral (0) +1 through +5	52.7% 8.7% 38.6%	57.5% 12.3% 30.0%
How costly is renewable electricity generation? (Where -5 = very costly, +5 = least costly.)	-5 through -1 Neutral (0) +1 through +5	40.3% 14.4% 45.3%	46.7% 10.7% 42.7%

When asked about the benefits of fossil fuels, participants were less likely to find positive benefits (29.0%) than the general sample (40.3%). Energy conservation and efficiency also had more benefits for participants (92.2% positive benefits) than the general sample (83.3%). The benefits of nuclear electricity and hydropower generation both garnered support at consistent levels between the general sample and the participants.

Table 3.6. Pre-survey & Treatment Group Comparison of Responses – Value of benefits

Survey question	Scale rating	Pre-survey group only % of responses	Treatment groups only % of responses
How valuable are the benefits of energy conservation and efficiency? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	6.6% 10.2% 83.3%	2.6% 5.2% 92.2%
How valuable are the benefits of fossil fuel electricity generation? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	42.6% 17.0% 40.3%	52.6% 18.4% 29.0%
How valuable are the benefits of hydroelectric generation? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	42.6% 17.0% 78.9%	9.2% 17.1% 73.8%
How valuable are the benefits of nuclear electricity generation? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	31.9% 14.1% 53.9%	31.6% 13.2% 55.2%

Treatment group respondents' optimism for solutions to the problems associated with the various energy options was slightly higher than that of the general survey sample. Solutions to minimize or eliminate greenhouse gas emissions, nuclear waste material, and the variability of electricity generation from renewable sources, were all slightly more positive for the treatment groups than for the general survey responses. While nuclear waste and salmon mitigation were both more negative than positive, only in the case of mitigating salmon migration issues did the treatment groups feel less positive than the general case.

Table 3.7. Pre-survey & Treatment Group Comparison of Responses – Likelihood of solution

Survey question	Scale rating	Pre-survey group only % of responses	Treatment groups only % of responses
What is the likelihood of a solution to minimize greenhouse gas emissions from fossil fuel electricity plants? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	43.9% 16.0% 40.1%	38.0% 15.2% 46.8%
What is the likelihood of a solution to minimize roadblocks to salmon migration? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	47.1% 18.8% 34.1%	45.5% 23.4% 31.2%
What is the likelihood of a solution to minimize nuclear waste…? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	48.1% 11.3% 34.1%	47.5% 13.8% 38.9%
What is the likelihood of a solution to minimize intermittency, etc. of transmission of renewable electricity…? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	21.1% 16.7% 62.3%	16.7% 11.5% 71.8%

Analysis of differences within and between treatment groups

Attendees at the deliberative event were randomly assigned to event groups. An analysis by selected demographics revealed that groups did not differ significantly in demographic composition. Event groups did not differ by gender (x^2=6.688; df=6;n.s.). Event groups were almost exclusively white (97 percent). There were two Latinos, two African Americans, four Asian Americans, four American Indian, one "other" and two "multiple" ethnicities. Event groups did not differ by marital status (versus "other" x^2=8.789; df=6; n.s.); married people comprised 77 percent of the sample. Event groups did not differ by age categories (x^2=30.171; df=30; n.s.), nor did they differ by the number of years they lived in Idaho.

The treatment groups were provided information or communications (one-way or two-way), before or at the event. Some treatment groups also had the opportunity to discuss energy options in the deliberation groups. The researchers hypothesized that some change would occur to preference and support for the various electricity generation options between the pre-survey and the post-survey due to these interventions.

All event participants took a pre- and post-test to measure for change in reflective preference, formative preference, or support for a particular electricity generating option. Differences between and within event groups' pre- and post-test analyses of their *reflective preferences* for energy conservation, fossil fuel, hydroelectric, nuclear, or renewable were not statistically significant.

Differences between and within event groups' pre- and post-test analyses of their perceptions about the factors building *formative preference* for the safety and security, reliability and predictability, trust, harm to the environment, cost, responsiveness and adaptability, harm to aesthetics, or any other benefits_ of/for energy conservation, fossil fuel, hydropower, nuclear energy, or renewable energy were not statistically significant.

However, one statistically significant difference was found between groups' in their perceptions of the *aesthetics* of fossil fuels (*p=.025*). Specifically, two groups' for which the difference in mean scores changed significantly between pre and post test are (1) *pre and post surveys with briefing documents* and (2) *a control group (pre and post surveys*).

With regard to how participants would allocate $100 if they could direct their power company to do so, a statistical analyses of differences in mean scores within and between event groups, indicate no significance except for fossil fuels (*p=.045*). That is, when participants were asked to allocate their $100 to buy different energy options, the only changes from pre to post surveys was for the fossil fuel generation option.

Citizens have a variety of ways to influence policy decisions, thus event participants were asked to choose their *preferred* approach to changing policy. Of the 103 responses to this question, most said they communicated with decision makers (52%), followed by signing a petition (28%), and joining or starting a grassroots organization (10%). Approximately 3% said they wrote a letter to the newspaper.

Relatively few survey respondents (n=56) specifically indicated ever engaging in an action to change energy policy specifically. Communication with a decision maker and signing a petition were the most frequently reported activities, at 17 respondents each. Nine respondents reported writing a letter to the editor, and only 4 respondents joined or started a group to advocate for change. The treatment group post-event treatment group study results (which address civic engagement since the event) are found in Chapter 6.

See Appendix B for descriptive statistics for the event treatment groups.

Chapter 4. Analysis of the Research Questions

The following four sub-sections cover the hypotheses proposed for this study. Each of the four primary research questions is followed by the relevant analysis of the data and conclusions.

Overview of Analysis

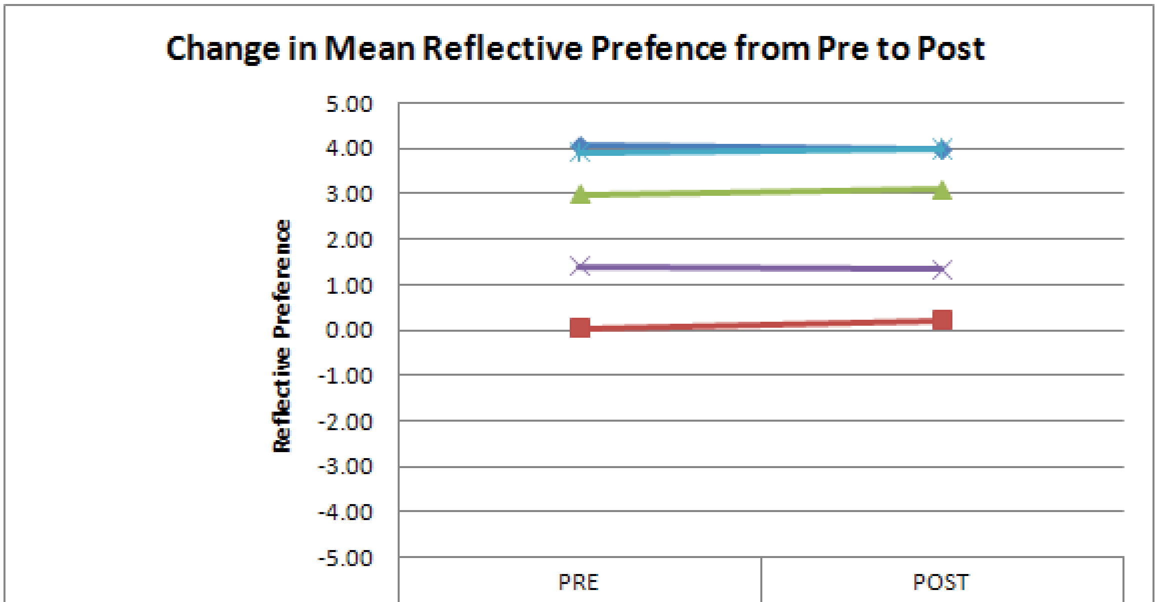
Research Question 1 examines the effects of the independent variable, **public discourse treatments**, on **reflective preference, formative preference,** and **support**, as measured by the pre to post test change of those dependent variables.

We used a within subjects design ANOVA, with 2 within subjects factors (*pre to post* with 2 levels, and *energy* type with 5 levels) and 1 between subjects factor (*public discourse treatment type* with 6 levels) to look at the effect of public discourse treatment type on **reflective preference** and on **formative preference**.

Details of the analysis are found in Appendix C, and the code book for the survey and the created variables used are in Appendix E.

For **support**, the sum of each respondent's allocations was intended to total $100. Therefore, there was a lack of independence in the responses for each energy type – if one knows four responses, one would know the fifth, if people correctly added their amounts to $100. Consequently, 5 separate ANOVAs were run, one for each energy type. Each ANOVA had one within subjects factor (*pre-post* with 2 levels) and one between subjects factor (*event group* with 6 levels).

The results for **reflective** preference were that the public discourse treatment type had no effect on reflective preference ($F = .74$, $p = .60$, ns). It was not significant as a main effect, nor was it present in any significant interactions. In addition, for the within subjects factors, there was a main effect of energy type ($F = 49.71$, $p = .000$). Again, there were no significant interactions.



	PRE	POST
Conservation & Efficiency	4.06	3.98
Fossil Fuels	0.04	0.21
Hydropower	3.00	3.09
Nuclear power	1.40	1.33
Renewables	3.91	3.99

Figure 4.1. Change in mean reflective preference pre- to post-measure.

When looking at post hoc comparisons among the energy types, the energy types with the highest reflective preferences were conservation and renewable energy. Hydropower and nuclear energy had intermediate levels of reflective preference, and fossil had the lowest level of reflective preference.

These results indicate that our main independent variable, public discourse treatment, had no statistically meaningful effect. Participants' reflective preferences changed very little, or not at all, from pre to post test. Moreover, our sample of participants showed clear reflective preference for some ways to meet electricity demand (aka energy types) over others, as seen in the 'spread' between the 5 different energy types. That is, conservation and renewable energy were reflectively preferred the most, with a mean of approximately +4 on a +5 to -5 scale, and fossil had a mean near zero. The lack of change from pre test to post test and the spread between the 5 different energy types indicate that the participants had strong prior attitudes, or preferences for ways to meet electricity demand, and that our public discourse treatment did not affect those strong prior attitudes.

The results for **formative** preference were very similar. There was no effect of public discourse treatment ($F = 1.605$, $p = .19$, ns), and there was a significant main effect of energy type ($F = 13.93$, $p = .0005$). Conservation and renewable energy were preferred the most, hydropower preferred next, then nuclear energy; fossil fuel was preferred the least. There were no significant interactions. That is, preference did not change differently from pre to post across the different treatment groups (as seen by the horizontal lines).

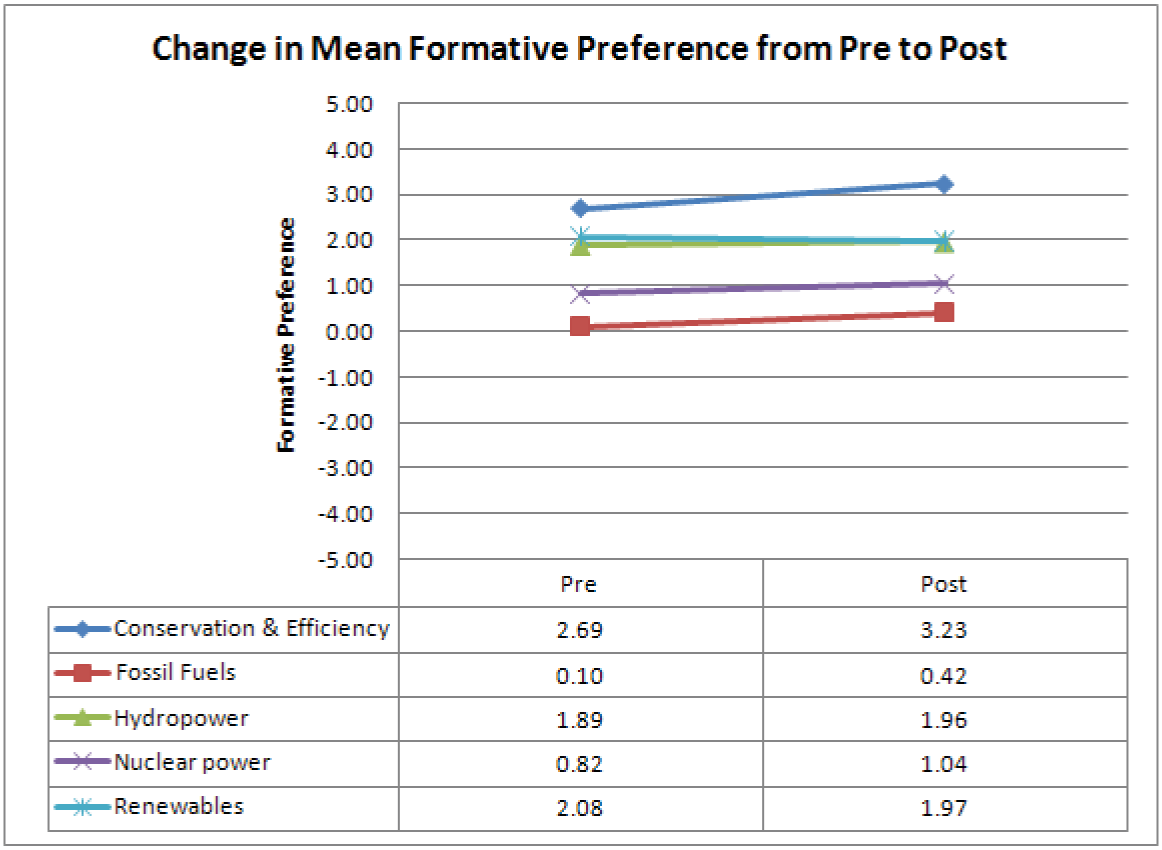


Figure 4.2. Change in mean formative preference, pre- to post-measure.

For **support**, when looking at the results of all 5 ANOVAs together, the results indicate that there were three significant main effects from pre to post. Support for fossil fuels and hydropower went up, and support for renewable energy went down, but there were no significant changes in support for the other two ways to meet electricity demand (i.e., nuclear energy and conservation/efficiency).

Table 4.1. Pre- to post-measures of support by selected energy option

	Pre	**Post**
Support for Fossil Fuel	$7.95	$10.22
Support for Hydropower	$22.17	$25.95
Support for Renewable	$30.43	$26.83

While these changes in support from pre to post are significant, they are main effects (i.e., support did not interact with public discourse treatments). A priori, we did not expect that every treatment group would change in a similar direction, because the different treatments (e.g., small group discussions for some, but not others) might lead to different types of information being shared and affecting support. However, the finding of a common main effect may suggest that some shared experience, such as the hour-long overview presentation in the morning session, influenced people in a consistent direction.

Unfortunately, the results for this research question are not supportive of our hypotheses.   The finding of no main effect or interactions between public discourse treatment and reflective preference, formative preference, or support, but a clear differences in preference for ways to meet electricity demand, indicates that our participants had strong prior attitudes (about what ways they preferred to meet electricity demand) and that the intervention of public discourse, at any level of civic engagement, did not change their attitudes.

Research Question 2 examines the effects of the independent variable, **public discourse treatments**, on participants' support for technical research or policy alternatives that would improve each way to meet electricity demand. The statistical approach used to test this question is similar to the one used to test the effect of the independent variable on support. That is, 5 separate ANOVAs were run, one for each energy type, because of the dependency that exists within the responses of a participant.

Unfortunately, the results were disappointingly consistent with prior results. There was no effect of public discourse treatment on support for any of the ways to solve problems associated with electricity demand. There were two marginally significant main effects from pre to post. Support for nuclear went up, and support for renewable energy went down. These marginally significant main effects did not interact with public discourse treatments. As such, there is no indication that changing the level or amount of public discourse participants were encouraged to engage in had any effect on their willingness to support technical research or policy alternatives that would improve any of the ways to meet electricity demand.

Research Question 3 examines the effects of public discourse treatments on pre to post test change in the dependent variables when controlling for the impact of socio-demographic factors. That is, the data analyses performed to answer this research question examined the impacts of each event group on changes in attitudes while controlling for respondents' characteristics, e.g., gender, age, marital status, education, income, household size, occupation, political affiliation, political activities, and years living in Idaho. The dependent variable is the absolute value of change in attitudes between pre and post tests.

The absolute value is used because, while we might expect that information and deliberation could cause individuals to readjust their views, there was no expectation that such changes would be in a consistent direction. (See Appendix C for the approach to the analysis.)

Public discourse treatment groups failed to display a clear statistical *pattern of effects* on the reflective and formative preferences, the intensity of support, on beliefs that negative outcomes can be resolved, and on support for producing solutions to problems associated with each option when controlling for socio-demographic characteristics.

Idiosyncratic effects did emerge, and researchers carefully considered whether findings yield firm information leading to recommendations for *actions*. However, after considering the noticeable absence of a clear pattern as well as the small size of individual treatment groups and the ensuing lack of statistical power, we decided to allow readers to come to their own conclusions. Persons interested in the findings of elaborated analyses may refer to the full report displayed in the Appendix D of this report. (Readers may also contact any of the Principal Investigators for further discussion.)

Research Question 4 tests the plausible alternative hypothesis that event participants' post-event preference and/or support for a given way to meet electricity demand may have been affected by how they evaluated and regarded the speakers and expert panelists. This cause and effect relationship differs from the one we hypothesized in previously in Research Question 1. However, prior research has shown that under certain circumstances, the characteristics of the speaker (especially credibility and trustworthiness) can cause attitudes to change more than the specific content of the message the speaker is communicating (e.g., Petty and Cacioppo, 1996, citation in executive summary). The event group participants spent an hour questioning the expert panel, and hence it is possible that this was a significant influence on their views.

All participants were asked to evaluate the expert panelists: Ralph Bennett, Pat Ford, Arjun Makhijani, Bob Neilson, Marsha Smith, David Solan, and Mark Stokes on their Credibility, Trustworthiness, Knowledge, and Likability. Mike Louis and John Freemuth were also speakers at the conference, so participants evaluated these two individuals on the same criteria, if in fact they assigned to a treatment condition where they had the opportunity to hear the speaker. Participants were also supposed to evaluate the facilitators, but many did not fill out that part of the survey, so no analysis was performed on this potential effect.

The first step in the analysis was to determine how strongly correlated the four measures of the speakers were. To perform this analysis, we simply calculated a Cronbach's alpha. The alpha values were all good to excellent, ranging from .80 to .93, indicating that it would be appropriate to combine all 4 measures into a single index measure for each of the seven panelists and for the two conference speakers. Then, we used a series of Pearson's correlations to examine the relationship between the index measure of each speaker and our main dependent variables of interest – namely post-test **reflective preference**, **formative preference**, **support**, and **support for improvements** (as measured by what portion of one's income tax a participant was willing to allocate to a way to meet electricity demands). A summary of the results is provided here. See Appendix C for the detailed analysis.

Mike Louis

The lack of any significant correlations between the MLIndex measure and any of the Main DVs showed that ML did not introduce any confound to the experimental design.

John Freemuth

There were 4 significant positive correlations out of a total 25 possible correlations between the JFIndex measure and some of the Main DVs. This indicated that JF's exposure to the participants is a potential confound to the experimental design, but his confounding effect is minimized somewhat by the fact that only a subset of the participants heard John speak (n = 29). Moreover, there is no consistent pattern to the correlations, so the correlations may be spurious.

Ralph Bennett

In general, how people regarded Ralph was not systematically related to what energy types participants preferred and/or supported. However, there were two statistically significant correlations: regard for Ralph was positively correlated with reflective preference for energy conservation and efficiency (r = .26) and support for improvements to fossil by allocating more of their income taxes to address the negative aspects of fossil fuels (r = .40).

Pat Ford

Regard for Pat was systematically related to what energy types participants preferred and/or supported. There were significant positive correlations between how participants regarded Pat and their reflective preference, formative preference and support for energy conservation and efficiency and significant negative correlations between their regard for him and their reflective preference, formative preference, and support for nuclear energy. There are few other idiosyncratic correlations between participants' regard for Pat and their preference and/or support for other ways to meet electricity demand.

Arjun Makhijani

How people regarded Arjun was systematically related to what energy types they preferred and/or supported. There were significant positive correlations between how participants regarded Arjun and their reflective preference, formative preference and support energy conservation and efficiency, as well as renewables. There were significant negative correlations between participants' regard for Arjun and their reflective preference, formative preference, and support for nuclear energy. There are few other idiosyncratic correlations between participants' regard for Arjun and their preference and/or support for other ways to meet electricity demand.

Bob Neilson

How people regarded Bob was systematically related to what energy types participants preferred and/or supported. There were significant positive correlations between how participants regarded Bob and their reflective preference, formative preference and support energy conservation and efficiency, as well as renewables. There were significant negative correlations between participants' regard for Bob and their reflective preference, formative preference, and support for nuclear energy.

Marsha Smith

How people regarded Marsha (who represented a pro-consumer position) was not systematically related to what energy types participants preferred and/or supported. There was only one statistically significant correlation, which showed that the more highly participants regarded Marsha, the more likely they were to support improvements to fossil fuels ($r = .42$) by allocating more of their income taxes to address the negative aspects of this energy source.

David Solan

How people regarded David was not systematically related to what energy types participants preferred and/or supported. There were only two significant positive correlations between how David was regarded and participants' support for improvements to fossil and improvements to hydro.

Mark Stokes

There was some indication that how people regarded Mark is systematically related to what energy types participants preferred and/or supported. There were positive correlations between participants' regard for Mark and their reflective preference, formative preference, and support for fossil fuels.

Observations and conclusions from the analysis of the 4 Research Questions

Correlation does not mean causation, but taking into consideration our findings from Research Question 1 helps us interpret the results obtained for Research Question 4. Results from Research Question 1 show that our sample of participants had strong prior attitudes with respect to which ways to meet electricity demand. Moreover, these strong prior attitudes clearly showed that some ways to meet electricity demand were more highly preferred (e.g., renewable energy and conservation) than others (e.g., fossil).

Given that participants had these preferences before meeting the experts, the most logical explanation for the significant correlations is that participants rated their regard for the panelist based on the extent to which that panelist agreed with the participant's prior attitude (e.g., position on the matter). That is, those participants who preferred renewable energy and conservation prior to meeting the panelists ended up saying they regarded the panelist(s) who shared their views as being more credible, trustworthy, knowledgeable, and likable. However, it is also possible that a person striving to be open-minded may have found some speakers' arguments compelling, which influenced his or her preference and support for energy options.

The fact that there were several significant correlations, and these were among the more prominent findings of the study, suggests that further investigation of the effects of interaction with experts on people's policy attitudes is warranted.

In conclusion, we believe there is substantial evidence to support our underlying model (See Figure 4 in the executive summary). The correlations are strong between reflective preference and formative preference for all respondents, by energy type. The positive correlations imply that these preferences are related to each other. The correlations ranged from 0.64 to 0.83.

Table 4.2. Correlation of preference type and energy option type

		Reflective Preference				
		Conservation & efficiency	**Fossil fuels**	**Hydro power**	**Nuclear energy**	**Renewable energy**
Formative Preference	**Conservation & efficiency**	.64				
	Fossil fuel		.72			
	Hydropower			.65		
	Nuclear energy				.83	
	Renewable energy					.65

In addition, for the analyses related Research Question 1, reflective preference and formative preference showed the same pattern of results. That is, no change was measured from pre- to post-test (i.e. the horizontal lines in the graphs). However, there was distance, or 'separation', between the lines, meaning that some energy types were more preferred than others. The order of preference for energy type was the same for both reflective preference and formative preference. Energy conservation & efficiency and renewable energy were most preferred, hydropower ranked next, then nuclear power, and fossil fuel was preferred the least of any type.

According to the ELM model (See Figure 3 in the executive summary) and Fishkin's work, some differences between reflective preference and formative preference are expected. Reflective preference, in this study was design to be the 'off the top of your head' judgment (i.e., the ELM peripheral route process). Fishkin's work discounts the value of a response based on one's reflective preference because it is not always a reliable predictor of one's future support. In this study, formative preference was intended to be the thoughtful evaluation or judgment (i.e., akin to central route processing), which is thought to be a better predictor of a person's actual support in the treatment groups where participants were asked to think more about the issue (e.g., read a briefing document, hear a presentation, talk to experts, and meet together in small groups).

We also hypothesized that a participant in a treatment condition where they were not asked to think as much (e.g. control groups) would show that their reflective preference was a better predictor of their subsequent support. Just as the ELM hypothesizes and has demonstrated different outcomes (i.e., different amounts and kinds of attitude change) based on whether the person being persuaded is processing the information peripherally or centrally (e.g. the ELM or Fishkin models), we expected something similar for those in our different treatment groups.

The research team did not necessarily think our underlying model (Figure 4) would provide a 'one size fits all' explanation of the cognitive processes we hypothesized would occur. What the model does not express well is the idea that we expected different kinds of cognitive processes to occur (i.e., peripheral and central) depending on the kind of experimental treatment condition randomly assigned to the participant. Unfortunately, the statistical power of the data did not support an analysis to assess whether this happened.

Appendices B, C and E provide additional detail supporting the research question analysis.

Chapter 5. A Comparison of “Knowledge Questions” from Pre- and Post-Surveys

One of the primary measures used in the Deliberative Polling model used by Fishkin is an analysis of change in knowledge about the topic of discussion measured before (pre-survey) and after (post-survey) the deliberation event. The survey asked a self-reported level of knowledge about energy issues, and included four actual knowledge questions.

The pre-survey respondents were less likely to report that they were very knowledgeable about energy generation issues. Those respondents that became a treatment group participant, however, were much more likely to self-report a high level of knowledge. Table 5.1 details the self-reported knowledge measures.

Table 5.1. Summary of Self-Reported Level of Knowledge of Energy Issues

	Pre-survey (No treatment group)	**Pre-survey Treatment Groups**	**Post-survey only (Control Group)**
	n = 398	n = 75	n = 21
	%	%	%
I am **very knowledgeable** about energy issues	14.9	24.0	14.3
I am **somewhat knowledgeable** about energy issues.	70.2	69.8	76.2
I am **not very knowledgeable** about energy issues.	13.6	5.2	4.8
I am **not at all knowledgeable** about energy issues.	1.3	0	4.8
Don’t Know/Unsure (Not included in % of valid responses)	.5	1<%	0

The high level of self-reported knowledge extended to the self-selection of the respondents to participate in the event. When asked specific factual questions, those that attended the event tended to choose an answer (versus responding ‘Don’t know/not sure’), and were more likely to be correct than the general survey respondents.

Table 5.2. Summary of Knowledge Question Results

Knowledge Questions (Correct answer choice in boldface)	**Pre-survey (No treatment group)**	**Pre-survey Treatment groups**	**Post-survey Treatment groups**	**Post-survey (Control group)**
	n = 393	n = 67	n = 69	n = 20
Within its borders, Idaho has abundant resources of which of the following?: Uranium, Natural gas, *Wind,* Coal, Don't know/not sure	67.9% correct 8.4% incorrect 23.7% don't know	92.5% correct 7.5% incorrect 0 % don't know	98.6% correct 1.4% incorrect 0% don't know	75.0% correct 0% incorrect 25.0% don't know
	n = 401	n = 70	n = 81	n = 21
Of the electricity that Idaho *consumes,* the majority comes from what one source?: *Fossil fuels,* Renewable, Nuclear, Hydropower, Don't know/not sure	14.9% correct 74.9% incorrect 10.2% don't know	17.1% correct 82.9% incorrect 0% don't know	53.1% correct 46.9% incorrect 0% don't know	0% correct 81.0% incorrect 19.0% don't know
	n = 403	n = 72	n = 81	n = 21
Of the electricity that Idaho *produces*, the majority comes from what one source?: Fossil fuels, Renewables, Nuclear, *Hydropower,* Don't know/not sure	86.1% correct 3.2% incorrect 10.7% don't know	97.2% correct 2.8% incorrect 0% don't' know	97.5% correct 2.5% incorrect 0% don't know	81.0% correct 4.4% incorrect 14.6% don't know
	n = 397	n = 64	n = 71	n = 21
Which one of the following is the fastest to implement?: Hydropower, *Energy conservation,* Nuclear, Renewables, Don't know/not sure	44.3% correct 25.7% incorrect 30.0% don't know	71.9% correct 28.1% incorrect 0% don't know	81.7% correct 17.3% incorrect 0% don't know	57.1% correct 19.0% incorrect 23.8% don't know

Table 5.2 shows the change in answers from pre- to post-survey in actual knowledge. Knowledge gain did occur for those that participated in the deliberation event and for those that received the briefing documents (but did not come to the event). All of the Knowledge Questions were addressed in the Briefing Document (used in three of the treatment groups) and in the presentation in the morning 'conference' session. Those that received the Briefing Document were encouraged to use it during the day-long event and refer to it for information. From the results, the participants at the event did augment their knowledge in the areas of Idaho's energy production and consumption, and some corrected their misperceptions of the sources and potential solutions to energy issues. See Appendix D for detailed results about the knowledge questions, and Appendices A and B for descriptive statistics for these questions.

Chapter 6. Post-event Study of the Deliberative Poll Participants' Attitudes

Introduction

The deliberative democracy movement advocates meaningful citizen engagement in policy issues (Thompson 2008). Proponents argue that citizens' off-the-cuff opinions are often uninformed and do not reflect what might expected if they thought carefully about issue-relevant information and therefore are a poor guide for policy decisions (Andersen & Hansen 2007; Kleinman et al. in press). Participatory processes that expose people to balanced, thorough, and accurate information, along with the opportunity for reasoned and open discussion, are thought to lead to more considered opinions (Luskin et al. 2002; Parkins & Mitchell 2005) and higher quality decisions (Walmsley in press). Deliberative democracy theory, its goals and practices, is of special interest in the realm of science and technology policy, given the complexity of the issues (Powell & Kleinman, 2008; Rowe et al. 2005). Despite an increasingly recognized need for open communication between scientists and laypeople, a substantial barrier is the lack of knowledge among the general public about the complex, technical nature of the science and its role in policymaking (Powell & Kleinman 2008). Deliberative practices hold promise for facilitating learning and generating informed input into these and other challenging policy areas.

Various experimental studies have confirmed that – in a typical opinion poll – a disturbingly large percentage of people indeed have "non-attitudes"; that is, they express an opinion on a fictitious issue (Bishop et al. 1980; Schuman & Presser 1980; Smith 1984). Such findings provide support for processes such as deliberative polling, which seek to generate more informed, stable, and "real" opinions to help inform policy-making. To the extent that people's initial opinions about complex technical issues are poorly formed or based on limited, potentially incorrect information, it is reasonable to expect that individuals' might change during a deliberative processes, as they become aware of the true implications of different policy options for themselves and others. However, there is no a priori reason to expect a consistent shift in one direction or another when information and debate are balanced (Eggins et al. 2007), because generally there are legitimate arguments for multiple perspectives and options, and people's value priorities should lead to divergent evaluations of the same options (Steg et al. 2005; Hansla et a. 2008). On the basis of persuasion theory, one might expect that a process that provides balanced information could lead people to form opinions (if they had not thought about issues previously) or to become neutral (if they came to realize that there are many legitimate arguments for and against each option). Additionally, theory suggests that individuals with strong prior attitudes are likely to process information selectively and to counter-argue information that contradicts their previous views; therefore such individuals are unlikely to change (Lien 2001; Petty & Wegener 1999).

Beyond leading to more stable, informed attitudes, proponents of deliberative processes argue that this type of involvement can lead to higher levels of subsequent civic engagement, both for the issue at hand and other issues. When people learn that they are capable of reasoning about issues and engaging with experts and fellow citizens they should experience empowerment to influence policy (Eggins et al. 2007; Mutz 2008; Rowe et al. 2005).

Although rigorous assessments are far fewer than the number of deliberative polls and similar participatory processes that have been conducted, a handful of studies have investigated their effects on participants' attitudes toward policy issues. These paint a complex and not altogether coherent picture (Mutz 2008). Some studies report significant shifts in preferences. For example, Eggins et al. (2007) found a modest (7%) shift in views among participants in an Australian deliberative poll about a bill of rights, and French and Laver (2009) documented a strong, consistent shift against a waste incineration proposal, which they attributed to differential persuasiveness of the expert speakers. Abelson et al. (2003) also found consistent shifts, which they believe were the result of particularly persuasive members of small group discussions.

On the other hand, several recent studies find no, or very weak, changes among participants as a whole. Farrar et al. (2009) reported that, in two deliberative polls about national security and free trade, "mean opinions changed trivially and in no consistent ideological direction" (p. 626). Sturgis et al. (in press) found that exposing people to either a short or long, balanced film about genomic science led to no changes in attitudes compared to a control group, either immediately after or 4-9 months later.

To the extent that a deliberative poll succeeds in presenting balanced information, it may not be surprising that there is no overall change in mean attitude ratings. It is therefore somewhat surprising that studies have not looked at within-subjects change using different analytic techniques. The few studies that have done so present intriguing findings. For instance, in Eggins et al.'s (2007) study, the variance in responses increased after the deliberative poll, suggesting that the information and engagement led to divergent changes among participants. Similarly, Andersen and Hansen (2007) found that between 7 and 28% of respondents reversed their opinions about issues related to the Euro, but individuals did not change in the same direction. Additionally, they reported that many people who were "undecided" at the pre-test formed an opinion as a result of participation. Additional research in needed to investigate how attitudes change as the result of a deliberative process, and this study focuses on such within-subjects changes.

Given the theory of deliberative democracy, it is also surprising that very little attention has been devoted to examining the effects of participation on participants' subsequent political engagement (Abelson et al. 2003). In one of the only studies we found, Eggins et al. (2007) examined how deliberative polling affected participants' intended political engagement (intention to discuss the issue with others and hope to play an active role in development of others' views). They found a fairly strong relationship, with much of the variation in political engagement explained by people's feelings of pride in participating and their sense of being a community representative. Unfortunately, their study did not include a follow-up component to assess whether such intentions were borne out. Another study of actual behavior (Andersen & Hansen 2007) found that the participants became only slightly more politically active after a deliberative poll, so it remains unclear how much such processes actually increase civic engagement. Our study sought to investigate this issue through interviews conducted several months following a deliberative poll.

Most evaluations have taken place immediately following a participation event. It is of interest to know whether short-term impacts are sustained, or whether such effects may fade over time. It is possible, for instance, that information that seemed compelling at the time is forgotten, leading people to revert to their original attitudes. Conversely, if the deliberative process causes significant changes to attitudinal and cognitive mental structures, these might be enduring (Eagly & Kulesa 1997). In this paper we report on the immediate and long-term effects of a deliberative poll held in April, 2009, in Boise, Idaho, dealing with energy options for the state of Idaho. Structured questions investigated attitude changes for five energy options (fossil fuels, renewables, nuclear, hydroelectric, and energy conservation and efficiency). Open-ended interviews 8-10 months afterwards explored people's perspectives on what they learned, how the poll affected their attitudes, and its effects on their subsequent civic engagement. The interviews also elicited evaluations of the deliberative poll process itself.

Methods

The deliberative poll we studied was designed as a quasi-experiment, in which randomly selected citizens would be exposed to different treatments, based on the recommendations of deliberative polling proponents (Luskin et al. 2002). All participants received a pre-test survey in the mail in January, 2009. Some of the groups then received a 35-page briefing document in the mail, which provided a description of how the electricity system works an overview of the energy situation in Idaho, and the benefits and problems with each potential energy option. Each option was discussed in terms of safety and security, reliability and predictability, public trust, impact to the environment, cost, responsiveness and adaptiveness, aesthetic considerations, and additional benefits beyond energy supply. Citizens who attended the one-day event all listened to an hour-long presentation that reviewed the highlights of the briefing document. They were then assigned to different conditions: some participants engaged in facilitated small group discussions about energy options, in which they generated questions for an expert panel; those who did not engage in deliberations listened to a presentation about deliberative democracy. All of the participants then attended a luncheon conference in which a panel of seven experts answered questions that had been developed by the small groups. Participants completed a post-test survey containing the same attitudinal items before they departed.

Event participants were contacted by telephone between November, 2009, and January, 2010, to participate in a brief interview. They were asked the same quantitative rating questions as on the pre- and post-event surveys regarding their preferences for the five energy options. They were asked to describe the most salient arguments for or against each of the options and to self-report the effect of the event on their knowledge and attitudes about energy options. To assess civic engagement effects, subsequent questions asked participants about the degree to which they had sought out additional information after the event, shared information with others, or encouraged others to look into energy policy issues. Another question asked if they had become more involved in energy issues. Finally, to evaluate the quality of the deliberative poll, participants were asked about the small group interactions and the expert panel, as well as their overall evaluation of the process. For the purposes of this paper, we refer to the initial survey as the pre-test, the survey completed immediately after the April 18 event as the post-test, and the telephone interview as the delayed post-test.

It should be noted that people who were part of control groups, and those who received the pre- and post-test surveys and briefing documents (but did not attend the deliberative poll event) are not included in this analysis. Of 62 potential participants, two did not furnish telephone contact information. Table 1 shows the number of participants by treatment group. “Conference” indicates the group that attended the luncheon panel discussion but not small group deliberation, while “Deliberation” refers to the group that participated in both small group discussions and the luncheon panel session. It is clear that cooperation with the interview was higher among people who were involved in more aspects of the deliberative poll.

Table 6.1. Number of Interview Participants by Treatment Group

	Study Total	Interviewed
1 – pre-post & conference	16	8
2 – pre-post & deliberation	13	10
4 – pre-post, briefing docs, conference	14	11
5 – pre-post, briefing docs, deliberation	19	13
Total	62	42

Interviews were transcribed verbatim. Two coders independently read through the interviews to identify common themes. After consultation, a codebook was developed, and each coder applied it to samples of interviews to establish inter-coder reliability (Krippendorff 1980; 2004). When an adequate κ value was achieved (>.80 for each top-level code), both coders independently applied the codebook to all remaining interviews. Discrepancies were resolved through consultation.

Results

It is important to note that, like the deliberative poll participants generally, the interviewees were not highly representative of the Idaho citizenry. Only six were women, and the mean age was 60 years. The median level of education was a 4-year college degree, and the median income category was $70,000-79,000 per year. Of the deliberative poll participants, 21 had either had schooling or employment in an energy or related industry; 10 were active in some way with energy issues; and 8 mentioned being aware of or involved in local issues such as power plant siting in their region or neighborhood.

Attitude Change

Participants rated each energy option on a scale from -5 (strongly oppose) to +5 (strongly support). It is important to note that, during the interviews (delayed post-test), some respondents were unwilling to give numeric ratings for certain options. Additionally, some interviewees differentiated within one of the categories; for instance 29% of people gave different ratings for coal, oil, and natural gas, although the questionnaires had combined these into one “fossil fuel” category. In these cases, no overall rating could be computed for the delayed post-test. Therefore, for some energy options, the number of delayed post-test responses is less than the total number of participants.

There are several ways that attitudinal change can be assessed. We examined change from pre-test to post-test, from post-test to delayed post-test, and from pre-test to delayed post-test for all treatment groups combined. “No change” indicates that a person gave identical ratings at two times. “Change within side” indicates different ratings, but within the same side of the scale, either positive or negative (for example, from +1 to +4, or from -3 to -4). “Reversed” indicate participants who changed from a negative to a positive rating, or vice versa. “Formed opinion” indicates people who changed from a neutral rating (0) to either a positive or negative rating, while “became neutral” indicates a shift from a valence score to a neutral rating. It is important to note that a small change (e.g., from +1 to +2) may not indicate an actual change in attitude, as there is likely to be some unknown degree of measurement error. However, reversal, forming an opinion, or becoming neutral may indicate substantive changes.

Short-term Changes

The quantitative ratings of energy preferences show that, between the pre-test and post-test, different patterns of changes occurred for the different energy options. Attitudes toward renewable energy sources were especially stable, while attitudes toward fossil fuels were most likely to change (Table 2). If we consider reversal, forming an opinion, and becoming neutral as substantive changes, between 3% and 28% of individuals experienced a substantial change between the pre- and post-tests, with the largest changes being for fossil fuels and hydropower. For respondents who gave a different response, but on the same side of the scale, Table 2 includes the mean (and standard deviation) for the absolute value of the changes. The mean change for fossil fuels, for instance, was nearly 2 points on the 11-point scale. There were 19 ratings of "neutral" at the pre-test, across all five options combined, and 12 of these changed to a substantive value after the deliberative poll. In contrast, almost no participants shifted from a substantive preference to a neutral opinion.

Table 6.2. Changes in Ratings of Energy Options between Pre-test and Post-test

	Conservation	**Fossil Fuels**	**Hydropower**	**Nuclear**	**Renewables**
No change	15	11	16	18	25
Change within side:					
Number	20	13	18	17	11
Mean (sd)	1.5 (.69)	1.92 (1.12)	1.44 (.62)	1.53 (.72)	1.27 (.65)
Reversed	0	5	3	2	1
Formed opinion	0	2	5	4	1
Became neutral	1	3	1	0	0

Note: data include all 4 TGs

Respondents' self-reports provide considerable insight into the effect of the deliberative poll on their knowledge and opinions. Eleven people said that they had not learned any new information and likewise did not shift their opinions about any of the options.

> *I don't think it enhanced or increased my knowledge… I don't think it changed my attitude either way, either. (2-00827NI[1])*
>
> *I think there were some things that I learned but I can't recall specifically. But I don't think that they were substantive… I think my attitudes have not really changed a lot on that either. I guess I maybe came to understand a little bit of other people's differences of opinion. But that's more a matter of understanding other people better than it is of changing my own opinions… Having a background in science and engineering, I already knew quite a bit about the options. So if I didn't learn very much, it was because of what I already knew. (5-1161SC)*
>
> *I don't think it affected me at all. I was disappointed in it actually… I just… for me, I didn't personally gain anything technical from any of the presentations or discussions. (2-01232BE)*
>
> *I don't think it affected my attitudes about energy options in Idaho much. I don't think it had much impact on my knowledge either. I think most of the stuff was pretty general. I think I knew those sorts of things anyway. (4-03528LO)*

[1] The first number in parentheses indicates the treatment group.

Well, I don't think I gained a whole lot of information.... I've always been interested in this. I've probably read a great deal more about it than some of the participants had. It was all… it was certainly constructive as far as I was concerned. It was a good format, but there wasn't anything that was brought up that I didn't know something about, as far as that goes. (5-02472MC).

Twenty individuals (approximately half of the participants) said that they had learned new information, but nevertheless did not shift their preferences for energy options in Idaho.

I think it expanded my knowledge to some degree. There were certain aspects of our energy policy, for example, the quantity of energy that we import into this state. The fact that we're opposed to coal fired plants in Idaho, yet we'll buy energy from coal fired plants across our border. I wasn't aware of that prior to that conference. In terms of changing my opinion, I don't think so. (1-00195CR)

I'm sure that it has enhanced my knowledge on it. I'm not sure that it changed my stance any, but I would say that it probably has enhanced my knowledge. (2-03027HO)
I thought it was informative too. I wasn't aware of how much…actually that coal and the resources that provided power in the state… No, it didn't affect my opinions, but it did make me think a little bit more about what is out there. It didn't change my position any. (4-01897WI)

Well, yeah I'd have to say I learned some little things that you don't tend to think about. The wind power… the wind blows it… it's renewable… but the finer points that come up that you don't really think about that… yeah, we learned some things… Maybe it reinforced my feelings a little bit concerning wind power and hydroelectric and the renewable end of it. I think there are more options… more of a availability than we're taking advantage of. It didn't change it as much as it reinforced it a little bit. (4-02578PR)

Many of these people recognized that their opinions were well established and unshakeable prior to the event:

It made me aware that there's a lot of things going on in Idaho that I was not aware of. Like, the fact that we share all of our power with all the different states… I learned more stuff, but it didn't affect my outlook… I'm pretty stubborn. (1-00361SM)

Knowledge? I got some good knowledge out of it. My options or my thoughts on it, they will never change… I went in there with one track mind and left with a one track mind. (5-02371SM)

Twelve people reported that they had learned new information and as a result changed their attitudes toward one or more of the energy options. As evident in the following excerpts, people picked up on different bits of information:

I think the conference was excellent as far as getting… to increase my knowledge of the pros and cons of all the different options available to us… Maybe just safety as a nuclear power industry…The exposure to expenses on some of the nonrenewables and conservation alternatives…Transmission lines and how that impacts energy costs… It increased my acceptance of nuclear power industries. I began to see that maybe it's a more viable alternative. (5-02792MI).

I learned some things. Particularly about the renewable energy sources. And, I think I came with much more of an impression that renewable energy sources are much more viable than I thought they were… It shifted me more towards that the renewable options are a lot more feasible than I thought. And that it should be something that we should be pursuing. I remain open to the idea of nuclear power options, but [now] I don't see that as the only solution. (1-04952ME)

I just had it in the back of my mind [before the deliberative poll] that because it [natural gas] was fossil fuel that it wasn't good. And I learned that it wasn't quite that cut and dry for me. I learned a lot... And, did it sway me? I think I had a real negative thought about certain fossil fuels for generation, like natural gas, that even though it's a fossil fuel… maybe it's not as bad as I thought it was. (1-03025NY)

[I learned] some advantages of some options less obvious than I thought…It reduced my support for hydroelectricity and increased my support for nuclear slightly. And reinforced my opinions about fossil fuels and my support for renewables…it increased my support for conservation. (5-00036PO).

I learned a few things at the conference… I learned from the meeting that we had here that one of the great advantages of gas fired electric generation is its versatility. We go into heavy load times… they're reluctant to jack up nuclear output or they don't have any water behind any dams that they can release or whatever… gas fired power plants come online. If I understood them correctly, a lot of these gas fired plants stand idle most of the time. And when peak loads come along, they can light them off in a very short time and pick up load with them. So I think that's a great plus… A question was asked at the luncheon down here by someone and it took me about 3 milliseconds to come up with the same answer that the panelists came up with. The question was: which form of power do you think will be the solution to this? And the answer was: all of them. I didn't have that feeling going in. I thought nuclear could do it all. And I walked out and thought, nuclear can't do it all, and neither can any of the rest of them. (2-01057OR).

Apart from the effects on specific knowledge or attitudes, eleven people reported that the deliberative poll event had changed the way they think about energy, generally making them more aware of the complexities of the issues.

I think it made me realize what I don't know. And so then that makes you more curious about what's out there. You know, want to learn more about it. (1-02910DI)

Well, the way it affected my knowledge it is that I got to hear other people's views and opinions on it. My attitude…I think maybe it just allowed me instead of just kind of thinking one dimensionally for myself, you know I can see what other people are thinking… It would definitely…that would definitely changed my attitude because like I said, instead of just thinking about myself, I can think about other people. (4-04984NA)

I would say I came away with an overall positive feeling. But, it's a very complex problem that we are faced with. There's reasons I think that we should use nukes and there are reasons we should not use nukes. That's obvious. It's a trade off. (2-03799VA)

It very much opened up my mind to thinking about the need for options and of the need for information about all the options. It let me know that the issues were more complicated than I thought. (5-00036PO)

> *In going around with that group, I think we all came to the conclusion that we were all misinformed in some way or another… I think what I learned was some of the qualifications that stand in the way of any one of these things being "the solution." So in that sense, let's say I earned more respect for the arguments of others. (2-01057OR).*

When thinking about these findings, a cautionary note is in order, because in some cases, people's verbal self-reports did not correspond well to their quantitative preference ratings. Overall, most people who said their attitudes did not change showed no shift (or only a 1-point difference) between pre- and post-test ratings for most of the energy options, and for those who remembered changing their minds, the quantitative data generally supported those recollections. However, 17 interviews showed a marked discrepancy for one, or occasionally two or three, options. In several cases this was a matter of a person saying that she or he had not been impacted, when in fact the data suggested otherwise. (Interestingly, some of these were cases where people gave quite different responses on the immediate post-test than on the pre-test, but whose delayed post-test responses were similar to the pre-test responses; this may suggest a temporary, and forgotten, effect of the event).

In a few instances, people reported becoming more positive or negative toward an option, when the data actually showed the opposite. From specific details given in the interviews, it seems possible that this reflects respondents' focusing on specific aspects of an energy option during the delayed post-test, which potentially was a different aspect than they considered during the pre- or post-test. For example, one person who had rated fossil fuels negatively on the pre- and post-tests gave it a very positive rating during the delayed post-test, but it was clear that rating was based on thinking about transportation, not electricity. Several people who said that they had become more positive toward an option did not have this reflected in their ratings, because they had already given the most extreme rating on a previous survey.

Long-term Impacts

Changes in ratings from the post-test to the delayed post-test, as well as from the pre-test to the delayed post-test, showed interesting and complex results (Tables 3 to 7). Attitudes appeared almost as volatile across this several-month time period as between the pre- and post-tests. It is rather difficult to know what to make of these changes – during the interviews people generally told us that their views had not changed since the deliberative poll event. In examining the transcripts, it appears that we did not probe deeply about changes *after* the event, and many people interpreted the questions as referring to changes caused by the deliberative poll itself. Unfortunately, therefore, it is difficult to provide much context or insight into the post-event changes.

Table 6.3. Changes in Ratings of Energy Conservation and Efficiency

	Post to Delayed	**Pre to Delayed**
No change	18	17
Change within side	15 (M =1.8; sd=1.02)	16 (M=1.8; sd=1.12)
Reversed	0	1
Formed opinion	1	0
Became neutral	2	2

Note: “Delayed” = delayed post-test; includes all 4 TGs

Table 6.4. Changes in Ratings of Fossil Fuels

	Post to Delayed	**Pre to Delayed**
No change	6	9
Change within side	13 (M=1.62; sd = .65)	13 (M=1.77; sd = .73)
Reversed	2	2
Formed opinion	3	0
Became neutral	7	6

Note: “Delayed” = delayed post-test

Table 6.5. Changes in Ratings of Hydropower

	Post to Delayed	**Pre to Delayed**
No change	14	16
Change within side	21 (M=1.52; sd = .68)	19 (M=1.84; sd = .90)
Reversed	2	2
Formed opinion	2	4
Became neutral	3	1

Note: “Delayed” = delayed post-test

Table 6.6. Changes in Ratings of Nuclear Power

	Post to Delayed	**Pre to Delayed**
No change	16	13
Change within side	19 (M=1.56; sd = .51)	20 (M=1.63; sd = 1.01)
Reversed	3	1
Formed opinion	1	5
Became neutral	1	1

Note: “Delayed” = delayed post-test

Table 6.7. Changes in Ratings of Renewables

	Post to Delayed	**Pre to Delayed**
No change	19	26
Change within side	17 (M=1.65; sd = .79)	10 (M=1.60; sd = .70)
Reversed	1	0
Formed opinion	1	2
Became neutral	0	0

Note: “Delayed” = delayed post-test

One factor that may help explain post-event shifts in attitudes – though this is largely interpretation on our part – is people's personal interest in and involvement with energy issues. Many people reported having a prior interest in energy, involvement with local issues, or making home improvements to save energy. Others had friends, family, or coworkers with whom they discussed energy issues. It seems possible, even likely, that such factors could have overwhelmed transient impacts of a one-day event or brought new considerations that led to attitude shifts between April and November. The following excerpts illustrate the types of information that led us to this interpretation.

> *It seems like when we all realize that we need power…and hearing the power company is trying to build a large transmission main to interconnect 'cause we're getting so much wind power out there… …and the transmission system I guess has gotten to the point where…it is hard to take that added power on. But anyway here we've got a power line they're trying to interconnect between Wyoming and Oregon…property owners are fighting it like a mad all along the line. (5-01069LI)*
>
> *I've been following the process of the nuclear applications that have been ongoing here in the area. There's 3-4 counties here in southern Idaho that have been approached and I've been following those in the newspaper. (4-01897WI)*
>
> *You know, building atomic energy plants on top of the faults that we have… Idaho has a lot of faults… earthquake faults. You know, you really wonder. California, I believe, there is a big energy plant they're building, and it's on top of the San Andres Fault. Do you see why I am very skeptical? …I mean Russia probably has the same problem, and that's why they had Chernobyl… And the thing is, also, people that I know that lived in that area during the atomic testing and during Chernobyl, you know… when you see them… 5 out of the 8 died of cancer. (1-00361SM)*
>
> *But, I've got to say one thing: It [conservation] doesn't pay you. Literally. I have cut my energy consumption in half in my house, but my cost has not gone down in half. In fact, it's the same if not higher… I am not saving myself any money. (1-00361SM)*
>
> *I don't understand why 3 Mile Island, for example, why they keep tracking it in the media and the anniversary of it, because I think it's extremely insignificant relative to other projects… other industries, other catastrophes that have occurred related to industrial processes. We've heard about Bhopal India recently. I was amazed at the accident with the biggest in dam in Russia recently. It got zero press attention. You had to look hard for information on that. Where 75 people were killed. It was a major failure. (2-01232BE)*
>
> *For example, I've known about heat pumps for a long time, but I've been focusing more recently on doing calculations and understanding the effect of the gas pricing vs. electricity pricing and the impact on the viability… economic viability of heat pumps. So that's something that I've focused on and like better since the conference. (2-01232BE)*
>
> *I've always been an advocate of power generation because we use it. We need it. But, now I'm also on the green edge of my philosophy. I'm concerned about the warming trend. And when I see on the news and what I read, you know… it's real. It's there. We need to do something with that. And that has a lot to do with power generation as well as our processing and industrial organizations and systems. For clean air, or cleaner air. (2-02000WA)*

You look at Chernobyl and the problems associated with that. I know that France is often times held up as an example, but I've had conversations with people who say that they are not really doing a good job with the waste as well. Storing it outside is not satisfactory. (2-03161GO)

I went over to China… China is very supportive of green energy technologies. They're going to have a whole… 2010 world expo over there, and it's the focus of that. They have a whole island that is zero emissions, and they have a major consortium of auto manufacturers working towards electrification of cars. They have the greatest number of electric bikes in the world. So, yeah I have watched the debate… (2-03161GO)

But then there's… that thing that has gone big in Germany, and those are photoelectric cells or whatever you want to call them. They have a terrible climate. I've been over there several times. But they still manage to produce electricity from these photovoltaic or whatever they are called. They have them all over the place. They've lined the freeways… the autobahns. Farmers have them. … the air isn't much brighter than what I've got in Boise, which is crud. Yet, they still manage to produce electricity. (5-03552BE)

I've traveled across country a few times this year, and seeing the increase in wind generated electricity… seeing trucks carrying the big blades on the highways… has given me a positive reinforcement towards renewable energy. And if they can do that with wind power, they can do it in other ways, with solar especially. (1-00195CR)

I feel very strongly about solar, to the point that my wife and I have invested roughly $15,000 into our own solar system. Unfortunately because of the snow, I got snowed out of my project. I purchased all the materials and I'm in the process of installing about a 3.1 kilowatt system, which will… in the wintertime I'm hoping to get roughly 40% of our total energy bill offset through what they call a net metering program. In the summertime I expect to see 60%. (2-03799VA)

The concept of a modular plant, similar to France… I think France is doing it, if not in modular, but apparently all their plants are more or less the same, which enables them to be even that much more safe in that if they find something wrong with one they can retrofit others before trouble develops. I think there's a lot to be gained from nuclear power, to tell you the truth. And frankly, the Navy's been using it for a long time. More or less without any grief. (2-01057OR)

You know there is another area that I think holds… well there are so many energy options that we haven't talked about yet. For example, algae. That's going to be interesting to see what potential there is there. I've read of engines that run on algae. There's a whole big future out there that we have only started to scratch the surface of. (2-023242ZE)

One of the concerns we have with some of the carbon neutral technologies down in Louisiana and Texas… they don't have much wind in those areas other than hurricanes… and there's quite a bit of pressure to build power plants that are going to burn wood. To cut down trees and get power out of them because that's considered carbon neutral. I guess I don't think cutting down trees to make kilowatts is a bright idea. (4-3568BR)

Effects on Civic Engagement

Sharing information & encouraging involvement

Nearly all participants in the deliberative poll (33 of 44) said that they had shared something about the process or what they had learned with other people after the event. Generally they talked to immediate family, and sometimes close friends, although it appears that most of these discussions were either not terribly substantive or that people had forgotten most of the details. A typical response to being asked about sharing was, "*I had a friend that… we got into a discussion about energy. I related some of it back to him when I could still remember what I had heard. So it was a good discussion*" (1-02910DI). Another said that he had "*not really*" talked to anyone, though he had "*talked a little bit about it with my coworkers and just mentioned to them that I attended*" (2-03799VA). One participant mentioned sharing with a "*group of guys*" with whom he has breakfast once a week, telling them that "*something needs to be done quickly. That we're running out of energy options. The prices are going to start [going up]…cheap energy will no longer be for Idahoans to have*" (5-00009NE). A few people who had family members in architectural or energy jobs said they had more extended discussions with those individuals.

> *I'll tell you what I have done though. I've played off what I remember with some of the people that I associate with. I just bounced off some of the things that I learned. Frankly, favorable reactions I had to it. Some of these people are engineering types, so we get to take an idea that I may have walked away with and beat it to death. We solve all the world's problems, then we go back to sleep. (2-01057OR)*

> *As far as somebody really following up on it and maybe going to be involved in it for years to come… is my daughter and her architectural firm. With her building solar buildings and green buildings, she has definitely influenced my thinking. She found it very interesting what the conference was all about. (4-04466VA)*

Some people shared their favorable impressions of the process itself, as with the participant who told other people "*that it was a good experience. If they ever had the opportunity … I suggested to them that they really think about going*" (4-04736OR). One of the more enthusiastic participants commented, "*I was very impressed with the situation. Mostly impressed with how many want to do something about what we need to do. So I talked to anybody who would listen or anyone who was interested*" (2-02000WA).

While people talked about the deliberative poll and what they had learned about energy with others, the majority responded "no" when asked whether they had encouraged other people to look into energy issues for themselves. One person summed it up this way: "*Not as just a citizen I haven't. I haven't really encouraged anyone to personally look into the issues*" (4-03528LO). Another said,

> *Oh boy… I guess I'd have to say no, because I don't recall doing that. You know most of the folks I know have been… they were early adapters to CFLs and that kind of stuff. Yeah, I don't think so. I guess that's not good. (1-03025NY)*

In the few cases where people said they had tried to influence others' behavior, they usually described encouraging others to adopt energy conservation measures in their own homes, as in this example: "*I tell them about conservation and that they need to think about it. I try not to press my opinions on people too much*" (2-04392CA). No one described encouraging others to contact policy makers or take other such civic action. Several of the people who said that they had tried to persuade others to act mentioned that they had always been outspoken, and it appears that the DP did not change their tendency.

> *I bend people's ear all the time on it. It's like… we were just in Seattle for a family Thanksgiving. I was talking to people there. I'm probably not the best person because I can overwhelm people that*

aren't… I could have the opposite effect, I don't know. If people are willing to listen I like talking to them about this stuff. (2-01232BE)

What most people don't realize about this whole metering situation… the whole change over to the smart meters… the benefits that are available to everybody. Because Idaho Power has kind of downplayed it because it's going to affect their rate system somewhat, and that has to all play out. Every opportunity, I go ahead and have that conversation with people. So it's kind of directly and indirectly related to the conference. (2-03161GO)

Seeking information

People generally (18 of 35) reported that they did not actively seek out more information about energy issues after the deliberative poll: "*I have not done as you suggest, and that's done any original research on this stuff. But my ears are always open when I hear comments about it*" (2-01057OR). Another remarked, "*I have over the years, but since the conference I haven't really done a lot of thinking about it. And I have not done any research on it*" (5-01161SC). In some cases, people said they paid more attention when they came across energy information, although they didn't seek it out. As one person said, "*I think of what I can do now, and that's definitely a lot of stuff to do with conservation on my end. I really haven't looked into anything more. When I hear about something on the news you know that regards to energy in Idaho, I just pay attention more now I guess*" (4-04984NA).

> *No, I haven't dug into it specifically to improve my knowledge about any of the energy options. There's a fairly constant stream of information being put out there that's available to us. No… I haven't done any research and I don't know that there's any particular information that's changed my way of thinking. (2-03242ZE).*

Approximately 11 people said that they had looked more into energy issues after the deliberative poll. They tended to use the internet to look into specific options, especially conservation and renewables.

> *I have looked at solar. Like I said I've lived in places where solar is used pretty predominantly. And I've been looking to see what we as US citizens are doing and promoting in that direction, and I have been looking on the internet for information to see what's going on, and kind of disappointed with what I'm seeing so far. (1-00195CR).*
>
> *Just a little bit more about conservation. I mean I knew it was good and I didn't have hardly any CFL bulbs in my house at the time, so… I started thinking that's where I can make a personal impact, so maybe I should start doing that, so yeah. (1-03025NY)*
>
> *I think I did a little bit of my own research into the renewables and that was it. On the internet. (1-04952ME).*
>
> *Since the conference I've gone through the house and all of our high wattage bulbs have been replaced with the compact fluorescents. So I think it's a very positive thing. (2-03799VA)*
>
> *I've talked to the farmer up on the hill… but he's an educated gentleman. He's a professor at BSU part-time. Of course he's done a lot of research into the nuclear end of it. I've talked to him a lot about what is fact and what isn't because the people promoting it… they tell you it's the answer to everything… I have[talked to] to Bob and a couple of others that have done a lot of research on nuclear to try to figure out what is fact and what is just fiction or promoted by the promoters.*

No, I haven't done any personally. (4-02578PR)

Several people who indicated seeking additional information appear to have done so for reasons other than the deliberative polling experience.

Well, I have a little bit of an edge there. I work on the periphery with respect to geothermal in the state, so I have looked into that a little bit more (1-00312HE)

Activism in energy policy

Most people (30 of 36) said they had not become active in any energy policy issues as a result of the deliberative poll. One person admitted, "*I know I should take the time, but I really haven't*" (5-04736OR). Age may have played a role for some people, as for the participant who said, "*I'm retired and been retired for 20 years. I guess I'm getting too old and lazy to get too active*" (2-02000WA). One person expressed this ambivalence about getting involved when he said, "*No, I just sit around and gripe like most of the others. Don't do anything. If something would come up, I wouldn't be against being involved" (4-02578PR).*

There was a small number of individuals who had already been active as citizens, and continued to be so, as well as several people who talked about how they are involved with energy in their jobs. Their activism is unlikely to be due to the deliberative poll.

I consider myself to be semi-active. I write a lot of letters to the local newspapers… the Tribune, Statesman, and Idaho World… and address just about everything that needs to be addressed. I may have, on purpose or not on purpose, mentioned something about power. (5-03552BE)

Well, we had a big controversy about a proposed nuclear plant here in Owyhee County. I have been a proponent of that, including in our comprehensive plan, panel, or committee. Just as it comes up I have a personal crusade to educate a lot of people who don't know anything more than what they read in the Idaho Statesman and who have no idea of the enormity of the energy consumption of this country and the needs and how pitifully inadequate even the most ambitious plans are for renewable. They have all these grandiose ideals and they don't understand the magnitude of the numbers. People are just not educated enough to understand what those numbers really are. So as I said I probably add to people's discomfort. (5-02723SC)

I am not any more or less involved. Like I said, I do deal with the geothermal resources in my job, so I have some involvement with that, regardless of the conference (1-00312HE).

I'm the director of the public utilities commission. So, I deal with these issues on a professional basis all the time… So, on a professional standpoint I get involved every day. (4-03528LO)

I handle the commercial leases for the state of Idaho and one of the things that we've been working a little harder on implementing is energy conservation in leased buildings. It's over two million square feet. So, it could you, know help, in the long run. (5092792MI)

Only two people described political actions they had taken as individual citizens.

I think I may have sent a message to a representative among some of the general messages I send every once in a while just urging them to look at a broad based approach. Not lock into some sort of specific technology or approach, which tends to be typical… Put a bug in their ear *that there are a lot of options out there. I know what it was… the message I throw out every once in a while to representatives just saying we need an energy policy. We need to put that together, and then we need to follow it and update it every 5 years or whatever. (1-04952ME)*

I think I made a response online at the Public Utilities Commission about one or two of their proposed conservation programs. Not theirs but Idaho Power or another utility's proposed conservation programs. The PUC was seeking comments. (5-0036PO)

Evaluations of the Deliberative Poll

Nearly all participants who engaged in the small group discussions (21 people) had positive things to say about those interactions. They recognized the high level of interest and knowledge of their group members. As one said, "*I was pretty impressed with the people that were in my discussion group. That was an interesting, worthwhile experience" (2-01232BE).* Several appreciated the opportunity to be exposed to others' views.

I did find quite a few intelligent people that were upon what their philosophy was. I had a wonderful time listening to them. So, I enjoyed hearing as much as I had the opportunity to present my own opinion (2-02000WA)

Discussions are a good thing… When you're in a discussion… and open discussion, and you can interchange both ideas and inquiries with other people. When you ask a question… when I ask a question of somebody in one of these group and I get an answer from it, I'm waiting for that answer. I want to hear that answer. I want to see how it meshes with what I understand or changes what I understand. (2-01057OR)

What works is to get together and talk and have people from different backgrounds come together and talk about "here's what I know and here's what I think." And then be open to the possibility that you might learn something that changes your mind. (1-04952ME).

I thought the work groups were very interesting and informative… I do recall that some information new to me came out of those work group discussions. It was very worthwhile to listen to other people's ideas and experiences. (2-03242ZE)

The few who mentioned disagreements in the group generally appreciated the value of constructive debate.

It was interesting that we didn't all agree and that we all had different views on different things, and I liked that. If everybody agreed, what was the point? (1-02910DI)

It was a great opportunity to have an exchange and debate with… people in the small group had views different than mine, which I respect. It really gave an opportunity to expand… in a civil format and really deal with the specific facts instead of just media driven assessment that we tend to have. I'm always suspect of that. I found it very informative and very useful. (2-03161GO).

Nine participants voiced criticisms of the small groups. Generally the issues were that there were too many old men (the group was not representative of Idaho's citizenry), the discussion was too short, or that the discussion was not lively or strayed from its task. A few people felt that strong personalities dominated their group.

When you're out numbered, like us, for one… and men really aren't interested in what the other… age group, or female group has to say. I didn't think that they were very interested. Which was, I thought… I could feel that in the room, but I don't mind sitting in the background and listening. I didn't really have any great input. I did have a question, which of course never got answered because I never got to ask it. I realized very quickly that they couldn't care less. (1-00361SM)

It certainly wasn't a waste of time or anything, but as I say, I just don't think the participants were all that lively about things. Yeah, I think that nobody tried to throttle the discussions or anything. There just wasn't that much put forth as far as I could see. (5-02472MC)

It was more of opposing opinions being debated amongst a couple of people, and we never got to the point of creating… and making it a working meeting where you come up with a thoughtful question that would serve everybody's interests. (5-02458SA)
I wasn't as thrilled with the small group discussions. I think that some people just kind of overran it. Not the moderator but the people in the group… I mean some of the questions were just more self interested and silly. And in the overall scheme of things they weren't items that we should've had the panel address, because they were just dumb. (5-02792MI)

Participants were quite mixed in their assessments of the expert panel. Many felt that the panel was informative and interesting, and presented a good range of expertise and knowledge.

Absolutely, they were knowledgeable. And they kind of provided a nice little political insight. …But, overall, I think they had a good knowledge base, and they provided some interesting information. (2-00827NI)

A little bit of everybody there was represented and they covered all the points… Nobody was there pushing one item or one area. It was an overall representation and without any bias or this one is better than that one. It was pretty much what's available and what the good and bad points of each of them were. It was well presented for that part of it and interesting. I think that's what people need to see. At least that's what I like to see. I like to see the overall picture. What's out there, what's available, what my options are, so that I can make a better type decision. Knowing what's available and what the good and bad points are. That part of it was well represented. (4-02578PR)

Gosh, I can't think of any. It was an excellent panel. I enjoyed listening to them… I couldn't notice any bias… I was impressed with the whole panel. (1-04784RO)

Some felt that the panel could have been more diverse, for instance, *"maybe more who are involved in construction of alternative energy sources. Particularly the renewables. I think mainly what we had was more like people who work in like a think-tank environment. There's a big difference between that and actually implementing. But, overall very good I think" (1-04952ME).* Another thought that, while the panelists "*very, very knowledgeable in the presentation of their information"* they tended to be *"on the green side and people that were pro nuclear side. As far as that goes, I thought it was a good panel selection" (4-01897WI).*

A few people, generally those with extensive knowledge about energy, thought that there was not enough depth or specific information presented.

The technical presenters… I was, I have to admit, underwhelmed with. It was… I just felt like the presenters… the main presentations and the panel discussion… I felt like it was dumbed down to the lowest common denominator, honestly. (2-01232BE)

I was a little disappointed in the depth of knowledge of some of them. Again, that's probably because I am an electrical engineer and I work with power systems, so I'm probably a little more interested than the average guy would be. (4-03528LO)

As I said the expert panel was underwhelming, since I consider myself to be a significant…or close to an expert… The people that presented in it didn't know enough to…with a couple of exceptions… know enough to…they didn't present anything that I didn't already know in 1964 when I was taking my first Chemical Engineering class at the university. (5-02723SC)

Some had hoped for more debate among the panelists.

I think that my overall impression was that it was…with that many speakers… they didn't have much time to talk or really debate the issues. They all got up and just kind of said their spiel. (5-02792MI)

It seemed like the nuclear representative really didn't speak much. I would have… I wanted to learn more about nuclear because I've got some pretty fixed opinions about it and I was wanting to learn more… Nuclear's things is that it's so important, at least in terms of being readily talked about… and such a major decisions. I really do think we would have had more dialogue about the pros and cons of it. So that I think was kind of a drawback (2-03161GO).

There was some mention of geothermal but almost no solar or anything like that…like that doesn't exist in Idaho so there's no point in even discussing it. I thought that was rather…I felt that…you know geothermal should be an important factor in this state. (4-02262CU)

Despite generally favorable overall assessments, several participants noted that one or more of the panelists was biased or not objective. Interestingly, the speakers who were named most often, Marsha Smith and Arjun Makajani, were praised and criticized by almost equal numbers of participants. Less than half of the participants had comments about specific speakers, because they did not remember individuals or the points they made.

Yeah, I was very impressed [with Makajani]. He seemed very knowledgeable, very… not a zealot. And that impressed me. I mean he just seemed very knowledgeable about his facts, but you know… the non-nuclear approach to power generation. And I think his background is physics, and that was the other thing that swayed me. (1-04952ME)

That gal [Smith] was sharp man. She was sharp. She knows what she's talking about. I was impressed with her. I thought the gentleman from Idaho Power did a good job. Uhm…let's see the one gentleman that…I don't know how to quite say this. I think he was from the University of California. I was not impressed with him. No way. I just…he just didn't do anything for me at all. I mean I'm sure the man has got a lot of credentials, but I think that he was very opinionated. As far as what he thought should be done. (5-01069LI)

Well, I don't really remember other than I felt like she [Smith] was somewhat close-minded… I wasn't overly impressed with our representative from Idaho Power. Maybe not close-minded, but I don't know that he had as much to contribute as I was hoping he would. (2-03799VA)

I think that the individual… the male that was the head that was called upon most frequently… he was somewhat biased in favor of renewables or something like that. How can you talk about electricity and not be biased? I forgave him. (5-03552BE)

I'd say if anything it would've been nice if some of them were more open… Just more open to different ideas and options…but I totally understand, if all you do is one part or one option, of course you're going to be biased to that. It just seems like they were all just kind of…not so open I guess. (4-04984NA)

The question and answer portion of the expert panel elicited split evaluations: nearly half liked it (generally providing few specifics, only mentioning that it was "good" or "fine"), while just over half thought it was inadequate. The primary criticisms were that the session was too short, it did not provide sufficient depth of discussion or debate, and that individual citizens didn't have a chance to ask questions. A few individuals felt that the questions generated in their small groups were contrived or too elementary.

I thought it was a good idea to put it out there and everybody could ask questions and get their questions answered. It seemed to work pretty well. I thought it was a pretty good idea myself. (2-04392CA)

I think it worked very well. I thought the questions that had come from the small groups generated pretty powerful questions and kept that…they got a great pace a stimulating pace. (5-00036PO)

By the time the questions in some areas got around, there wasn't any time left. Some of the speakers… 1 or 2 of them… excellent job of speaking, but need to open it up for more questions, but by the time they got around to telling what they wanted to say… deliver their side of it… there wasn't an awful lot of time for questions. (4-04466VA)

I don't think an hour long lunch… well I think if you're serious about your questions with respect to energy policy, you could easily spend an hour with one of the individuals… with a panel of 5 or 6 in a room full of 50 people, each with a question or 2… it's certainly… I don't that was the intent of the hour long discussion. If you wanted serious questions and answers, you wouldn't limit that to an hour. (1-00312HE)

Some people in Treatment Groups 1 and 4, who did not participate in the small group discussions, thought they were going to have a chance to ask questions of the panel, but they were not given the opportunity. Their disappointment could have been due to false expectations, as well as being primed by John Freemuth's lecture to want to take a more active role.

It turned into more of a presentation. And not from individuals, consumers like myself, but more of the panelists. It may have kind of evolved that way. I don't know if it's any person's fault. I think it just… I did kind of walk with the thought like, "gosh, I don't feel like I had a chance to have my say." Not that I had my hand raised up all the time or anything. And then I started thinking, well maybe that wasn't the point, maybe the point was more education for me and then they sort out what they learned from the poll. Anyway, but yeah, but it did feel like maybe they could have learned something from the individuals attending. (1-03025NY)

In their overall assessments of the deliberative poll, 30 participants had positive things to say, while 19 offered criticisms. Positive comments focused on the value of the event for sharing broad information, raising individuals' personal knowledge, and increasing careful thought about issues. Only a few mentioned that having the chance to interact with other citizens was particularly positive.

> *I think it's pretty useful. I think it's important for citizens to understand what the alternatives are and what the positive and negative aspects of each resource decision is. I think it's good for everybody to have a better understanding of why you don't go build a nuclear plant. (4-03528LO)*
>
> *I would give it… on a scale of 1-10… about a 7. I thought it was better than what we're getting through the media and it was more balanced than what we get through the media. It's probably more truthful information too. In that case it rated pretty high. I think for the general public, it would be great. (4-03568BR)*
>
> *I think I had an attitude adjustment. I think it was… a favorable attitude adjustment. There were things that perhaps I even knew about, but I hadn't weighed sufficiently to include in my own arguments and understanding of the situation and circumstances. So I thought that the thing was great. (2-01057OR)*
>
> *It very much opened up my mind to thinking about the need for options and of the need for information about all the options. It let me know that the issues were more complicated than I thought… I think it focuses individuals who otherwise would not pay attention. It gives people a chance to respond or not to an area of particular individual interest. It honors people's opinions which seems to, at least for me, stimulate a desire to be involved. It exposes me, as well as others, to things that they otherwise don't think of on their own. (5-00036PO)*
>
> *I think it, like I said, was definitely worth my time. I'm definitely more informed now. I'm a true believer that knowledge is power… So, when I go to something like this, I can actually be a part of the conversation regarding energy policy in Idaho, and I can say that I probably have a more informed view than the person I'm talking with. You know, that doesn't make my opinion right or wrong…it's just that I think I have more information to base my opinion off of. So, I definitely thought it was a huge win for myself. It was definitely worth my time and I would definitely do another one. (4-04984NA)*
>
> *I'd love to participate in something like that again. Not only was it educational for me, but I felt like it could be potentially educational for the policy makers as well… I came away from that experience thinking that I'd love to do that again. And now that I know what it was like, I think maybe I would be more apt to force a conversation or get myself involved in the conversation…*
> ***How useful do you think deliberative polling is as a way to inform citizens on current issues?***
> *You know, if you would have asked me that before the session, I would have said not so much, because I think that people here in the West… we're pretty set in our ways. We're either one side of the fence or the other. But, having gone through the experience I know that I changed. I learned something. I maybe have changed my opinion a little bit on, like I said, natural gas. And I wondered how many other folks came away with that same thought that yeah, it changed you or I learned something. With that I thought, boy how effective that could be with other issues that face us. Not just energy policy but whatever. So, yeah, I definitely thought it was better*

than… most folks get their information, if you will, off the internet maybe or regular media (1-03025NY)

Negative comments generally focused on the limited participation – many people observed that the make-up was largely "old white men," and they doubted whether this represented the types of people who need to be involved in such discussions. A few thought that the high cost, involvement of those who already know about the issues, and lack of policy impact seriously limited the value of the event.

It was particularly the men there. And, I think they were in certain kinds of business. So, I thought that was not… you know, there was nothing I could do about it. So, and, I honestly thought it was a very male oriented thing. (1-00361SM)

The main thing on this issue or any issue is to get a better cross section of people…. I've just never seen so many white haired old men. (2-03161GO)

You know it could be [effective], but we need a bigger group of people to get it all out. Because, you know, we had a relatively small group. So, you know, I think we'd have to have a lot larger group of people to really get it spread very fast. (1-02910DI)

I think it's good, but it's too bad more citizens don't take part in it. That's the problem. I don't know how you get more people involved though. (2-04990SU)

It was people who already knew quite a bit of it. So how much additional they learn as a result of the conference I'm not sure. (1-01161SC)

I would say it's not useful and that's only because… in the situation that I was in… you had the most knowledgeable segment of the Boise population there I think. Not maybe the most, but the people that were there have a lot of interest and are above average knowledge. There is also a segment of the population that gets extremely mad about certain discussions and about the ideas… So what I'm saying is I think the greatest opportunity is with people who wouldn't necessarily attend something like that. I think you're getting a very biased sampling of the population, in other words. (2-01232BE)

Discussion and Conclusions

This study adds to the growing number of assessments of deliberative polling events by providing insights into effects on attitudes and civic engagement. Before discussing the contributions of the study, it is important to point out some limitations. Despite concerted efforts, we did not obtain a representative sample of citizens. In retrospect, this is not surprising. The event was discussing general energy issues, and was not focused on a particular real policy. We did not include incentives or media coverage, which have been shown to be very important in gaining participation (Kleinman et al. in press). Most other similar participatory processes have not achieved representation (Rowe et al. 2005; Kenyon 2005). Compared to the population as a whole, participants tend to be older, more educated, more male, and have higher levels of knowledge and activism (Abelson et al. 2003; Andersen & Hansen 2007; French & Laver 2009; Kleinman et al. in press; Parkins & Mitchell 2005). This was certainly true of our participants as well.

Evaluations of the Deliberative Poll

Most participants enjoyed taking part in the deliberative poll. Other studies report the same (Abelson et al. 2007; French & Laver 2009). People appreciated the effort to create a fair and balanced process, and some mentioned that fears about a "biased" process were not realized. It is important to remember, of course, that these sentiments reflect the views of the small, self-selected group of people who chose to attend the event.

The small group discussions were especially well-liked, and some people in treatments groups without discussion remarked that they would have liked the opportunity for discussion rather than a lecture on deliberative democracy. For some people, the small groups were an opportunity to share their knowledge with others, while others preferred to listen and learn.
People were divided about the expert panel. Many thought the panelists were diverse, knowledgeable, informative, and trustworthy. However, many others thought the information was shallow, that some speakers had an agenda, and that time was insufficient for meaningful debate and learning.

Few of the people who received the briefing documents recalled their contents or the impact they had, which is unfortunate, as the documents had the most detailed, concrete information. However, the few people who commented on the overview talk that covered the same material thought it was quite good and informative.

Attitude Changes

Interviews revealed that many participants felt they had learned important new information about Idaho's energy options. Many of those who were disappointed not to have learned more were already highly knowledgeable. Despite having gained knowledge, many people said that it had not affected their attitudes. Such a finding is in line with persuasion theories like the Elaboration Likelihood Model, which posits that people who have high levels of interest in a topic and strong prior attitudes are unlikely to be swayed by persuasive appeals. This is especially the case when balanced information is provided, because people can elaborate upon the elements that support their opinions, and use that information to counter-argue opposing positions (Eagly & Kulesa 1997; Petty et al. 1999).

We cannot draw firm conclusions about the effect of the event on long-term attitudes. It is clear that as much change occurred in the 8-10 months between the event and our interviews as happened during the deliberative poll event, but it is difficult to discern the causes for such changes. The literature is inconsistent about what types and magnitude changes might be expected. For instance, Andersen and Hansen (2007) found larger changes three months after a deliberative poll than immediately after two days of deliberation. However, French and Laver (2009) found very substantial changes in attitudes immediately after a participatory event, while 9 months later attitudes had regressed toward their initial levels. Overall, we believe that the effects of the deliberative poll on long-term attitudes were minor in the context of the personal lives and interests of most of our participants. Walmsley (in press) makes a similar point, that 1people's views about different policy options emerge largely from their particular life experiences and situations.

Civic Engagement

The interviews point to a strong, consistent finding that the deliberative poll did not increase civic engagement. Although participants did discuss the event with close friends and family, they did not encourage others to look into energy options or become active. Participants themselves were, for the most part, not inclined to seek out additional information about energy after the event. Only two people partook in any type of political activism, and both these individuals were people who tended to be active anyway. These findings are inconsistent with those of Eggins et al. (2007), who reported that participation increased civic engagement. Looking closely at their data, however, reveals that their participants were providing an indication of their likely future engagement, and no data on actual engagement were obtained. Our findings are more similar to those of Andersen and Hansen (2007) who did not find much increase in political behavior.

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Chapter 7. Limitations to the Research and Potential Future Research

Limitations of the Research

Every project is limited by funding, time or human resource, and this study was no different. However, the research team did recognize several key limits to this study. These limits may be cautionary to future researchers, or at minimum, describe some of the acknowledged shortfalls the team experienced.

One limitation to the study began with list acquired for the survey mailing. As a small population state, the pool of potential participants was constrained. The list, compiled from a variety of sources over time by the vendor, often contained only the 'head of household' or male residing at the address in the case of a married couple. It is unknown if the addressee actually passed the survey off to the adult with the most recent birthday, as they were asked to do. No measure was implemented to assess this. Additionally, it is thought that any resident who had lived a short time at the current residence was less likely to be on a compiled commercial list. Thus, these mobile or new residents may have been under-represented in the sample.

Recruitment of individuals to the event was challenging. The team did not anticipate the length of time and level of resources to recruit and remind potential participants, especially those who had difficulty committing to event participation. Even though some survey respondents were very interested in energy generation options in the state, and indicated willingness for future contact, actually getting people to commit to a Saturday in spring compounded the attendance shortfall. Many of those contacted explained that they had family obligations, had to work, or were unsure if they were free for the entire day. Some survey respondents asked to send their spouse/partner/friend/adult child to the event. These 'stand-ins' were declined. The actual event day also proved a challenge for getting those who had committed to attend to show up for the event. (The day was sunny and unseasonably warm, and too difficult for outdoors-oriented Idahoans to resist.)

Anecdotal evidence suggests that potential respondents who did not have 'any' or 'enough' prior knowledge about energy generation or energy policy were more likely not to respond or attend the deliberation event than those who reported that they had prior knowledge.

A disappointing aspect of the low event turnout was the limit to the resulting statistical power of the data from the treatment groups. A cell size of 22 was required to provide the power for analysis; the actual cell counts were between 14 and 20. This precluded much of the analysis to explain the results of the experimental design. This became a major limit of the study.

Complexity of the research design drove many decisions. The team had diverse interests, and serving all of them was impossible. The team had robust discussions about the objectives, and individual researchers willingly let go of aspects that might prove too difficult to operationalize. The experimental nature of the project was to provide the main learning from the study. However, the logistics of the event, and the tactical details of implementing a large event, proved difficult for a resource constrained team.

Potential Future Research

Because of the diverse interests of the research team, many aspects of the study begged more questions that were answered. Below is a list of ideas developed by the team.

- **Subject matter expert (SME) study.** Would more interaction between participants and SMEs influence participants preference? How would modifying the composition of the SMEs change the participants' perceptions? Does posing questions directly to the SME (vs. anonymously) create more change in perceptions? Does allowing follow-up questions cause more change in preference? Would attitudes and preferences change if participants had extended personal contact with SMEs? Does a panel discussion of SMEs produce more change in attitudes and perceptions than the plenary session? Does a smaller group in dialogue with a panel of SMEs produce more change in preferences? If participants learn more about fellow participants (e.g. develop trust) prior to the SME question period, does this produce change in preferences? Does a panel of strongly biased SMEs produce more change in participants' preferences?

- **Participant issue pre-education/knowledge-base study.** (Based on the premise that a person should have a base of knowledge of an issue prior to participation in deliberation of policy.) What difference in preference occurs when participants are exposed to 'balanced' information vs. 'biased' information prior to a deliberative event? Does 'self-testing' of knowledge (pre- and post reading) of information prior to the event produce change participant preferences? Does more active engagement (reading, testing, presentation of information, i.e. 'cause' reflection) prior to group discussion produce more change in attitudes and perceptions than the methods used (plenary, SMEs, limited questions, etc that they are more reflective? Does a greater command of the information about the issue contribute to: a more meaningful discussion in small group deliberations; greater change in preference; engagement with SMEs?

- **Methods assessment study.** Perform an assessment on the relative strengths and weaknesses and opportunities of the methodology vs. other methods of citizen engagement.

- **Assessment of pre- to post-change rationales.** Did participants at the event have more entrenched prior attitudes and preferences than non-participants? What factor(s) caused an individual change to the preference level pre-to post-event? What factors contributed to *individual* change pre/post? What methodological issues influenced the level of change? Were the factors of preference used relevant to the participants?

- **Additional analysis (if we had more data).** One key additional analysis that the research team still hopes to do is to check the correlations between Reflective Preference, Formative Preference, and Support measures to see how much consistency exists among them as a function of treatment group.

  According to Fishkin, Deliberative Polling is better than phone polling. In phone opinion polls, the public provides "off the top of their heads" answers that often do not have any relationship to how they will actually respond, when the issue actually starts affecting them directly. Based on this critique, one could infer that opinions gathered by Deliberative Polling processes are more highly correlated with how the public will respond when the issue at hand becomes personally relevant. That is, there should be better internal consistency between attitude and behavior, if Deliberative Polling really does what it claims.

If Deliberative Polling is a superior method of gaining public input, then one would expect to see the correlations between reflective preference, formative preference, and support to become more strongly positive from pre-test to post-test, especially for the participants in the treatment group that received the most interventions (all method of communication and briefing document and deliberation in small groups. Some initial efforts were made to perform this analysis. However, we encountered the problem of small sample sizes and low statistical power. Further studies of on this question or the use of statistical techniques (such as mean imputation) on the existing dataset are needed.

- Process questions (if we had more time and data). In the post-test questionnaire, we asked those who were at the April 18, 2009 event a number of "process" questions. Examples of process questions include:
    - The process increased my trust in other citizens participating today.
    - The process increased my trust in the experts.
    - The process improved my ability to communicate to other participants.
    - The process fostered my learning about the issues.
    - The process helped me consider different options to address the issues.
    - The process was efficient. It was time and money well spent.

  One question that we would have liked to answer is: What was the effect of the treatment/event group on participant answers to these questions? Specifically, did participants in the deliberation condition feel differently about the "process" than those in the conference only condition? This is important to know from the implementation standpoint. If participants felt the deliberation process was better than just the conference, then it provides evidence that it is worth going to the extra effort to provide people the opportunity to deliberate.

Chapter 8. Project Management and Lessons Learned from this Collaborative Project

Project management

The team used a variety of project management tools and techniques to complete this project. See Appendix D for descriptions of the roles and responsibilities of the team members. An overall project plan, research (R&D) plan, and individual task plans facilitated the many complexities. Documents describing the subject matter expert selection, training for facilitators, a project plan check-off document, and other useful matters researched by the team members are in Appendix D.

Microsoft Project was used to plan each major deliverable. 'Go-to-Meeting', a Centrix subscription site, allowed for document sharing during routine meetings and reviews. Agendas, action items, and open issues were tracked using MS Office Excel. A secure online 'portal' hosted by the Idaho National Laboratory provided a repository of current and archived documents available to all team members. Routine e-mail updates and meeting notices served to keep team members informed. A 'standing' weekly telephone conference call provided structure for delivering the project. Additionally, periodic in-person review meetings included all team members and relevant guests. A project manager provided processes and structure to maintain the work flow, address issues as they arose, and meet the project deliverables. The team scheduled very few face-to-face meetings and minimized travel whenever possible.

Lessons learned

It is important to clearly define roles and responsibilities of each member. Recruit for team members where skills and knowledge are lacking. The addition of several key 'ad hoc' team members augmented the skills the original team had, and created a better end product. For example, the use of ISU's Teri Peterson as a statistician was a fundamental improvement to the research design.

Collaboration across multiple institutions is bureaucratically frustrating. Plan for time to resolve policy and process issues. Each institution had policies and procedures for everything from the human subjects review process, to the requirements of the sponsored projects office, to the accounts payable function. When policy and process collide, an escalation path is needed for timely decision making.

To enhance productivity, resources should be budgeted for periodic face-to-face time with all collaborators. The focused effort as a team yields richer ideas than presenting ideas to the team remotely and to stay on task. Team needs time to form/storm/norm and time for group discussions outside of the routine task-oriented meetings. Remote conferencing enables collaboration across distances efficiently. Technology, however, may be limited in replicating face-to-face collaboration and the exchange of ideas.

Provide team members with tools to collaborate efficiently (online meetings, telephony, software, etc.) Audio conferencing worked well. Video conferencing did not. Check your institution's capacity and system requirements for compatibility.

As a team, plan for more time and people than you need for all critical elements; especially when assigning help with event management and document management. Don't under-resource critical components.

Typical survey response rates (of 25 – 30%) may not provide a sufficient pool of event attendees.
Plan sufficient time and people to recruit for the deliberation event and for the ongoing communication with potential participants.

Developing materials that are 'unbiased' may not be conducive to consensus. Develop a process, designate an owner and be willing to relinquish some control over non-life-threatening decisions.

Good training of the invited experts, facilitators, moderators and event helpers will reduce stress during the event.

Test materials used in the study with those unfamiliar with the project prior to deployment. Solicit feedback from those not involved in the project at multiple stages to address 'blind spots'. For example, rigorous testing revealed that the detailed construct definitions we provided were not helpful to the participants. 'Keep it simple' worked better, just as the test subjects told us.

Engaging the community in a substantive issue discussion is always positive for the institution, the policy makers and the citizens. However, participants in a quasi-experimental study may expect future contact or a means of continued discussion. Be prepared to field requests for more information, ongoing email communication or more opportunities to meet and discuss the topic of discussion.

See Appendix D for the team's insights about this collaborative effort, and the event debriefing notes.

Biographies of the Research Team

John C. Freemuth, Ph.D. Is the Senior Fellow, Cecil Andrus Center for Public Policy, Professor of Political Science and Public Administration at Boise State University, and served as Interim Director of the Energy Policy Institute. He is the author of an award-winning book as well as numerous articles on aspects of natural resource policy. He is also the author of nine Andrus Center white papers on public land policy, which were based on Center conferences. All Andrus Center white papers can be found at www.andruscenter.org. John has worked on numerous projects with the Forest Service, Bureau of Land Management and National Park Service at the federal level, and the Departments of Fish and Game, Parks and Recreation, and Division of Environmental Quality of the State of Idaho, among others. He was past chair of the Science Advisory Board of the Bureau of the Canada-U.S. natural gas trade and deregulation of the natural gas industry.

Ann Hunter, Ph.D. Is department Chair of Sociology, Social Work, and Criminal Justice, and Director of the Ifft Social Sciences Methodology Lab. She has been PI or Co-PI on approximately $500,000 in grants or contracts focusing on public perceptions of dangers associated with moving transuranic waste on public highways, attitudes regarding the conservation and preservation of Idaho's natural resources, and on the environmental attitudes of business people including farmers and ranchers in southeastern Idaho. Dr. Hunter is the author or co-author of seven referred articles and five technical reports about the views and perceptions of Idahoans regarding environmental issues. Dr. Hunter has worked on numerous projects with agencies including the Boise National Forest, US Forest Service, Boise District, US Bureau of Land Management, US Bureau of Reclamation, Idaho Department of Commerce, Idaho Department of Fish and Game, Idaho Department of Parks and Recreation, Idaho Department of Water Resources, the Idaho State Police, and the Idaho Department of Transportation. Currently she is working with colleagues from Boise State, University of Idaho, and the INL to advance the renaissance of nuclear energy within Idaho.

Steven Piet, Sc.D. He is a 24-year veteran at the INL, has 38 peer-reviewed publications, authored the safety-environmental chapter of an International Atomic Energy Agency (IAEA) book on Inertial Fusion Reactors and co-authored the long-term performance chapter of a DOE/EPA book on landfill caps and covers. At the INL, he has worked in fusion safety and technology, the Laboratory-Directed R&D program office, the Environmental Systems Research and Analysis (ESRA) program, an ESRA project to understand long-term performance of near-surface engineering environmental barriers, a project on making and keeping complex decisions, and, since 2003, the Advanced Fuel Cycle Initiative (AFCI).

As evidence of his interest in communication, Dr. Piet is a trained facilitator (and past member) through the International Association for Public Participation, and has achieved the level of Advanced Communicator-Silver in Toastmasters International. He has led a previous LDRD-funded projects on improved decision making and a DOE-funded project on stakeholder analysis for the Next Generation Nuclear Plant (NGNP) project.

Patrick Wilson, Ph.D. Is Associate Professor of Natural Resource Policy at the University of Idaho. He holds a joint appointment in the Department of Conservation Social Sciences (College of Natural Resources) and the Department of Political Science (College of Letters, Arts, and Social Science). In addition, he is a member of the core faculty group responsible for administering the University of Idaho's new, interdisciplinary Waters of the West Program, and serves on the advisory board for the Inland Northwest Research Alliance (INRA) Water Resources Program. Research and teaching interests are water and energy policy, public lands management, and the politics of species conservation. He is the author of a number of articles that include such topics as tribal governments as mangers of natural resources, the politics of hydropower in the Pacific Northwest, and the role of state governments in the management of endangered species. His most recent publications are a study of the politics of hydropower project re-licensing (*Environmental Practice*) and the policy challenge associated with delisting species (*Society and Natural Resources*).

Troy E. Hall, Ph. D. is Professor in the Department of Conservation Social Sciences in the College of Natural Resources, University of Idaho. She has conducted extensive research on communication related to natural resource issues, including how persuasive messages from land managers are processed by the public. She has also conducted research on public perceptions of risk associated with various natural resource issues, such as wildfire and insect infestations, and how those risk perceptions affect support for policies and homeowner behaviors. Having been PI or Co-PI on more than $1,000,000 in research funding, she has published more than 30 peer-reviewed journal articles and delivered nearly 70 conference presentations.

Dr. Hall has worked with the US Forest Service, National Park Service, and Bureau of Land Management across the country, and she is a member of the US Forest Service's national Wilderness Information Management Steering Team. Dr. Hall teaches courses in environmental psychology theory, social research methods, and natural resource communication. She is Editor-in-Chief of the international journal, *Society & Natural Resources*, and previously was Associate Editor for the Journal of *Leisure Research*, *Forest Science*, the *International Journal of Wilderness*, and the *Journal of Interpretation Research*

Michael Louis, M.P.A., M.S.I.E., Assistant Director, Energy Policy Institute. He has 20 years of experience leading major initiatives and projects in both the public and private sector. He has served as the project lead for the completion of the Social Science Research Center's 16th Annual Public Policy Survey and the Energy Policy Institute's 2007 Idaho Energy Policy Survey. He was also a team member contributing to the completion of Deliberation Day 2004 sponsored by McNeil/Lehrer which used Deliberative Polling to assess public opinion on issues affecting the 2004 presidential election.

Carole Nemnich, M.P.A., Associate Director, the Public Policy Center, and Project Manager, the Social Science Research Center. She currently manages the project portfolio of the Public Policy Center and Social Science Research Center at Boise State University, including the annual public policy survey. She has designed, implemented and reported on numerous studies used to inform policy makers and citizens on issues of importance. She has over 20 years of experience in communications, marketing, and social science research in the private and public sectors. For the 2004 Deliberation Day project at Boise State, she managed the local issues survey, was the team lead for overall data collection and reporting, and served as a liaison to the McNeil/Lehrer team. Her research clients include the Idaho Department of Labor, the State Independent Living Council, the Idaho Transportation Department, the Idaho Department of Environmental Quality, the Idaho State Library Commission, the Idaho Department of Agriculture, the Idaho Commission for the Arts, the Idaho Hunger Taskforce, and various others.

Jeffrey C. Joe, M.S. Social Psychology, INL. He has been a Human Factors research scientist at the Idaho National Laboratory for the last 7 years. His research interests are in the general areas of human factors, social, and organizational psychology. Specific research areas of interest include: human performance, organizational influences on human performance, attitudes and attitude change, human reliability analysis, and decision-making. He has recently been the project manager for Human Factors research activities with the US Nuclear Regulatory Commission and the National Aeronautics and Space Administration.

Eileen DeShazo, M.P.A, was a graduate student working for the Energy Policy Institute at Boise State University. She recently became the Executive Director of Northwest Animal Companions, moving from the Idaho Office of Energy, where she managed programs. Eileen was the real energy behind the survey and the Deliberation Event at BSU.

Tina Giannini, an Idaho native, is a graduate student in the Master's of Sociology program at Idaho State University. Tina has worked on the Public Discourse project for a year during which she cleaned the data set and assisted in testing Research Question 3. Tina plans to complete her Master's degree in June, 2011 after which she will enter a doctoral program specializing in methods and statistics.

Teri Peterson is a statistical consultant and lecturer at Idaho State University. Teri has earned a Master's in Biology, and a Master's in Statistics. She is currently working on a Doctorate in Educational Leadership. She has been a statistical consultant for faculty and graduate students at ISU for 18 years. In addition, she teaches Business Statistics.

Kendelle Vogt, M.P.A, was a graduate student working for the Energy Policy Institute at Boise State University. She also completed her certificate in Urban and Regional Planning while obtaining her Master's. She recently worked for Idaho Smart Growth. Her role was managing and analyzing data from the research and organizing the materials used for writing the final report.

Jennie Newman, is a master's student in the Conservation Program at Idaho State University. Jennie was a major contributor to the post-event study. She was responsible for data collection and assisted with analysis.

Steven Sorenson, is a master's student in Political Science at University of Idaho. He contributed to the data base construction and data collection.

APPENDIX A

1. Survey Instrument:

These definitions may assist you while taking the survey.

Please note that each issue listed below may be impacted during the policy process, fuel exploration, site construction, use, or discontinuation of use, or site restoration resulting from the use of an electricity option. *When answering the questions, please keep each stage in mind.*

Safety and Security: No personal harm, property damage, or accidents as a direct result of human actions or naturally occurring events.

Reliability and Predictability: The ability of an electricity option to perform consistently and maintain its functions both short term and long term, under normal and unexpected circumstances.

Trust: An expectation that an electricity industry or regulating body will fulfill policies, ethical codes, laws, and previous promises.

Harm to the Environment: Harm to air, land, water, wildlife, or other natural resources.

Cost: Negative impact on taxes, government subsidies, bills paid directly to utilities by consumers, private investment, and/or reduction in property values.

Responsiveness and Adaptability: Time to construct or add to electricity generation facilities; or the ease with which an electricity option can change in order to meet temporary or permanent growth or reduction in electricity demand.

Harm to Aesthetics: Negative impact on the way something looks, sounds, or smells.

Benefits: Additional advantages and value resulting from a particular electricity option **beyond** the primary benefit of meeting electricity demand.

Electricity Options

Energy Efficiency and Conservation: The use of less energy or the use of technology that requires less energy to perform the same function.

Fossil Fuels: The use of coal, oil, or natural gas resources to create electricity.

Hydropower: The use of natural or artificial water flow to create electricity.

Nuclear: The use of uranium to create electricity.

Renewable: The use of solar, wind, and geothermal electricity resources.

1. For the following question, please circle the letter that best represents you.

A. I am very knowledgeable about energy issues.

B. I am somewhat knowledgeable about energy issues.

C. I am not very knowledgeable about energy issues.

D. I am not at all knowledgeable about energy issues.

E. Don't know/not sure

2. In your opinion, energy policy decisions should primarily be made by which of the following? Please circle one option.

A. Government agencies

B. Business and industries involved in the generation of electricity

C. Groups or organizations that advocate for a particular energy position

D. Citizens

E. Elected officials

F. No opinion

3. How **important** to you are the following issues when deciding the best way to meet the electricity needs of homes and businesses? Please place an X in the box that best represents your current opinion.

	Not at all Important					**Neutral**					**Very Important**		**No Opinion**
	-5	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**		**NO**
Safety and Security													
Reliability and Predictability													
Trust													
Impact to the Environment													
Cost													
Responsiveness and Adaptability													

Aesthetics													
Other Benefits													

4. How would you rate your **preference** for each of the following electricity options? Please place an X in the box that best represents your current opinion.

	Not at all Preferred					**Neutral**					**Very Preferred**		**No Opinion**
	-5	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**		**NO**
Energy Conservation And Efficiency													

Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

Safety and Security: *No personal harm, property damage, or accidents as a direct result of human actions or naturally occurring events.*

5. How **safe and secure** are each of the following electricity options? Please place an X in the box that best represents your current opinion.

	Not at all Safe and Secure					Neutral					Very Safe and Secure		No Opinion
	-5	-4	-3	-2	-1	0	1	2	3	4	5		NO
Energy Conservation And Efficiency													
Fossil Fuel Electricity Generation													

Hydropower Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

Reliability and Predictability: *The ability of an electricity option to perform consistently and maintain its functions both short term and long term, under normal and unexpected circumstances.*

6. How **reliable and predictable** are each of the following electricity options? Please place an X in the box that best represents your current opinion.

	Not at all Reliable										**Very**		**No**

	and Predictabl e					Neutral					Reliable and Predictable		Opinion
	-5	-4	-3	-2	-1	0	1	2	3	4	5		NO
Energy Conservation And Efficiency													
Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													

Nuclear Electricity Generation													
Renewable Electricity Generation													

Trust: *An expectation that an electricity generation industry or regulating body will fulfill policies, ethical codes, laws, and previous promises to the public.*

7. How **trustworthy** are each of the following electricity option industries? Please place an X in the box that best represents your current opinion.

	Not at all Trustworthy					**Neutral**					**Very Trustworthy**		**No Opinion**
	-5	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**		**NO**

Energy Conservation And Efficiency													
Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

Harm to the Environment: *Harm to air, land, water, wildlife, or other natural resources.*

8. How much **harm to the environment** do you think each of the following electricity options have? Please place an X in the box that best represents your current opinion.

	Much Harm to the Environmen t					Neutral					No Harm to the Environmen t		No Opinion
	-5	-4	-3	-2	-1	0	1	2	3	4	5		NO
Energy Conservation And Efficiency													

Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

Cost: *Negative impact on taxes, government subsidies, bills paid directly to utilities by consumers, private investment, and/or reduction in property values.*

9. How **costly** are each of the following electricity options? Please place an X in the box that best represents your current opinion.

	Very Costly					Neutral					Not at all Costly		No Opinion
	-5	-4	-3	-2	-1	0	1	2	3	4	5		NO
Energy Conservation And Efficiency													
Fossil Fuel Electricity Generation													
Hydropower													

Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

Responsiveness and Adaptability: *Time to construct or add to electricity generation facilities; or the ease with which an electricity option can change in order to meet temporary or permanent growth or reduction in electricity demand.*

10. How **responsive and adaptable** are each of the following electricity options? Please place an X in the box that best represents your current opinion.

	Not at all Responsive and					**Neutral**					**Very Responsive and**		**No Opinion**

	Adaptable										Adaptable		
	-5	-4	-3	-2	-1	0	1	2	3	4	5		NO
Energy Conservation And Efficiency													
Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													
Nuclear Electricity													

Generation													
Renewable Electricity Generation													

Harm to Aesthetics: *Negative impact on the way something looks, sounds, or smells.*

11. How much **harm to aesthetics** does each of the following electricity options have? Please place an X in the box that best represents your current opinion.

	Much Harm to Aesthetics					**Neutral**					**No Harm to Aesthetics**		**No Opinion**
	-5	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**		**NO**
Energy													

Conservation And Efficiency													
Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

Benefits: *Additional advantages and value resulting from a particular electricity option* ***beyond*** *the primary benefit of meeting electricity demand.*

12. How valuable to you are the **benefits** of each of the following electricity options? Please place an X in the box that best represents your current opinion.

	Not at all Valuable Benefits					**Neutral**					**Very Valuable Benefits**		**No Opinion**
	-5	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**		**NO**
Energy Conservation And Efficiency													

Fossil Fuel Electricity Generation													
Hydropower Electricity Generation													
Nuclear Electricity Generation													
Renewable Electricity Generation													

13. Assume your electricity bill is 100 dollars. You get to tell your power company how to use your money to buy different electricity options as they currently exist to meet electricity needs of homes and businesses.

Please place a dollar amount next to the option(s) that best represent(s) your current level of support for each alternative.

You may allocate your $100 in any combination as long as your total adds up to $100 and only $100.

A. Electricity Conservation and Efficiency	$_______
B. Fossil Fuel Electricity Generation	$_______
C. Hydropower Electricity Generation	$_______
D. Nuclear Power Generation	$_______
E. Renewable Electricity Generation	$_______
	TOTAL $____100

14. While there are many challenges to each electricity option, we have identified one challenge associated with each. **If you think something else is a higher priority, please write it under "other."**

Next, imagine that you could tell the Government how to allocate $100 of your income tax toward research intended to solve these challenges. Write in the portion of your $100 next to the option(s) that best represent(s) your current level of support.

You may allocate your $100 in any combination of priorities (including ones that you add) as long as your total adds up to $100 and only $100.

A. Solutions addressing funding issues related to house and building energy conservation and efficiency projects.	**$**_______
B. Solutions that address greenhouse gas emissions from fossil fuel power plants.	**$**_______
C. Solutions that address salmon migration issues from hydropower electricity generation.	**$**_______
D. Solutions that address nuclear waste associated with nuclear electricity generation.	**$**_______
E. Solutions that address variability of renewable electricity generation.	**$**_______
F. Other (please describe):____	**$**_______
TOTAL	**$____100**

15. What is the likelihood that a solution will be found to minimize or eliminate the following problems within the next 10 years **given that there is adequate funding**? Please place an X in the box that best represents your opinion.

	Very Unlikely					Neither Likely Nor Unlikely					Very Likely		No Opinion
	-5	-4	-3	-2	-1	0	1	2	3	4	5		NO
Current consumer, utility, and government resistance to making investments in house and building energy conservation and efficiency projects													
Reducing or eliminating greenhouse gas emissions from fossil fuel electricity													

plants.													
Current roadblocks to salmon migration from hydro-power electricity generation													
Nuclear waste associated with nuclear electricity generation													
Intermittency, availability, and predictability concerns from renewable electricity generation.													

For the following questions, please circle one correct response.

16. Within its borders, Idaho has abundant resources of which one of the following? (If you don't know, please choose the "don't know/not sure" option).

A. Uranium

B. Natural gas
C. Wind
D. Coal
E. Don’t know/not sure

17. Of the electricity that Idaho consumes, the majority comes from what one source? (If you don’t know, please choose the “don’t know/not sure” option).

A. Fossil fuels
B. Renewables
C. Nuclear
D. Hydropower
E. Don’t know/not sure

18. Of the electricity that Idaho produces, the majority comes from what one source? (If you don’t know, please choose the “don’t know/not sure” option).

A. Fossil fuels
B. Renewables
C. Nuclear

D. Hydropower
E. Don’t know/not sure

19. Which one of the following electricity options is the fastest to implement? (If you don’t know, please choose the “don’t know/not sure” option).

A. Hydropower
B. Energy conservation and efficiency
C. Nuclear
D. Renewables
E. Don’t know/not sure

For the following questions, please circle the letter that best represents you.

20. What is your gender?

A. Male
B. Female

21. Which of the following racial or ethnic group (or groups) best describe you?

A. White or Caucasian
B. Hispanic or Latino
C. Black or African American
D. Asian American

E. American Indian or Alaskan Native
F. Other (please specify) ____
G. Multiple (please specify) ____
H. Don't Know/Not Sure

22. What is your current marital status?

A. Single, never married
B. Married
C. Divorced
D. Separated
E. Widowed

23. What is your age?

_______ (Please enter your age in whole years.)

_______ I prefer not to answer

24. How many consecutive years have you lived in Idaho? _______ (If less than one year, please write 0).

25. ***If you have lived less than 5 years in Idaho*****, what was the most important reason that you moved to or**

returned to this state? (If you have lived in Idaho for more than 5 years, please leave blank.)

A. For employment opportunities
B. To retire
C. Quality of life
D. To obtain an education
E. To be near friends or family
F. Or some other reason (please describe) ____
G. Don't Know/Not Sure

26. Have you voted in an election in the past two years?

A. Yes
B. No
C. Don't Know/Not Sure

27. What is the highest level of school or college that you have completed?

A. Less Than High School
B. High School Graduate or GED
C. 2-Year or Associates Degree
D. Some College but Less Than 4 Years

E. Trade or Vocational Certificate
F. 4-Year College Graduate (Bachelors or 4-Year Degree)
G. Some Graduate School
H. Masters Degree
I. Doctorate or Professional Degree (PHD, MD, JD)
J. Something Else (please specify) ____
K. Don't Know/Not Sure

(Survey continues on next page)

28. Please choose one range that describes your annual household income from all sources.

A. Less than $9,999
B. $10,000 up to $19,999
C. $20,000 up to $29,999

D. $30,000 up to $39,999
F. $40,000 up to $49,999
G. $50,000 up to $59,999
H. $60,000 up to $69,999
I. $70,000 up to $79,999
J. $80,000 up to $89,999
K. $90,000 up to $99,999
L. More than $100,000
M. Don't Know/Not Sure
N. I prefer not to answer

29. What political party best represents you?

A. Democrat
B. Republican
C. Independent
D. Other (please specify) ____
E. Don't Know/Not Sure

30. In general, where are you on the ideological spectrum?

A. Very conservative
B. Somewhat conservative
C. Middle of the road

D. Somewhat liberal
E. Very liberal
F. Don’t Know/Not Sure

31. What is your current housing arrangement?

A. I am a home owner
B. I rent
C. I live with another that pays cost of my housing
D. I live in a dorm, nursing home, or other group facility
E. Other (Please describe) ____
F. Don’t know/not sure

32. Please estimate the amount of your average monthly electricity bill.

$__________

(or)

A. My household does not pay for electricity.
B. Don’t know/Not sure

33. What is your employment status? (Please circle all that apply.)

A. Employed for wages, part-time
B. Employed for wages, full-time

C. Self-employed
D. Out of work for more than 1 year
E. Out of work for less than 1 year
F. A homemaker
G. A student
H. An employed student
I. Retired
J. Volunteer
K. Unable to work
L. Other (please describe) ____
M. Don't know/not sure

(Survey continues on next page)

34. Which profession/occupation group best describes your primary employment? (Please circle all that apply.)
A. Management, professional, or related occupation
B. Service occupations
C. Sales or office occupation
D. Farming, fishing, forestry, or mining
E. Construction, extraction, or maintenance
F. Production, transportation or material moving
G. Government
H. Other (Please describe) ____

I. Don’t know/not sure

35. Which group best describes the entity where you work?

A. Employee of a **private for-profit** company or business or of an individual, for wages, salary or commissions
B. Employee of a **private not-for-profit**, tax-exempt, or charitable organization
C. Local government employee (city, county, etc.)
D. State government employee
E. Federal government employee
F. Self-employed in own **non-incorporated** business, professional practice, or farm
G. Self-employed in own **incorporated** business, professional practice, or farm
H. Working **without pay** in family business or farm
I. Other (Please describe) ____
J. Don’t know/not sure

36. In which Idaho County is your primary residence located.

A. Ada
B. Adams
C. Boise
D. Canyon
E. Elmore
F. Gem
G. Owyhee
H. Payette
I. Valley
J. Washington
K. Other, Please specify. ___________________________

37. **What is the zip code of your *primary* residence? ________________**

38. **For the following question, please include all members of your household.**

A. ______ How many members of your household, including yourself, are 18 years of age or older?

B. ______ How many members of your household are 17 years of age or younger?

39. **Do you consider yourself living in a rural, suburban, or urban area?**

A. Rural

B. Urban

C. Suburban

D. Don't Know/Not Sure

40. **Over the past two years, have you personally participated in a political campaign by doing any of the following: (Please circle all that apply.)**

A. Contributed your money (to a candidate, political party, or an organization that supported candidates).

B. Volunteered or given your time (to distribute flyers, perform campaign work, phone voters, drive voters to the polls, or other actions).

C. Publicly demonstrated your candidate choice (by publicly distributing campaign flyers, putting up a yard sign, attending a rally or meeting, writing a letter to the editor, or other activity).

D. I have done at least one of these but not in the past two years.

E. I have never done any of these activities

41. **Over the past two years, have you personally participated in an issue of local or statewide importance by doing any of the following: (Please circle all that apply.)**

A. Contributed your money (to a candidate, political party, or an organization that supported candidates).

B. Volunteered or given your time (to distribute flyers, perform campaign work, phone voters, drive voters to the polls, or other actions).
C. Publicly demonstrated your candidate choice (by publicly distributing campaign flyers, putting up a yard sign, attending a rally or meeting, writing a letter to the editor, or other activity).
D. I have done at least one of these but not in the past two years.
E. I have never done any of these activities

42. Have you ever participated in an event, campaign, individual action, or other form of engagement related to energy policy matter*s*? (Please circle all that apply.)

A. Contributed your money (to a candidate, political party, or an organization that supported candidates).
B. Volunteered or given your time (to distribute flyers, perform campaign work, phone voters, drive voters to the polls, or other actions).
C. Publicly demonstrated your candidate choice (by publicly distributing campaign flyers, putting up a yard sign, attending a rally or meeting, writing a letter to the editor, or other activity).
D. I have done at least one of these but not in the past two years.
E. I have never done any of these activities

(End of survey)

2. Frequencies – Pre-survey Results

Table A.1: For the following question, please circle the letter that best represents (your)

Knowledge of energy issues

	Frequency	Percent
I am very knowledgeable about energy issues.	82	16.7
I am somewhat knowledgeable about energy issues.	345	86.8
I am not very knowledgeable about energy issues.	59	98.8
I am not at all knowledgeable about energy issues.	6	100.0
Total	492	
Don't know/not sure	3	

Table A.2: In your opinion, **Energy policy decisions** should primarily be made by:

	Frequency	Percent
Government agencies	90	20.0
Business and industries involved in generation of electricity.	99	22.0
Groups or organizations that advocate for a particular energy position.	19	4.2
Citizens	171	38.0
Elected officials	71	15.8
Total	450	100.0
No opinion	28	

A.3: How important to you is **SAFETY and SECURITY** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent
-4	1	.2
Somewhat important	2	.4
-2	3	.6
-1	2	.4
Neutral	14	2.8
1	17	3.4
2	34	6.7
Not very important	60	11.9
4	95	18.8
Very important	276	54.8
Total	504	100.0
No opinion	3	

A.4: How important to you is **RELIABILITY and PREDICTABILITY** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	**Percent**
Neutral	**4**	**.8**
1	**6**	**1.2**
2	**19**	**3.8**
Somewhat important	**54**	**10.7**
4	**113**	**22.4**
Very important	**309**	**61.2**
Total	**505**	**100.0**
No opinion	**4**	

A.5: How important to you is **TRUST** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent
Not at all important	1	.2
-2	1	.2
Neutral	37	7.5
1	11	2.2
2	26	5.3
3	66	13.4
4	83	16.8
Very important	268	54.3
6	1	.2
Total	494	100.0
No opinion	12	

A.6: How important to you is **IMPACT TO THE ENVIRONMENT** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent
Not at all important	2	.4
-4	3	.6
-3	2	.4
-2	4	.8
-1	8	1.6
Neutral	19	3.8
1	29	5.8
2	40	8.0
3	81	16.1
4	106	21.1
Very important	208	41.4
Total	502	100.0
No opinion	4	

A.7: How important to you is **COST** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent

-3	3	.6
-2	1	.2
-1	6	1.2
Neutral	32	6.3
1	17	3.4
2	46	9.1
3	74	14.7
4	96	19.0
Very important	229	45.4
Total	504	100.0
No opinion	2	

A.8: How important to you is **RESPONSIVENESS and ADAPTABILITY** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent
-3	2	.4
-2	1	.2
-1	2	.4
Neutral	41	8.2
1	22	4.4
2	47	9.5
3	107	21.5
4	105	21.1
Very important	170	34.2
Total	497	100.0
No opinion	8	

A.9: How important to you is **AESTHETICS** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent
Not at all important	21	4.2

-4	11	2.2
-3	20	4.0
-2	6	1.2
-1	18	3.6
Neutral	95	19.2
1	56	11.3
2	56	11.3
3	89	18.0
4	58	11.7
Very important	65	13.1
Total	495	100.0
No opinion	11	

A.10: How important to you is **OTHER BENEFITS** when deciding the best way to meet electricity needs of homes and businesses?

	Frequency	Percent
Not at all important	6	1.7
-3	3	.8
-2	2	.6
-1	1	.3
Neutral	122	34.6
1	22	6.2
2	35	9.9
3	64	18.1
4	46	13.0
Very important	52	14.7
Total	353	100.0
No opinion	95	

A.11: How would you rate your **preference of ENERGY CONSERVATION and EFFICIENCY?**

	Frequency	Percent
Not at all preferred	5	1.0
-4	1	.2
-3	4	.8

-2	3	.6
-1	2	.4
Neutral	27	5.4
1	18	3.6
2	37	7.4
3	75	14.9
4	93	18.5
Very preferred	237	47.2
Total	502	100.0
No opinion	1	

A.12: How would you rate your **preference of FOSSIL FUEL** electricity generation?

	Frequency	Percent
Not at all preferred	73	14.7
-4	19	3.8
-3	34	6.8
-2	28	5.6
-1	43	8.7
Neutral	67	13.5
1	42	8.5
2	54	10.9
3	60	12.1
4	40	8.0
Very preferred	37	7.4
Total	497	100.0
No opinion	5	

A.13: How would you rate your **preference of HYDROPOWER** electricity generation?

	Frequency	Percent
Not at all preferred	5	1.0
-4	5	1.0
-3	4	.8
-2	7	1.4

	Frequency	Percent
-1	6	1.2
Neutral	40	8.0
1	26	5.2
2	45	9.0
3	71	14.1
4	89	17.7
Very preferred	204	40.6
Total	502	100.0
No opinion	4	

A.14: How would you rate your **preference of NUCLEAR** electricity generation?

	Frequency	Percent
Not at all preferred	64	12.8
-4	9	1.8
-3	16	3.2
-2	8	1.6
-1	9	1.8
Neutral	48	9.6
1	24	4.8
2	32	6.4
3	69	13.8
4	68	13.6
Very preferred	154	30.7
Total	501	100.0
No opinion	6	

A.15: How would you rate your **preference of RENEWABLE** electricity generation?

	Frequency	Percent
Not at all preferred	8	1.6
-4	3	.6
-3	3	.6
-2	2	.4
-1	2	.4

Neutral	22	4.4
1	14	2.8
2	22	4.4
3	49	9.8
4	82	16.3
Very preferred	295	58.8
Total	502	100.0
No opinion	5	

A.16: How **safe and secure is ENERGY CONSERVATION and EFFICIENCY**?

	Frequency	Percent
Not at all safe and secure	5	1.0
-3	2	.4
-2	1	.2
-1	4	.8
Neutral	40	8.3
1	16	3.3
2	30	6.3
3	54	11.3
4	81	16.9
very safe and secure	247	51.5
Total	480	100.0
No opinion	21	

A.17: How **safe and secure is FOSSIL FUEL** electricity generation?

	Frequency	Percent
Not at all safe and secure	32	6.5
-4	24	4.8
-3	24	4.8
-2	21	4.2
-1	45	9.1
Neutral	54	10.9

1	46	9.3
2	51	10.3
3	63	12.7
4	72	14.5
Very safe and secure	64	12.9
Total	496	100.0
No opinion	7	

A.18: How **safe and secure is HYDROPOWER** electricity generation?

	Frequency	Percent
Not at all safe and secure	4	.8
-3	10	2.0
-2	8	1.6
-1	12	2.4
Neutral	39	7.8
1	22	4.4
2	32	6.4
3	76	15.3
4	111	22.3
Very safe and secure	184	36.9
Total	498	100.0
No opinion	8	

A.19: How safe and secure is NUCLEAR electricity generation?

	Frequency	Percent
Not at all safe and secure	57	11.4
-4	23	4.6
-3	20	4.0
-2	15	3.0
-1	23	4.6
Neutral	47	9.4
1	27	5.4

2	48	9.6
3	62	12.4
4	80	16.1
Very safe and secure	96	19.3
Total	498	100.0
No opinion	7	

A.20: How **safe and secure is RENEWABLE** electricity generation?

	Frequency	Percent
Not at all safe and secure	5	1.0
-4	3	.6
-3	1	.2
-2	1	.2
-1	3	.6
Neutral	34	7.0
1	13	2.7
2	29	5.9
3	47	9.6
4	116	23.8
Very safe and secure	236	48.4
Total	488	100.0
No opinion	16	

A.21: How **reliable and predictable is ENERGY CONSERVATION and EFFICIENCY**?

	Frequency	Percent
Not very reliable and predictable	18	3.8
-4	6	1.3
-3	11	2.3
-2	7	1.5
-1	14	2.9
Neutral	54	11.4
1	33	6.9
2	41	8.6

3	66	13.9
4	79	16.6
Very reliable and predictable	146	30.7
Total	475	100.0
No opinion	28	

A.22: How **reliable and predictable is FOSSIL FUEL** electricity generation?

	Frequency	Percent
Not very reliable and predictable	22	4.5
-4	14	2.8
-3	15	3.0
-2	11	2.2
-1	21	4.3
Neutral	44	8.9
1	33	6.7
2	50	10.2
3	102	20.7
4	84	17.1
Very reliable and predictable	96	19.5
Total	492	100.0
No opinion	13	

A.23: How **reliable and predictable is HYDROPOWER** electricity generation?

	Frequency	Percent
-4	2	.4
-3	14	2.8
-2	9	1.8
-1	6	1.2
Neutral	33	6.5
1	22	4.4
2	60	11.9
3	96	19.0
4	105	20.8

Very reliable and predictable	158	31.3
Total	505	100.0
No opinion	3	

A.24: How **reliable and predictable is NUCLEAR** electricity generation?

	Frequency	Percent
Not very reliable and predictable	29	5.9
-4	9	1.8
-3	14	2.9
-2	7	1.4
-1	14	2.9
Neutral	42	8.6
1	18	3.7
2	35	7.1
3	80	16.3
4	90	18.3
Very reliable and predictable	153	31.2
Total	491	100.0
No opinion	14	
Total	548	

A.25: How **reliable and predictable is RENEWABLE** electricity generation?

	Frequency	Percent
Not very reliable and predictable	17	3.5
-4	4	.8
-3	22	4.5
-2	16	3.3
-1	22	4.5
Neutral	45	9.3
1	32	6.6
2	61	12.6
3	85	17.6
4	79	16.3

Very reliable and predictable	101	20.9
Total	484	100.0
No opinion	20	

A.26: How trustworthy is the ENERGY CONSERVATION and EFFICIENCY industry?

	Frequency	Percent
Not at all trustworthy	18	3.8
-4	9	1.9
-3	16	3.4
-2	11	2.3
-1	18	3.8
Neutral	64	13.6
1	26	5.5
2	54	11.5
3	72	15.4
4	69	14.7
Very trustworthy	112	23.9
Total	469	100.0
No opinion	34	

A.27: How trustworthy is the FOSSIL FUEL electricity generation industry?

	Frequency	Percent
Not at all trustworthy	44	9.1
-4	20	4.1
-3	28	5.8
-2	23	4.8
-1	31	6.4
Neutral	65	13.4
1	41	8.5
2	62	12.8
3	72	14.9
4	47	9.7
Very trustworthy	51	10.5

Total	484	100.0
No opinion	22	

A.28: How trustworthy is the HYDRPOWER electricity generation industry?

	Frequency	Percent
Not at all trustworthy	14	2.8
-4	6	1.2
-3	11	2.2
-2	15	3.0
-1	13	2.6
Neutral	57	11.6
1	38	7.7
2	44	8.9
3	87	17.7
4	84	17.1
Very trustworthy	123	25.0
Total	492	100.0
No opinion	16	

A.29: How trustworthy is the NUCLEAR electricity generation industry?

	Frequency	Percent
Not at all trustworthy	52	10.9
-4	12	2.5
-3	23	4.8
-2	15	3.2
-1	27	5.7
Neutral	65	13.7
1	18	3.8
2	55	11.6
3	65	13.7
4	67	14.1
Very trustworthy	76	16.0

Total	475	100.0
No opinion	31	

A.30: How trustworthy is the RENEWABLE electricity generation industry?

	Frequency	Percent
Not at all trustworthy	19	4.1
-4	5	1.1
-3	12	2.6
-2	11	2.3
-1	19	4.1
Neutral	73	15.6
1	21	4.5
2	45	9.6
3	89	19.0
4	81	17.3
Very trustworthy	94	20.0
Total	469	100.0
No opinion	36	

A.31: How much **harm to the environment do you think ENERGY CONSERVATION and EFFICIENCY** have?

	Frequency	Percent
Much harm to the environment	3	.6
-4	3	.6
-3	3	.6
-2	4	.8
-1	6	1.3
Neutral	55	11.5
1	15	3.1
2	23	4.8
3	51	10.6
4	93	19.4
No harm to the environment	223	46.6
Total	479	100.0
No opinion	20	

A.32: How much **harm to the environment do you think FOSSIL FUEL** electricity generation have?

	Frequency	Percent
Much harm to the environment	98	19.8
-4	58	11.7
-3	63	12.8
-2	42	8.5
-1	58	11.7
Neutral	29	5.9
0	1	.2
1	31	6.3
2	33	6.7
3	37	7.5
4	29	5.9
No harm to the environment	15	3.0
Total	494	100.0
No opinion	8	

A.33: How much **harm to the environment do you think HYDROPOWER** electricity generation have?

	Frequency	Percent
Much harm to the environment	16	3.2
-4	16	3.2
-3	33	6.7
-2	30	6.0
-1	40	8.1
Neutral	35	7.1
1	51	10.3
2	40	8.1
3	79	15.9
4	64	12.9

No harm to the environment	92	18.5
Total	496	100.0
No opinion	8	

A.34: How much **harm to the environment do you think NUCLEAR** electricity generation have?

	Frequency	Percent
Much harm to the environment	82	16.7
-4	21	4.3
-3	25	5.1
-2	23	4.7
-1	28	5.7
Neutral	59	12.0
1	36	7.3
2	33	6.7
3	62	12.7
4	60	12.2
No harm to the environment	61	12.4
Total	490	100.0
No opinion	13	

A.35: How much **harm to the environment do you think RENEWABLE** electricity generation have?

	Frequency	Percent
Much harm to the environment	5	1.0
-4	4	.8
-3	10	2.1
-2	6	1.3
-1	14	2.9
Neutral	51	10.7
1	28	5.9
2	43	9.0
3	78	16.3
4	103	21.5
No harm to the environment	136	28.5

Total	478	100.0
No opinion	23	

A.36: How **costly is ENERGY CONSERVATION and EFFICIENCY**?

	Frequency	Percent
Very costly	21	4.5
-4	18	3.8
-3	35	7.5
-2	38	8.1
-1	21	4.5
Neutral	72	15.4
1	24	5.1
2	35	7.5
3	42	9.0
4	80	17.1
Not at all costly	82	17.5
Total	468	100.0
No opinion	31	

A.37: How **costly is FOSSIL FUEL** electricity generation?

	Frequency	Percent
Very costly	54	11.6
-4	33	7.1
-3	49	10.5
-2	62	13.3
-1	53	11.4
Neutral	61	13.1
1	34	7.3
2	44	9.4
3	46	9.9
4	17	3.6
Not at all costly	13	2.8

Total	466	100.0
No opinion	34	

A.38: How **costly is HYDRPOWER** electricity generation?

	Frequency	Percent
Very costly	18	3.8
-4	16	3.4
-3	26	5.5
-2	23	4.8
-1	49	10.3
Neutral	57	11.9
0	1	.2
1	49	10.3
2	42	8.8
3	74	15.5
4	73	15.3
Not at all costly	49	10.3
Total	477	100.0
No opinion	25	

A.39: How **costly is NUCLEAR** electricity generation?

	Frequency	Percent
Very costly	83	18.1
-4	29	6.3
-3	45	9.8
-2	47	10.3
-1	40	8.7
Neutral	45	9.8
1	29	6.3
2	36	7.9
3	36	7.9
4	51	11.1

Not at all costly	17	3.7
Total	458	100.0
No opinion	41	

A.40: How **costly is RENEWABLE** electricity generation?

	Frequency	Percent
Very costly	44	9.5
-4	31	6.7
-3	40	8.7
-2	38	8.2
-1	40	8.7
Neutral	63	13.6
1	37	8.0
2	35	7.6
3	52	11.3
4	46	10.0
Not at all costly	36	7.8
Total	462	100.0
No opinion	2	
No opinion	37	

A.41: How **responsive and adaptable is ENERGY CONSERVATION and EFFICIENCY**?

	Frequency	Valid Percent
Not at all responsive and adaptable	17	3.6
-4	12	2.6
-3	18	3.8
-2	18	3.8
-1	20	4.3
Neutral	77	16.4
1	40	8.5
2	52	11.1
3	61	13.0
4	42	9.0

Very responsive and adaptable	112	23.9
Total	469	100.0
No opinion	34	

A.42: How **responsive and adaptable is FOSSIL FUEL** electricity generation?

	Frequency	Percent
Not at all responsive and adaptable	33	6.9
-4	21	4.4
-3	35	7.4
-2	38	8.0
-1	45	9.5
Neutral	67	14.1
1	48	10.1
2	68	14.3
3	46	9.7
4	34	7.2
Very responsive and adaptable	40	8.4
Total	475	100.0
No opinion	27	

A.43: How **responsive and adaptable is HYDROPOWER** electricity generation?

	Frequency	Percent
Not at all responsive and adaptable	29	6.0
-4	33	6.9
-3	49	10.2
-2	34	7.1
-1	33	6.9
Neutral	64	13.3
1	39	8.1
2	60	12.5
3	53	11.0
4	33	6.9

Very responsive and adaptable	54	11.2
Total	481	100.0
No opinion	24	

A.44: How **responsive and adaptable is NUCLEAR** electricity generation?

	Frequency	Percent
Not at all responsive and adaptable	65	13.8
-4	38	8.1
-3	46	9.8
-2	31	6.6
-1	26	5.5
Neutral	73	15.5
1	34	7.2
2	41	8.7
3	37	7.9
4	40	8.5
Very responsive and adaptable	39	8.3
Total	470	100.0
No opinion	33	

A.45: How **responsive and adaptable is RENEWABLE** electricity generation?

	Frequency	Percent
Not at all responsive and adaptable	22	4.7
-4	19	4.0
-3	31	6.6
-2	25	5.3
-1	33	7.0
Neutral	78	16.6
1	37	7.9
2	46	9.8
3	69	14.6
4	47	10.0

Very responsive and adaptable	64	13.6
Total	471	100.0
No opinion	30	

A.46: How much **harm to aesthetics does ENERGY CONSERVATION and EFFICIENCY** have?

	Frequency	Percent
Much harm to aesthetics	6	1.3
-4	3	.6
-3	4	.8
-2	6	1.3
-1	9	1.9
Neutral	75	15.9
1	8	1.7
2	27	5.7
3	35	7.4
4	69	14.6
No harm to aesthetics	231	48.8
Total	473	100.0
No opinion	30	

A.47: How much **harm to aesthetics does FOSSIL FUEL** electricity generation have?

	Frequency	Percent
Much harm to aesthetics	84	16.9
-4	43	8.7
-3	51	10.3
-2	67	13.5
-1	67	13.5
Neutral	49	9.9
1	31	6.2
2	30	6.0
3	32	6.4
4	25	5.0

No harm to aesthetics	18	3.6
Total	497	100.0
No opinion	10	

A.48: How much **harm to aesthetics does HYDROPOWER** electricity generation have?

	Frequency	Percent
Much harm to aesthetics	28	5.6
-4	18	3.6
-3	32	6.5
-2	38	7.7
-1	42	8.5
Neutral	68	13.7
1	35	7.1
2	41	8.3
3	54	10.9
4	51	10.3
No harm to aesthetics	89	17.9
Total	496	100.0
No opinion	12	

A.49: How much **harm to aesthetics does NUCLEAR** electricity generation have?

	Frequency	Percent
Much harm to aesthetics	63	12.9
-4	34	7.0
-3	30	6.1
-2	39	8.0
-1	49	10.0
Neutral	71	14.5
1	28	5.7
2	27	5.5
3	50	10.2
4	49	10.0

No harm to aesthetics	49	10.0
Total	489	100.0
No opinion	19	

A.50: How much **harm to aesthetics does RENEWABLE** electricity generation have?

	Frequency	Percent
Much harm to aesthetics	21	4.4
-4	18	3.7
-3	25	5.2
-2	43	8.9
-1	50	10.4
Neutral	83	17.2
1	33	6.8
2	40	8.3
3	53	11.0
4	54	11.2
No harm to aesthetics	62	12.9
Total	482	100.0
No opinion	23	

A.51: How **valuable are the benefits of ENERGY CONSERVATION and EFFICIENCY**?

	Frequency	Percent
Not at all valuable benefits	12	2.5
-4	1	.2
-3	3	.6
-2	5	1.0
-1	7	1.5
Neutral	46	9.6
1	21	4.4
2	36	7.5
3	55	11.5

4	57	11.9
Very valuable benefits	235	49.2
Total	478	100.0
No opinion	22	

A.52: How **valuable are the benefits of FOSSIL FUEL** electricity generation?

	Frequency	Percent
Not at all valuable benefits	81	16.9
-4	26	5.4
-3	33	6.9
-2	26	5.4
-1	46	9.6
Neutral	83	17.4
1	38	7.9
2	43	9.0
3	33	6.9
4	30	6.3
Very valuable benefits	39	8.2
Total	478	100.0
No opinion	22	

A.53: How **valuable are the benefits of HYDROPOWER** electricity generation?

	Frequency	Percent
Not at all valuable benefits	7	1.4
-4	5	1.0
-3	15	3.1
-2	7	1.4
-1	9	1.9
Neutral	67	13.8
1	45	9.3
2	57	11.8
3	57	11.8
4	70	14.5

Very valuable benefits	145	30.0
Total	484	100.0
No opinion	20	

A.54: How **valuable are the benefits of NUCLEAR** electricity generation?

	Frequency	Percent
Not at all valuable benefits	74	15.5
-4	21	4.4
-3	20	4.2
-2	20	4.2
-1	14	2.9
Neutral	71	14.9
1	29	6.1
2	44	9.2
3	50	10.5
4	45	9.4
Very valuable benefits	89	18.7
Total	477	100.0
No opinion	25	

A.55: How **valuable are the benefits of RENEWABLE** electricity generation?

	Frequency	Percent
Not at all valuable benefits	16	3.4
-4	9	1.9
-3	7	1.5
-2	9	1.9
-1	11	2.3
Neutral	58	12.3
1	21	4.5
2	36	7.6
3	55	11.7
4	66	14.0

Very valuable benefits	183	38.9
Total	471	100.0
No opinion	30	

Table A.56: Place a dollar amount next to **ELECTRICITY CONSERVATION and EFFICIENCY** that best represents your current level of support**.**

	Frequency	Percent
$1.0	1	.2
$2.0	7	1.6
$3.0	3	.7
$5.0	30	6.9
$8.0	1	.2
$10.0	101	23.1
$12.0	3	.7
$12.5	1	.2
$15.0	17	3.9
$20.0	94	21.5
$25.0	46	10.5
$30.0	44	10.1
$35.0	5	1.1
$37.5	1	.2
$40.0	24	5.5
$43.0	1	.2
$45.0	3	.7
$50.0	45	10.3
$60.0	4	.9
$70.0	3	.7
$80.0	2	.5
$100.0	1	.2
Total	437	100.0

A.57: Place a dollar amount next to **FOSSIL FUEL electricity generation** that best represents your current level of support**.**

	Frequency	Percent
$2.0	2	.7
$3.0	3	1.1
$5.0	40	15.0
$7.0	1	.4
$8.0	1	.4
$9.0	1	.4
$10.0	98	36.7
$15.0	22	8.2
$20.0	54	20.2
$22.0	1	.4
$24.0	1	.4
$25.0	17	6.4
$30.0	16	6.0
$35.0	1	.4
$40.0	5	1.9
$45.0	1	.4
$50.0	2	.7
$60.0	1	.4
Total	267	100.0

A.58: Place a dollar amount next to **HYDROPOWER electricity generation** that best represents your current level of support**.**

	Frequency	Percent
$2.5	1	.2
$3.0	2	.5
$4.0	1	.2
$5.0	16	3.9
$6.0	1	.2
$9.0	1	.2
$10.0	53	12.9
$12.5	1	.2
$15.0	37	9.0
$16.0	1	.2
$20.0	88	21.4
$22.0	1	.2
$24.0	1	.2
$25.0	39	9.5
$30.0	56	13.6
$35.0	7	1.7
$36.0	1	.2
$40.0	28	6.8
$45.0	5	1.2
$50.0	36	8.7
$58.0	1	.2
$60.0	15	3.6
$65.0	3	.7
$70.0	5	1.2
$75.0	4	1.0
$80.0	3	.7
$90.0	2	.5
$100.0	3	.7

Tota	412	100.0

A.59: Place a dollar amount next to **NUCLEAR electricity generation** that best represents your current level of support**.**

	Frequency	Percent
$1.0	1	.3
$2.0	1	.3
$2.5	1	.3
$5.0	21	6.3
$7.0	1	.3
$10.0	49	14.6
$12.0	2	.6
$12.5	1	.3
$13.0	1	.3
$15.0	20	6.0
$20.0	55	16.4
$22.0	1	.3
$25.0	31	9.3
$27.0	1	.3
$28.0	1	.3
$30.0	39	11.6
$35.0	9	2.7
$40.0	26	7.8
$45.0	1	.3
$50.0	35	10.4
$60.0	9	2.7
$65.0	2	.6
$70.0	8	2.4
$75.0	4	1.2
$80.0	6	1.8
$90.0	3	.9
$100.0	6	1.8

Total	335	100.0

A.60: Place a dollar amount next to **RENEWABLE electricity generation** that best represents your current level of support**.**

	Frequency	Percent
$1.0	2	.4
$2.0	2	.4
$3.0	1	.2
$4.0	2	.4
$5.0	28	6.2
$7.0	1	.2
$8.0	1	.2
$10.0	67	14.8
$12.0	1	.2
$12.5	1	.2
$13.0	1	.2
$15.0	15	3.3
$20.0	61	13.4
$22.0	1	.2
$25.0	41	9.0
$30.0	57	12.6
$34.0	1	.2
$35.0	10	2.2
$37.5	1	.2
$40.0	41	9.0
$45.0	4	.9
$50.0	67	14.8
$60.0	16	3.5
$70.0	8	1.8
$72.0	1	.2
$75.0	7	1.5
$80.0	5	1.1

$90.0	2	.4
$95.0	1	.2
$100.0	8	1.8
Total	454	100.0

A.61: Imagine you could tell the government how to allocate your income tax towards solutions that address **ENERGY CONSERVATION and EFFICIENCY.**

	Frequency	Percent
$1	2	.5
$2	1	.3
$5	28	7.0
$8	1	.3
$9	1	.3
$10	91	22.9
$15	18	4.5
$16	1	.3
$19	1	.3
$20	125	31.4
$23	1	.3
$25	43	10.8
$30	32	8.0
$35	3	.8
$40	18	4.5
$45	2	.5
$50	24	6.0
$60	2	.5
$70	3	.8
$80	1	.3
Total	398	100.0

A.62: Imagine you could tell the government how to allocate your income tax towards solutions that address **FOSSIL FUEL electricity generation.**

	Frequency	Percent
$1	1	.3
$2	2	.6
$3	1	.3
$5	32	9.2
$8	1	.3
$10	100	28.8
$12	1	.3
$15	18	5.2
$17	1	.3
$20	91	26.2
$24	1	.3
$25	39	11.2
$30	31	8.9
$35	4	1.2
$40	11	3.2
$50	5	1.4
$60	4	1.2
$70	2	.6
$75	1	.3
$100	1	.3
Total	347	100.0

A.63: Imagine you could tell the government how to allocate your income tax towards solutions that address **HYDROPOWER electricity generation.**

	Frequency	Percent
$1	1	.3
$2	4	1.1
$5	42	11.7
$6	1	.3
$7	1	.3
$10	112	31.1
$15	26	7.2
$18	1	.3
$20	83	23.1
$25	36	10.0
$30	21	5.8
$35	3	.8
$40	11	3.1
$50	10	2.8
$60	1	.3
$70	2	.6
$75	1	.3
$80	1	.3
$100	3	.8
Total	360	100.0

A.64: Imagine you could tell the government how to allocate your income tax towards solutions that address **NUCLEAR electricity generation.**

	Frequency	Percent
$5	14	3.5
$10	65	16.4
$12	1	.3
$15	15	3.8
$20	80	20.2
$22	1	.3
$25	37	9.3
$30	58	14.6
$35	4	1.0
$40	37	9.3
$45	3	.8
$50	38	9.6
$55	1	.3
$60	7	1.8
$70	5	1.3
$75	6	1.5
$80	8	2.0
$90	5	1.3
$100	12	3.0
Total	397	100.0

A.65: Imagine you could tell the government how to allocate your income tax towards solutions that address

RENEWABLE electricity generation.

	Frequency	Percent
$0	1	.2
$2	1	.2
$3	2	.5
$5	18	4.2
$10	62	14.3
$15	22	5.1
$18	1	.2
$20	103	23.8
$25	39	9.0
$28	1	.2
$30	46	10.6
$35	5	1.2
$37	1	.2
$38	1	.2
$40	38	8.8
$45	3	.7
$50	49	11.3
$55	2	.5
$60	9	2.1
$65	1	.2
$70	8	1.8
$75	4	.9
$80	6	1.4
$90	4	.9
$100	6	1.4
Total	433	100.0

A.66: Imagine you could tell the government how to allocate your income tax towards solutions that address **OTHER electricity generation options.**

	Frequency	Percent
$5	5	7.0
$9	1	1.4
$10	8	11.3
$15	3	4.2
$20	14	19.7
$25	5	7.0
$30	7	9.9
$35	2	2.8
$40	8	11.3
$45	1	1.4
$50	3	4.2
$60	3	4.2
$80	2	2.8
$90	2	2.8
$100	7	9.9
Total	71	100.0

A.67: *What is the likelihood a solution will be found to minimize or eliminate* ***RESISTENCE TO MAKING INVESTMENTS***

IN HOUSE AND BUILDING ENERGY CONSERVATION AND EFFICIENCY PROJECTS?

	Frequency	Percent
Very unlikely	37	7.7
-4	12	2.5
-3	20	4.2
-2	26	5.4
-1	21	4.4
Neiter likely or unlikely	74	15.4
1	63	13.2
2	68	14.2
3	62	12.9
4	37	7.7
Very likely	59	12.3
Total	479	100.0
-9	1	
No opinion	18	

A.68: What is the likelihood a solution will be found to minimize or eliminate **GREENHOUSE GAS EMISSIONS FROM**

FOSSIL FUEL ELECTRICITY PLANTS?

	Frequency	Percent
Very unlikely	64	13.1
-4	26	5.3
-3	52	10.7
-2	28	5.7
-1	39	8.0
Neither likely or unlikely	76	15.6
1	63	12.9
2	58	11.9
3	35	7.2
4	23	4.7
Very likely	23	4.7
Total	487	100.0

-9	1	
No opinion	14	

A.69 What is the likelihood a solution will be found to minimize or eliminate **CURRENT ROADBLOCKS TO SALMON MIGRATION FROM HYDROPOWER ELECTRICITY GENERATION?**

	Frequency	Percent
Very unlikely	62	12.9
-4	32	6.6
-3	44	9.1
-2	34	7.1
-1	53	11.0
Neither likely or unlikely	97	20.1
1	49	10.2
2	43	8.9
3	30	6.2
4	13	2.7
Very likely	25	5.2
Total	482	100.0
-9	1	
No opinion	20	

A.70: What is the likelihood a solution will be found to minimize or eliminate **NUCLEAR WASTE ASSOCIATED WITH NUCLEAR ELECTRICITY GENERATION?**

	Frequency	Percent
Very unlikely	109	22.2
-4	30	6.1
-3	36	7.3
-2	22	4.5
-1	37	7.6
Neither likely or unlikely	58	11.8
1	42	8.6
2	45	9.2
3	36	7.3
4	30	6.1

Very likely	45	9.2
Total	490	100.0
-9	1	
No opinion	12	

A.71: What is the likelihood a solution will be found to minimize or eliminate **INTERMITTENCY, AVAILABILITY, AND PREDICTABILITY CONCERNS FROM RENEWABLE ELECTRICITY GENERATION?**

	Frequency	Percent
Very unlikely	25	5.2
-4	12	2.5
-3	21	4.3
-2	24	5.0
-1	16	3.3
Neither likely or unlikely	75	15.5
1	60	12.4
2	71	14.7
3	70	14.5
4	53	11.0
Very likely	56	11.6
Total	483	100.0
-9	2	
No opinion	17	

A.72: Within its borders, **Idaho has abundant resources of which** of the following**?**

	Frequency	Percent
Uranium	21	5.5
Natural gas	14	3.7
Wind	344	90.1
Coal	3	.8
Total	382	100.0
Don't know/not sure	109	

A.73: Of **the electricity that Idaho consumes,** the majority comes from what one source?

	Frequency	Percent
Fossil fuels	72	16.1
Hydropower	376	83.9
Total	448	100.0
Don't know/not sure	54	

A.74: Of **the electricity that Idaho produces,** the majority comes from what one source?

	Frequency	Percent
Fossil fuels	14	3.1
Renewables	1	.2
Nuclear	1	.2
Hydropower	434	96.4
Total	450	100.0
Don't know/not sure	53	

A.75: Which one of the following is the **fastest to implement?**

	Frequency	Percent
Hydropower	35	9.8
Energy conservation and efficiency	234	65.4
Nuclear	19	5.3
Renewables	70	19.6
Total	358	100.0
Don't know/not sure	137	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	425	77.6	79.4	79.4
	Female	110	20.1	20.6	100.0
	Total	535	97.6	100.0	
Missing	System	13	2.4		
	Total	548	100.0		

Which of the following racial or ethnic group (or groups) best describes you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White or Caucasian	496	90.5	97.1	97.1
	Hispanic or Latino	2	.4	.4	97.5
	Black or African American	2	.4	.4	97.8
	Asian American	4	.7	.8	98.6
	American Indian or Alaskan Native	4	.7	.8	99.4
	Other	1	.2	.2	99.6
	Multiple	2	.4	.4	100.0
	Total	511	93.2	100.0	
Missing	Don't know/not sure	6	1.1		
	System	31	5.7		
	Total	37	6.8		
	Total	548	100.0		

What is your current marital status?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single, never married	26	4.7	4.9	4.9
	Married	422	77.0	79.5	84.4
	Divorced	46	8.4	8.7	93.0
	Separated	1	.2	.2	93.2
	Widowed	36	6.6	6.8	100.0
	Total	531	96.9	100.0	
Missing	System	17	3.1		
	Total	548	100.0		

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 - 34	19	3.5	3.8	3.8
	35 - 44	57	10.4	11.5	15.4
	45-54	102	18.6	20.6	36.0
	55-64	138	25.2	27.9	64.0
	65 - 74	102	18.6	20.6	84.6
	75+	76	13.9	15.4	100.0
	Total	494	90.1	100.0	
Missing	I prefer not to answer	35	6.4		
	System	19	3.5		
	Total	54	9.9		
Total		548	100.0		

How many consecutive years have you lived in Idaho?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<=3 yrs	29	5.3	5.5	5.5
	4-10 yrs	59	10.8	11.1	16.6
	11-17 yrs	71	13.0	13.4	29.9
	18-25 yrs	77	14.1	14.5	44.4
	26+ yrs	295	53.8	55.6	100.0
	Total	531	96.9	100.0	
Missing	System	17	3.1		
	Total	548	100.0		

If you have lived less than 5 years in Idaho, what was the most important reason that you moved to or returned to this state?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	For employment opporunities	6	1.1	14.0	14.0
	To retire	7	1.3	16.3	30.2
	Quality of life	16	2.9	37.2	67.4
	To be near friends or family	13	2.4	30.2	97.7
	Other	1	.2	2.3	100.0
	Total	43	7.8	100.0	
Missing	System	505	92.2		
	Total	548	100.0		

Have you voted in an election in the past two years?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	13	2.4	2.4	2.4
	Yes	516	94.2	96.3	98.7
	No	7	1.3	1.3	100.0
	Total	536	97.8	100.0	
Missing	System	12	2.2		
	Total	548	100.0		

What is the highest level of school or college that you have completed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than high school	6	1.1	1.1	1.1
	High school graduate or GED	78	14.2	14.7	15.8
	2-Year or associates degree	32	5.8	6.0	21.8
	Some college but less than 4 years	113	20.6	21.2	43.0
	Trade or vocational certificate	29	5.3	5.5	48.5
	4-Year college graduate	113	20.6	21.2	69.7
	Some graduate school	48	8.8	9.0	78.8
	Masters degree	84	15.3	15.8	94.5
	Docorate or professional degree	28	5.1	5.3	99.8
	Other	1	.2	.2	100.0
	Total	532	97.1	100.0	
Missing	System	16	2.9		
	Total	548	100.0		

Please choose one range that describes your annual household income from all sources.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than $9,999	6	1.1	1.1	1.1
	$10,000 up to $19,000	21	3.8	4.0	5.1
	$20,000 up to $29,000	30	5.5	5.7	10.8
	$30,000 up to $39,000	57	10.4	10.8	21.6
	$40,000 up to $49,000	44	8.0	8.3	29.9
	$50,000 up to $59,000	41	7.5	7.8	37.7
	$60,000 up to $69,000	42	7.7	8.0	45.6
	$70,000 up to $79,000	48	8.8	9.1	54.7
	$80,000 up to $89,000	30	5.5	5.7	60.4
	$90,000 up to $99,000	28	5.1	5.3	65.7
	More than $100,000	121	22.1	22.9	88.6
	Prefer not to answer	21	3.8	4.0	92.6
	Don't know/not sure	39	7.1	7.4	100.0
	Total	528	96.4	100.0	
Missing	System	20	3.6		
	Total	548	100.0		

What political party best represents you?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Democract	120	21.9	23.1	23.1
	Republican	217	39.6	41.7	64.8
	Independent	132	24.1	25.4	90.2
	Other	21	3.8	4.0	94.2
	Don't know/not sure	30	5.5	5.8	100.0
	Total	520	94.9	100.0	
Missing	System	28	5.1		
	Total	548	100.0		

In general, where are you on the ideological spectrum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very conservative	73	13.3	14.1	14.1
	Somewhat conservative	173	31.6	33.3	47.4
	Middle of the road	146	26.6	28.1	75.5
	Somewhat liberal	82	15.0	15.8	91.3
	Very liberal	29	5.3	5.6	96.9
	Don't know/not sure	16	2.9	3.1	100.0
	Total	519	94.7	100.0	
Missing	System	29	5.3		
	Total	548	100.0		

What is your current housing arrangement?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	I am a home owner	494	90.1	93.7	93.7
	I rent	28	5.1	5.3	99.1
	I live with anaother that pays cost of my housing	2	.4	.4	99.4
	I live in a dorm, nursing home, or other group facility	1	.2	.2	99.6
	Other	2	.4	.4	100.0
	Total	527	96.2	100.0	
Missing	System	21	3.8		
	Total	548	100.0		

Please estimate the amount of your average electricity bill.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<=$100	353	64.4	69.1	69.1
	$101-$200	122	22.3	23.9	93.0
	$201-$300	22	4.0	4.3	97.3
	$300+	3	.5	.6	97.8
	My household does not pay for electricity	5	.9	1.0	98.8
	Don't know/not sure	6	1.1	1.2	100.0
	Total	511	93.2	100.0	
Missing	System	37	6.8		
	Total	548	100.0		

What is your employment status, EMPLOYED FOR WAGES, PART-TIME?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	471	85.9	91.1	91.1
	Yes	46	8.4	8.9	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, EMPLOYED FOR WAGES, FULL-TIME?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	335	61.1	63.3	63.3
	Yes	194	35.4	36.7	100.0
	Total	529	96.5	100.0	
Missing	System	19	3.5		
	Total	548	100.0		

What is your employment status, SELF-EMPLOYED?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	429	78.3	82.8	82.8
	Yes	89	16.2	17.2	100.0
	Total	518	94.5	100.0	
Missing	System	30	5.5		
	Total	548	100.0		

What is your employment status, OUT OF WORK FOR MORE THAN 1 YEAR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	510	93.1	98.6	98.6
	Yes	7	1.3	1.4	100.0
	Total	517	94.3	100.0	

What is your employment status, OUT OF WORK FOR LESS THAN 1 YEAR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	511	93.2	98.8	98.8
	Yes	6	1.1	1.2	100.0
	Total	517	94.3	100.0	

What is your employment status, A HOMEMAKER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	509	92.9	98.3	98.3
	Yes	9	1.6	1.7	100.0
	Total	518	94.5	100.0	

What is your employment status, A STUDENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	508	92.7	98.3	98.3
	Yes	9	1.6	1.7	100.0
	Total	517	94.3	100.0	

What is your employment status, AN EMPLOYED STUDENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	512	93.4	99.0	99.0
	Yes	5	.9	1.0	100.0
	Total	517	94.3	100.0	

What is your employment status, RETIRED?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	322	58.8	60.9	60.9

		Frequency	Percent	Valid Percent	Cumulative Percent
	Yes	207	37.8	39.1	100.0
	Total	529	96.5	100.0	

What is your employment status, VOLUNTEER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	506	92.3	97.9	97.9
	Yes	11	2.0	2.1	100.0
	Total	517	94.3	100.0	

What is your employment status, UNABLE TO WORK?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	508	92.7	98.3	98.3
	Yes	9	1.6	1.7	100.0
	Total	517	94.3	100.0	

What is your employment status, OTHER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	515	94.0	99.6	99.6
	Yes	2	.4	.4	100.0
	Total	517	94.3	100.0	

What profession/occupation group best describes your primary employment, MANAGEMENT, PROFESSIONAL, OR RELATED OCCUPATION?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	325	59.3	61.7	61.7
	Yes	202	36.9	38.3	100.0
	Total	527	96.2	100.0	

What profession/occupation group best describes your primary employment, SERVICE OCCUPATIONS?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	463	84.5	89.2	89.2
	Yes	56	10.2	10.8	100.0
	Total	519	94.7	100.0	

What profession/occupation group best describes your primary employment, SALES OR OFFICE OCCUPATION?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	469	85.6	90.7	90.7
	Yes	48	8.8	9.3	100.0
	Total	517	94.3	100.0	

What profession/occupation group best describes your primary employment, FARMING, FISHING, FORESTRY, OR MINING?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	64	11.7	66.0	66.0
	Yes	33	6.0	34.0	100.0
	Total	97	17.7	100.0	

What profession/occupation group best describes your primary employment, CONSTRUCTION, EXTRACTION, OR MAINTENANCE?

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	110	20.1	65.1	65.1
	Yes	59	10.8	34.9	100.0
	Total	169	30.8	100.0	

What profession/occupation group best describes your primary employment, PRODUCTION, TRANSPORTATION OR MATERIAL MOVING?

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	117	21.4	80.7	80.7
	Yes	28	5.1	19.3	100.0
	Total	145	26.5	100.0	

What profession/occupation group best describes your primary employment, GOVERNMENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	108	19.7	65.1	65.1
	Yes	58	10.6	34.9	100.0
	Total	166	30.3	100.0	
Missing	-99	1	.2		
	System	381	69.5		
	Total	382	69.7		
	Total	548	100.0		

What group best describes the entity where you work?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Employee, private for-profit	185	33.8	42.7	42.7
	Employee, private not-for-profit	31	5.7	7.2	49.9
	Local government employee	11	2.0	2.5	52.4
	State government employee	50	9.1	11.5	64.0
	Federal government employee	23	4.2	5.3	69.3
	Self-employed, non-incorporated	58	10.6	13.4	82.7
	Self-employed, incorporated	40	7.3	9.2	91.9
	Working without pay	4	.7	.9	92.8

Other	31	5.7	7.2	100.0
Total	433	79.0	100.0	
Don't know/not sure	8	1.5		

In which Idaho County is your primary residence located?

	Frequency	Percent	Valid Percent	Cumulative Percent
Ada	332	60.6	61.9	61.9
Boise	18	3.3	3.4	65.3
Canyon	101	18.4	18.8	84.1
Elmore	19	3.5	3.5	87.7
Gem	29	5.3	5.4	93.1
Owyhee	12	2.2	2.2	95.3
Payette	25	4.6	4.7	100.0
Total	536	97.8	100.0	

How many members of your household, including yourself, are 18 years of age or older?

	Frequency	Percent	Valid Percent	Cumulative Percent
1	86	15.7	16.3	16.3
2	365	66.6	69.0	85.3
3	60	10.9	11.3	96.6
4	12	2.2	2.3	98.9
5	4	.7	.8	99.6
6	1	.2	.2	99.8
13	1	.2	.2	100.0
Total	529	96.5	100.0	

How many members of your household are 17 years of age or younger?

		Frequency	Percent	Valid Percent	Cumulative Percent
	0	4	.7	2.7	2.7
	1	67	12.2	45.3	48.0
	2	58	10.6	39.2	87.2
	3	14	2.6	9.5	96.6
	4	4	.7	2.7	99.3
	5	1	.2	.7	100.0
	Total	148	27.0	100.0	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	425	77.6	79.4	79.4
	Female	110	20.1	20.6	100.0
	Total	535	97.6	100.0	
Missing	System	13	2.4		
	Total	548	100.0		

Which of the following racial or ethnic group (or groups) best describes you?

		Frequency	Percent	Valid Percent	Cumulative Percent
	White or Caucasian	496	90.5	97.1	97.1
	Hispanic or Latino	2	.4	.4	97.5
	Black or African American	2	.4	.4	97.8
	Asian American	4	.7	.8	98.6
	American Indian or Alaskan Native	4	.7	.8	99.4
	Other	1	.2	.2	99.6
	Multiple	2	.4	.4	100.0
	Total	511	93.2	100.0	
Missing	Don't know/not sure	6	1.1		
	System	31	5.7		
	Total	37	6.8		

How many members of your household are 17 years of age or younger?

		Frequency	Percent	Valid Percent	Cumulative Percent
	0	4	.7	2.7	2.7
	1	67	12.2	45.3	48.0
	2	58	10.6	39.2	87.2
	3	14	2.6	9.5	96.6
	4	4	.7	2.7	99.3
	5	1	.2	.7	100.0
	Total	148	27.0	100.0	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Male	425	77.6	79.4	79.4
	Female	110	20.1	20.6	100.0
	Total	535	97.6	100.0	
Missing	System	13	2.4		
	Total	548	100.0		

What is your current marital status?

		Frequency	Percent	Valid Percent	Cumulative Percent
	Single, never married	26	4.7	4.9	4.9
	Married	422	77.0	79.5	84.4
	Divorced	46	8.4	8.7	93.0
	Separated	1	.2	.2	93.2
	Widowed	36	6.6	6.8	100.0
	Total	531	96.9	100.0	
Missing	System	17	3.1		
	Total	548	100.0		

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	25 - 34	19	3.5	3.8	3.8
	35 - 44	57	10.4	11.5	15.4
	45-54	102	18.6	20.6	36.0
	55-64	138	25.2	27.9	64.0
	65 - 74	102	18.6	20.6	84.6
	75+	76	13.9	15.4	100.0
	Total	494	90.1	100.0	
Missing	I prefer not to answer	35	6.4		
	System	19	3.5		
	Total	54	9.9		
	Total	548	100.0		

How many consecutive years have you lived in Idaho?

		Frequency	Percent	Valid Percent	Cumulative Percent
	<=3 yrs	29	5.3	5.5	5.5
	4-10 yrs	59	10.8	11.1	16.6
	11-17 yrs	71	13.0	13.4	29.9
	18-25 yrs	77	14.1	14.5	44.4
	26+ yrs	295	53.8	55.6	100.0
	Total	531	96.9	100.0	
Missing	System	17	3.1		
	Total	548	100.0		

If you have lived less than 5 years in Idaho, what was the most important reason that you moved to or returned to this state?

		Frequency	Percent	Valid Percent	Cumulative Percent
	For employment opportunities	6	1.1	14.0	14.0
	To retire	7	1.3	16.3	30.2
	Quality of life	16	2.9	37.2	67.4
	To be near friends or family	13	2.4	30.2	97.7
	Other	1	.2	2.3	100.0
	Total	43	7.8	100.0	
Missing	System	505	92.2		

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 - 34	19	3.5	3.8	3.8
	35 - 44	57	10.4	11.5	15.4
	45-54	102	18.6	20.6	36.0
	55-64	138	25.2	27.9	64.0
	65 - 74	102	18.6	20.6	84.6
	75+	76	13.9	15.4	100.0
	Total	494	90.1	100.0	
Missing	I prefer not to answer	35	6.4		
	System	19	3.5		
	Total	54	9.9		
Total		548	100.0		

Have you voted in an election in the past two years?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	13	2.4	2.4	2.4
	Yes	516	94.2	96.3	98.7
	No	7	1.3	1.3	100.0
	Total	536	97.8	100.0	
Missing	System	12	2.2		
Total		548	100.0		

What is the highest level of school or college that you have completed?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than high school	6	1.1	1.1	1.1
	High school graduate or GED	78	14.2	14.7	15.8
	2-Year or associates degree	32	5.8	6.0	21.8
	Some college but less than 4 years	113	20.6	21.2	43.0
	Trade or vocational certificate	29	5.3	5.5	48.5
	4-Year college graduate	113	20.6	21.2	69.7

	Some graduate school	48	8.8	9.0	78.8
	Masters degree	84	15.3	15.8	94.5
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	Other	1	.2	.2	100.0
	Total	532	97.1	100.0	
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	$30,000 up to $39,000	57	10.4	10.8	21.6
	$40,000 up to $49,000	44	8.0	8.3	29.9
	$50,000 up to $59,000	41	7.5	7.8	37.7
	$60,000 up to $69,000	42	7.7	8.0	45.6
	$70,000 up to $79,000	48	8.8	9.1	54.7
	$80,000 up to $89,000	30	5.5	5.7	60.4
	$90,000 up to $99,000	28	5.1	5.3	65.7
	More than $100,000	121	22.1	22.9	88.6
	Prefer not to answer	21	3.8	4.0	92.6
	Don't know/not sure	39	7.1	7.4	100.0
	Total	528	96.4	100.0	
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What political party best represents you?

		Frequency	Percent	Valid Percent	Cumulative Percent
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	Independent	132	24.1	25.4	90.2

	Other	21	3.8	4.0	94.2
	Don't know/not sure	30	5.5	5.8	100.0
	Total	520	94.9	100.0	
Missing	System	28	5.1		
	Total	548	100.0		

In general, where are you on the ideological spectrum?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Very conservative	73	13.3	14.1	14.1
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	Middle of the road	146	26.6	28.1	75.5
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	Very liberal	29	5.3	5.6	96.9
	Don't know/not sure	16	2.9	3.1	100.0
	Total	519	94.7	100.0	
Missing	System	29	5.3		
	Total	548	100.0		

What is your current housing arrangement?

		Frequency	Percent	Valid Percent	Cumulative Percent
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	I rent	28	5.1	5.3	99.1
	I live with anaother that pays cost of my housing	2	.4	.4	99.4
	I live in a dorm, nursing home, or other group facility	1	.2	.2	99.6
	Other	2	.4	.4	100.0
	Total	527	96.2	100.0	
Missing	System	21	3.8		
	Total	548	100.0		

Please estimate the amount of your average electricity bill.

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	<=$100	353	64.4	69.1	69.1
	$101-$200	122	22.3	23.9	93.0
	$201-$300	22	4.0	4.3	97.3
	$300+	3	.5	.6	97.8
	My household does not pay for electricity	5	.9	1.0	98.8
	Don't know/not sure	6	1.1	1.2	100.0
	Total	511	93.2	100.0	
Missing	System	37	6.8		
	Total	548	100.0		

What is your employment status, EMPLOYED FOR WAGES, PART-TIME?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	471	85.9	91.1	91.1
	Yes	46	8.4	8.9	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, EMPLOYED FOR WAGES, FULL-TIME?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	335	61.1	63.3	63.3
	Yes	194	35.4	36.7	100.0
	Total	529	96.5	100.0	
Missing	System	19	3.5		
	Total	548	100.0		

What is your employment status, SELF-EMPLOYED?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	429	78.3	82.8	82.8
	Yes	89	16.2	17.2	100.0
	Total	518	94.5	100.0	
Missing	System	30	5.5		

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 - 34	19	3.5	3.8	3.8
	35 - 44	57	10.4	11.5	15.4
	45-54	102	18.6	20.6	36.0
	55-64	138	25.2	27.9	64.0
	65 - 74	102	18.6	20.6	84.6
	75+	76	13.9	15.4	100.0
	Total	494	90.1	100.0	
Missing	I prefer not to answer	35	6.4		
	System	19	3.5		
	Total	54	9.9		
	Total	548	100.0		

What is your employment status, OUT OF WORK FOR MORE THAN 1 YEAR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	510	93.1	98.6	98.6
	Yes	7	1.3	1.4	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, OUT OF WORK FOR LESS THAN 1 YEAR?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	511	93.2	98.8	98.8
	Yes	6	1.1	1.2	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, A HOMEMAKER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	509	92.9	98.3	98.3
	Yes	9	1.6	1.7	100.0
	Total	518	94.5	100.0	
Missing	System	30	5.5		
	Total	548	100.0		

What is your employment status, A STUDENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	508	92.7	98.3	98.3
	Yes	9	1.6	1.7	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, AN EMPLOYED STUDENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	512	93.4	99.0	99.0
	Yes	5	.9	1.0	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, RETIRED?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	322	58.8	60.9	60.9
	Yes	207	37.8	39.1	100.0
	Total	529	96.5	100.0	
Missing	System	19	3.5		
	Total	548	100.0		

What is your employment status, VOLUNTEER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	506	92.3	97.9	97.9
	Yes	11	2.0	2.1	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, UNABLE TO WORK?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	508	92.7	98.3	98.3
	Yes	9	1.6	1.7	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, OTHER?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	515	94.0	99.6	99.6
	Yes	2	.4	.4	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What is your employment status, DON'T KNOW, NOT SURE?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	1	.2	100.0	100.0
Missing	System	547	99.8		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, MANAGEMENT, PROFESSIONAL, OR RELATED OCCUPATION?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	325	59.3	61.7	61.7
	Yes	202	36.9	38.3	100.0
	Total	527	96.2	100.0	
Missing	System	21	3.8		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, SERVICE OCCUPATIONS?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	463	84.5	89.2	89.2
	Yes	56	10.2	10.8	100.0
	Total	519	94.7	100.0	
Missing	System	29	5.3		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, SALES OR OFFICE OCCUPATION?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	469	85.6	90.7	90.7
	Yes	48	8.8	9.3	100.0
	Total	517	94.3	100.0	
Missing	System	31	5.7		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, FARMING, FISHING, FORESTRY, OR MINING?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	64	11.7	66.0	66.0
	Yes	33	6.0	34.0	100.0
	Total	97	17.7	100.0	
Missing	System	451	82.3		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, CONSTRUCTION, EXTRACTION, OR MAINTENANCE?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	110	20.1	65.1	65.1
	Yes	59	10.8	34.9	100.0
	Total	169	30.8	100.0	
Missing	-99	1	.2		
	System	378	69.0		
	Total	379	69.2		
Total		548	100.0		

What profession/occupation group best describes your primary employment, PRODUCTION, TRANSPORTATION OR MATERIAL MOVING?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	117	21.4	80.7	80.7
	Yes	28	5.1	19.3	100.0
	Total	145	26.5	100.0	
Missing	-99	1	.2		
	System	402	73.4		
	Total	403	73.5		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, GOVERNMENT?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	108	19.7	65.1	65.1
	Yes	58	10.6	34.9	100.0
	Total	166	30.3	100.0	
Missing	-99	1	.2		
	System	381	69.5		
	Total	382	69.7		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, OTHER (PLEASE SPECIFY)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	106	19.3	72.6	72.6
	Yes	40	7.3	27.4	100.0
	Total	146	26.6	100.0	
Missing	-99	1	.2		
	System	401	73.2		
	Total	402	73.4		
	Total	548	100.0		

What profession/occupation group best describes your primary employment, DON'T KNOW/NOT SURE?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	116	21.2	94.3	94.3
	Yes	7	1.3	5.7	100.0
	Total	123	22.4	100.0	
Missing	-99	1	.2		
	System	424	77.4		
	Total	425	77.6		
	Total	548	100.0		

What group best describes the entity where you work?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employee, private for-profit	185	33.8	42.7	42.7
	Employee, private not-for-profit	31	5.7	7.2	49.9
	Local government employee	11	2.0	2.5	52.4
	State government employee	50	9.1	11.5	64.0
	Federal government employee	23	4.2	5.3	69.3
	Self-employed, non-incorporated	58	10.6	13.4	82.7
	Self-employed, incorporated	40	7.3	9.2	91.9
	Working without pay	4	.7	.9	92.8
	Other	31	5.7	7.2	100.0
	Total	433	79.0	100.0	
Missing	-99	1	.2		
	0	1	.2		
	Don't know/not sure	8	1.5		
	System	105	19.2		
	Total	115	21.0		
	Total	548	100.0		

In which Idaho County is your primary residence located?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ada	332	60.6	61.9	61.9
	Boise	18	3.3	3.4	65.3
	Canyon	101	18.4	18.8	84.1
	Elmore	19	3.5	3.5	87.7
	Gem	29	5.3	5.4	93.1
	Owyhee	12	2.2	2.2	95.3
	Payette	25	4.6	4.7	100.0
	Total	536	97.8	100.0	
Missing	-99	1	.2		
	System	11	2.0		
	Total	12	2.2		
	Total	548	100.0		

How many members of your household, including yourself, are 18 years of age or older?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	86	15.7	16.3	16.3
	2	365	66.6	69.0	85.3
	3	60	10.9	11.3	96.6
	4	12	2.2	2.3	98.9
	5	4	.7	.8	99.6
	6	1	.2	.2	99.8
	13	1	.2	.2	100.0
	Total	529	96.5	100.0	
Missing	System	19	3.5		
	Total	548	100.0		

How many members of your household are 17 years of age or younger?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0	4	.7	2.7	2.7
	1	67	12.2	45.3	48.0
	2	58	10.6	39.2	87.2
	3	14	2.6	9.5	96.6
	4	4	.7	2.7	99.3
	5	1	.2	.7	100.0
	Total	148	27.0	100.0	
Missing	System	400	73.0		
	Total	548	100.0		

Do you consider yourself living in a rural, suburban, or urban area?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Rural	155	28.3	29.2	29.2
	Urban	164	29.9	30.9	60.2
	Suburban	207	37.8	39.1	99.2
	Don't know/not sure	4	.7	.8	100.0
	Total	530	96.7	100.0	
Missing	System	18	3.3		

3. Descriptive Statistics – Pre-survey

	Knowledge of energy issues	Energy policy decisions should primarily be made by :
N	492	450
Mean	1.98	3.08
Median	2.00	4.00
Std. Deviation	.579	1.425

	How important to you is SAFETY and SECURITY when deciding the best way to meet electricity needs of homes and businesses?	How important to you is RELIABILITY and PREDICTABILITY when deciding the best way to meet electricity needs of homes and businesses?	How important to you is TRUST when deciding the best way to meet electricity needs of homes and businesses?	How important to you is IMPACT TO THE ENVIRONMENT when deciding the best way to meet electricity needs of homes and businesses?
N	504	505	494	502
Mean	3.98	4.36	3.91	3.53
Median	5.00	5.00	5.00	4.00
Std. Deviation	1.524	.987	1.590	1.842

	How important to you is RESPONSIVENESS and ADAPTABILITY when deciding the best way to meet electricity needs of homes and businesses?	How important to you is AESTHETICS when deciding the best way to meet electricity needs of homes and businesses?	How important to you is OTHER BENEFITS when deciding the best way to meet electricity needs of homes and businesses?
N	497	495	353
Mean	3.41	1.52	1.94
Median	4.00	2.00	2.00
Std. Deviation	1.639	2.628	2.155

	How would you rate your preference of ENERGY CONSERVATION and EFFICIENCY?	How would you rate your preference of FOSSIL FUEL electricity generation?	How would you rate your preference of HYDROPOWER electricity generation?	How would you rate your preference of NUCLEAR electricity generation?	How you F g
N	502	497	502	501	
Mean	3.64	.07	3.24	1.81	
Median	4.00	.00	4.00	3.00	
Std. Deviation	1.901	3.159	2.172	3.462	

	How safe and secure is ENERGY CONSERVATION and EFFICIENCY?	How safe and secure is FOSSIL FUEL electricity generation?	How safe and secure is HYDROPOWER electricity generation?	How safe and secure is NUCLEAR electricity generation?	How is g
N	480	496	498	498	
Mean	3.67	1.07	3.21	1.24	
Median	5.00	2.00	4.00	2.00	
Std. Deviation	1.933	3.026	2.153	3.399	

	How reliable and predictable is ENERGY CONSERVATION and EFFICIENCY?	How reliable and predictable is FOSSIL FUEL electricity generation?	How reliable and predictable is HYDROPOWER electricity generation?	How reliable and predictable is NUCLEAR electricity generation?	Ho p F g
N	475	492	505	491	
Mean	2.49	2.03	3.10	2.45	
Median	3.00	3.00	4.00	3.00	
Std. Deviation	2.694	2.794	2.041	2.941	

	How trustworthy is ENERGY CONSERVATION and EFFICIENCY?	How trustworthy is FOSSIL FUEL electricity generation?	How trustworthy is HYDRPOWER electricity generation?	How trustworthy is NUCLEAR electricity generation?	How F g
N	469	484	492	475	
Mean	2.07	.75	2.37	1.13	
Median	3.00	1.00	3.00	2.00	
Std. Deviation	2.766	3.048	2.577	3.239	

	How much harm to the environment do you think ENERGY CONSERVATION and EFFICIENCY have?	How much harm to the environment do you think FOSSIL FUEL electricity generation have?	How much harm to the environment do you think HYDROPOWER electricity generation have?	How much harm to the environment do you think NUCLEAR electricity generation have?	How enviro RENI ge
N	479	494	496	490	
Mean	3.45	-1.32	1.49	.39	
Median	4.00	-2.00	2.00	1.00	
Std. Deviation	2.101	3.068	2.931	3.464	

	How costly is ENERGY CONSERVATION and EFFICIENCY?	How costly is FOSSIL FUEL electricity generation?	How costly is HYDRPOWER electricity generation?	How costly is NUCLEAR electricity generation?	H F g
N	468	466	477	458	
Mean	1.22	-.71	1.18	-.66	
Median	2.00	-1.00	1.00	-1.00	
Std. Deviation	3.096	2.784	2.783	3.211	

	How responsive and adaptable is ENERGY CONSERVATION and EFFICIENCY?	How responsive and adaptable is FOSSIL FUEL electricity generation?	How responsive and adaptable is HYDROPOWER electricity generation?	How responsive and adaptable is NUCLEAR electricity generation?
N	469	475	481	470
Mean	1.73	.39	.41	-.26
Median	2.00	.00	.00	.00
Std. Deviation	2.825	2.861	3.034	3.236

	How much harm to aesthetics does ENERGY CONSERVATION and EFFICIENCY have?	How much harm to aesthetics does FOSSIL FUEL electricity generation have?	How much harm to aesthetics does HYDROPOWER electricity generation have?	How much harm to aesthetics does NUCLEAR electricity generation have?
N	473	497	496	489
Mean	3.22	-1.14	1.01	.01
Median	4.00	-1.00	1.00	.00
Std. Deviation	2.380	2.917	3.077	3.261

	How valuable are the benefits of ENERGY CONSERVATION and EFFICIENCY?	How valuable are the benefits of FOSSIL FUEL electricity generation?	How valuable are the benefits of HYDROPOWER electricity generation?	How valuable are the benefits of NUCLEAR electricity generation?
N	478	478	484	477
Mean	3.29	-.35	2.50	.68
Median	4.00	.00	3.00	1.00
Std. Deviation	2.359	3.169	2.460	3.503

	What is the likelihood a solution will be found to minimize or eliminate CURRENT ROADBLOCKS TO SALMON MIGRATION FROM HYDROPOWER ELECTRICITY GENERATION?	What is the likelihood a solution will be found to minimize or eliminate NUCLEAR WASTE ASSOCIATED WITH NUCLEAR ELECTRICITY GENERATION?	What is the likelihood a solution will be found to minimize or eliminate INTERMITTENCY, AVAILABILITY, AND PREDICTABILITY CONCERNS FROM RENEWABLE ELECTRICITY GENERATION?
N	482	490	483
Mean	-.60	-.55	1.25
Median	.00	.00	2.00
Std. Deviation	2.810	3.401	2.727

	Within its borders, Idaho has abundant resources of which of the following?	Of the electricity that Idaho consumes, the majority comes from what one source?	Of the electricity that Idaho produces, the majority comes from what one source?	Which one of the following is the fastest to implement?
N	382	448	450	358
Mean	2.86	3.52	3.90	2.35
Median	3.00	4.00	4.00	2.00
Std. Deviation	.496	1.103	.531	.903

4. Summary Tables – Pre-survey

Table a.1: How **important** to you are the following when deciding the best way to meet electricity needs of homes and businesses?

	Mean	Standard Deviation	Minimum	Maximum	N
Reliability/Predictability	4.36	0.99	0	5	504
Safety & Security	3.98	1.52	-4	5	504
Trust	3.90	1.59	-5	5	501
Cost	3.66	1.68	-3	5	503
Impact to Environment	3.53	1.84	-5	5	501
Responsiveness and Adaptability	3.41	1.64	-3	5	496
Other Benefits	1.93	2.16	-5	5	352
Aesthetics	1.52	2.63	-5	5	494

(Note: 'other benefits' was included as a choice if the respondent had a different reason for preference than the factors provided)

Summary Table Reflective Preference Factors
Table a.2: How would you rate your preference of the following?

	Mean	Standard Deviation	Minimum	Maximum	N
Renewable	3.87	2.01	-5	5	501
Energy conservation and Efficiency	3.64	1.90	-5	5	501
Hydropower	3.24	2.17	-5	5	501
Nuclear	1.81	3.67	-5	5	500
Fossil Fuels	0.06	3.16	-5	5	496

Table a.3: How safe and secure are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Renewable	3.71	1.91	-5	5	487
Energy conservation and Efficiency	3.67	1.93	-5	5	479
Hydropower	3.21	2.15	-5	5	497
Nuclear	1.24	3.40	- 5	5	497
Fossil Fuels	1.06	3.03	-5	5	495

Table a.4: How reliable and predictable are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Hydropower	3.10	2.04	-4	5	504
Energy conservation and Efficiency	2.49	2.70	-5	5	474
Nuclear	2.44	2.94	-5	5	490
Renewable	2.08	2.69	-5	5	483
Fossil Fuels	2.03	2.70	-5	5	491

Table a.5: How trustworthy are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Hydropower	2.37	2.57	-5	5	491
Renewable	2.08	2.66	-5	5	468
Energy conservation and Efficiency	2.07	2.77	-5	5	468
Nuclear	1.12	3.24	-5	5	474
Fossil Fuels	0.74	3.05	-5	5	483

Table a.6: How much harm to the environment are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Energy conservation and efficiency	3.45	2.10	-5	5	478
Renewable	2.81	2.29	-5	5	477
Hydropower	1.49	2.93	-5	5	495
Nuclear	0.39	3.47	-5	5	489
Fossil Fuels	-1.33	3.07	-5	5	493

Table a.7: How costly are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Energy conservation and Efficiency	1.22	3.01	-5	5	467
Hydropower	1.18	2.79	-5	5	476
Renewable	0.06	3.15	-5	5	463
Nuclear	-0.67	3.21	-5	5	457
Fossil Fuels	-0.72	2.78	-5	5	465

Table a.8: How responsive and adaptable are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Energy conservation and Efficiency	1.74	2.83	-5	5	468
Renewable	1.03	2.91	-5	5	470
Hydropower	0.41	2.04	-5	5	480
Fossil Fuels	0.39	2.86	-5	5	474
Nuclear	-0.26	3.24	-5	5	469

Table a.9: How much harm to aesthetics are the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Energy conservation and Efficiency	3.23	2.38	-5	5	473
Hydropower	1.01	3.08	-5	5	495
Renewable	0.85	2.86	-5	5	481
Nuclear	0.01	3.26	-5	5	488
Fossil Fuels	-1.15	2.92	-5	5	496

Table a.10: How would you rate the extra benefits* of the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Energy conservation and Efficiency	3.29	2.36	-5	5	477
Renewable	2.69	2.74	-5	5	470
Hydropower	2.51	2.46	-5	5	483
Nuclear	0.67	3.50	-5	5	476
Fossil Fuels	-0.36	3.17	-5	5	477

(Note: 'other benefits' was included as a choice if the respondent had a different reason for preference than the factors provided)

Table a.11: Level of support for electricity options:

	Mean	Standard Deviation	Minimum	Maximum	N
Renewable	$28.35	$22.03	$0.00	$100.00	504
Hydropower	$23.13	$19.68	$0.00	$ 100.00	504
Nuclear	$20.14	$22.49	$0.00	$ 100.00	501
Energy conservation and efficiency	$20.09	$16.34	$0.00	$ 100.00	503
Fossil fuels	$ 7.22	$ 10.13	$0.00	$ 60.00	104
Other	$36.32	$28.32	$5.00	$ 100.00	71

Table a.12: Level of support for solutions that solve challenges for the following:

	Mean	Standard Deviation	Minimum	Maximum	N
Renewable	$25.92	$21.06	$0.00	$100.00	496
Nuclear	$25.08	$23.31	$0.00	$100.00	496
Energy conservation and Efficiency	$17.09	$14.31	$0.00	$ 80.00	495
Hydropower	$13.36	$14.61	$0.00	$ 100.00	496
Fossil Fuels	$13.27	$13.59	$0.00	$ 100.00	496
Other	$ .98	$0.12	$0.00	$ 1.00	66

Table a.13: What is the likelihood that a solution will be found for the following?

	Mean	Standard Deviation	Minimum	Maximum	N
Renewable	1.25	2.73	-5	5	483
Energy conservation and Efficiency	0.96	2.87	-5	5	479
Fossil Fuels	- 0.38	2.91	-5	5	487
Nuclear	-0.55	3.40	-5	5	490
Hydropower	-0.60	2.81	-5	5	482

APPENDIX B – Analysis Event Treatment Groups

B.1. Treatment Groups Table

	Frequency	Percent
Pre & Post Surveys and Conference	15	18.5
Pre and Post Surveys, Deliberation Groups	14	17.3
Pre and Post Surveys and Briefing Documents	20	24.7
Pre and Post Surveys, Briefing Documents and Conference	14	17.3
Pre and Post Surveys, Briefing Documents and Deliberation	18	22.2
Total	81	100.0

2. Frequency Tables – Treatment Groups Only

	Frequency	Percent
I am very knowledgeable about energy issues.	20	26.7
I am somewhat knowledgeable about energy issues.	51	94.7
I am not very knowledgeable about energy issues.	4	100.0
Total	75	
Don't know/not sure	1	

	Frequency	Percent
Government agencies	16	23.9
Business and industries involved in generation of electricity.	14	44.8
Groups or organizations that advocate for a particular energy position.	1	46.3
Citizens	27	86.6
Elected officials	9	100.0
Total	67	
No opinion	4	

Table B.2: Selected Descriptive Statistics for Event Groups Participants

Variable	N	%	Mean	Standrd Dev.
Gender (males=1; females=0)	81	79.4		
Age	98		58.72	13.45
Years Living in Idaho	101		32.56	20.36
Political Affiliation				
Democrat	27	26.0		
Republican	32	30.8		
Other	45	43.3		
Professions				
Manager/Professional/Related	41	39.4		
Service	14	13.5		
Sales/Office	8	7.7		
Farming/Fishing/Forestry/Mining	10	9.6		
Construction/Extrac/Mainenance	7	6.7		
Production/Transportation	6	5.8		
Government	9	8.7		
Other	9	9.6		
Marital Status				

Married	79	78.2		
Divorced	10	9.9		
Widowed	3	3.0		
Single, never married	9	8.9		
Income	90		$63,277.7	$28,711.18

1 Index (Cronbach's alpha=.748) of Questionnaire items 40 (A-D), 41 (A-d) and 42 (A-D).

3. Descriptive Statistics – Treatment Groups Only

4. Summary Tables – Selected Question Comparison - Pre-survey and Treatment Groups

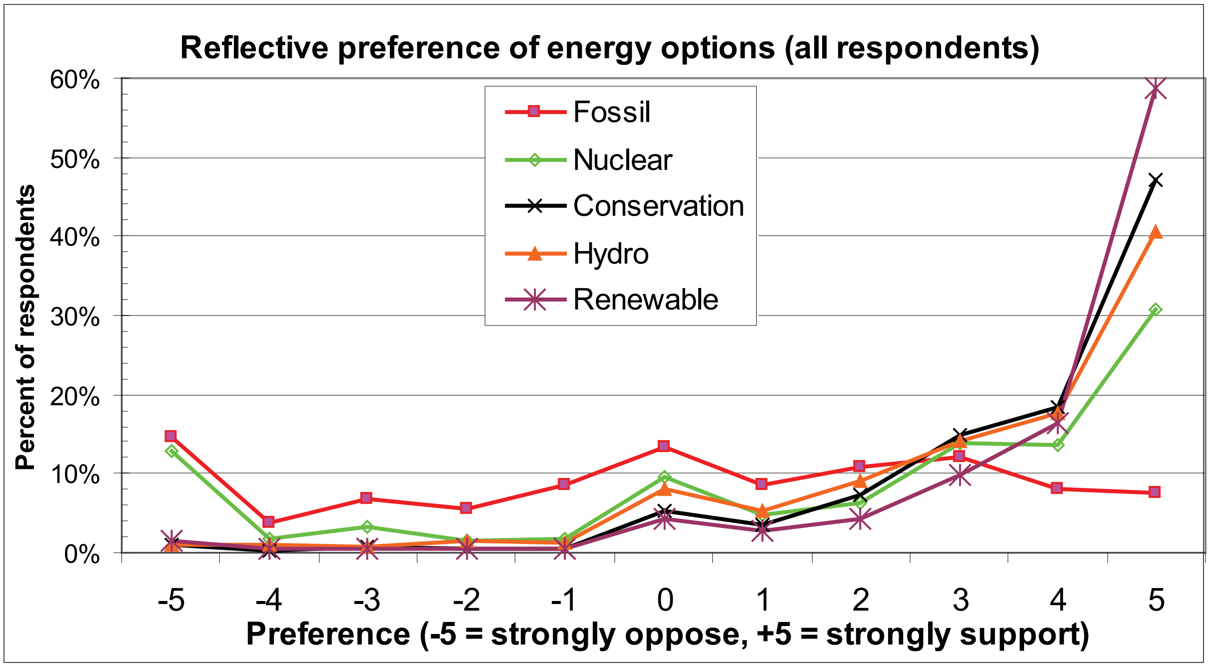
Survey question	Scale rating	Pre-survey % or responses	Treatment group % of responses
How important is impact to the environment…?	-5 through -1	4.7%	0%
	Neutral (0)	3.6%	2.5%
	+1 through +5	88.2%	96.3%
How important is aesthetics…..?	-5 through -1	15.4%	14.1%
	Neutral (0)	21.2%	11.5%
	+1 through +5	63.4%	74.3%
How would you rate your preference of energy conservation and efficiency?	-5 through -1	3.6%	0%
	Neutral (0)	5.7%	2.5%
	+1 through +5	90.6%	97.6%
How would you rate your preference of fossil fuel…?	-5 through -1	38.9%	45.6%
	Neutral (0)	14.1%	7.6%
	+1 through +5	47.1%	46.9%
How safe and secure is nuclear …?	-5 through -1	25.6%	33.4%
	Neutral (0)	9.5%	7.7%
	+1 through +5	65.0%	58.9%
How trustworthy is energy conservation and efficiency?	-5 through -1	16.6%	9.2%
	Neutral (0)	14.4%	11.8%
	+1 through +5	62.0%	78.9%
How much harm to the environment do you think energy conservation and efficiency has? (Where much harm = -5, no harm = +5)	-5 through -1	4.2%	2.6%
	Neutral (0)	13.4%	3.9%
	+1 through +5	82.5%	93.5%
How much harm to the environment do you think	-5 through -1	62.5%	75.9%
	Neutral (0)	6.6%	1.3%

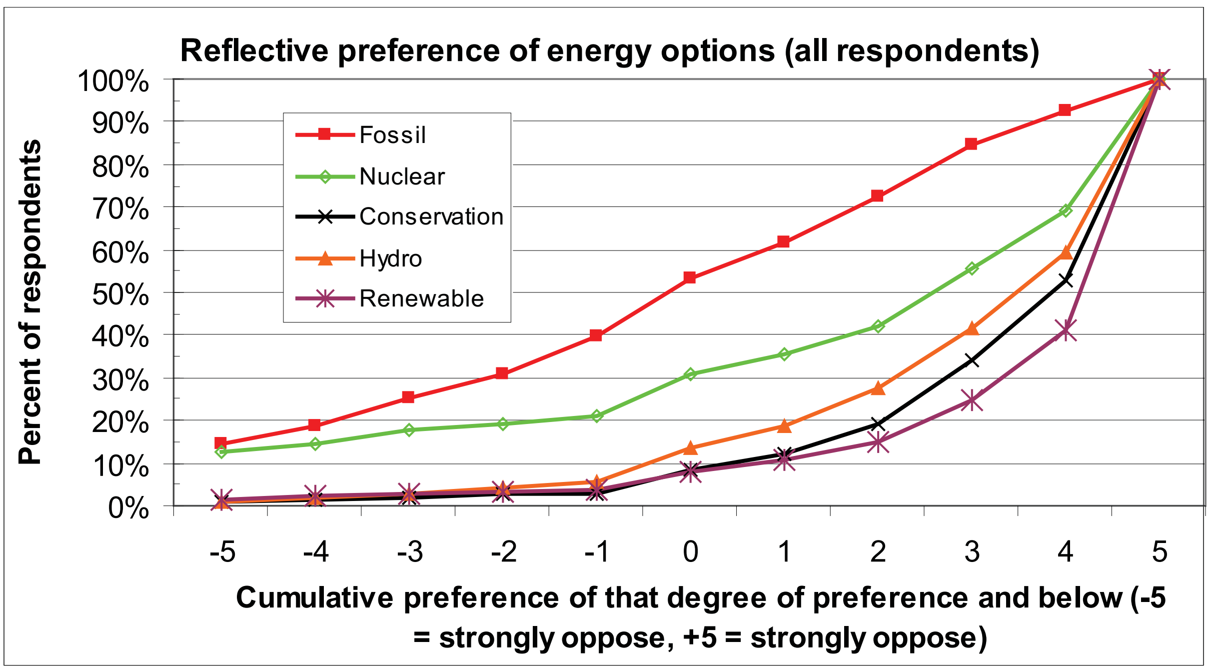
fossil fuel electricity generation has? (Where much harm = -5, no harm = +5)	+1 through +5	30.9%	22.1%
How much harm to the environment do you think hydroelectricity generation has? (Where much harm = -5, no harm = +5)	-5 through -1 Neutral (0) +1 through +5	26.0% 7.3% 66.7%	32.5% 5.0% 62.6%
How costly is fossil fuel electricity generation? (Where -5 = very costly, +5 = least costly.)	-5 through -1 Neutral (0) +1 through +5	51,5% 13.5% 35.0%	60.0% 12.0% 27.9%
How costly is nuclear electricity generation? (Where -5 = very costly, +5 = least costly.)	-5 through -1 Neutral (0) +1 through +5	52.7% 8.7% 38.6%	57.5% 12.3% 30.0%
How costly is renewable electricity generation? (Where -5 = very costly, +5 = least costly.)	-5 through -1 Neutral (0) +1 through +5	40.3% 14.4% 45.3%	46.7% 10.7% 42.7%
How responsive and adaptable is nuclear electricity generation? (Where -5 = not at all, +5 = very)	-5 through -1 Neutral (0) +1 through +5	44.1% 15.2% 40.7%	44.9% 12.8% 42.2%
How harmful to aesthetics is fossil fuel electricity generation? (Where -5 = much harm, +5 = no harm)	-5 through -1 Neutral (0) +1 through +5	61.1% 10.9% 28.0%	72.5% 5.0% 22.6%
How harmful to aesthetics is hydropower electricity generation? (Where -5 = much harm, +5 = no harm)	-5 through -1 Neutral (0) +1 through +5	30.7% 13.4% 56.0%	38.5% 15.4% 46.1%
How harmful to aesthetics is nuclear electricity generation? (Where -5 = much harm, +5 = no harm)	-5 through -1 Neutral (0) +1 through +5	42.1% 14.9% 43.0%	54.4% 11.4% 34.2%
How valuable are the benefits of energy conservation and	-5 through -1 Neutral (0) +1 through +5	6.6% 10.2% 83.3%	2.6% 5.2% 92.2%

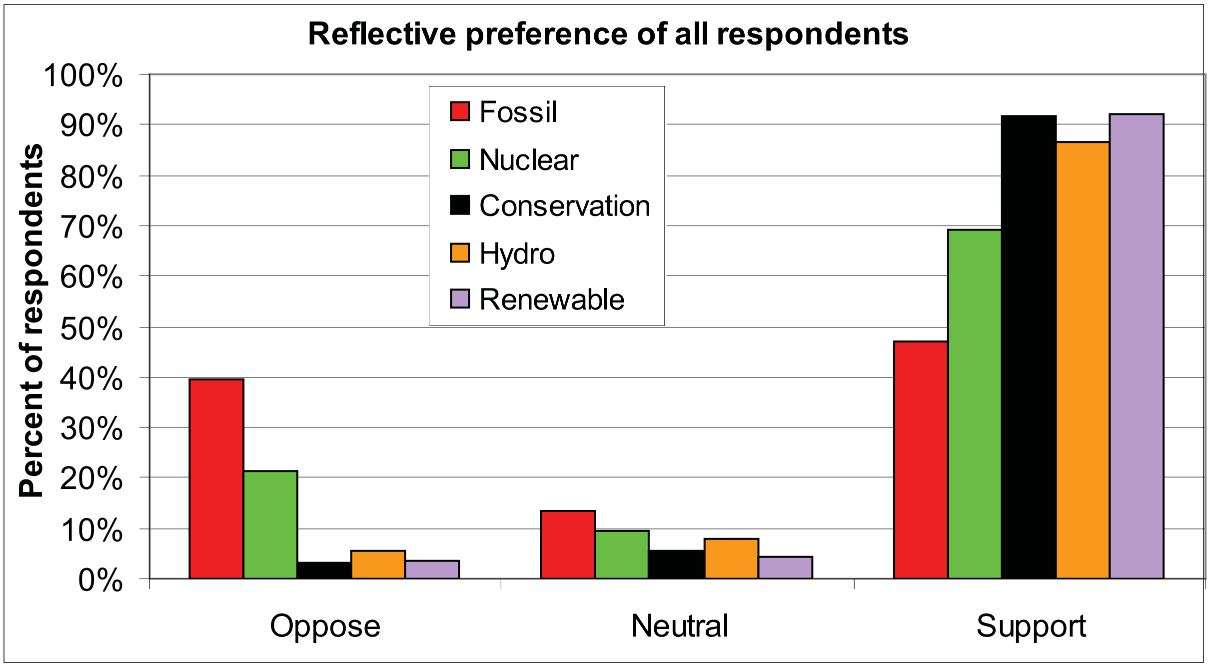
efficiency? (Where -5 = no valuable benefits, +5 = very valuable benefits)			
How valuable are the benefits of fossil fuel electricity generation? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	42.6% 17.0% 40.3%	52.6% 18.4% 29.0%
How valuable are the benefits of hydroelectric generation? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	42.6% 17.0% 78.9%	9.2% 17.1% 73.8%
How valuable are the benefits of nuclear electricity generation? (Where -5 = no valuable benefits, +5 = very valuable benefits)	-5 through -1 Neutral (0) +1 through +5	31.9% 14.1% 53.9%	31.6% 13.2% 55.2%
What is the likelihood of a solution to minimize greenhouse gas emissions from fossil fuel electricity plants? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	43.9% 16.0% 40.1%	38.0% 15.2% 46.8%
What is the likelihood of a solution to minimize roadblocks to salmon migration? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	47.1% 18.8% 34.1%	45.5% 23.4% 31.2%
What is the likelihood of a solution to minimize nuclear waste…? (Where -5 = very unlikely, +5 = very likely)	-5 through -1 Neutral (0) +1 through +5	48.1% 11.3% 34.1%	47.5% 13.8% 38.9%
What is the likelihood of a solution to minimize intermittency, etc. of transmission of renewable electricity…? (Where -5 =	-5 through -1 Neutral (0) +1 through +5	21.1% 16.7% 62.3%	16.7% 11.5% 71.8%

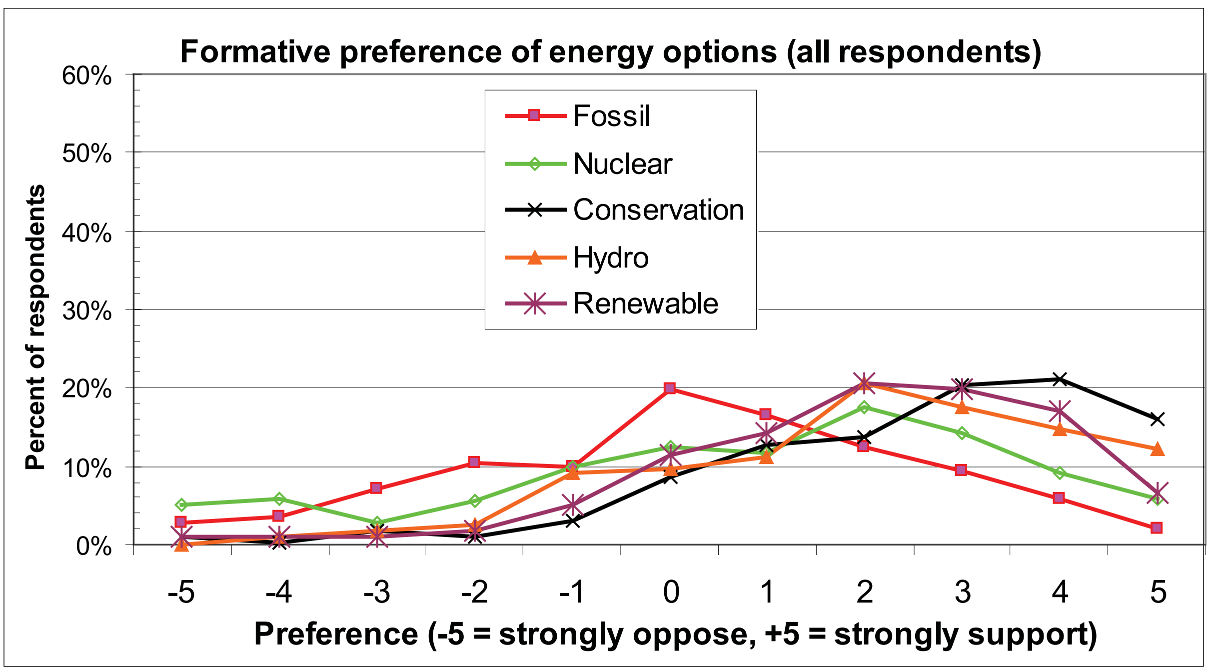
very unlikely, +5 = very likely)			

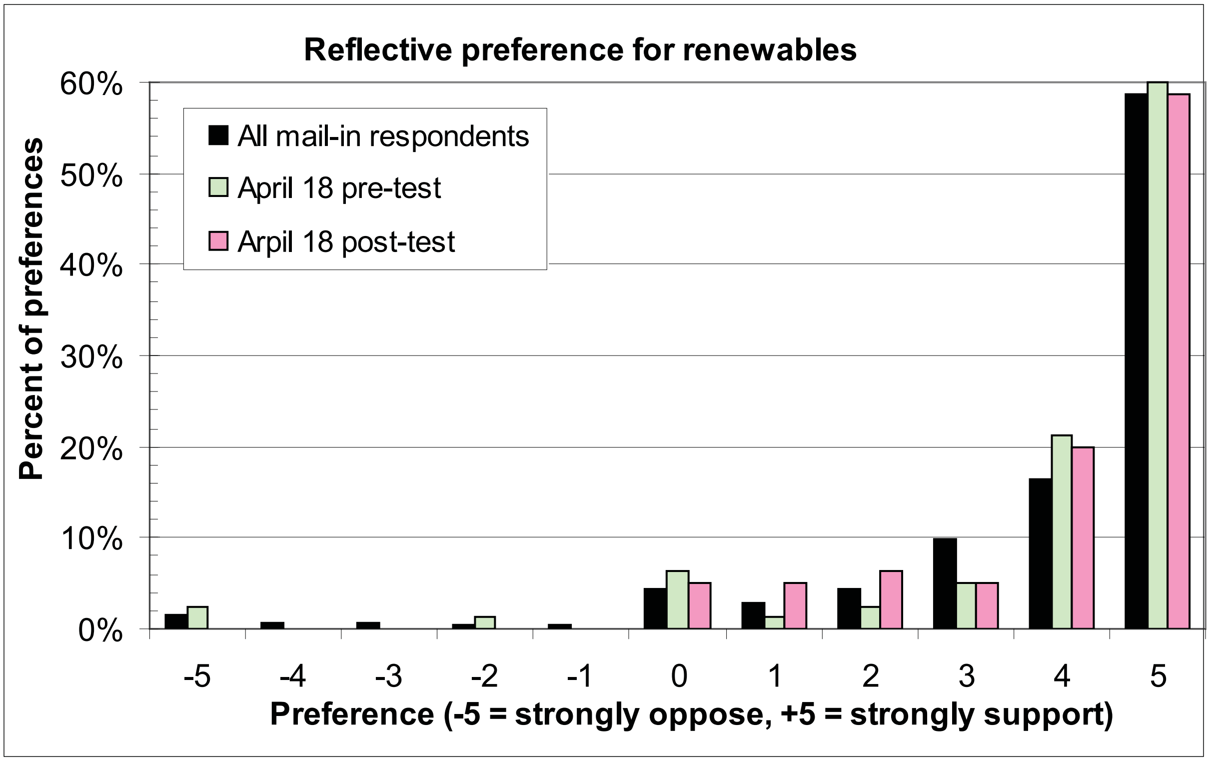
4. Graphics for Reflective and Formative Preference



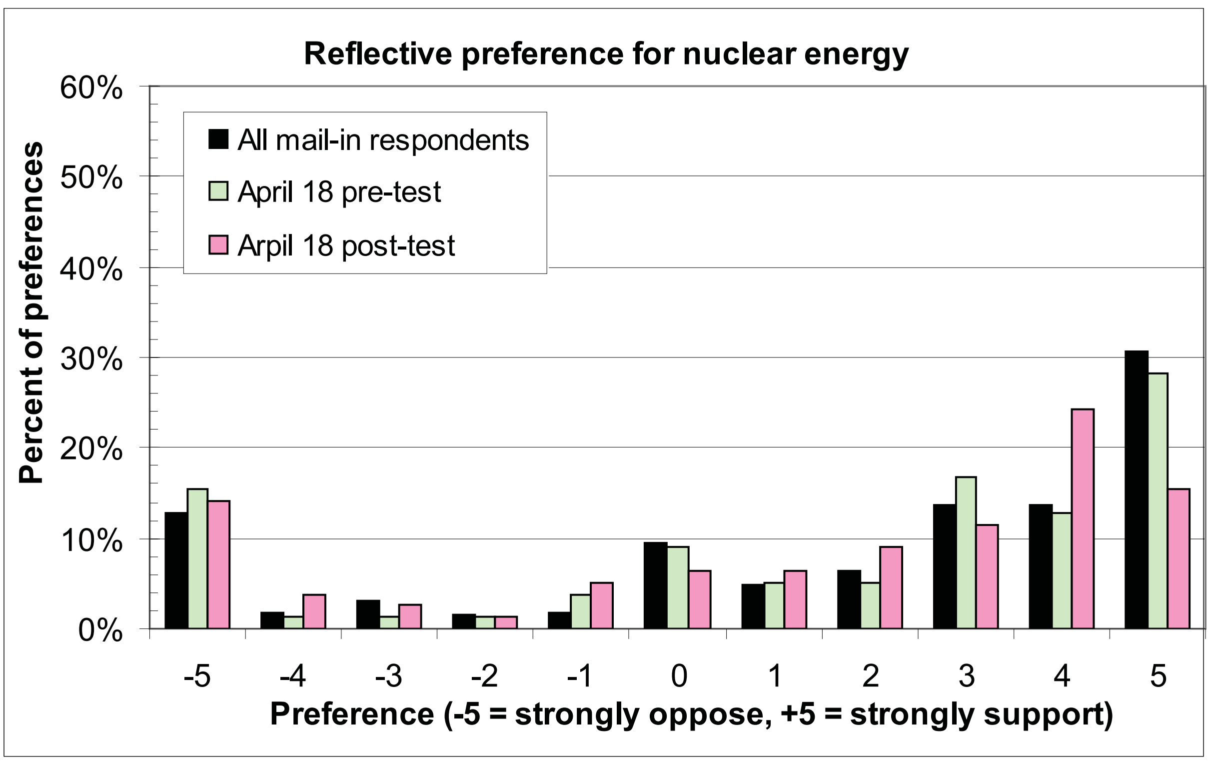



Reflective preference of all respondents
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent of respondents
Fossil
Nuclear
Conservation
Hydro
Renewable
Oppose
Neutral
Support

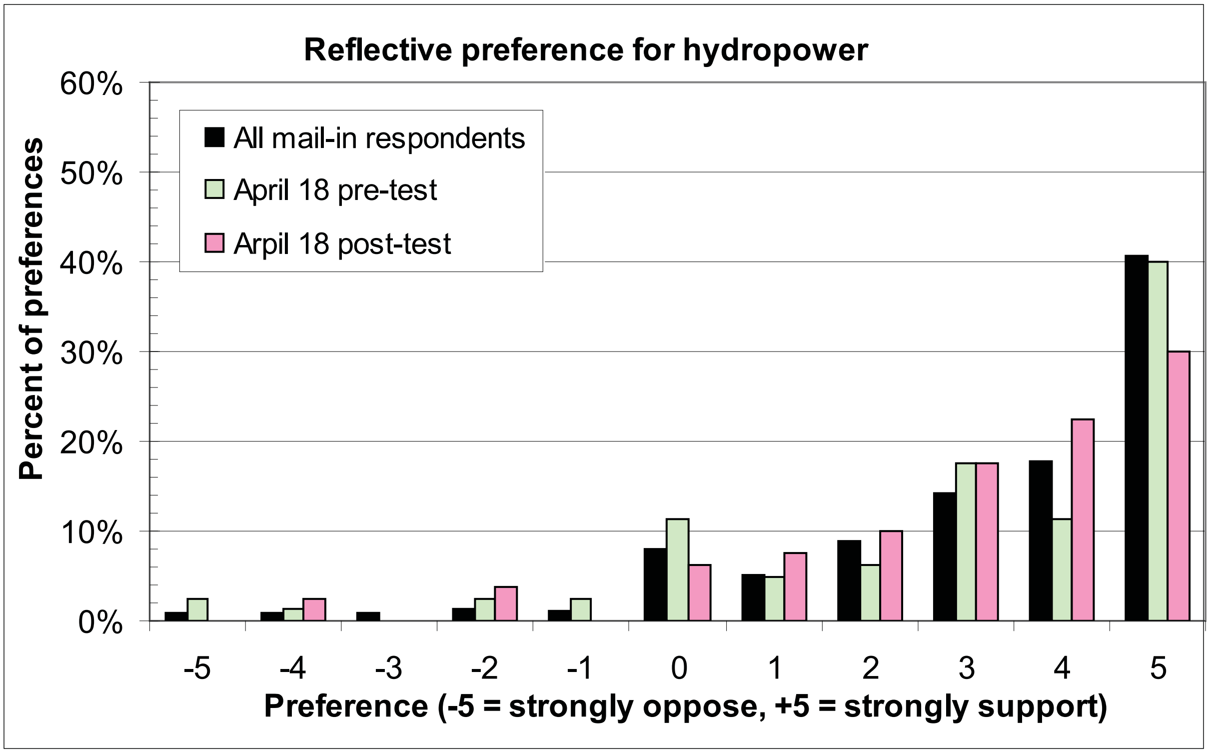

Formative preference of energy options (all respondents)
60%
50%
40%
30%
20%
10%
0%
Percent of respondents
Fossil
Nuclear
Conservation
Hydro
Renewable
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)



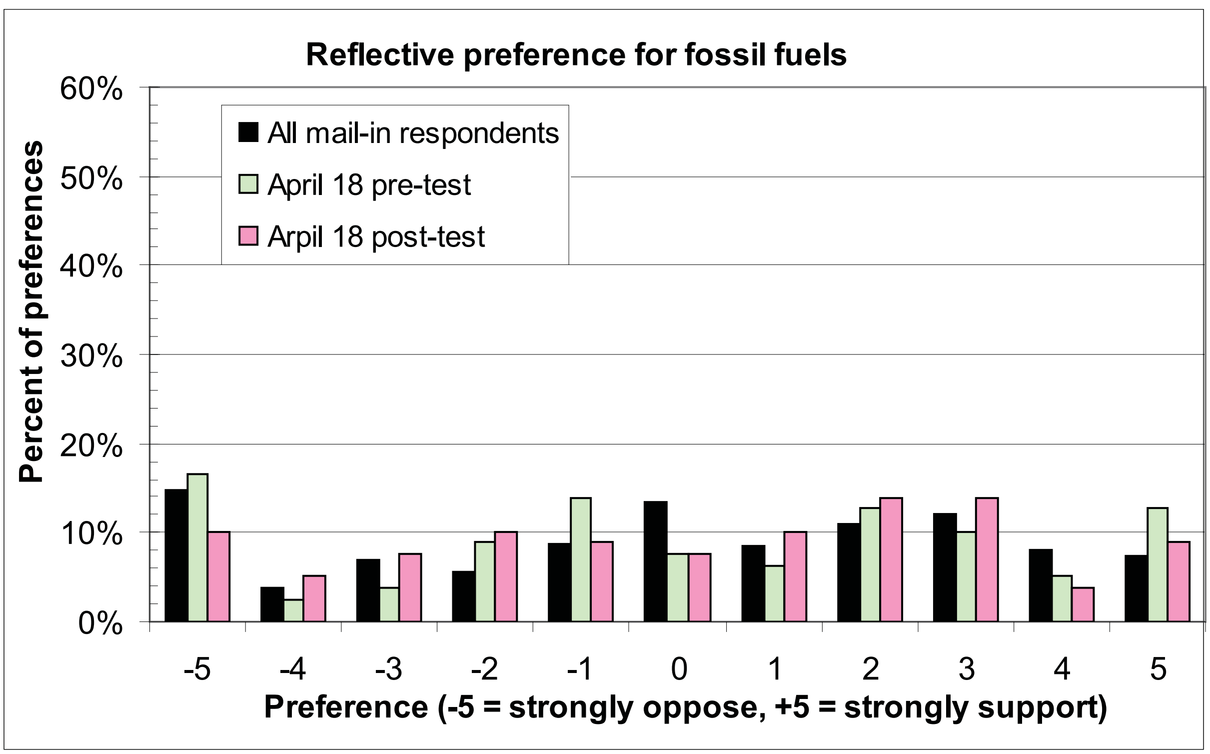
Reflective preference for renewables
60%
50%
40%
30%
20%
10%
0%
Percent of preferences
All mail-in respondents
April 18 pre-test
Arpil 18 post-test
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)



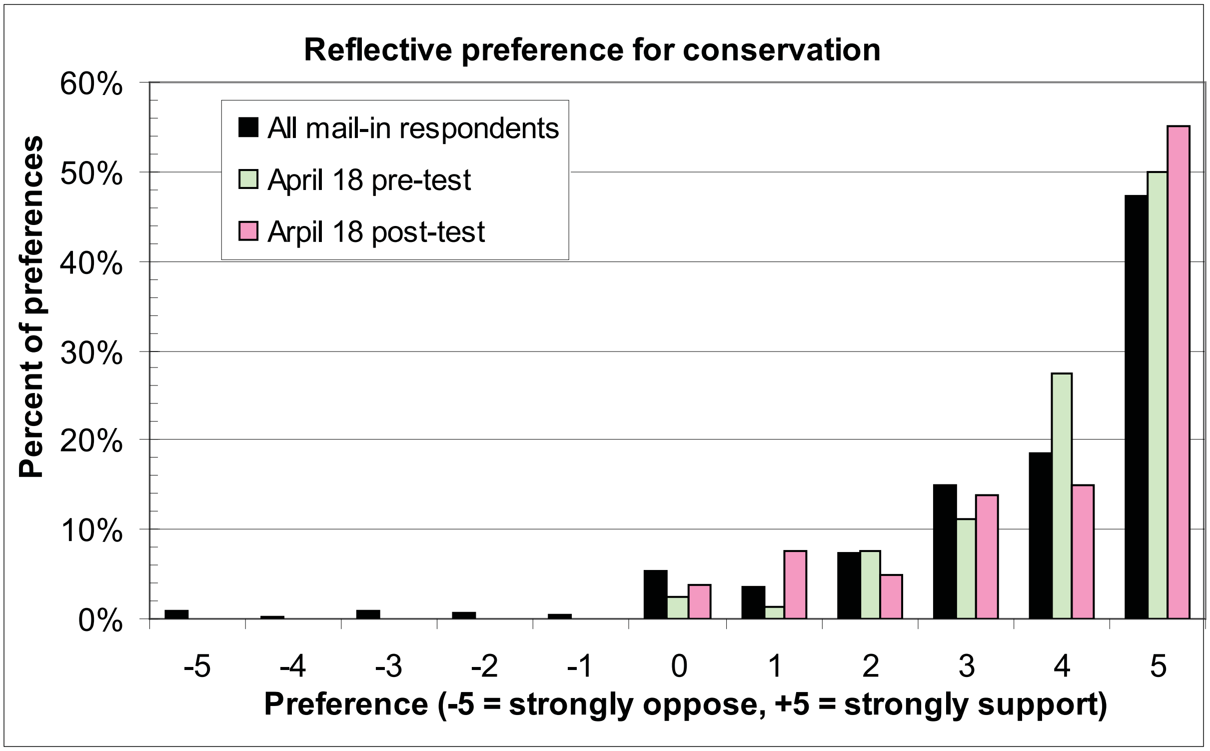
Reflective preference for nuclear energy
60%
50%
40%
30%
20%
10%
0%
Percent of preferences
All mail-in respondents
April 18 pre-test
Arpil 18 post-test
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)

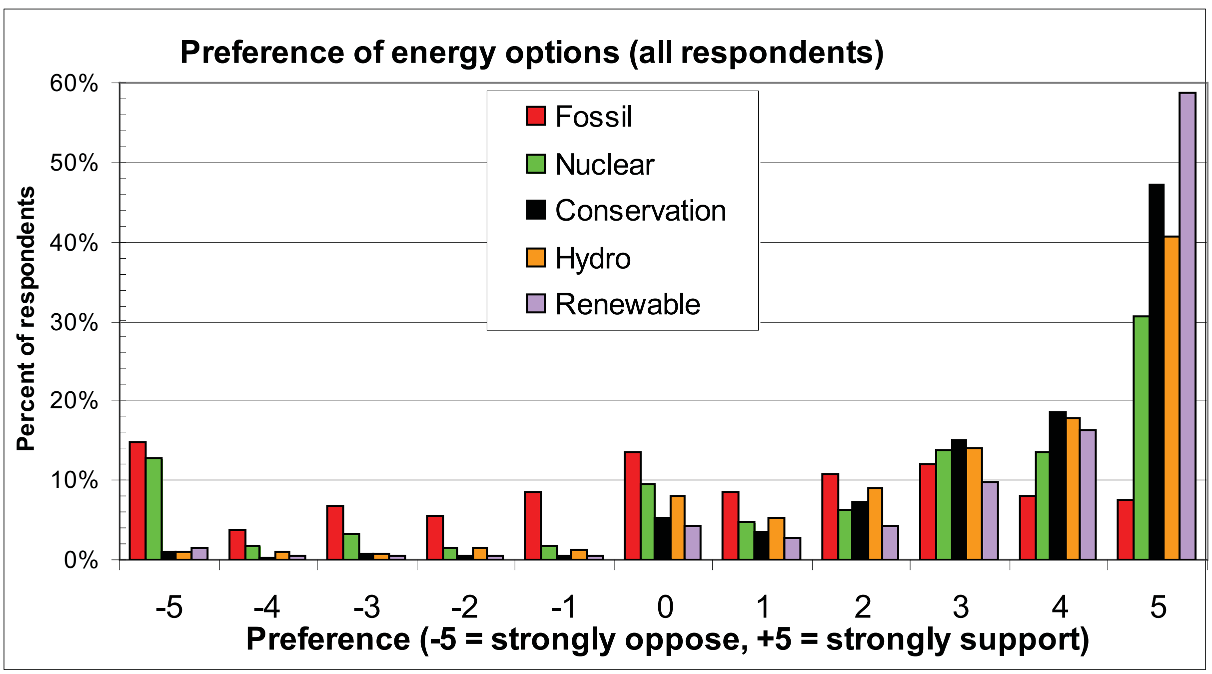


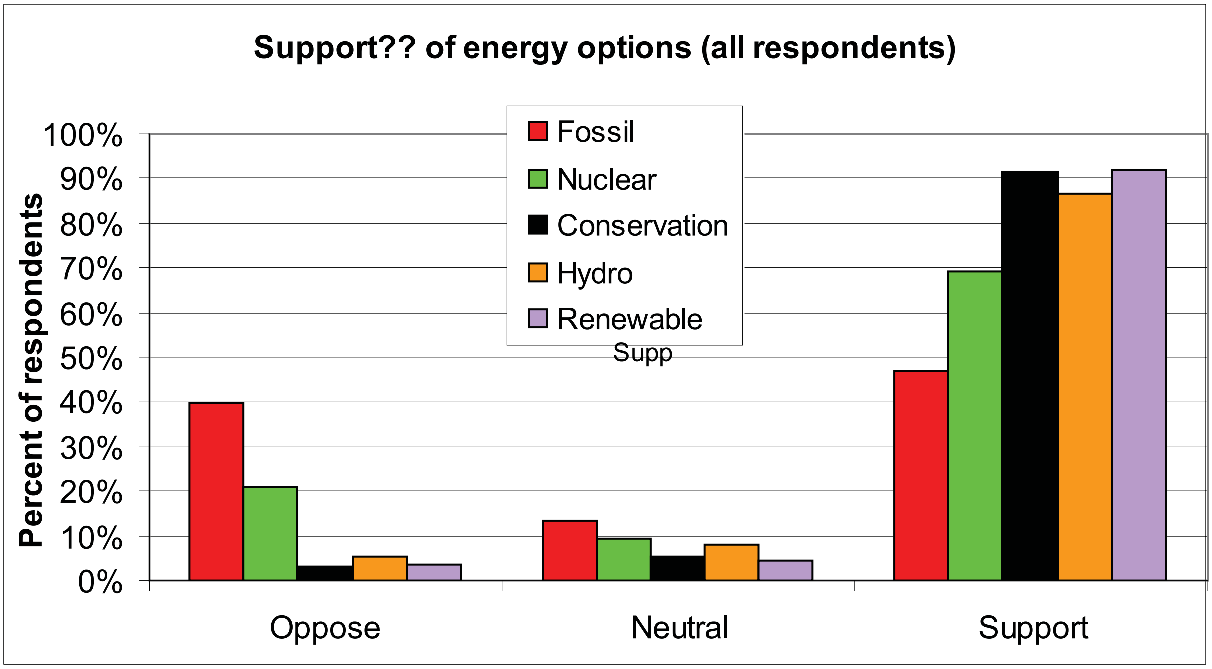
Reflective preference for hydropower
Percent of preferences
60%
50%
40%
30%
20%
10%
0%
All mail-in respondents
April 18 pre-test
Arpil 18 post-test
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)

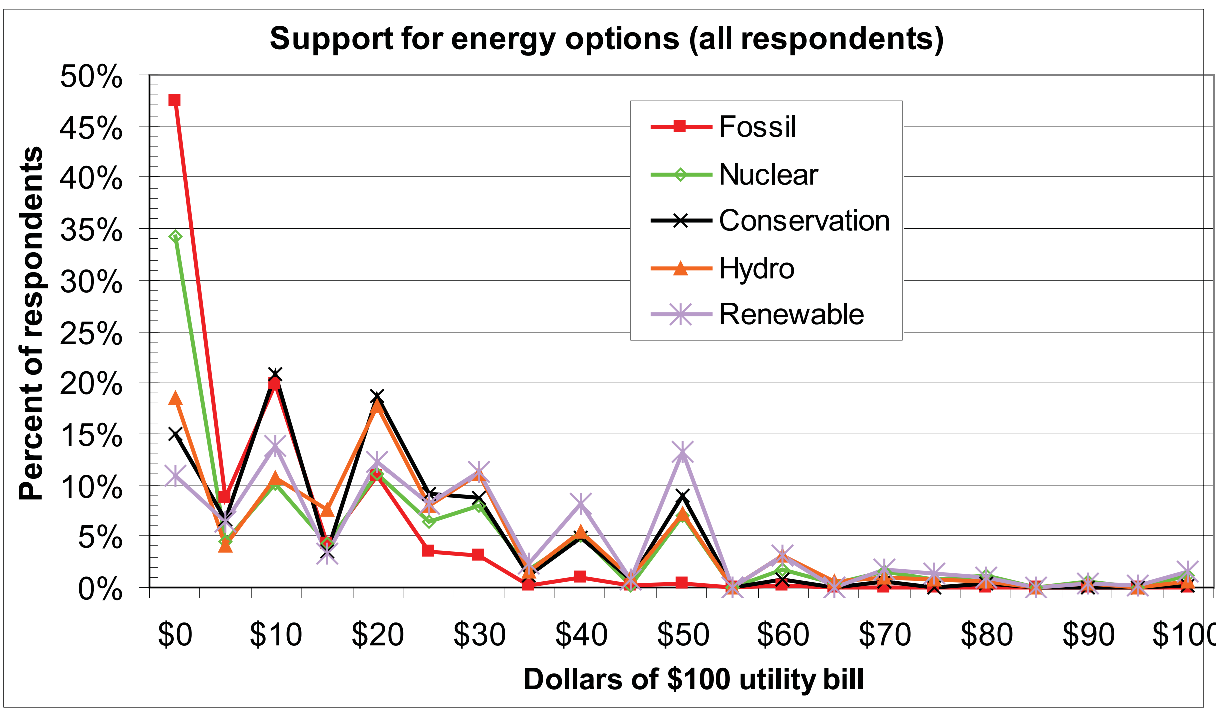


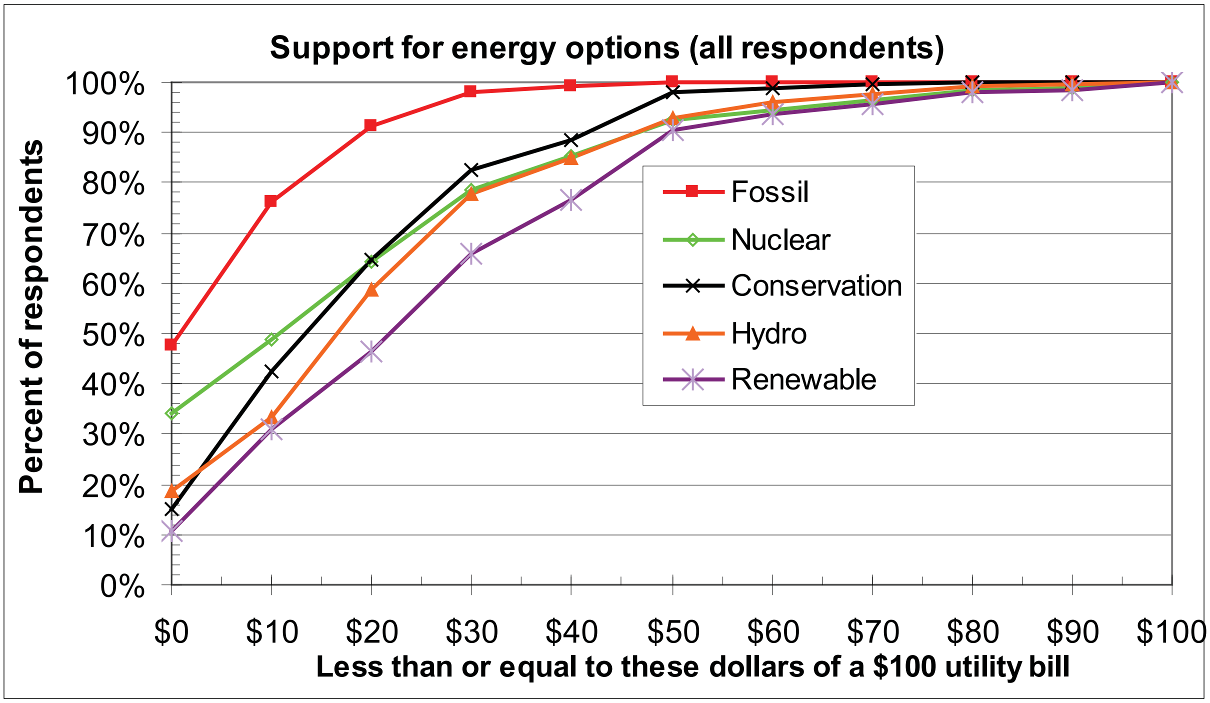
Reflective preference for fossil fuels
Percent of preferences
60%
50%
40%
30%
20%
10%
0%
All mail-in respondents
April 18 pre-test
Arpil 18 post-test
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)

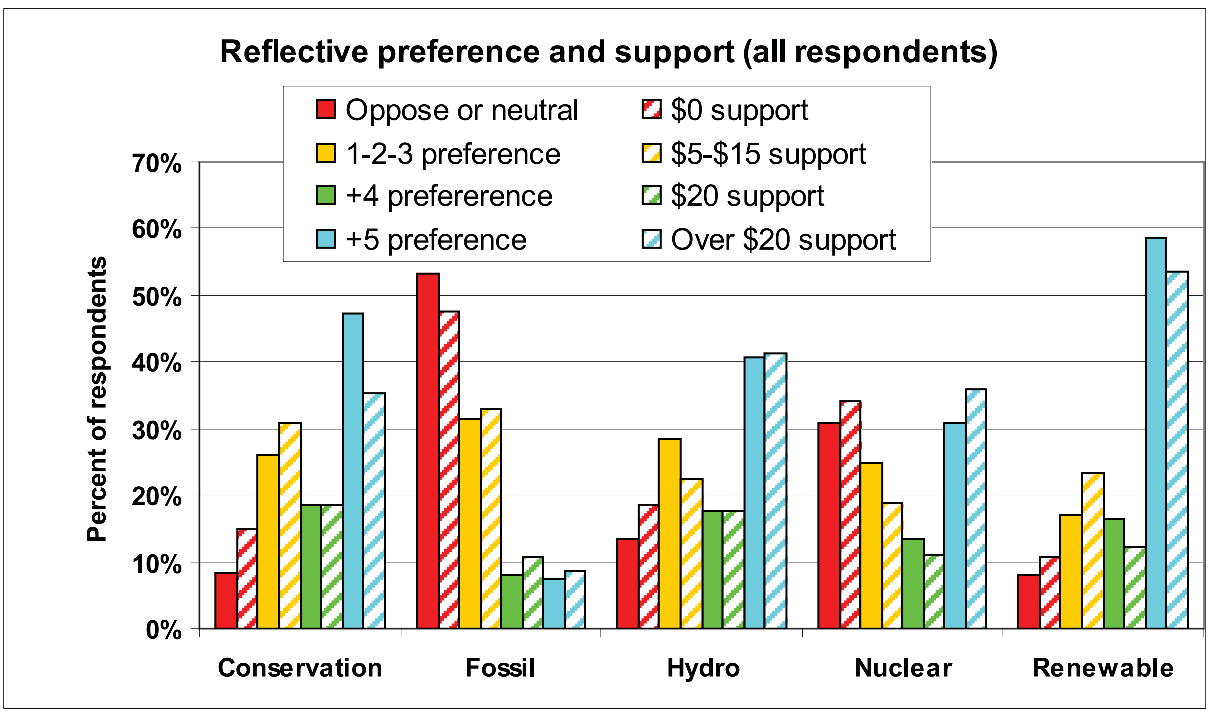

Reflective preference for conservation
Percent of preferences
60%
50%
40%
30%
20%
10%
0%
All mail-in respondents
April 18 pre-test
Arpil 18 post-test
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)


Preference of energy options (all respondents)
Percent of respondents
60%
50%
40%
30%
20%
10%
0%
Fossil
Nuclear
Conservation
Hydro
Renewable
-5
-4
-3
-2
-1
0
1
2
3
4
5
Preference (-5 = strongly oppose, +5 = strongly support)


Support?? of energy options (all respondents)
Fossil
Nuclear
Conservation
Hydro
Renewable
Supp
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Percent of respondents
Oppose
Neutral
Support


Support for energy options (all respondents)
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Percent of respondents
Fossil
Nuclear
Conservation
Hydro
Renewable
$0
$10
$20
$30
$40
$50
$60
$70
$80
$90
$10(
Dollars of $100 utility bill


Support for energy options (all respondents)
Percent of respondents
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
$0
$10
$20
$30
$40
$50
$60
$70
$80
$90
$100
Less than or equal to these dollars of a $100 utility bill
Fossil
Nuclear
Conservation
Hydro
Renewable


Reflective preference and support (all respondents)
Oppose or neutral
$0 support
1-2-3 preference
$5-$15 support
+4 prefererence
$20 support
+5 preference
Over $20 support
Percent of respondents
70%
60%
50%
40%
30%
20%
10%
0%
Conservation
Fossil
Hydro
Nuclear
Renewable

Appendix C – Analysis of Research Questions

Research Question 1

What effect do different types of public discourse (treatments) have on the public's preference and resulting support for different options to meet electricity demand?

<u>Hypotheses:</u>

It is believed that increasing the level of public discourse (i.e., ranging from no discourse to full deliberation) will on average lead to the following:

- increasingly higher levels of change in study participants' preference for each of the five energy options, which will affect (change) participants' level of support for each option;
- increasingly smaller differences between *Reflective Preference* and *Formative Preference* from pre to post, across all electricity option categories; and
- increasingly smaller variation among participants for both measures of preference across all energy option categories.

Analysis Approach used for Research Question 1

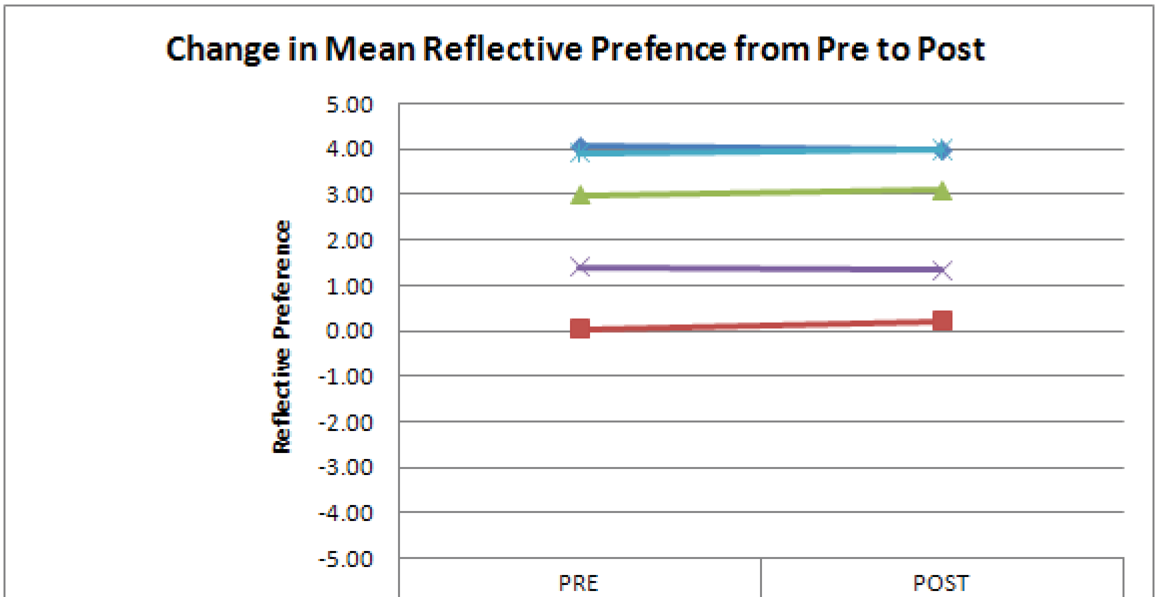
We used a within subjects design ANOVA, with 2 within subjects factors (*pre to post* with 2 levels, and *energy* type with 5 levels) and 1 between subjects factor (*discourse/treatment type* with 6 levels) to look at the effect of discourse/treatment type on **reflective preference**, and on 2 different calculations of **formative preference**. A second calculation of formative preference was performed, where the "extra benefits" question (questions #3 and #12) was dropped from the calculation because very few participants answered this question, most likely because it forced the participant to think of some other benefit not already captured by the other factors, and if they did not answer this question, the formative preference calculation does not work. With the "extra benefits" question removed from the formative preference calculation, the sample size per condition increased, resulting in an increase in statistical power.

For **support**, the sum of each respondent's allocations was intended to total \$100. Therefore, there was a lack of independence in the responses for each energy type – if one knows four responses, one would know the fifth, if people correctly added their amounts to \$100. Consequently, 5 separate ANOVAs were run, one for each energy type. Each ANOVA had one within subjects factor (*pre-post* with 2 levels) and one between subjects factor (*event group* with 6 levels).

In addition, the absolute value difference score was calculated from each participant's pre-test and post-test scores of reflective preference, the second calculation of formative preference, and support. This was done because our hypotheses for research question 1 do not predict a directional change in preference or support for any of the 5 options to meet electricity demand. Taking the absolute value of the pre-post difference score allows us to see any potential idiosyncratic changes. For example, there may be a participant in a treatment group who strongly preferred an energy type (e.g., hydro) prior to any exposure to treatments, but then strongly did not prefer this energy type after exposure; another participant might have the exact opposite change in preference. However, the hypothesis the absolute values (levels of change) for both participants would be greater, given more types of discourse participation. The net effect of the two participants' changes would cancel each other out if our analyses used simple mean values, rather than the absolute value change scores. Detailed results for Research Question 1 are below.

REFLECTIVE PREFERENCE

The results for **reflective** preference were that the public discourse treatment type had no effect on reflective preference (F = .74, p = .60, ns). It was not significant as a main effect, nor was it present in any significant interactions. In addition, for the within subjects factors, there was a main effect of energy type (F = 49.71, p = .000). Again, there were no significant interactions.



	PRE	POST
Conservation & Efficiency	4.06	3.98
Fossil Fuels	0.04	0.21
Hydropower	3.00	3.09
Nuclear power	1.40	1.33
Renewables	3.91	3.99

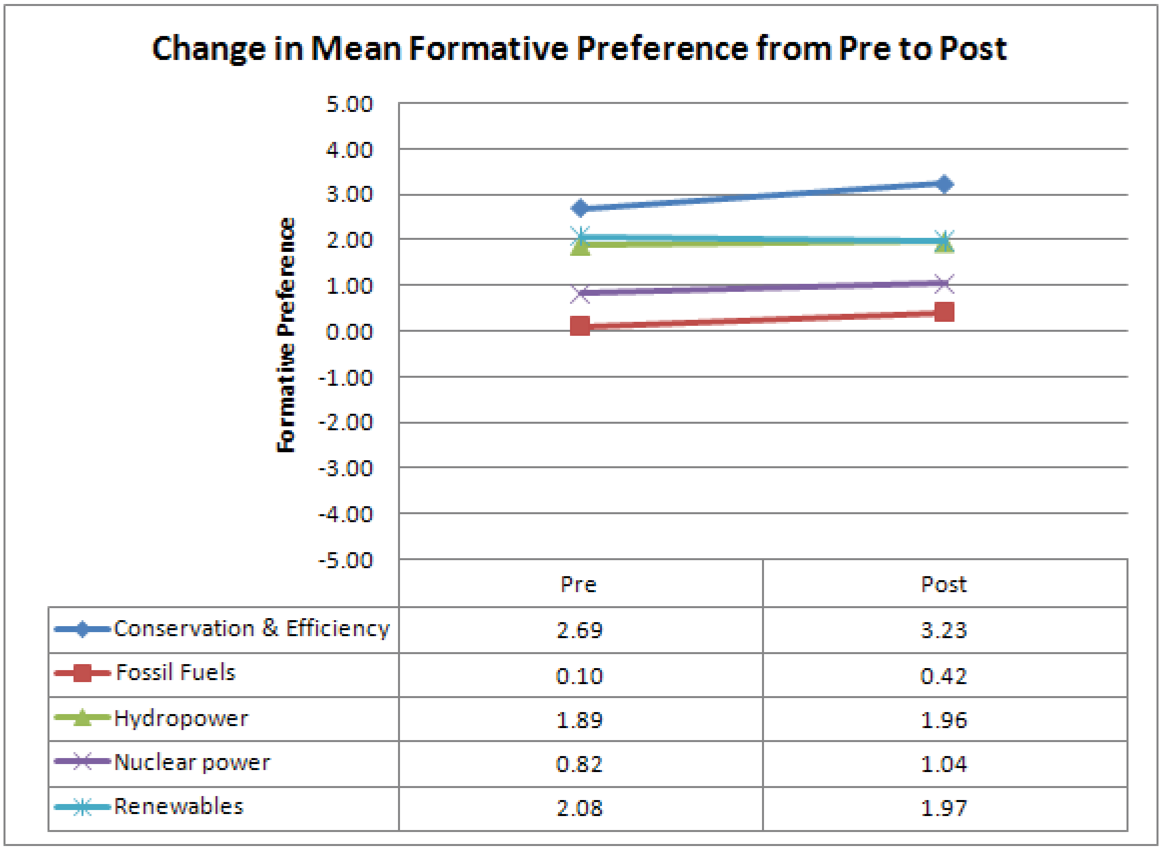
When looking at post hoc comparisons among the energy types, the energy types with the highest reflective preferences were conservation and renewables. Hydro and nuclear had intermediate levels of reflective preference, and fossil had the lowest level of reflective preference.

These results indicate that our main independent variable, public discourse treatment, had no statistically meaningful effect. Participants' reflective preferences changed very little, or not at all, from pre to post test. Moreover, our sample of participants showed clear reflective preference for some ways to meet electricity demand (aka energy types) over others, as seen in the 'spread' between the 5 different energy types. That is, conservation and renewables were reflectively preferred the most, with a mean of approximately +4 on a +5 to -5 scale, and fossil had a mean near zero. The lack of change from pre test to post test and the spread between the 5 different energy types indicate that the participants had strong prior attitudes, or preferences for ways to meet electricity demand, and that our public discourse treatment did not affect those strong prior attitudes.

- Caveat 1: the data violated sphericity; therefore the reported F values are those calculated using the Greehouse-Geisser correction to the degrees of freedom.
- Caveat 2: violations of normality occurred with the residuals of the formative preference for nuclear and renewable on the pre-test, and conservation on the post-test. All of these violated normality due to significant negative skewness. Therefore the results of this analysis must be viewed with caution. However, the robustness of the ANOVA should enable us to draw conclusions from this analysis.
- Caveat 3: all of our analyses suffered from a lack of statistical power due to small sample sizes in each of our treatment conditions/event groups.

FORMATIVE PREFERENCE, Original Calculation

The results for **formative** preference were very similar. There was no effect of public discourse treatment ($F = 1.605$, $p = .19$, ns), and there was a significant main effect of energy type ($F = 13.93$, $p = .0005$). Conservation and renewable were preferred the most, hydropower preferred next, then nuclear; fossil fuel was preferred the least. There were no significant interactions. That is, preference did not change differently from pre to post across the different treatment groups (as seen by the horizontal lines).

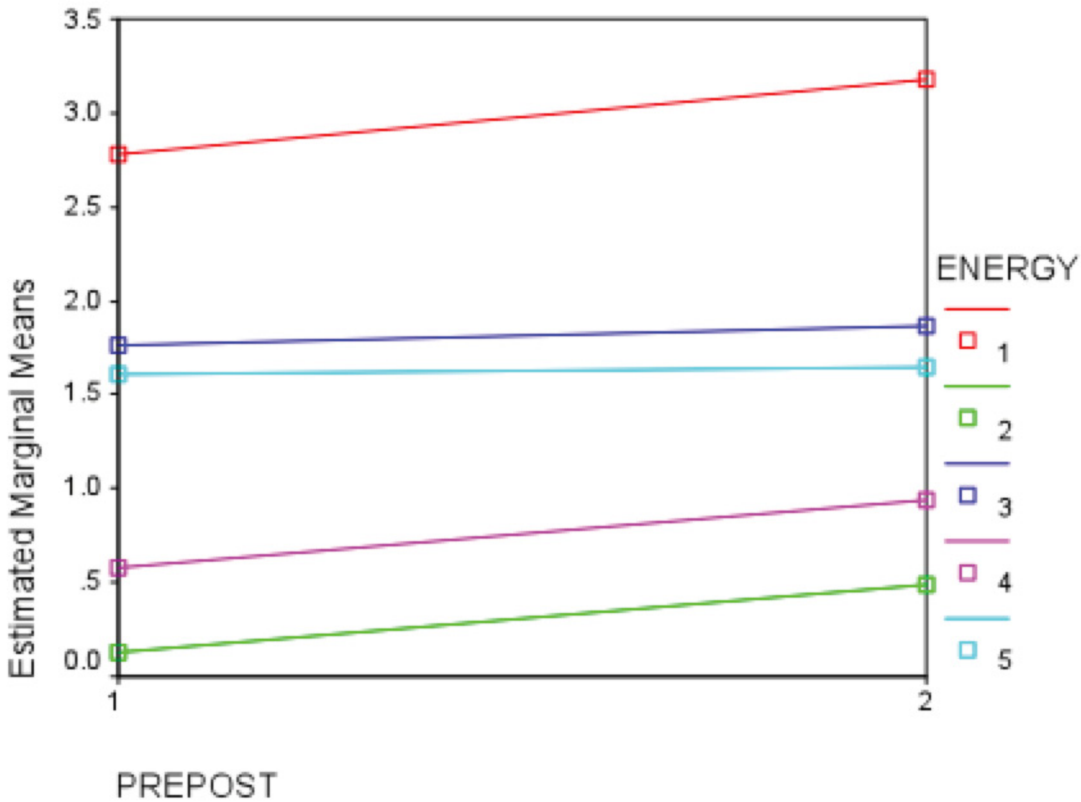


	Pre	Post
Conservation & Efficiency	2.69	3.23
Fossil Fuels	0.10	0.42
Hydropower	1.89	1.96
Nuclear power	0.82	1.04
Renewables	2.08	1.97

FORMATIVE PREFERENCE, Revised Calculation – drops "extra benefits" question

As previously mentioned, **formative preference** was calculated a second way. The "extra benefits" question (questions #3 and #12) was dropped from the calculation because very few participants answered this question. With the "extra benefits" question removed from the formative preference calculation, the sample size per condition increased, resulting in an increase in statistical power.

However, the results did not substantively improve. There was a marginally significant effect of discourse treatment ($F = 2.086$, $p = .084$). There was also a significant main effect of energy type ($F = 22.25$, $p = .000$). In addition, there was a significant main effect of pre-post ($F = 4.63$, $p = .036$). However, there were no significant interactions.



Note: 1 = Conservation, 2 = Fossil fuel, 3 = Hydropower, 4 = Nuclear power , 5 = Renewables

Interestingly, for this calculation of formative preference, at least one of the event groups/treatment groups had a mean that was significantly different from the rest of the groups. In looking at the means, it appears that the pre-post only mean is different from all of the other means, but no post hoc statistical test was run because the result is only marginally significant.

1. Event post-survey group #

Measure: MEASURE_1

Event post-survey group #	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Pre & Post Surveys and Conference	1.210	.349	.511	1.910
Pre and Post Surveys, Deliberation Groups	1.859	.329	1.199	2.519
Pe and Post Surveys and Briefing Documents	1.340	.285	.769	1.911
Pre and Post Surveys, Briefing Documents and Conference	1.938	.274	1.389	2.487
Pre and Post Surveys, Briefing Documents and Deliberation	1.819	.329	1.159	2.479
Pre and Post Only	.829	.312	.203	1.455

As with the original calculation of formative preference, there was a main effect of energy type. As before, energy conservation and efficiency was preferred the most. Hydropower and renewables were preferred next, nuclear power was preferred even less, and fossil fuel was preferred the least. This is evidence of strong prior attitudes. People prefer some energy types over others, and didn't change their preferences from pre to post.

The main effect of pre-post is a new result, relative to the findings for the original calculation of formative preference. This means that formative preference for all 5 energy types, on average, changed from pre to post. In looking at the graph above, mean formative preference went up from pre to post. It appears that after getting "more information" via exposure to any one of the discourse treatment groups, in general, caused people formatively prefer each energy type more than they did prior to receiving this information. However, because this was just one idiosyncratic main effect, and because of the general lack of statistical power, additional analyses were not performed to try to further understand this effect.

SUPPORT

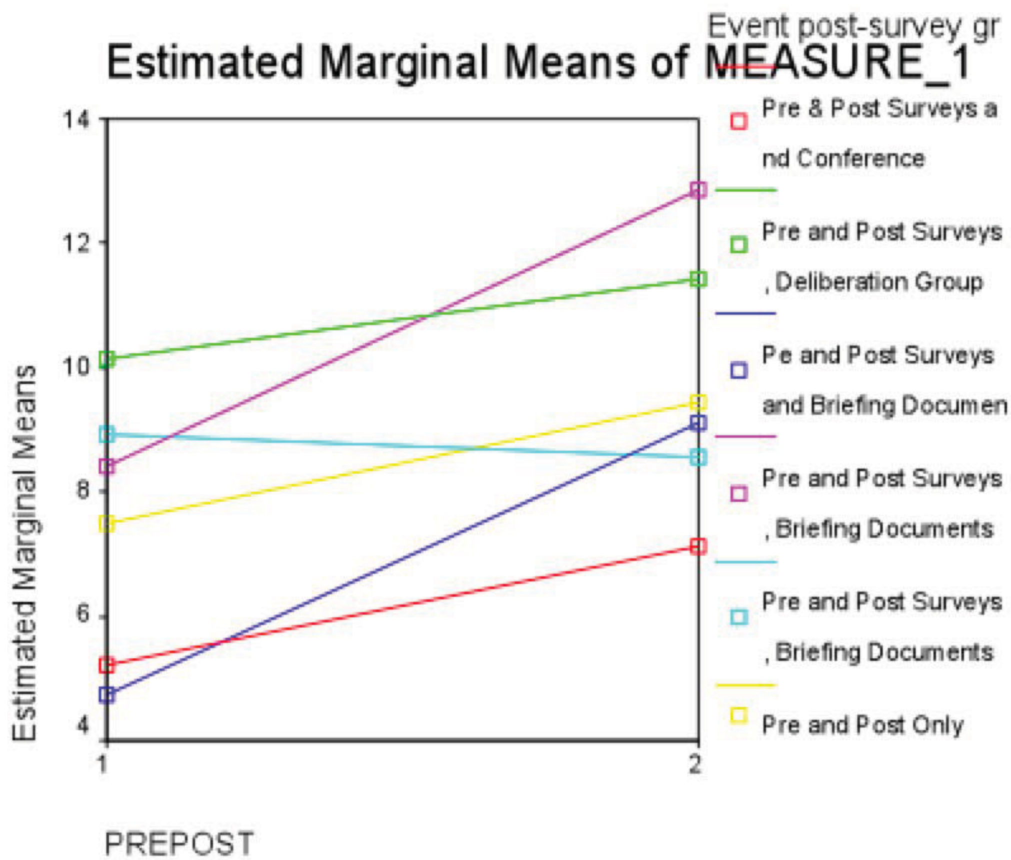
As previously mentioned the sum of each respondent's allocations was intended to total $100. However, not all participants did this correctly. To ensure we used only valid responses to this question, the following steps were performed:

1. The total dollar amount each participant gave to support all energy types on their pre-test survey and post-test survey was computed.
2. Only those participants who correctly added up their dollar amounts to $100 on both pre and post test surveys were selected. This constituted 475 people on the pre-test survey (94.8% of the participants) and 126 people on the post test survey (96.9%). All others were dropped.
3. Five ANOVAs were run, one for each energy type. Each ANOVA had one within subjects factor (pre-post with 2 levels) and one between subjects factor (event group with 6 levels).

The detailed results are below.

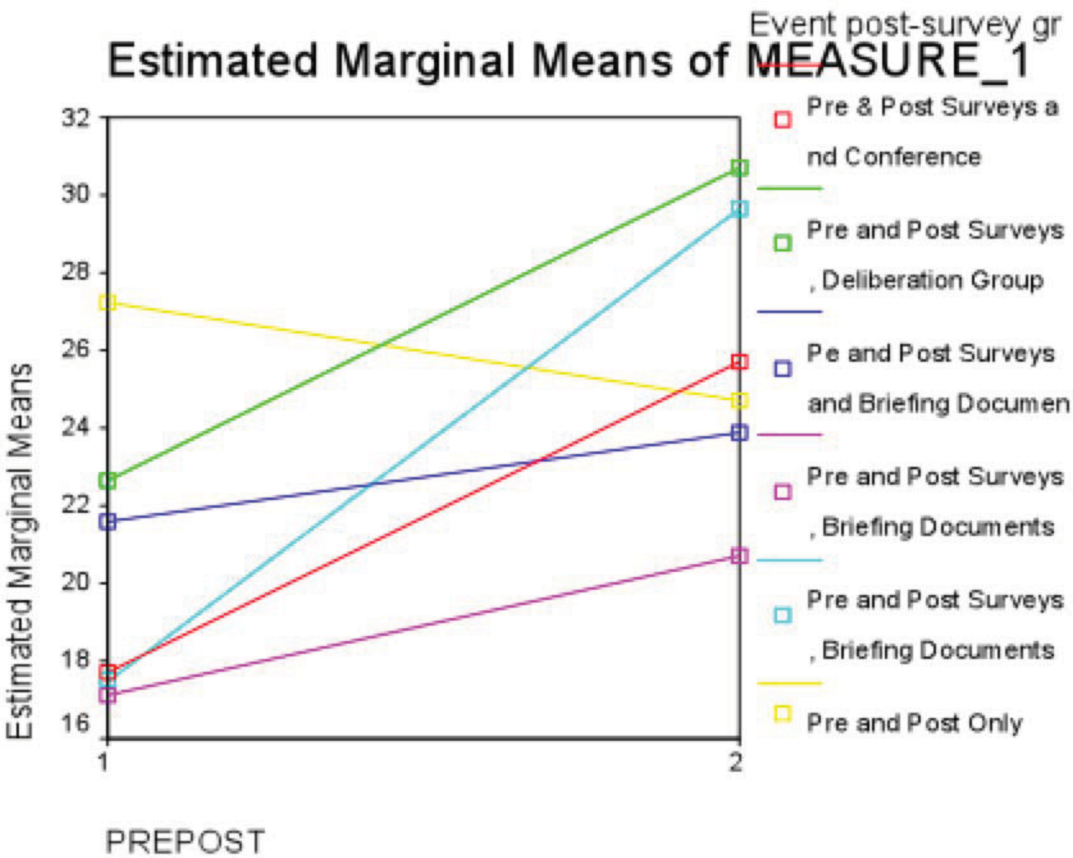
For Energy Conservation and Efficiency, there was no effect of discourse treatment (F = .55, p = .74, ns). There was no main effect of pre-post (F = 1.43, p = .24), ns. There were no significant interactions between event group and pre-post.

For Fossil fuel, there was no effect of discourse treatment (F = .77, p = .57, ns). There was a main effect of pre-post (F = 8.47, p = .005). Across all 6 event group/treatment groups, support went up for fossil fuel from pre to post. There were no significant interactions between event group and pre-post.



People were willing to allocate more of the $100 to fossil fuel after participating in the April 18th experiment. However, even people who did not participate in the April 18th experiment (i.e., the pre and post only treatment group) also show an increase in support for fossil fuel. It could be that something "external" to our experiment, (i.e., a variable beyond our control, like the prolonged economic recession), is responsible for the wholesale increase in support for fossil fuel.

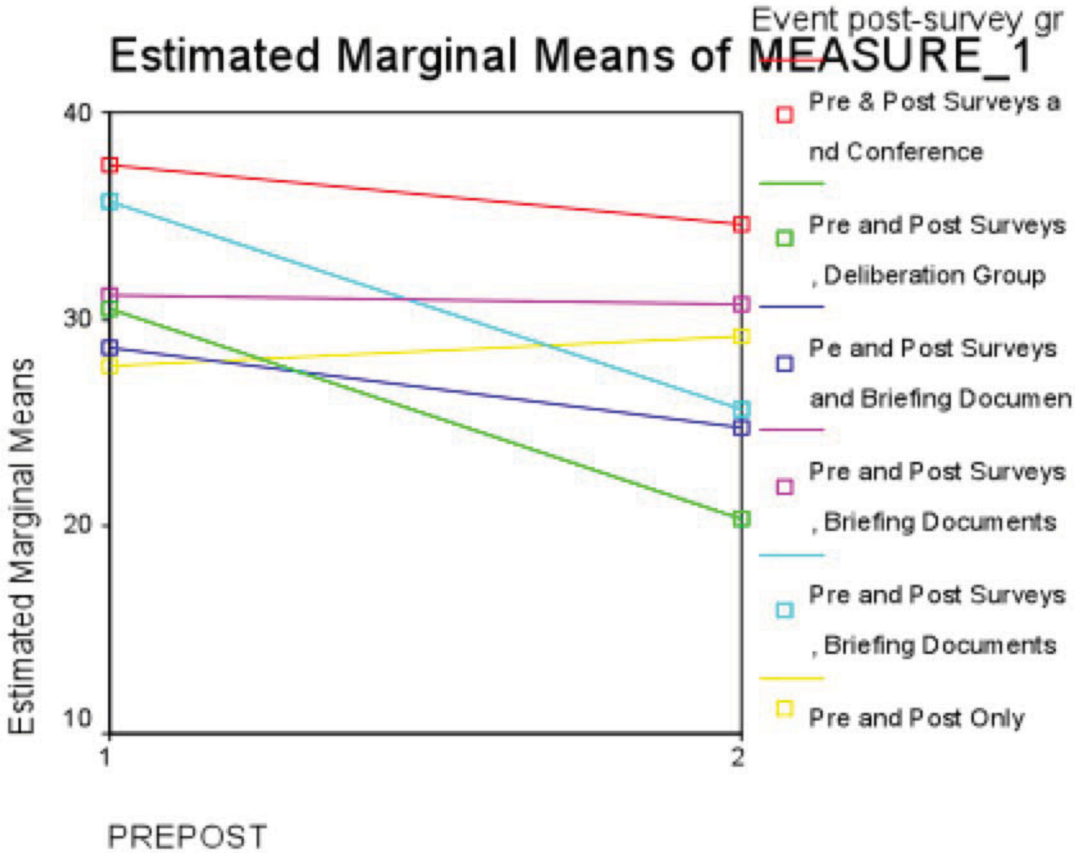
For Hydropower, there was no effect of discourse treatment (F = .44, p = .82, ns). There was a main effect of pre-post (F = 6.13, p = .015). Across all 6 event groups/treatment groups, support went up for hydropower from pre to post. There were no significant interactions between event group and pre-post.



People were willing to allocate more of the $100 to hydropower after participating in the April 18th experiment. Moreover, people who did not participate in the April 18th experiment (i.e., the pre and post only treatment group) show a decrease in support for hydropower.

For Nuclear power, there was no effect of discourse treatment (F = .37, p = .87, ns). There was no main effect of event group type (F = .35, p = .53). There were no significant interactions between event group and pre-post.

For Renewables, there was no effect of discourse treatment (F = .63, p = .68, ns). There was a main effect of pre-post (F = 4.10, p - .046). Across all 6 event group/treatment groups, support went down for renewable from pre to post. There were no significant interactions between event group and pre-post.



People were willing to allocate less of the $100 to renewables after participating in the April 18th experiment. Moreover, people who did not participate in the April 18th experiment (i.e., the pre and post only treatment group) show a slight increase or no change in support for renewables.

Using absolute value change scores

As previously mentioned, the absolute value difference score was calculated from each participant's pre-test and post-test scores of reflective preference, the second calculation of formative preference, and support. This was done because our hypotheses for research question 1 do not predict a directional change in preference or support for any of the 5 options to meet electricity demand. Taking the absolute value of the pre-post difference score allows us to see any potential idiosyncratic changes.

A within subjects design ANOVA, with 2 within subjects factors (*absolute value change in reflective preference* with 1 level, and *energy* type with 5 levels) and 1 between subjects factor (*discourse/treatment type* with 6 levels) was used to look at the effect of discourse/treatment type on **reflective** preference, and on **formative** preference**,** version 2 calculation.

REFLECTIVE PREFERENCE

The results of this analysis were similar to what was obtained previously for **reflective** preference. *Discourse/treatment type* had no effect on reflective preference (F = .59, p = .70, ns). It was not significant as a main effect nor was it present in any significant interactions. For the within subjects factors, there was a main effect of *energy type* (F = 7.18, p = .000). There were no significant interactions. Participants showed clear reflective preference for some energy types over others. Moreover, their reflective preference changed very little, or not at all, in the post-test results. Our intervention did nothing to change people's reflective preferences for the 5 types of energy.

FORMATIVE PREFERENCE, second version

For the analyses looking at formative preference using absolute value change scores, only the second version of the formative preference calculation was used. *Discourse/treatment type* had no effect on formative preference (F = .13, p = .99, ns). It was not significant as a main effect nor was it present in any significant interactions. For the within subjects factors, there was NO main effect of *energy type* (F = 1.50, p = .21, ns). There were also no significant interactions.

SUPPORT

For the analyses looking at support using absolute value change scores, there were no significant results. For Energy Conservation and Efficiency, there was no effect of discourse treatment (F = .89, p = .49, ns). For Fossil fuel, there was no effect of discourse treatment (F = 1.31, p = .27, ns). For Hydropower, there was no effect of discourse treatment (F = .72, p = .61, ns). For Nuclear power, there was no effect of discourse treatment (F = 1.38, p = .24, ns). For Renewables, there was no effect of discourse treatment (F = .72, p = .61, ns).

Research Question 2

What effect do different types of public discourse (treatments) have on the public's support for technical research or policy alternatives that could eliminate or improve different options for meeting electricity demand?

Hypotheses:

It is believed that by increasing the level of public discourse (i.e., ranging from no discourse to full deliberation), it will on average:

- cause an increasingly higher level of change in the level of support for different policy alternatives or technological research tied to the improvement of options for meeting electricity demand.
- cause lower levels of variation between participants in their levels of support for different policy alternatives or technological research tied to the improvement of options for meeting electricity demand.

Analysis Approach

To answer this question, we analyzed one specific question in the survey (#14), which asked participants to allocate $100 of their income tax to **support improvements** to each of the five ways to meet electricity demand (i.e., energy types). Because the sum of supports were supposed to total $100, there is a lack of independence in the responses – if you know four responses you should know the fifth, if people correctly added their amounts to $100. Consequently, 5 separate ANOVAs were run, one for each energy type. Each ANOVA had one within subjects factor (pre-post with 2 levels) and one between subjects factor (event group with 6 levels).

In addition, the absolute value difference score was calculated between participants' pre-test and post-test scores for this measure of support for improvements. This was done because our hypotheses for research question 2 do not predict a directional change in preference or support for any of the 5 ways to meet electricity demand. Taking the absolute value of the pre-post difference score allows us to see any potential idiosyncratic changes. Detailed results for Research Question 2 are below.

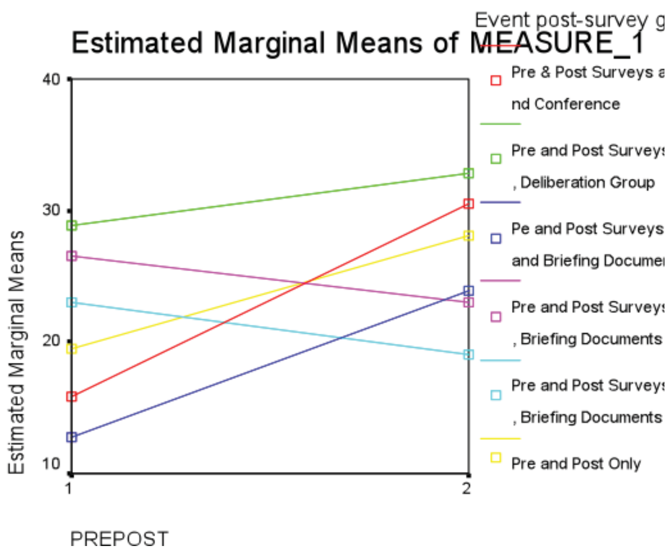
SUPPORT for Improvements (using pre-post difference scores in support)

For Energy Conservation and Efficiency, there was no effect of discourse treatment ($F = .92$, $p = .48$, ns). There was no main effect of pre-post ($F = .05$, $p = .83$, ns). There were no significant interactions between event group and pre-post.

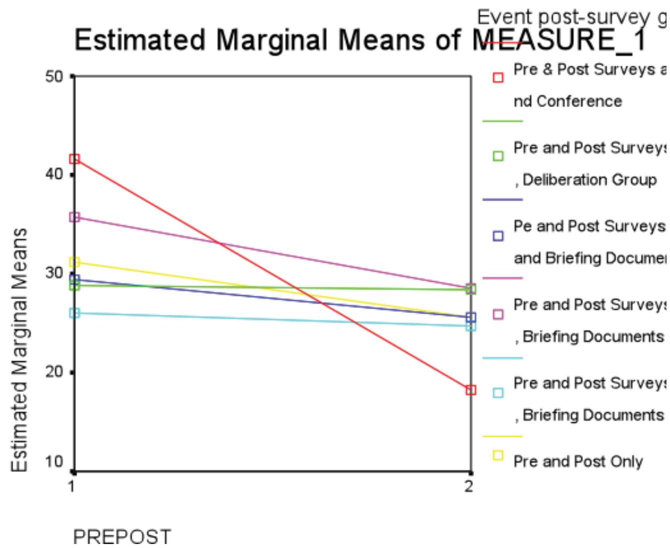
For Fossil fuel, there was no effect of discourse treatment ($F = .56$, $p = .73$, ns). There was no main effect of pre-post ($F = .02$, $p = .90$, ns). There were no significant interactions between event group and pre-post.

For Hydropower, there was no effect of discourse treatment ($F = .78$, $p = .57$, ns). There was no main effect of pre-post ($F = .27$, $p = .61$, ns). There were no significant interactions between event group and pre-post.

For Nuclear power, there was no effect of discourse treatment (F = .54, p = .75, ns). There was a marginally significant main effect of pre-post (F =3.21, p = .08). There were no significant interactions between event group and pre-post. It appears that 4 of the treatment/event groups, on average, decided to allocate more of their income taxes to support improvements to nuclear after being exposed to our April 18th event. The three event groups are: 1(pre-post survey and conference), 2(pre-post survey with deliberation), 3 (pre post survey and briefing documents), and 6 (pre-post only). That is, one of the treatment groups that increased their support for improvements to nuclear was our control group (pre-post only). Also, the other 2 treatment groups lowered their support for improvements to nuclear. This result was not formally tested with any post hoc statistical test.



For Renewables, there was no effect of discourse treatment (F = .18, p = .97, ns). There was a marginally significant main effect of pre-post (F = 3.96, p = .051). Across all 6 event group/treatment groups, support for improvements to renewables, on average, went down from pre to post. People were willing to allocate less of their $100 in tax to renewables after participating in the April 18th experiment. Moreover, people who did not participate in the April 18th experiment (i.e., the pre and post only treatment group) appear to show no change, or just a slight decrease, in support improvements for renewables. There were no significant interactions between event group and pre-post.



SUPPORT for Improvements (using absolute value change in support)

For the analyses looking at support using absolute value change scores, there were no significant results. For Energy Conservation and Efficiency, there was no effect of discourse treatment (F = .44, p = .82, ns). For Fossil fuel, there was no effect of discourse treatment (F = 1.42, p = .23, ns). For Hydropower, there was no effect of discourse treatment (F = 1.10, p = .37, ns). For Nuclear power, there was no effect of discourse treatment (F = .15, p = .98, ns). For Renewables, there was no effect of discourse treatment (F = .43, p = .83, ns).

Research Question 3

What effect do different types of public discourse (treatments) and the public's intensity of opinion, psychological and demographic factors, social values, environmental factors, and assumptions have on their preference and level of support of different options for meeting electricity demand as well as the likelihood and level of support/preference for improvements in energy options?

Hypotheses:

It is believed that the different types of public discourse will affect participants' preferences for different energy options differently as a function of individual differences that exists between participants. As such, these hypotheses will test for the statistical interaction between level of public discourse and factors such as:

- Political affiliation/ideology
- Education
- Profession
- Highly involved in issues vs. apathetic (as measured by common measures of civic engagement, e.g. voting, writing a letter to congressperson, signing a petition, etc.)
- Gender
- Age
- Length of time in Idaho
- Marital status
- Income level
- Civic Engagement
- Number in family
- Home ownership

As an example, one hypothesis is that increasing the level of public discourse (i.e., from briefing documents to full deliberation) will generate higher levels of change in preference for a given energy option in participants who are in the 'middle of the road' (i.e., apathetic) towards energy issues than those who are already highly involved and possibly "polarized".

Introduction

This document reports the preliminary analysis to Research Question 3 of *Investigation of Public Discourse Methods in Energy Policy Decision-Making.* Research Question 3 asks:

How do different types of public discourse (treatments) and the public's intensity of opinion, psychological and demographic factors, social values, environmental factors, and assumptions affect their preference and support of different options for meeting electricity demand? As a corollary, how do they affect the likelihood and level of support/preference for improvements in energy options? (page 14).

The analysis is based on these variables:

Dependent Variable: (page 14, Research Plan) ": ..defined by the change in *preference* rating and level of *support* for ...energy options...as well as factors related to intensity of opinions..... It will also measure the change in the likelihood as well as preference and level of support for improvements in energy options ....”

Dependent variables are the absolute values of change between the pre-survey and post-survey for *Formative Preference*[1], *Reflective Preference,* (Question 4), *Level of Support* (Question 13), *Research for Energy Challenges* (Question 14) and the *Likelihood of Challenge Solutions* (Question 15).

Independent Variable: There is one central independent variable: the type of group activity at the discourse event along with the control group (pre and post survey only). Other independent variables (controls) are as follows:

- Political Party (Democrat, Republican, Independent/Others)
- Years of Education (Question 27 recoded to reflect years)
- Professions (Question 34 treated as seven separate dichotomous variables)
- Gender
- Age
- Years of residency in Idaho
- Marital Status
- Income Level
- Number in family (Persons 18 and over; Persons 17 and under)
- Civic Engagement and involvement in environmental issues (Index of Q 40, 41, 42, and A-D of each.

Operationalization of Variables

The 25 dependent variables in Tables A and B (displayed on pages 7 through 9) are computed by subtracting pretest scores from post test scores. Table A reports changes in scores. However, since negative change and positive change cancel each other, the analyses for Research Question 3 uses *absolute values*. *Absolute values* for each of the dependent variables are displayed in Table B[2].

Table B displays absolute values for changes in **Formative Preference** (computed following the equation on page 8, research draft). This measure excludes *other benefits* (Question 3, last category) and Question 12 (How valuable to you are the benefits of the following electricity options). While we computed Formative Preference with and without these two entries, deleting them added an additional **25** cases to the analyses.[3]

Reflective Preference is operationalized as Question 4.

Support for Energy type is operationalized as Question 13.

Support for Improvements is operationalized as Question 14.

Likelihood of Improvements is operationalized as Question 15.

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[1] The equation is displayed on page 8 , of *Investigation of Public Discourse Methods in Energy Policy Decision-Making*

[2] I wish to thank Teri Peterson, statistical consultant for Idaho State University for this suggestion.

[3] SPSS drops cases that do not have complete information on each item. Many people skipped these sections.

Methods of Analysis

Statistical analysis of the change in formative preference, reflective preference, support for energy type, support for improvement, and likelihood of improvements was conducted for each of the five energy types. Please note the following:

- We conducted 450 analyses required to answer the research question. (Note: These results should be read and interpreted cautiously. That is, multiple comparisons increase the possibilities of a Type I error.)

- We performed Analysis of Covariance (ANCOVA) comparing means on the absolute value of change between pre and post tests singularly by categories of the Public Discourse event groups (see Table 2 A for the categories of *event groups)* controlling for socio-demographic and political influences.
- ANCOVA allowed us to control or to remove the effects of pre-survey scores, referred to hereafter as the *covariate*. This corrects for a *ceiling effect*[4]. In other words, the effects of the pre-survey are removed by adjusting the scores on the dependent variable to reflect initial differences on the pre-survey.
- The small sample size (n=104) disallows simultaneous testing of all independent variables with each dependent variable
- Each of the analyses focuses on the main effect of *event groups*, one independent variable, after controlling for the pre-survey score—the covariate.
- Where statistically significant, we report the F score and *probability* for the main effect, interaction effect (if any), covariate, and the effect of the independent variable.
- For those instances of *statistical significance*, the estimate of the slope coefficient (*b*) is included.
- In many, if not most instances, the type of Public discourse event groups is not statistically significant.
- Interaction forms are frequently statistically significant. Interaction effects confound the ability to identify unique main effects. In these cases, slope coefficients are not interpreted.
- Where Public Discourse Event Groups, interaction forms, and independent variables are *not significant* but the covariate is, the latter (pretest) is the only thing that accounts for change (or how much "room" for change).
- Statistically significant interactions between factors and the covariate mean that conclusions are limited about the main effect for each factor. Typically, if the F test of factor-covariate interaction is significant, the full analysis of variance should not be conducted. Even so, I report the F values and their probabilities, but be forewarned of this limitation.

[4] This allows us to partial out the impact of respondent's extreme scores on the pretest. In other words, one who strongly supported an energy option could not score higher than the original +5.

- The assumption of homogeneity of variance has been tested using Levene's test, and violations are noted for each analysis.

Main Effects of Public Discourse Events

Public Discourse event groups is statistically significant for the following:

Tables 2 and 4 (pages 15 and 19) indicate that Event Group 3 (pre- and post-survey and briefing document) is associated with the rate of change in **reflective preference for nuclear** and **support for solving the problem of nuclear waste** when controlling for the effects of gender, marital status, political party, and household size. Note the interpretation on page 11 for further detail.

Table 11(page 33) indicates that Event Group 2 (pre-and post-survey and deliberation)is associated with the rate of change in **formative preference for energy conservation and efficiency** when controlling for age, marital status, and household members over 18 years of age. Note the interpretation on page 32 for further detail.

Table 20 (page 45) indicates Event Groups 3 (pre-and post-survey and briefing document) and Group 5 (pre- and post-survey, briefing document, and deliberation) are associated with the rate of change in **likelihood of a solution for greenhouse gases from coal-fired emissions** when controlling for the occupation of construction worker. Note the interpretation on page 40 for further detail.

Table 22 (page 49) indicates Event Groups 1 (pre- and post-survey and conference) and Group 3 (pre- and post-survey and briefing document) are associated with rate of change for **reflective preference for renewable energy** when controlling for marital status and sales occupations. Note the interpretation on page 47 for further detail.

Table A: Descriptive Statistics for the Dependent Variables Used in the Analysis .

Variable	N	Mean	Standrd Dev.	Minimum	Maximum
Δ Formative Preference[1]					
Energy Conservation	76	.363	1.648	- 3.95	5.82
Fossil Fuel	79	.519	1.539	- 2.44	5.06
Hydro	82	.181	1.585	- 3.58	5.51
Nuclear	73	.363	1.705	- 3.00	4.88
Renewables	71	.032	1.332	- 2.63	3.67
Δ Reflective Preference					
Energy Conservation	101	- .12	1.344	- 5.00	4.00
Fossil Fuel	99	.21	2.715	-10.00	8.00
Hydro	101	.02	2.131	- 7.00	8.00
Nuclear	97	- .01	2.325	- 8.00	9.00

Renewables	101	.06	1.567	- 3.00	9.00
Δ Support for Energy Type (In $)					
Energy Conservation	101	-1.77	16.809	-50.00	40.00
Fossil Fuel	101	2.08	7.949	-20.00	25.00
Hydro	101	4.20	20.612	-40.00	80.00
Nuclear	101	- .85	16.288	-70.00	50.00
Renewables	101	-3.64	20.017	-90.00	50.00
Δ Support for Improvements (in $)					
Energy Conservation	100	.31	15.367	- 50.00	50.00
Fossil Fuel	100	.95	15.844	-100.00	40.00
Hydro	100	.24	14.443	- 60.00	60.00
Nuclear	100	3.63	21.349	- 35.00	100.00
Renewables	100	- 2.67	23.311	-100.00	50.00
Δ Likelihood of Improvements					
Energy Conservation	95	.31	3.049	- 10.00	10.00
Fossil Fuel	101	.29	3.226	- 7.00	9.00
Hydro	97	.63	2.966	- 6.00	9.00
Nuclear	101	-.54	3.257	- 10.00	8.00
Renewables	99	.16	3.063	- 10.00	9.00

[1] All changes (deltas) were computed by subtracting pretest scores from post test scores.

Table C: Descriptive Statistics for the Independent Variables Used in the Analysis .

Variable	N	%	Mean	Standrd Dev.
Event Groups				
Pre/Post and Conference	15	14.4		
Pre/Post and Deliberation Groups	14	13.5		
Pre/ Post and Briefing Documents	20	19.2		
Pre/Post, Briefing Doc, Conference	14	13.5		
Pre/Post Briefing Docs, Deliberation	18	17.3		
Pre/Post Only (control group)	23	22.1		
Political Affiliation				
Democrat	27	26.0		
Republican	32	30.8		
Other	45	43.3		
Years of Education	101		15.25	2.36
Professions				
Manager/Professional/Related	41	39.4		
Service	14	13.5		
Sales/Office	8	7.7		
Farming/Fishing/Forestry/Mining	10	9.6		
Construction/Extrac/Maintenance	7	6.7		
Production/Transportation	6	5.8		
Government	9	8.7		
Other	9	9.6		
Gender (males=1; females=0)	81	79.4		
Age	98		58.72	13.45
Years Living in Idaho	101		32.56	20.36
Marital Status				
Married	79	78.2		
Divorced	10	9.9		
Widowed	3	3.0		
Single, never married	9	8.9		

Table C: Descriptive Statistics for the Independent Variables Used in the Analysis (cont) .

Variable	N	%	Mean	Standrd Dev.
Income	90		$63,277.7	$28,711.18

Civic Engagement Index I[1]	104	2.67	3.49
Number in Household >=18 years	102	2.00	.58

1 Index (Cronbach's alpha=.748) of Questionnaire items 40 (A-D), 41 (A-D) and 42 (A-D).

Nuclear Power: Interpretation of Findings for Tables 1 to 5.

Note: the following narrative interprets the impact of socio-demographic characteristics while controlling for the statistical effects of participation in Event Groups 0 through 6.

Event Groups:

Formative Preference for Nuclear.	N.S.
Reflective Preference for Nuclear.	Group 3 , controlling for gender
Support for Nuclear.	N.S.
Support for Solution to Waste.	*Group 3*, controlling for gender
	Group 3, controlling for marital stat
	Group 3, controlling for household size
	Group 3, controlling for political party
Support for likelihood of solution.	N.S.

As shown above, tests of significance support the impact of Event Group 3 on Reflective preference, when controlling for gender. In addition, Event Group 3 explains change in responses to "support for solutions for waste" when controlling for gender, marital status, household size and political party. These results must be interpreted cautiously, however, since multiple comparisons increase the likelihood of Type I error.

Gender

Females in *Event Group 3* (Pre and Post Survey plus Briefing Document) increased their *reflective preference* by 2.4 points on average.

Females in *Event Group 3* (Pre and Post Survey plus Briefing Document) increased their allocation of income tax towards solving the solutions that address nuclear waste by $16 on average.

Marital Status

After controlling for marital status, those in *Event Group 3* (Pre and Post Survey plus Briefing Document) increased their allocation of income tax towards solving the problems of nuclear waste by $18 on average.

Divorced people, compared to married and widowed, increased their allocation of income tax towards solving the solutions that address nuclear waste by $38 on average.

Years of Education

Years of education has a slight effect on peoples' beliefs in solutions to the problems associated with nuclear energy. Small increases in education are associated with about one-fourth of a point increase (*b*=.284) in peoples' positive response.

Household Size: number of members 18 years and older

After controlling for number of people in the household 18 years and older, those *in Event Group 3* increased allocations of income tax to solve the problems of nuclear waste by $18 on average.

People in Group 3 increased their income tax allocation for solving the problem of nuclear waste by $16 after controlling for political party preferences.

Continue on next page-→

Nuclear Power: Interpretation of Findings for Tables 1 to 5 (continued).

Political Party

Republicans, on average, increased their income tax allocation for solving the problem of nuclear waste by $22.

Full Time Employment

Compared to those who are fully employed, those not employed full time increased their formative preference for nuclear energy by less than one point (*b*=.742).

When it comes to thinking the problems of nuclear waste will be solved, after participating in the event groups, those employed full time decreased their rates of change by about one point (*b*=-1.201).

Occupational Groups

Compared to other occupational groups, *managers and professionals* increased their reflective preference for nuclear energy by one point, on average (*b*=1.148).

Compare to other occupational groups, those in *farming and forestry* decreased their allocation to solve the nuclear waste problem by $72.

Compared to other occupational groups, *construction* workers decreased their reflective preferences for nuclear energy by 5 points on average (*b*=-5.229).

Table 1: Absolute Values for Change in **Formative Preference** for Nuclear Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Nuclear		
	B	F Values	N
Political Party			
Presurvey FP (Covariate)		15.439***	73
Party x Event Group x Covariate		1.994*	
Years of Education		NS	73
Gender (Female=1)[a]			
Presurvey FP (Covariate)		4.705*	73
Age		NS	71
Years in Idaho			
Years in Idaho x Event Gr. x Covariate		2.300*	72
Marital Status		NS	65
Income			
Presurvey FP (Covariate)		7.502**	63
Civic Engagement		NS	73
Employed Full Time (1=Yes)		7.520**	73
Not Employed Full Time	.742**		
Presurvey FP (Covariate)		7.107**	
Self-employed (1=Yes)			
Presurvey FP (Covariate)		8.278**	73

Continue to next page -→

Table 1 : Absolute Values for Change in Dependent Variables for Nuclear Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Nuclear		
	B	F Values	N
Occupations:			
Professional (Covariate)		13.980***	73
Service (Covariate)		10.099**	73
Sales		NS	73
Farming and Forestry [a]		NS	18
Construction[a]		NS	28
Production[a]		NS	29
Government		NS	33
Household members 18 or over		NS	73
Household members 17 or under		NS	17

*p<.05 **p<.01 ***p<.001 [a] Error variance is not equal; interpret w caution!

Table 2: Absolute Values for Change in **Reflective Preference** for Nuclear Controlling for Effects of Independent Variables, Covariates

Variables	Reflective Preference: Nuclear		
	B	F Values	N
Political Party[a]			
Presurvey RP (Covariate)		6.938**	97
Years of Education[a]		NS	96
Gender (Female=1)[a]			
Event Groups		3.012*	97
Event Group 3		2.408**	
Female x Groups x Covariate		2.286*	
Age		NS	94
Years in Idaho		NS	96
Marital Status		NS	96
Income		NS	87
Civic Engagement			
PreSurvey RP (Covariate)		7.984**	97
Employed Full Time (1=Yes)		NS	97
Self-employed (1=Yes)		NS	97
Professional (1=Professional)	1.148*	6.392*	97
Professional x Ev Gr. x Covariate		2.165*	
Service		NS	97
Sales		NS	97
Farming and Forestry [a]		NS	21

Continue on next page→

Table 2: Absolute Values for Change in **Reflective Preference** for Nuclear Controlling for Effects of Independent Variables, Covariates

Variables	Reflective Preference: Nuclear		
	B	F Values	N
Construction[a]	-5.229*	5.507*	21
Presurvey (Covariate)		14.942**	
Event Groups		3.627*	
Production[a]			
Presurvey (Covariate)		9.833**	34
Production x Ev Group x Covariate		4.719***	
Government			
Event Groups		3.100*	41
Gov Occ x Ev Gr X Covariate		3.895**	
Household members 18 or over		NS	97
Household members 17 or under		NS	27

*p<.05 **p<.01 ***p<.001 [a] Error variance not equal; interpret with caution!

Table 3: Absolute Values for Change in **Level of Support** for Nuclear Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Nuclear		
	B	F Values	N
Political Party[a]			
Party x Ev Gr x PreSurvey (Covariate)		3.211	100
Years of Education[a]			99
Presurvey (Covariate)		8.017**	
Years of Ed x Ev Gr x Covariate		3.700**	
Gender (Female=1)[a]			
Presurvey (Covariate)		19.865***	100
Female x Ev Gr x Covariate		2.288*	
Age[a]			
Age x Event Group x Covariate		3.763**	96
Years in Idaho[a]			
Presurvey (Covariate)		8.854**	99
Marital Status[a]			
Presurvey (Covariate)		6.960**	99
Income			
Income x Ev Group x Covariate		2.578**	88
Civic Engagement[a]			
PreSurvey RP (Covariate)		15.491***	100
CE Index x Event Group x Covariate		2.300*	
Employed Full Time [a] (1=Yes)			
Presurvey (Covariate)		21.565***	100
FT Employed x Event Gr. x Covariate		1.960*	
Self-employed (1=Yes)			
Presurvey (Covariate)		5.124*	100
Self Emp x Event Group x Covariate		2.424*	
Professional Occupation[a] (1=Professional)			
Presurvey (Covariate)		15.366***	100
Professional x Event Gr. x Covariate		3.629***	

Table 3: Absolute Values for Change in **Level of Support** for Nuclear Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Nuclear		
	B	F Values	N
Service Occupation		NS	100
Sales Occupation[a]			
Presurvey (Covariate)		18.384	100
Sales Occ. x Event Groups x Covariate		2.529*	
Group 1 x Sales x Covariate	1.058*		
Groups 4 x Sales x Covariate	.689**		
Farming and Forestry [a]			
Presurvey (Covariate)		5.242*	25
Construction[a]		NS	39
Production		NS	38
Government		NS	44
Household members 18 or over[a]			
Presurvey (Covariate)		11.921**	100
HH members x Groups x Covariate		2.789**	
Household members 17 or under		NS	28

*p<.05 **p<.01 ***p<.001

Table 4: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Nuclear Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Nuclear		
	B	F Values	N
Political Party		5.905**	100
Republican	22.316*		
Event Groups		2.395**	
Group 3	16.524**		
Years of Education[a]			
Education x Event Group x Covariate		2.455*	99
Gender (Female=1)[a]			
Event Groups		2.346*	100
Group 3	16.005*		
Age		8.926**	96
Presurvey (Covariate)		4.602*	
Age x Event Groups x Covariate		2.225*	
Years in Idaho[a]		NS	99
Marital Status		4.042*	99
Divorced	38.467***		
Event Group		2.379*	
Group 3	18.114*		
Income		NS	88
Civic Engagement		NS	100
Employed Full Time (1=Yes)		NS	100
Self-Employed		NS	100

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Table 4: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Nuclear Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Nuclear		
	B	F Values	N
Professional Occupation[a]	15.748**	7.929**	100
(1=Professional)			
Event Group		2.505*	
Group 3	15.898*		
Professional x Group x Covariate		2.331*	
Service[a]	-22.461**	8.424**	100
Event Groups		2.793*	
Group 3	17.585*		
Service Occupation x Groups x Covariate		2.116*	
Sales[a]		NS	100
Farming and Forestry [a]	-71.628	11.363**	25
Construction		NS	38
Production[a]		NS	37
Government		NS	43
Household members 18 or over[a]	NS	5.717**	100
Event Group		2.719*	
Group 3	17.589		
Household members 17 or under		NS	28

*p<.05 **p<.01 ***p<.001 [a] Interpret with caution: violation of homogeneity of variance

Table 5: Absolute Values for Change in Likelihood of Eliminating Problems with Nuclear Energy Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Likelihood of Solution for Nuclear		
	B	F Values	N
Political Party		NS	101
Years of Education	.284*	5.600*	100
Gender (Female=1)		NS``	101
Age			
Presurvey (Covariate)		6.651*	97
Years in Idaho[a]		NS	100
Marital Status[a]		NS	100
Income		NS	89
Civic Engagement			
Presurvey (Covariate)		6.494*	101
Employed Full Time[a] (1=Yes)	-1.201**	7.635**	101
Presurvey (Covariate)		12.678**	
Full Time x Groups x Covariate		2.410**	
Self-Employed			
Self Emp x Groups x Covariate		2.124*	101
Professional Occupation		NS	101
Service Occupation		NS	101
Sales Occupation		NS	101
Farming/Forestry/Fishing/Mining[a]	3.091*	11.013	24
Presurvey (Covariate)		6.971*	
Construction Occupation		NS	38
Production Occupation		NS	37
Government Occupation		NS	43
Household Members 18 or older[a]		NS	101
Household Members 17 or younger		NS	28

*p<.05 **p<.01 ***p<.001 [a] Violation of Levene's Test for Equal Variance

Hydro Power: Interpretation of Findings for Tables 6 to 10.

Note: the following narrative interprets the impact of socio-demographic characteristics while controlling for the statistical effects of participation in Event Groups 0 through 6.

Event Groups:

Formative Preference for Hydro. . . . . N.S.
Reflective Preference for Hydro. . . . . N.S.
Support for Hydro. . . . . N.S.
Support for Solution for salmon migration. . . . . N.S.
Support for likelihood for salmon migration . . . . . . N.S.

Age

Every one year increase in age produced slightly more than a third of a dollar increase in financial support for Hydro electric power generation (*b*=.385).

Gender

Females decreased their formative preference by nearly a point after participating in the event groups (*b*=-.852)

Years of Education

There is approximately a one third of a point decrease in reflective preference for hydro electric power for every one year increase in years of education.

There is slightly more than a $2 decline in support for hydro electric power generation for every one year increase in years of education (*b*=-$2.22).

Household Size: number of members 18 years and older

There is a $38.48 increase in support for research to solve the challenges of hydro electric power for every additional household member 18 years and older.

Years in Idaho

Length of residency in Idaho has a small statistical effect on peoples' preferences or support for hydro electric power generation. For every year of residency, there is, on average, an increase in $0.29 allocated for hydro electric power generation.

Political Party

Being Republican increased reflective preference for hydro electric power generation by nearly two points (*b*=1.838).

Republicans, on average, increased support for hydro electric power generation by $14.83.

Continue to next page→

Hydro Power: Interpretation of Findings for Tables 6 to 10 (continued).

Note: the following narrative interprets the impact of sociodemographic characteristics while controlling for the statistical effects of participation in Event Groups 0 through 6.

Self Employed

Self employment status has a slight positive effect on support or preference for hydro electric power generation. After controlling for the effects of the event groups, self employed increased their formative preference response by 1.304, on average.

<u>Occupational Groups</u>

Compared to other occupational groups, those who are managers or professionals increased their support for hydro electric power by $13, on average.

Compared to other occupational groups, those in service occupations decreased their reflective preference for hydro electric power generation by 1.892 points, on average.

Compared to other occupational groups, those in sales occupations increased their reflective preference for hydro electric power generation by 1.31 points, on average.

Compared to other occupational groups, farmers and foresters decreased their support for hydro electric power generation by $39.20, on average, and constructions workers decreased theirs by $49.85.

Compared to other occupational groups, construction workers decreased their support for resolving the issue of salmon migration by $40.77, on average.

Compared to other occupational groups, government workers increased their formative preference for hydro electric power generation by .786 points, on average.

Compared to other occupational groups, government workers decreased their support for research to solve the issue of salmon migration by nearly $12 (*b*=-$11.954).

Table 6: Absolute Values for Change in **Formative Preference** for Hydro Power Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Hydro Power		
	B	F Values	N
Political Party [a]		NS	82
Years of Education		NS	81
Gender (Female=1)[a]	-.852**	7.723**	82
Presurvey FP (Covariate)		13.078**	
Age		NS	80
Years in Idaho			
Presurvey FP (Covariate)		9.516**	81
Marital Status		NS	65
Income[a]		NS	72
Presurvey FP (Covariate)		7.502**	63
Civic Engagement			
Presurvey FP (Covariate)		5.880*	82
Employed Full Time (1=Yes)	.778**	7.732**	82
Covariate		14.400***	
Full Time x Group x Covariate		3.072**	
Self-employed (1=Yes)	-1.304**	7.512**	82
Presurvey FP (Covariate)		4.428*	
Professional Occupation [a]			
Presurvey FP (Covariate)		6.536*	82
Service Occcupation[a]			
Presurvey FP (Covariate)		16.633***	82
Service Occ. x Group x Covariance		2.921**	
Sales Occupation		NS	82

Table 6: Absolute Values for Change in **Formative Preference** for Hydro Power Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Hydro Power		
	B	F Values	N

Farming and Forestry [a]		NS	21	
Construction[a]				
Presurvey FP (Covariate)		6.052*	35	
Production Occupation			NS	35
Government Occupation	.786*	6.633*	40	
Household members 18 or over				
Covariance		6.712*	82	
Census x Group x Covariate		2.135*		
Household members 17 or under		NS	23	

**p*<.05 ***p*<.01 ****p*<.001 [a] Error variance is not equal; interpret w caution!

Table 7: Absolute Values for Change in **Reflective Preference** for Hydro Power Controlling for Effects of Independent Variables, Covariates

Variables	Reflective Preference: Hydro		
	B	F Values	N
Political Party[a]		4.041*	101
Republican	1.838*		
Presurvey RP (Covariate)		21.720***	
Years of Education	-.320*	4.556*	100
Years x Groups x Covariate		2.220*	
Gender (Female=1)[a]			
Presurvey (Covariate)		5.192*	101
Gender x Groups x Covariate		2.116*	
Age			
Age x Groups x Covariate		2.552*	98

Years in Idaho			
Presurvey (Covariate)		11.231**	100
Yrs x Groups x Covariate		3.020*	
Marital Status[a]			
MS x Groups x Covariate		3.827***	100
Income			
Income x Groups x Covariate		2.418*	90
Civic Engagement[a]			
PreSurvey RP (Covariate)		15.734***	101
Employed Full Time[a] (1=Yes)	1.755*	11.577*	101
Presurvey (Covariate)		8.476**	
FT x Groups x Covariate		3.363**	
Self-employed (1=Yes)			
Presurvey(Covariate)		11.972**	101

Table 7: Absolute Values for Change in **Reflective Preference** for Hydro Power Controlling for Effects of Independent Variables, Covariates

Variables	Reflective Preference: Hydro		
	B	F Values	N
Occupations:			
Professional (1=Professional)			
Presurvey (Covariate)		15.960***	101
Service[a]	-1.892*	4.686*	101
Presurvey (Covariate)		15.013***	
Service Occ x Groups x Covariate		2.894***	
Sales			
Sales x Groups x Covariate	1.310*	2.404*	101
Farming and Forestry [a]			
Presurvey (Covariate)		19.088*	24
Construction[a]			
Presurvey (Covariate)		5.293*	39
Production		NS	38

Government		NS	44
Household members 18 or over			
Presurvey (Covariate)		19.1993***	101
Household members 17 or under			
Event Groups		4.308*	28
People <=17 x Groups x Covariate		3.303*	

*$p<.05$ **$p<.01$ ***$p<.001$ [a] Error variance not equal; interpret with caution!

Table 8: Absolute Values for Change in **Level of Support** for Hydro Power Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Hydro		
	B	F Values	N
Political Party		3.765*	101
Republican	14.825*		
Years of Education	-2.222*	3.964*	100
Gender (Female=1)		NS	101
Age	.385*	5.414*	97
Years in Idaho	.292*	6.757*	100
Presurvey (Covariate)		5.075*	
Marital Status			
Presurvey (Covariate)		6.229*	100
Income		NS	89
Civic Engagement		NS	101
Employed Full Time [a] (1=Yes)		NS	101
Self-employed (1=Yes)		NS	101
Professional Occupation[a] (1=Professional)	12.764*	6.627*	101
Service Occupation		NS	101
Sales Occupation		NS	101
Farming and Forestry [a]	-39.201*	43.036*	25
Event Groups		10.526**	

Farm x Group x Covariate		9.574**	
Construction	-49.851**	13.703**	39
Presurvey (Covariate)		12.144**	
Construction x Group x Covariate		3.532**	
Production Occupation		NS	38
Government Occupation[a]			
Gov x Group x Covariate		2.762**	44
Household members 18 or over		NS	101
Household members 17 or under[a]		NS	28

*p<.05ca **p<.01 ***p<.001 [a] Homogeneity of variance is violated

Table 9: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Hydro Power Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Hydro Power		
	B	F Values	N
Political Party[a]		NS	100
Years of Education[a]		NS	99
Gender (Female=1)[a]		NS	100
Age[a]		NS	99
Years in Idaho[a]			
Presurvey (Covariate)		6.306*	99
Marital Status		NS	99
Income[a]			
Presurvey (Covariate)		26.491	88
Civic Engagement[a]			
Presurvey(Covariate)		6.364*	100
Employed Full Time [a](1=Yes)		NS	100
Self-Employed			
Presurvey (Covariate)		17.6773***	100
Professional[a] (1=Professional)	8.422*	6.627*	100
Prof x Group x Covariate		1.970*	

Service [a]		NS	100
Sales [a]		NS	100
Farming and Forestry [a]		NS	25

Continue to next page→

Table 9: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Hydro Power Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Hydro Power		
	B	F Values	N
Construction [a]	-40.772***	21.092***	38
Presurvey (Covariate)		7.455*	
Construction x Group x Covariate		2.646*	
Production [a]			
Presurvey(Covariate)		5.527*	37
Government	-11.954*	5.695*	43
Household members 18 or over [a]	38.476**	5.017**	100
Household members 17 or under		NS	28

*p<.05 **p<.01 ***p<.001 [a] Interpret with caution: violation of homogeneity of variance

Table 10: Absolute Values for Change in Likelihood of Eliminating Problems with Hydro Power Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Likelihood of Solution for Hydro		
	B	F Values	N

Political Party[a]	NS	97
Years of Education	NS	96
Gender (Female=1)		
Presurvey (Covariate)	5.131*	97
Age	NS	96
Years in Idaho		
Presurvey (Covariate)	10.168**	96
Marital Status		
Presurvey (Covariate)	6.108*	96
Income[a]	NS	87
Civic Engagement		
Presurvey (Covariate)	6.096*	97
Employed Full Time[a] (1=Yes) -		
Presurvey (Covariate)	6.604*	97
Self-Employed		
Self Emp x Groups x Covariate	2.741*	97
Professional Occupation[a]	NS	97
Service Occupation[a]	NS	97
Sales Occupation	NS	97
Farming/Forestry/Fishing/Mining	NS	24
Construction[a]	NS	38
Production[a]	NS	37
Government[a]	NS	43
Household Members 18 or older[a]	NS	97
Household Members 17 or younger	NS	27

*p<.05 **p<.01 ***p<.001 [a] Violation of Levene's Test for Equal Variance

Energy Conservation and Efficiency : Interpretation of Findings for Tables 11-15.

Note: the following narrative interprets the impact of socio-demographic characteristics while controlling for the statistical effects of participation in Event Groups 0 through 6.

Event Groups:

Formative Preference for conservation. . . . . *Group 2*, controlling for age
Group 2, controlling for marital status
Group 3, controlling for household

size

Reflective Preference for conservation . . . . N.S.
Support for conservation . . . . N.S.
Support for Solution to housing/building . . . . N.S.
Support for likelihood of housing/building. . . . . . . N.S.

Age

Participants in Event Group 2 (Pre and Post Surveys with Deliberation) had a one point change, on average, in their formative preference scores. (*b*=1.395).

Marital Status

Participant in Event Group 2 (Pre and Post Surveys and Deliberation) had a two point change, on average, in their formative preference scores (*b*=2.077).

Household Size: number of members 18 years and older

Participants in Event Group 3 (Pre and Post Survey and Briefing Document) had a 1.5 point decline in their formative preference for Energy Conservation and Efficiency after controlling for household members 18 years and older.

Civic Engagement

Civic engagement has a slight effect on formative preference for Energy Conservation and Efficiency. Those who score highly on political activities (see Table C for measurement information) increased, on average, about one-fourth of a point (*b*=.209).

Occupational Groups

Production workers showed a 2.5 point decline, on average, in their formative preference scores after controlling for the effects of Event Groups.

People working in farming and forestry showed a $49 increase, on average, in their support for Energy Conservation and Efficiency after controlling for the effects of Event Groups.

Table 11: Absolute Values for Change in **Formative Preference** for Energy Conservation and Efficiency Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Energy Con & Efficiency		
	B	F Values	N
Political Party			
Party x Group x Covariate		2.098*	76
Years of Education			
Yrs x Groups x Covariate		6.877***	75
Gender (Female=1)			
Gender x Groups x Covariate		3.385**	76
Age			
Event Group		2.684*	74
Group 2	1.395*		
Years in Idaho			
Presurvey FP (Covariate)		6.720*	75
Marital Status[a]			
Event Groups		3.085*	75
Group 2	2.077*		
Income			
Presurvey FP (Covariate)		6.255*	66
Civic Engagement	.209*	4.493*	76
Presurvey FP (Covariate)		11.221*	
Employed Full Time (1=Yes)	.		
Presurvey(Covariate)		19.585***	75
Self-employed[a] (1=Yes)		NS	76
Professional			
Presurvey FP (Covariate)		25.038***	76

Table 11 : Absolute Values for Change in **Formative Preference** for Energy Conservation and Efficiency Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Energy Con & Efficiency		
	B	F Values	N

Service			
Presurvey FP (Covariate)		17.148***	76
Service Occ. x Group x Covariance		2.921**	
Sales			
Sales x Groups x Covariate		2.338*	76
Farming and Forestry [a]			
Farming x Groups x Covariate		21.830*	17
Construction[a]			
Presurvey FP (Covariate)		11.747**	30
Production[a]	-2.501*	5.022*	30
Presurvey (Covariate)		12.311**	
Government[a]			
Presurvey (Covariate)		7.266*	35
<u>Household members 18 or over</u>		7.768**	76
Event Groups		2.954*	
Event Group 3	-1.513*		
<u>Household members 17 or under</u>		NS	21

*p<.05 **p<.01 ***p<.001 [a] Error variance is not equal; interpret w caution!

Table 12: Absolute Values for Change in **Reflective Preference** for Energy Conservation and Efficiency for Effects of Independent Variables, Covariates

Variables	Reflective Preference: Energy Conser. & Efficiency		
	B	F Values	N
Political Party[a]		NS	101
Years of Education[a]		NS	100
Gender (Female=1)[a]		NS	101
Age[a]		NS	98
Years in Idaho [a]			
Presurvey (Covariate)		4.018*	101
Marital Status[a]		NS	100
Income[a]		NS	90
Civic Engagement[a]		NS	101
Employed Full Time[a] (1=Yes)		NS	101
Self-employed (1=Yes)			
Presurvey(Covariate)		11.972**	101
Professional (1=Professional)		NS	101
Service [a]		NS	101
Sales[a]		NS	101
Farming and Forestry [a]		NS	24
Construction[a]		NS	39
Production[a]		NS	38
Government		NS	41
Household members 18 or over[a]		3.572*	101
Household members 17 or under		NS	28

*p<.05 **p<.01 ***p<.001 [a] Error variance not equal; interpret with caution!

Table 13: Absolute Values for Change in **Level of Support** for Energy Conservation and Efficiency Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Energy Con & Efficiency		
	B	F Values	N

Political Party[a]		NS	101
Years of Education			
Presurvey (Covariate)		4.098*	101
Gender[a] (Female=1)		NS	100
Age			
Age x Event Group x Covariate		2.807*	97
Years in Idaho			
Presurvey (Covariate)		4.534*	100
Marital Status [a]		NS	100
Income		NS	89
Civic Engagement		NS	101
Employed Full Time (1=Yes)			
Presurvey (Covariate)		6.620*	101
Self-employed (1=Yes)			
Self-emp x Event Groups x Covariate		1.915*	101
Professional Occupation			
Presurvey (Covariate)		9.334**	101
Service		NS	101
Sales			
Sales x Event Group x Covariate		1.953*	101
Farming and Forestry[a]	49.424	7.062*	25
Construction[a]		NS	39
Production[a]		NS	38
Government		NS	44
Household members 18 or over (Covariate)		4.889*	101
Household members 17 or under[a]		NS	28

**p*<.05ca   ***p*<.01   ****p*<.001   [a] Homogeneity of variance is violated

Table 14: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Energy Conservation and Efficiency Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Energy Con & Efficiency		
	B	F Values	N

Political Party			
Party x Event Group x Covariate		2.032*	100
Years of Education[a]			
Educ x Event Groups x Covariate		2.051*	99
Gender (Female=1)[a]		NS	100
Age[a]		NS	96
Years in Idaho[a]	.223	4.735*	95
Presurvey (Covariate)		5.423*	
Yrs x Event Groups x Covariate		2.838*	
Marital Status [a]		NS	99
Income[a]		NS	88
Civic Engagement			
Presurvey (Covariate)		4.507*	100
Employed Full Time (1=Yes)		NS	100
Self-Employed[a]		NS	100
Professional[a] (1=Professional)		NS	100
Service[a]		NS	100
Sales[a]			
Sales x Event Groups x Covariate		2.053*	100
Farming and Forestry [a]		NS	25
Construction		NS	38
Production		NS	37
Government		NS	43
Household members 18 or over (Covariate)[a]		NS	100
Household members 17 or under		NS	28

*$p<.05$ca **$p<.01$ ***$p<.001$ [a] Homogeneity of variance is violated

Table 15: Absolute Values for Change in Likelihood of Eliminating Problems with Energy Conservation and Efficiency Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Likelihood of Solution for Energy Con & Efficiency		
	B	F Values	N
Political Party[a]			
Party x Event Group x Covariate		2.187*	95
Years of Education[a]		NS	94
Gender (Female=1)		NS	95
Age[a]		NS	91
Years in Idaho[a]		NS	94
Marital Status [a]		NS	94
Income[a]		NS	85
Civic Engagement			
Presurvey (Covariate)		7.694**	95
Engagement x Event Group x Covariate		3.260**	
Employed Full Time[a] (1=Yes)		NS	95
Self-Employed [a]		NS	95
Professional Occupation[a]		NS	95
Service Occupation[a]		NS	95
Sales Occupation[a]		NS	95
Farming/Forestry/Fishing/Mining[a]		NS	23
Construction[a]		NS	36
Production[a]		NS	36
Government[a]		NS	42
Household Members 18 or older[a]		NS	95
Household Members 17 or younger[a]		NS	27

*p<.05 **p<.01 ***p<.001 [a] Violation of Levene's Test for Equal Variance

Fossil Fuels : Interpretation of Findings for Tables 16-20

Note: the following narrative interprets the impact of sociodemographic characteristics while controlling for the statistical effects of participation in Event Groups 0 through 6.

Event Groups:

Formative Preference for fossil fuels . . . . N.S.

Reflective Preference for fossil fuels . . . . N.S.
Support for fossil fuels . . . . N.S.
Support for Solution to greenhouse gases . . . . N.S.
Support for likelihood of solution for gases. . . . . . . *Group 3*, controlling for construction occupations
Group 5, controlling for construction occupations.

Age
Age seems not to make a difference in peoples' support or preference for fossil fuels although there is a small coefficient associated with formative preference and age. For every year of age, formative preference increased by .029 (Table 16).

Years in Idaho
On average, there was a .025 point difference in pre and post reflective preferences for fossil fuels for every year of residency in Idaho.

Civic Engagement
The rate of change associated with funding solutions for greenhouse gas emissions was 1.3 units for each type of political or voluntary activity, all other things being equal.

The rate of change associated with the likelihood of a solution for greenhouse gas emissions was less than one point (*b*=.143) for each type of political or voluntary activity, all other things being equal.

Full Time Employment
On average, there was a half point (*b*=.491) change in formative preference for fossil fuels for those employed full time.

Occupational Groups

Being in farming or forestry is associated with a $7 decline in support for fossil fuel, after controlling for other effects (*b*=7.174).
Event group members in Group 3 (pre- and post-survey with briefing document) and Group 5 (pre- and post-survey with briefing document and deliberation) decreased their rate of change for the likelihood of solving the problem of greenhouse gases by about 2 units (*b=-2.356* and *-2.743,* respectively) for construction workers.

Table 16: Absolute Values for Change in **Formative Preference** for Fossil Fuels Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Fossil Fuels		
	B	F Values	N
Political Party			
Presurvey (Covariate)		5.665*	79
Years of Education		NS	78
Gender (Female=1)		NS	79
Age	.029*	14.077*	76
Years in Idaho		NS	78
Marital Status[a]		NS	78
Income		NS	69
Civic Engagement			
Presurvey FP (Covariate)		9.393**	79
CE x Groups x Covariate		2.653*	
Employed Full Time (1=Yes)	.491*	4.720*	79
Presurvey(Covariate)		14.177**	
Self-employed[a] (1=Yes)			

Presurvey (Covariate)	16.901***	79
Professional [a]		
Presurvey FP (Covariate)	16.250***	79
Service	NS	79
Sales	NS	79
Farming, Fishing, Forestry	NS	19
Construction	NS	32
Production	NS	33
Government	NS	37
Household members 18 or over	NS	79
Household members 17 or under	NS	21

*p<.05 **p<.01 ***p<.001 [a] Error variance is not equal; interpret w caution!

Table 17: Absolute Values for Change in **Reflective Preference** for Fossil Fuels for Effects of Independent Variables, Covariates

Variables	Reflective Preference: Fossil Fuels		
	B	F Values	N
Political Party		NS	99
Years of Education		NS	98
Gender (Female=1)		NS	99
Age		NS	96
Years in Idaho	.025	11.965**	96
Marital Status[a]		NS	98
Income		NS	88
Civic Engagement		NS	99
Employed Full Time (1=Yes)		NS	99
Self-employed [a](1=Yes)		NS	99
Professional (1=Professional)		NS	99
Service		NS	99
Sales		NS	99

Farming and Forestry [a]		
Presurvey (Covariate)	9.009*	22
Construction	NS	37
Production[a]	NS	36
Government[a]	NS	42
Household members 18 or over	NS	99
One Person Households		
Household members 17 or under[a]	NS	27

*p<.05 **p<.01 ***p<.001 [a] Error variance not equal; interpret with caution!

Table 18: Absolute Values for Change in **Level of Support** for Fossil Fuel Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Fossil Fuels		
	B	F Values	N
Political Party		NS	101
Years of Education		NS	100
Gender (Female=1)		NS	100
Age		NS	97
Years in Idaho		NS	100
Marital Status		NS	100
Income		NS	89
Civic Engagement		NS	101
Employed Full Time (1=Yes)		NS	101
Self-employed (1=Yes)		NS	101
Professional Occupation		NS	101
Service		NS	101
Sales		NS	101
Farming and Forestry [a]	-7.174	5.054*	25
Construction[a]		NS	39
Production		NS	38

Government	NS	44
Household members 18 or over	NS	101
Household members 17 or under	NS	28

*p<.05 **p<.01 ***p<.001

Table 19: Absolute Values for Change in Support for Research to Solve Challenges of Fossil Fuels Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Fossil Fuels		
	B	F Values	N
Political Party			
Party x Event Group x Covariate		6.052***	100
Years of Education	1.194*	4.623*	99
Presurvey (Covariate)		32.224***	
Education x Event Groups x Covariate		7.044***	
Gender (Female=1)			
Event Group		2.441*	100
Gender x Event Group x Covariate		4.352***	
Age			
Presurvey (Covariate)		6.595*	96
Years in Idaho			
Event Groups		3.594**	99
Group 3	-10.427***		
Years x Event Groups x Covariate		11.246***	
Marital Status[a]			
Presurvey (Covariate)		4.150*	99
Marital Status x Event Gr X Covariate		5.842***	
Income		NS	88
Civic Engagement	1.331**	8.983**	100
Presurvey (Covariate)		46.390***	
Employed Full Time (1=Yes)			
Event Group		2.526*	100
FT x Event Group x Covariate		5.035***	

Continue to next page→

Table 19: Absolute Values for Change in Support for Research to Solve Challenges of Fossil Fuels Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Fossil Fuels		
	B	F Values	N
Self-Employed			
Event Group		2.516*	100
Self Emp x Event Group x Covariate		4.023***	
Professional(1=Professional)			
Event Group		2.435*	100
Prof x Group x Covariate		5.124***	
Service			
Event Groups		2.387*	100
Service Occ x Event Group x Covariate		4.100***	
Sales			
Event Group		2.944*	100
Sales Occ x Event Group x Covariate		5.439***	
Farming and Forestry [a]		NS	25
Construction[a]		NS	38
Production		NS	37
Government		NS	43
Household members 18 or over[a]			
People 18+ x Event Group x Covariate		5.233***	100
Household members 17 or under		NS	28

*p<.05 **p<.01 ***p<.001 [a] Interpret with caution: violation of homogeneity of variance

Table 20: Absolute Values for Change in **Likelihood of Eliminating Problems** with Fossil Fuels Energy Option Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Likelihood of Solution for Fossil Fuels		
	B	F Values	N
Political Party[a]		NS	101
Years of Education[a]		NS	100
Gender[a] (Female=1)		NS	101
Age[a]		NS	97
Years in Idaho[a]		NS	100
Marital Status [a]		NS	100
Income[a]		NS	90
Civic Engagement	.143*	4.574*	101
Employed Full Time[a] (1=Yes)			
FT x Event Group x Covariate		2.258*	101
Self-Employed [a]		NS	101
Professional Occupation[a]			
Prof x Event Group x Covariate		2.972**	100
Service Occupation[a]		NS	100
Sales Occupation[a]		NS	95
Farming/Forestry/Fishing/Mining[a]		NS	23
Construction			
Event Group		3.056*	39
Group 3	-2.356*		
Group 5	-2.743		
Production			
Event Group		4.101**	38
Production work x Event Gr x Covariate		4.301**	
Government[a]		NS	44
Household Members 18 or older[a]		3.485*	101
Household Members 17 or younger		NS	27

**p*<.05 ***p*<.01 ****p*<.001 [a] Violation of Levene's Test for Equal Variance

Renewable Energy: Interpretation of Findings for Tables 21-25

Note: the following narrative interprets the impact of socio-demographic characteristics while controlling for the statistical effects of participation in Event Groups 0 through 6.

Event Groups:

Formative Preference for renewable.	N.S.
Reflective Preference for renewable	*Group 1*, controlling for sales occupations *Group 3*, controlling for sales occupations *Group 4*, controlling for Marital status
Support for renewable.	N.S.
Support for Solution to variability.	N.S.
Support for likelihood of solution for variability.	N.S.

<u>Marital Status</u>

Marital status had an impact on the rate of change for people reflective preference for renewable energy. Those in Event Group 4 (pre- and post-survey, briefing document and conference) increased their change by 2 points (*b*=2.373).

<u>Political Party</u>

Being a democrat is associated with a 1 point decrease in the rate of change of formative preference for renewable energy options (*b*=-1.137).

<u>Full Time Employment</u>

Full time employment is associated with a 2.5 point increase in rate of change for reflective preference of renewable energy options (*b*=2.483).

<u>Occupational Groups</u>

Professionals and managers displayed a 1.5 decrease in rate of change for renewable energy (*b*=-1.494).

Sales personnel in Groups 1 (pre- and post-survey and conference) displayed a 3 point decrease in the rate of change associated with reflective preference for renewable energy and those in Group 3 (pre- and post-survey and briefing document) displayed a 1.5 decrease (*b*=-3.158 and -1.479, respectively).

Table 21: Absolute Values for Change in **Formative Preference** for Renewable Energy Controlling for Effects of Independent Variables, Covariates

Variables	Formative Preference: Renewable Energy		
	B	F Values	N
Political Party		3.276*	71
Democrat	-1.137		
Years of Education[a]		NS	70
Gender (Female=1)[a]		NS	71
Age		NS	70
Years in Idaho			
Pre-survey FP (Covariate)		12.263**	71
Marital Status		NS	71
Income[a]		NS	63
Civic Engagement		NS	71
Employed Full Time		NS	71
Self-employed (1=Yes)		NS	71
Professional		NS	71
Service[a]		NS	71
Sales[a]		NS	71
Farming and Forestry [a]		NS	18
Construction[a]		NS	28
Production[a]		NS	28
Government [a]		NS	33
Household members 18 or over		NS	71
Household members 17 or under[a]		NS	18

*p<.05 **p<.01 ***p<.001 [a] Error variance is not equal; interpret w caution!

Table 22: Absolute Values for Change in **Reflective Preference** for Renewable Energy with Effects of Independent Variables, Covariates

Variables	Reflective Preference: Renewable Energy		
	B	F Values	N
Political Party[a]			
Pre-survey (Covariate)		31.194***	101

Variables	B	F Values	N
Years of Education[a]			
Event Groups		2.501*	100
Education x Groups x Covariate		2.304*	
Gender[a] (Female=1)	- 2.381**	11.456**	101
Event Groups		3.826**	
Pre-survey (Covariate)		38.309***	
Gender x Groups x Covariate		2.991**	
Age			
Pre-survey (Covariate)		9.110	98
Years in Idaho[a]			
Pre-survey (Covariate)		24.984***	100
Marital Status[a]	-	4.139*	100
Event Groups		3.120*	
Group 4	2.373*		
Income[a]			
Pre-survey (Covariate)		5.879*	90
Civic Engagement[a]	.363	37.831***	101
CE x Groups x Covariate		8.454***	
Employed Full Time[a] (1=Yes)	2.483*	5.254*	101
Pre-survey (Covariate)		17.282***	
Self-employed [a](1=Yes)			
Pre-survey (Covariate)		16.958***	101
Professional[a] (1=Professional)	-1.494	6.008*	101
Pre-survey (38.072***)			

Continue to next page→

Table 22: Absolute Values for Change in **Reflective Preference** for Renewable Energy with Effects of Independent Variables, Covariates

Variables	Reflective Preference: Renewable Energy		
	B	F Values	N
Service[a]	1.930	4.427*	101
Pre-survey (Covariate)		4.965*	
Professional x Groups x Covariate		2.332*	
Sales[a]			
Event Group		2.743*	101

Group 1	-3.158**		
Group 3	-1.479		
Pre-survey (Covariate)		28.476***	
Farming and Forestry		NS	24
Construction[s]			
Event Groups		4.202**	39
Construction x Event Gr x Covariate		2.997**	
Production[a]			
Event Groups		4.418**	38
Production x Event Groups x Covariate		3.077*	
Government[a]			
Event Groups		5.538**	44
Pre-survey (Covariate)		9.396**	
Gov x Event Groups x Covariate		2.939*	
Household members 18 or over		7.002**	101
Event Groups		2.690*	
Persons 18+ x Event Groups x Covariate		2.783**	
Household members 17 or under[a]		20.890**	28
Pre-survey (Covariate)		9.280*	
Persons <=17 x Event Groups x Covariate		12.316***	

*p<.05 **p<.01 ***p<.001 [a] Error variance not equal; interpret with caution!

Table 23: Absolute Values for Change in **Level of Support** for Renewable Energy Sources Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Renewable Energy		.
	B	F Values	N
Political Party			
Pre-survey (covariate)		14.800***	101
Party x Event Groups x Covariate		4.437***	
Years of Education			
Event groups		2.706*	100
Pre-survey (Covariate)		17.699***	
Years x Event Groups x Covariate		4.978***	
Gender (Female=1)			
Event Groups		3.370**	101

Presurvey (Covariate)		7.691**	
Gender x Event Groups x Covariate		3.370**	
<u>Age</u>			
Event Groups		2.663*	97
Age x Event Groups x Covariate		4.385**	
<u>Years in Idaho</u>			
Event Groups		2.914*	100
Years x Event Groups x Covariate		7.982***	
<u>Marital Status</u> [a]			
Event Group		3.576**	100
Marital Status x Event Group x Covariate		2.456**	
<u>Income</u>			
Income x Event Group x Covariate		2.366*	89
<u>Civic Engagement</u>			
Pre-survey (Covariate)		45.008***	101
Engagement x Event Groups x Covariate		4.358**	
<u>Employed Full Time</u> (1=Yes)			
Event Group		3.354*	101
Pre-survey (Covariate)		14.412***	
Full time x Event Groups x Covariate		3.264***	

Continued next page→

Table 23: Absolute Values for Change in **Level of Support** for Renewable Energy Sources Controlling for Effects of Independent Variables, Covariates (Q13)

Variables	Level of Support for Renewable Energy		
	B	F Values	N
<u>Self-employed</u> (1=Yes)			
Pre-survey (Covariate)		42.093***	101
Self Emp x Event Group x Covariate		3.588***	
<u>Professional</u> Occupation			
Pre-survey (Covariate)		22.694***	101
Professional x Event Groups x Covariate		4.003***	
<u>Service</u>			
Event Group		2.803*	101
Service x Event Group x Covariate		2.985**	
<u>Sales</u>			
Event Groups		3.608**	101

Sales x Event Groups x Covariate	4.010***	
Farming and Forestry [a]	NS	25
Construction		
Pre-survey (Covariate)	10.010**	39
Construction x Event Group x Covariate	4.546**	
Production		
Production x Event Group x Covariate	2.639*	38
Government		
Pre-survey (Covariate)	4.743*	44
Government x Event Gr x Covariate	3.150**	
Household members 18 or over		
Event Group	3.119*	101
Over 18 x Event Group x Covariate	2.210*	
Household members 17 or under	NS	28

*p<.05 **p<.01 ***p<.001

Table 24: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Renewable Energy Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Renewable		
	B	F Values	N
Political Party			
Pre-survey (Covariate)		51.358***	100
Years of Education		NS	99
Gender (Female=1)			
Gender x Event Groups x Covariate		3.073**	100
Age			
Age x Event Groups x Covariate		3.654*	96
Years in Idaho			
Yrs x Event Groups x Covariate		4.254**	99
Marital Status			
Marital Status x Event Groups x Covariate		7.264***	99
Income			
Pre-survey (Covariate)		9.827*	88
Civic Engagement		7.147	100
Pre-survey (Covariate)		39.061***	
Civic Engagement x Event Group X Covariate		3.333**	
Employed Full Time (1=Yes)			
Pre-survey (Covariate)		16.992*	100
Full Time x Event Group x Covariate		2.095*	
Self-Employed[a]		4.290*	100
Pre-survey (Covariate)		15.967*	
Self Emp x Event Group x Covariate		2.156	
Professional[a] (1=Professional)			
Pre-survey (Covariate)		27.921***	100

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Table 24: Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Renewable Energy Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Renewables		
	B	F Values	N

Service		
Pre-survey (Covariate)	7,407**	100
Service x Event Group x Covariate	2.866**	
Sales		
Pre-survey (Covariate)	9.621***	100
Sales x Event Groups x Covariate	3.516***	
Farming and Forestry [a]	NS	25
Construction[a]	NS	38
Production	NS	37
Government[a]	NS	43
Household members 18 or over		
Pre-survey (Covariate)	12.233***	100
Household members 17 or under	NS	28

*p<.05ca **p<.01 ***p<.001 [a] Homogeneity of variance is violated

Table 25: Absolute Values for Change in Likelihood of Eliminating Problems with Renewable Energy Options Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Likelihood of Solution for Renewables		
	B	F Values	N
Political Party[a]		3.193*	99
Pre-survey (Covariate)		5.736*	
Party x Event Group x Covariate		2.088*	
Years of Education[a]		NS	98
Gender (Female=1)		NS	99
Age			
Pre-survey (Covariate)		9.230*	95
Years in Idaho		NS	98
Marital Status		NS	98
Income		NS	88
Civic Engagement			
Pre-survey (Covariate)		8.373**	99
Employed Full Time(1=Yes)			
Pre-survey (Covariate)		7.506**	99
Self-Employed		NS	99
Professional Occupation[a]		NS	99
Service Occupation		NS	99
Sales Occupation		NS	99
Farming/Forestry/Fishing/Mining		NS	24
Construction[a]			
Event Groups		3.528*	37
Construction x Event Group x Covariate		4.747**	
Production[a]		5.249*	36
Event Group		3.418	
Production x Event Group x Covariate		3.246*	
Government[a]			
Event Group		2.905*	42
Government x Event Group x Covariate		4.539***	

Table 25: Absolute Values for Change in Likelihood of Eliminating Problems with Renewable Energy Options Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Likelihood of Solution for Renewable		
	B	F Values	N
Household Members 18 or older[a]		NS	99
Household Members 17 or younger[a]		NS	27

*p<.05 **p<.01 ***p<.001 [a] Violation of Levene's Test for Equal Variance

Research Question 4*:*

What effects will the participants' evaluations of the different treatments (e.g., the deliberative polling process vs. plenary only vs. only briefing materials), the speakers, mediators, and facilitators (e.g., their knowledge, interaction styles, etc.) have on their support for different options for meeting electricity demand?

<u>*Hypotheses:*</u>

This research question may be seen as testing an alternative hypothesis. One alternative hypothesis is that some characteristics of the speaker may "trump," or at least provide additional explanatory power over and above that of energy preference on the dependent variables, as hypothesized in Research Question 1. As such, it is prudent to check if factors such as differences between the treatment conditions, the interaction styles of the speakers, facilitators, and moderator affect the support participants have for an energy option, or affect the level of change that occurs in participants' support for an electricity option.

We will also test for the interaction of the speaker's characteristics and the participants' characteristics. Are some types of speakers or individual participants more persuasive to certain segments of the population?

> One could hypothesize that a "fire and brimstone" type of speaker would be very persuasive to participants with certain religious ideologies – leading to that speaker's persuasive ability causing (explaining) more change in the energy preferences of participants who are of that religious ideology than:
>
> 1. In other participants who have a different religious ideology
> 2. The type of public discourse treatment those participants receive.

This question can be tested by looking at the interaction of the demographic information collected on the participants and the participants' evaluations of the speakers' characteristics.

Analysis Approach

Research Question 4 tests the plausible alternative hypothesis that event participants' post-event preference and/or support for a given way to meet electricity demand may have been affected by how they evaluated and regarded the speakers and expert panelists. This cause and effect relationship differs from the one we hypothesized in previously in Research Question 1. However, prior research has shown that under certain circumstances, the characteristics of the speaker (especially credibility and trustworthiness) can cause attitudes to change more than the specific content of the message the speaker is communicating (e.g., Petty and Cacioppo, 1996). The event group participants spent an hour questioning the expert panel, and hence it is possible that this was a significant influence on their views.

All participants were asked to evaluate the expert panelists: Ralph Bennett, Pat Ford, Arjun Makhijani, Bob Neilson, Marsha Smith, David Solan, and Mark Stokes on their Credibility, Trustworthiness, Knowledge, and Likability. Mike Louis and John Freemuth were also speakers at the conference, so participants evaluated these two individuals on the same criteria, if in fact they assigned to a treatment condition where they had the opportunity to hear the speaker. Participants were also supposed to evaluate the facilitators, but many did not fill out that part of the survey, so no analysis was performed on this potential effect.

The first step in the analysis was to determine how strongly correlated the four measures of the speakers were. To perform this analysis, we simply calculated a Cronbach's alpha. The alpha values were all good to excellent, ranging from .80 to .93, indicating that it would be appropriate to combine all 4 measures into a single index measure for each of the seven panelists and for the two conference speakers. Then, we used a series of Pearson's correlations to examine the relationship between the index measure of each speaker and our main dependent variables of interest – namely post-test **reflective preference**, **formative preference**, **support**, and **support for improvements** (as measured by what portion of one's income tax a participant was willing to allocate to a way to meet electricity demands). Detailed results for Research Question 4 are below.

Correlations in **12 point bold** indicate statistical significance.

Name: Mike Louis

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.9213						
Correlations between Participant's "regard" for Mike and their post-test reflective preference	MLIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
MLIndex	1	0.219	-0.003	-0.198	-0.16	0.174	61
Correlations between Participant's "regard" for Mike and their post-test formative preference (ver1)	MLIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
MLIndex	1	0.079	-0.208	-0.194	-0.224	0.127	40
Correlations between Participant's "regard" for Mike and their post-test formative preference (ver2)	MLIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
MLIndex	1	0.255	-0.188	-0.265	-0.226	0.236	52
Correlations between Participant's "regard" for Mike and their post-test support	MLIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
MLIndex	1	0.068	0.173	-0.119	-0.222	0.183	61
Correlations between Participant's "regard" for Mike and their post-test income tax allocation	MLIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
MLIndex	1	0.062	0.194	0.16	-0.04	0.04	61

Name: John Freemuth

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.9346						
Correlations between Participant's "regard" for Mike and their post-test reflective preference	JFIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
JFIndex	1	**0.38**	-0.182	-0.278	-0.2	**0.6**	29
Correlations between Participant's "regard" for John and their post-test formative preference (ver1)	JFIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
JFIndex	1	0.406	-0.248	-0.138	-0.209	**0.482**	20
Correlations between Participant's "regard" for John and their post-test formative preference (ver2)	JFIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
JFIndex	1	0.374	-0.211	-0.165	-0.202	0.333	25
Correlations between Participant's "regard" for John and their post-test support	JFIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
JFIndex	1	0.182	0.168	-0.17	-0.317	0.205	29
Correlations between Participant's "regard" for John and their post-test income tax allocation	JFIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
JFIndex	1	0.133	-0.118	0.221	-0.332	**0.425**	29

Name: Ralph Bennett

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.8935						
Correlations between Participant's "regard" for Ralph and their post-test reflective preference	RBIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
RBIndex	1	**0.264**	0.224	0.107	-0.066	-0.137	61
Correlations between Participant's "regard" for Ralph and their post-test formative preference (ver1)	RBIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
RBIndex	1	0.037	0.155	0.038	0.021	0.212	40
Correlations between Participant's "regard" for Ralph and their post-test formative preference (ver2)	RBIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
RBIndex	1	-0.071	0.126	0.101	0.074	0.169	52
Correlations between Participant's "regard" for Ralph and their post-test support	RBIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
RBIndex	1	-0.023	0.187	0.066	-0.11	-0.057	61
Correlations between Participant's "regard" for Ralph and their post-test income tax allocation	RBIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
RBIndex	1	0.071	**0.4**	0.139	-0.116	-0.136	61

Name: Pat Ford

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.8249						
Correlations between Participant's "regard" for Pat and their post-test reflective preference	PFIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
PFIndex	1	**0.469**	-0.192	-0.084	**-0.536**	0.041	61
Correlations between Participant's "regard" for Pat and their post-test formative preference (ver1)	PFIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
PFIndex	1	**0.438**	-0.194	-0.077	**-0.457**	**0.391**	40
Correlations between Participant's "regard" for Pat and their post-test formative preference (ver2)	PFIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
PFIndex	1	**0.392**	-0.243	-0.036	**-0.479**	**0.369**	52
Correlations between Participant's "regard" for Pat and their post-test support	PFIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
PFIndex	1	**0.333**	-0.014	-0.113	**-0.414**	0.25	61
Correlations between Participant's "regard" for Pat and their post-test income tax allocation	PFIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
PFIndex	1	**0.405**	0.2	**0.288**	**-0.254**	-0.02	61

Name: Arjun Makhijani

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.866						
Correlations between Participant's "regard" for Arjun and their post-test reflective preference	AMIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
AMIndex	1	**0.348**	**-0.29**	-0.17	**-0.464**	**0.265**	61
Correlations between Participant's "regard" for Arjun and their post-test formative preference (ver1)	AMIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
AMIndex	1	**0.388**	-0.235	-0.052	**-0.408**	**0.369**	40
Correlations between Participant's "regard" for Arjun and their post-test formative preference (ver2)	AMIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
AMIndex	1	**0.544**	**-0.281**	-0.135	**-0.414**	**0.464**	52
Correlations between Participant's "regard" for Arjun and their post-test support	AMIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
AMIndex	1	**0.297**	0.032	-0.049	**-0.564**	**0.297**	61
Correlations between Participant's "regard" for Arjun and their post-test income tax allocation	AMIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
AMIndex	1	**0.32**	0.074	**0.293**	-0.2	0.19	61

Name: Bob Neilson

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.8235						
Correlations between Participant's "regard" for Bob and their post-test reflective preference	BNIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
BNIndex	1	**0.396**	-0.108	-0.097	**-0.469**	0.228	61
Correlations between Participant's "regard" for Bob and their post-test formative preference (ver1)	BNIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
BNIndex	1	0.216	-0.139	0.035	**-0.384**	**0.314**	40
Correlations between Participant's "regard" for Bob and their post-test formative preference (ver2)	BNIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
BNIndex	1	**0.431**	-0.132	-0.125	**-0.401**	**0.459**	52
Correlations between Participant's "regard" for Bob and their post-test support	BNIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
BNIndex	1	**0.301**	0.12	-0.175	**-0.498**	**0.337**	61
Correlations between Participant's "regard" for Bob and their post-test income tax allocation	BNIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
BNIndex	1	**0.342**	0.125	**0.314**	**-0.284**	0.071	61

Name: Marsha Smith

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.8502						
Correlations between Participant's "regard" for Marsha and their post-test reflective preference	MSIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
MSIndex	1	0.045	0.189	0.091	0.027	-0.126	61
Correlations between Participant's "regard" for Marsha and their post-test formative preference (ver1)	MSIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
MSIndex	1	0.091	0.062	0.193	-0.037	0.219	40
Correlations between Participant's "regard" for Marsha and their post-test formative preference (ver2)	MSIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
MSIndex	1	0.025	0.088	0.153	0.09	0.086	52
Correlations between Participant's "regard" for Marsha and their post-test support	MSIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
MSIndex	1	-0.129	0.168	0.112	0.028	-0.139	61
Correlations between Participant's "regard" for Marsha and their post-test income tax allocation	MSIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
MSIndex	1	-0.15	**0.417**	0.041	0.184	-0.226	61

Name: David Solan

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.8036						
Correlations between Participant's "regard" for David and their post-test reflective preference	DSIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
DSIndex	1	0.244	0.092	-0.053	-0.239	0.03	61
Correlations between Participant's "regard" for David and their post-test formative preference (ver1)	DSIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
DSIndex	1	0.137	-0.149	-0.118	-0.225	0.202	40
Correlations between Participant's "regard" for David and their post-test formative preference (ver2)	DSIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
DSIndex	1	0.225	-0.071	-0.136	-0.191	0.246	52
Correlations between Participant's "regard" for David and their post-test support	DSIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
DSIndex	1	0.06	0.209	-0.032	-0.269	0.113	61
Correlations between Participant's "regard" for David and their post-test income tax allocation	DSIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
DSIndex	1	0.107	**0.273**	**0.27**	-0.027	-0.071	61

Name: Mark Stokes

Cronbach's alpha for combining Likability, Credibility, Trustworthy, and Knowledgeable	0.8793						
Correlations between Participant's "regard" for Mark and their post-test reflective preference	STIndex	Ref Pref Conserve	Ref Pref Fossil	Ref Pref Hydro	Ref Pref Nuclear	Ref Pref Renew	N (listwise
STIndex	1	0.01	**0.337**	**0.31**	-0.129	0.075	61
Correlations between Participant's "regard" for Mark and their post-test formative preference (ver1)	STIndex	Form Pref Conserve	Form Pref Fossil	Form Pref Hydro	Form Pref Nuclear	Form Pref Renew	
STIndex	1	0.192	0.099	0.269	-0.077	0.245	40
Correlations between Participant's "regard" for Mark and their post-test formative preference (ver2)	STIndex	Form Pref2 Conserve	Form Pref2 Fossil	Form Pref2 Hydro	Form Pref2 Nuclear	Form Pref2 Renew	
STIndex	1	0.186	**0.316**	0.155	0.014	**0.291**	52
Correlations between Participant's "regard" for Mark and their post-test support	STIndex	Support Conserve	Support Fossil	Support Hydro	Support Nuclear	Support Renew	
STIndex	1	0.04	**0.292**	-0.031	-0.188	0.013	61
Correlations between Participant's "regard" for Mark and their post-test income tax allocation	STIndex	Tax Conserve	Tax Fossil	Tax Hydro	Tax Nuclear	Tax Renew	
STIndex	1	0.082	0.134	0.138	-0.064	-0.133	61

Mike Louis

The lack of any significant correlations between the MLIndex measure and any of the Main DVs showed that ML did not introduce any confound to the experimental design.

John Freemuth

There were 4 significant positive correlations out of a total 25 possible correlations between the JFIndex measure and some of the Main DVs. This indicated that JF's exposure to the participants is a potential confound to the experimental design, but his confounding effect is minimized somewhat by the fact that only a subset of the participants heard John speak (n = 29). Moreover, there is no consistent pattern to the correlations, so the correlations may be spurious.

Ralph Bennett

In general, how people regarded Ralph was not systematically related to what energy types participants preferred and/or supported. However, there were two statistically significant correlations: regard for Ralph was positively correlated with reflective preference for energy conservation and efficiency (r = .26) and support for improvements to fossil by allocating more of their income taxes to address the negative aspects of fossil fuels (r = .40).

Pat Ford

Regard for Pat was systematically related to what energy types participants preferred and/or supported. There were significant positive correlations between how participants regarded Pat and their reflective preference, formative preference and support for energy conservation and efficiency and significant negative correlations between their regard for him and their reflective preference, formative preference, and support for nuclear energy. There are few other idiosyncratic correlations between participants' regard for Pat and their preference and/or support for other ways to meet electricity demand.

Arjun Makhijani

How people regarded Arjun was systematically related to what energy types they preferred and/or supported. There were significant positive correlations between how participants regarded Arjun and their reflective preference, formative preference and support energy conservation and efficiency, as well as renewables. There were significant negative correlations between participants' regard for Arjun and their reflective preference, formative preference, and support for nuclear energy. There are few other idiosyncratic correlations between participants' regard for Arjun and their preference and/or support for other ways to meet electricity demand.

Bob Neilson

How people regarded Bob was systematically related to what energy types participants preferred and/or supported. There were significant positive correlations between how participants regarded Bob and their reflective preference, formative preference and support energy conservation and efficiency, as well as renewables. There were significant negative correlations between participants' regard for Bob and their reflective preference, formative preference, and support for nuclear energy.

Marsha Smith

How people regarded Marsha (who represented a pro-consumer position) was not systematically related to what energy types participants preferred and/or supported. There was only one statistically significant correlation, which showed that the more highly participants regarded Marsha, the more likely they were to support improvements to fossil fuels ($r = .42$) by allocating more of their income taxes to address the negative aspects of this energy source.

David Solan

How people regarded David was not systematically related to what energy types participants preferred and/or supported. There were only two significant positive correlations between how David was regarded and participants' support for improvements to fossil and improvements to hydro.

Mark Stokes

There was some indication that how people regarded Mark is systematically related to what energy types participants preferred and/or supported. There were positive correlations between participants' regard for Mark and their reflective preference, formative preference, and support for fossil fuels. .

Correlation does not mean causation, but taking into consideration our findings from Research Question 1 helps us interpret the results obtained for Research Question 4. Results from Research Question 1 show that our sample of participants had strong prior attitudes with respect to which ways to meet electricity demand. Moreover, these strong prior attitudes clearly showed that some ways to meet electricity demand were more highly preferred (e.g., renewables and conservation) than others (e.g., fossil). Given that participants had these preferences before meeting the experts, the most logical explanation for the significant correlations is that participants rated their regard for the panelist based on the extent to which that panelist agreed with the participant's prior attitude (e.g., position on the matter). That is, those participants who preferred renewables and conservation prior to meeting the panelists ended up saying they regarded the panelist(s) who shared their views as being more credible, trustworthy, knowledgeable, and likable. However, it is also possible that a person striving to be open-minded may have found some speakers' arguments compelling, which influenced his or her preference and support for energy options. The fact that there were several significant correlations, and these were among the more prominent findings of the study, suggests that further investigation of the effects of interaction with experts on people's policy attitudes is warranted.

5. Factor Analysis – Treatment Groups – Post-survey

Factor Analysis of Various Energy Generation Types

Ann Oakes-Hunter

Date Analysis: Factor Analysis (FA) and its Application (N=378 to 497)

Note: FA did not produce any underlying factors for *Energy Conservation and Efficiency* or *Renewable Electricity Generation*

Fossil Fuel Electricity Generation

- Factor analysis indicated one underlying construct for these variables:
  - How would you rate your **preference** of fossil fuel electricity generation?
  - How **safe and secure** is fossil fuel electricity generation?
  - How **trustworthy** is fossil fuel electricity generation?
  - How much **harm to the environment** do you think fossil fuel electricity generation have?

Table 1: *Money I would allocate to Buy Fossil Fuel* (Pearson correlations)

Variables/Factor	Buy Fossil Fuel Generation
Factor (safety, trust, env harm, preference)	.362**
Reliability/predictability	.253**
Benefits	.242**
Harm aesthetics	.240*
Cost	.230**
Responsive/adaptable	n.s.

**p=/<.01

Nuclear Electricity Generation

- Factor analysis indicated one underlying construct for these variables:
  - How would you rate your **preference** for nuclear electricity generation?
  - How **safe and secure** is nuclear electricity generation?
  - How **trustworthy** is nuclear fuel electricity generation?
  - How much **harm to the environment** do you think nuclear electricity generation have?

Table 2: *Money I would allocate to Buy Nuclear Electricity* (Pearson correlations)

Variables/Factor	Buy Nuclear Generation
• Factor (safety, trust, env harm, preference)	.419**
• Reliability/predictability	.346**
• Harm to aesthetics	.331**.
• Benefits	.319**
• Cost	.266**
• Responsive/adaptable	.176**

- **p=/<.01

Table 2: *Money I would allocate to Buy Nuclear Electricity* (Pearson correlations)

Variables/Factor	Buy Nuclear Generation
• Factor (pref, safety, reliable/predicable, Trustworthy, harm to env. harm to aest benefits)	.403**
• Cost	n.s.
• Responsive/adaptable	n.s.

- **p</=,01

Renewable Electricity Generation

- Factor analysis indicated one underlying construct for these variables:
    - How would you rate your **preference** for renewable electricity generation?
    - How **reliable and predictable** is renewable electricity generation?
    - How **trustworthy** is renewable fuel electricity generation?
    - How valuable are the **benefits** of renewable electricity generation?

Table 3: *Money I would allocate to Buy Renewable Electricity* (Pearson correlations)

Variables/Factor	Buy Renewable Generation
• Factor (preference, reliability, trustwrth,benefits)	.376**
• Safety and Security	.185*
• Harm to Environment	n.s.
• Costly	n.s.
• Responsive/adaptable	n.s.
• Harm to aesthetics	n.s.

**p=/<.01; *p=/<.05

Date Analysis: Factor Analysis (FA) and its Application (N=378 to 497)

Note: FA did not produce any underlying factors for *Energy Conservation and Efficiency* or *Renewable Electricity Generation*

Fossil Fuel Electricity Generation

- Factor analysis indicated one underlying construct for these variables:
  - How would you rate your **preference** of fossil fuel electricity generation?
  - How **safe and secure** is fossil fuel electricity generation?
  - How **trustworthy** is fossil fuel electricity generation?
  - How much **harm to the environment** do you think fossil fuel electricity generation have?

Table 1: *Money I would allocate to Buy Fossil Fuel* (Pearson correlations)

Variables/Factor	Buy Fossil Fuel Generation
Factor (safety, trust, env harm, preference)	.362**
Reliability/predictability	.253**
Benefits	.242**
Harm aesthetics	.240*
Cost	.230**
Responsive/adaptable	n.s.

***p*=/<.01

Nuclear Electricity Generation

- Factor analysis indicated one underlying construct for these variables:
  - How would you rate your **preference** for nuclear electricity generation?
  - How **safe and secure** is nuclear electricity generation?
  - How **trustworthy** is nuclear fuel electricity generation?
  - How much **harm to the environment** do you think nuclear electricity generation have?

Table 2: *Money I would allocate to Buy Nuclear Electricity* (Pearson correlations)

Variables/Factor	Buy Nuclear Generation
• Factor (safety, trust, env harm, preference)	.419**
• Reliability/predictability	.346**
• Harm to aesthetics	.331**.
• Benefits	.319**
• Cost	.266**
• Responsive/adaptable	.176**

- ***p*=/<.01

<u>Hydropower Electricity</u> <u>Generation</u>

- Factor analysis indicated one underlying construct for these variables:
  - How valuable are the **benefits** of hydropower electricity generation?
  - How **safe and secure** is hydropower electricity generation?
  - How much **harm to the environment** do you think hydropower electricity generation have?
  - How much **harm to aesthetics** does hydropower electricity generate?

Table 2: *Money I would allocate to Buy Nuclear Electricity* (Pearson correlations)

Variables/Factor	Buy Hydro Electricity Generation
Factor (safety, env harm, aesth. harm, benfits)	.366**
Preference	.292**
Cost	.250**
Reliable/Predictable	.193**
Responsive/adaptable	.162**
Trustworthy	.156**

**p=/<.01

6. Process Measures – Selected Analysis of Deliberative Polling v. Conference Process Measures

Comparing Effectiveness of "Process" of Deliberative Polling versus Conference Only

Jeffrey Joe

In the post-test questionnaire, we asked those who were at the April 18th event a number of "process" questions. The key ones for this analysis were:

12. What processes have you used to try to change energy public policy? Please circle all that apply.

A. Wrote a letter to the editor (of a newspaper)

B. Communicated with decision maker(s)

C. Signed citizen petition

D. Filed a lawsuit (engaged in litigation)

E. Proposed legislation

F. Joined or started a grassroots organization

G. Other (please describe)____

H. Nothing

*13. If you answered "Nothing" to the previous question, please skip to question 15. Otherwise, when you have tried to change or influence public energy policy, what is your preferred approach? From the options below, chose your preferred approach? Please circle **one**.*

A. Writing a letter to the editor (of a newspaper)

B. Communicating with decision maker(s)

C. Signing citizen petition

D. Filing a lawsuit (engaging in litigation)

E. Proposing legislation

F. Joining or starting a grassroots organization

G. Other (please describe)____

H. Nothing

14. Compare your preferred approach for changing or influencing energy public policy to what you experienced today. For the topic of energy policy, which way do you think would most likely:

(Place an X on the line under the option you choose)

	Today's experience	*Other preferred approach*
A. Cost less?	______	______
B. Take less time?	______	______
C. Improve communication among participants?	______	______
D. Improve trust among participants?	______	______
E. Produce a more effective, lasting outcome?	______	______

In performing this analysis, I looked at the data for those participants in the treatment conditions were 1, 2, 4, and 5. That is:

1 Pre & Post Surveys and Conference

2 Pre and Post Surveys, Deliberation Groups

4 Pre and Post Surveys, Briefing Documents and Conference

5 Pre and Post Surveys, Briefing Documents and Deliberation

The results for question 14 are as follows:

Treatment Group 1 = *Pre & Post Surveys and Conference*

Would today's experience or your other preferred approach cost less?

	Percent	n
Today's experience	33.3%	2
Other preferred approach	50.0%	3
Missing	16.7%	1
Total	100%	6

Would today's experience or your other preferred approach take less time?

	Percent	n
Today's experience	33.3%	2
Other preferred approach	50.0%	3
Missing	16.7%	1
Total	100%	6

Would today's experience or your other preferred approach improve communication among participants?

	Percent	n
Today's experience	83.3%	5
Other preferred approach	0.0%	0
Missing	16.7%	1
Total	100%	6

Would today's experience or your other preferred approach improve trust among participants?

	Percent	n
Today's experience	83.3%	5
Other preferred approach	0.0%	0
Missing	16.7%	1
Total	100%	6

Would today's experience or your other preferred approach produce a more effective, lasting outcome?

	Percent	n
Today's experience	66.7%	4
Other preferred approach	16.7%	1
Missing	16.7%	1
Total	100%	6

Treatment Group 2 = *Pre and Post Surveys, Deliberation Groups*

Would today's experience or your other preferred approach cost less?

	Percent	n
Today's experience	33.3%	2
Other preferred approach	33.3%	2
Missing	33.3%	2
Total	100%	6

Would today's experience or your other preferred approach take less time?

	Percent	n
Today's experience	33.3%	2
Other preferred approach	33.3%	2
Missing	33.3%	2
Total	100%	6

Would today's experience or your other preferred approach improve communication among participants?

	Percent	n
Today's experience	50.0%	3
Other preferred approach	16.7%	1
Missing	33.3%	2
Total	100%	6

Would today's experience or your other preferred approach improve trust among participants?

	Percent	n
Today's experience	33.3%	2
Other preferred approach	33.3%	2
Missing	33.3%	2
Total	100%	6

Would today's experience or your other preferred approach produce a more effective, lasting outcome?

	Percent	n
Today's experience	50.0%	3
Other preferred approach	33.3%	2
Missing	16.7%	1
Total	100%	6

Treatment Group 4 = *Pre and Post Surveys, Briefing Documents and Conference*

Would today's experience or your other preferred approach cost less?

	Percent	n
Today's experience	57.1%	4
Other preferred approach	28.6%	2
Missing	14.3%	1
Total	100%	7

Would today's experience or your other preferred approach take less time?

	Percent	n
Today's experience	57.1%	4
Other preferred approach	28.6%	2
Missing	14.3%	1
Total	100%	7

Would today's experience or your other preferred approach improve communication among participants?

	Percent	n
Today's experience	57.1%	4
Other preferred approach	28.6%	2
Missing	14.3%	1
Total	100%	7

Would today's experience or your other preferred approach improve trust among participants?

	Percent	n
Today's experience	71.4%	5
Other preferred approach	14.3%	1
Missing	14.3%	1
Total	100%	7

Would today's experience or your other preferred approach produce a more effective, lasting outcome?

	Percent	n
Today's experience	57.1%	4
Other preferred approach	28.6%	2
Missing	14.3%	1
Total	100%	7

Treatment Group 5 = *Pre and Post Surveys, Briefing Documents and Deliberation*

Would today's experience or your other preferred approach cost less?

	Percent	n
Today's experience	22.2%	2
Other preferred approach	55.6%	5
Missing	22.2%	2
Total	100%	9

Would today's experience or your other preferred approach take less time?

	Percent	n
Today's experience	44.4%	4
Other preferred approach	33.3%	3
Missing	22.2%	2
Total	100%	9

Would today's experience or your other preferred approach improve communication among participants?

	Percent	n
Today's experience	57.1%	4
Other preferred approach	28.6%	2
Missing	14.3%	1
Total	100%	9

Would today's experience or your other preferred approach improve trust among participants?

	Percent	n
Today's experience	44.4%	4
Other preferred approach	22.2%	2
Missing	33.3%	2
Total	100%	9

Would today's experience or your other preferred approach produce a more effective, lasting outcome?

	Percent	N
Today's experience	33.3%	3
Other preferred approach	22.2%	2
Missing	44.4%	4
Total	100%	9

Appendix D – Project Team Documentation

1. Roles and responsibilities of team members

Project Advisors: The advisor's role is to provide oversight and direction over the course of the entire study. They will also be involved by: serving as principal investigators, serving as spokesman to the media, performing an editorial function in the development and writing of reports and published papers, and giving presentations at conferences and other public forums.

Project Leads: The project leader's role is to perform all of the detailed planning necessary for successful execution. They will also coordinate the execution of the day-to-day details, hold project status meetings, and ensure that elements of the plan are executed successfully. They will also be involved in performing much of the higher level work that will include: developing the survey instrument and database, developing and performing training, implementing processes for data collection and analysis, performing quality assurance on interim deliverables, writing drafts of the final paper, and developing presentations of the results for conferences.

Facilitators: The facilitator's role is to develop the facilitation model and to facilitate/moderate the conference and the deliberation sessions. The facilitators will be identified at a later date

Subject Matter Experts: The subject matter expert's role is to develop briefing materials and to serve as scientific experts during the conference and the deliberation sessions. Subject matter experts will be identified at a later date and will come from the Center for Advanced Energy Studies and its affiliate members.

Method Consultant: Consultants will be involved to harvest their expertise and to ensure methods and understandings gained in this proposal are utilized at the INL.

2. Interpersonal Dynamics of Collaboration

Insights on the Interpersonal Dynamics of Collaboration

Among Multi-Disciplinary Experts

Steve Piet

Since this research project started, a number of insights have been gained on how the interpersonal dynamics of collaboration among multi-disciplinary experts affects team functioning, the evolution of research, goal formation, and the deliverable production. Overall, the research team agrees that the research has evolved – in the sense that the kernel idea of the research is still intact, but vastly improved by input from the team, and that the biggest issue/factor for our success has been the ability of our multi-disciplinary team to have mostly open dialogue about everyone's perspectives and interests.

The best example of how the research has evolved is seen in the following: most of the research team (if not all) knows that this project is studying the effects of public discourse (process) on participant's attitudes (content) and their interaction. There is a tendency, however, for some researchers to frame the interaction differently, and as a result prioritize one over the other. For example, in early drafts of the LDRD proposal, there was one effort to develop a research plan that studied "content" and another effort to study "process", which are two fundamentally different research questions. Different people on the team were advocating to do research on questions that other people felt pretty confident they already knew the answer to, and vice versa. That is, those that knew the research literature on "process" were interested in studying "content" and those that knew the research literature on "content" were interested in studying "process".

The research team recognizes, however, that policy decision-making must factor in the appropriate role of science and experts along with the public; which means that content and process cannot be separated. As such, there is a continual effort to develop a research plan that studies the interaction between "content" and "process". The research is asking questions like, "How does the process for presenting content affect preference and subsequent support for certain electricity generating technologies?" Similarly, "How does the way in which information is presented to the public and then discussed (process) on topics such as technological improvements in electricity generating technologies (content) affect the public's preference and subsequent support for them?"

There have also been other factors that have influenced the evolution of the research, and they include:

- Excellent project management. The research has proceeded in an organized manner with respect to planning and deliverables. Having a stable system for deliverables in this aspect of the research will allow me to be focused and engaged. It has been and will continue to be valuable for every task we need to perform.
    - For future Graduate Assistants, a clear deliverables and a mutual understanding between the group and each GA of how our deliverables fit into the larger project. This enable us to stay connected and engaged in a meaningful way and gives them ownership of the process.
- Good use of technologies that allow people to collaborate across long distances. A commitment to constant communication and use of enabling tools (web-based meeting software, a shareable secure web site, etc.) is very necessary for this collaboration to work. Sometimes the little things create big time wasters that are

frustrations (e.g. e-mailing documents vs. having a repository of all current accessible to everyone), but collaboration over distance (with the right tools to communication) is very do-able.

- An attitude of sharing everything which has led to better overall results. We have fairly equal access to all aspects of the project (budget, plan, documents, PIs for consultation, etc) and we don't shy away from discussing how those will impact the work we need to do. In other words, we have agreed to a somewhat level playing field, even though it is human nature to want control over as much as possible. This egalitarian feel means that we all must buy into the end product part and parcel (and people can't silo their stuff and have total say over how it plays out).
- Recognition that the 'culture' that each team member comes from cannot be discounted. Team members come from: private sector, academia, and public sector. Each work culture has a different way in which work gets done, and how progress and success are measured, but the team has managed to work effectively across cultures.

Opportunities for Improvement:

- The research was not significantly influenced by stakeholder's feedback on the letter sent to them. Having more substantive input from stakeholders would have been beneficial, in the sense that it would show that the research team tried to take into account their perspectives, but based on the input received, this conclusion can be drawn with any confidence. It should be noted that the letter served a Public Relations function, and it was used to identify some of the pro's and con's used to test some of the indicators for our "Preference" index. The initial reasons for doing it came from a public policy philosophy of casting a wide net on questions that help lawmakers understand the relevant issues that the Legislature will likely tackle in the upcoming session. If we had this to do over again, however, we probably would have skipped the stakeholder feedback step.
- PIs need to suggest literature that will inform our research as much as possible. The working group can leverage their expertise in this way and save time searching for good literary support.
- As diverse as the team is, we may have missed some areas of expertise that could help guide the research and prevented us from taking a few detours along the way. Dr. Troy Hall and Dr. Ross Burkhardt have informally provided significant methodological advice and direction. Inclusion of their skills and knowledge on the team would have been valuable.

Conclusion and Lessons Learned:

- Research teams need to come together quickly and to not ignore soft skills and team dynamics. Most, if not everyone, on the team believes we currently have a diverse yet very functional team that is able to endure criticism and conflict without it affecting our learning and performance.
- There are fundamental issues and challenges of having an interdisciplinary group of experts working on a complex socio-technical problem. Putting a group of experts together to work on a problem sometimes results in effective collaboration, and other times the group implodes before ever getting off the ground. This research team's success or failure is a leading indicator for the real decision makers for these issues, in that we are a microcosm of the different 'expert' perspectives on these issues. We will serve as a model for success, or be the example of what not to do.

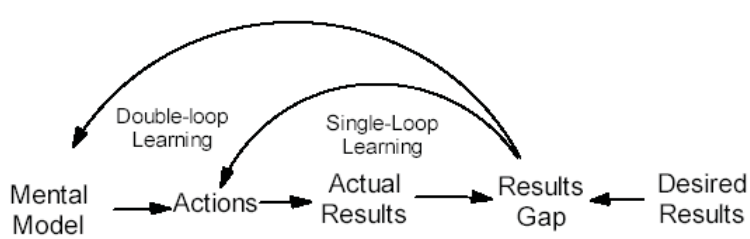
3. Learning How to Learn – an operating tenant

Jeffrey C. Joe and Harold J. Heydt

The purpose of this document is to propose one of our team operating tenants. This is only a proposal, but it potentially serves as the basis for the decision on how team will chose to operate.

Basically, the proposed operating tenant is: To strive to be in "learning mode" rather than "advocacy mode". What does this mean? Learning mode and advocacy mode are constructs that have many different facets. Learning mode is essentially about being open-minded, reserving judgment, and asking questions to improve understanding of other's opinions, views, and mental models *before* engaging in constructive debate and analysis. Advocacy mode is essentially about being close-minded (i.e., having your mind already made up) and engaging in debate and asking interrogative questions with the goal of trying to win. In other words, in advocacy mode, one tries to convince or persuade others who have a different position (i.e., different opinions, views, and mental models) about the veracity or correctness of his or her position without attempting to understand fully the other person's position. Also note that in learning mode, the effective examination of different mental models requires thinking of the mental models from three viewpoints. The three viewpoints are 1) my mental model and its implications, 2) the other person's mental model and its implications, and 3) our shared mental model and how we achieve it.

Peter Senge's The Fifth Discipline and the concept of "single-loop learning" versus "double-loop learning" potentially provides additional understanding of this concept of being in learning mode versus advocacy mode. Some have described single-loop learning as trying to find a better way to do a process. It is comparable to continuous quality improvement. Double-loop learning goes a step further and asks why we are doing the process in the first place. Another simplified and slightly different explanation of the differences between single-loop and double-loop learning is provided in the figure below.



The connection here is that advocacy mode is essentially single-loop learning and learning mode is double-loop learning. In advocacy mode, the level of learning that occurs is focused at the actions level or at a superficial level of understanding. The learning in advocacy mode usually occurs through asking interrogative questions, which are typically designed to catch people in traps of logic (i.e., being inconsistent or hypocritical), and do not attempt to get at the deeper underlying mental model. Learning mode, on the other hand, is more like double-loop learning in that it attempts to go a step further and asks about the underlying mental model or the reasons why a certain course of action or a certain position on an issue was taken.

In the context of this NGNP Public engagement effort, what this means is that when we interact as a team and when we interact with external stakeholders, we should strive to be in learning mode as much as possible and engage in advocacy mode only when necessary. I (JCJ) believe being in learning mode will allow us to truly engage the public and consider their values more effectively, but eagerly wait to hear what other team members think, so that we can make a decision on how we will operate and move forward on our efforts.

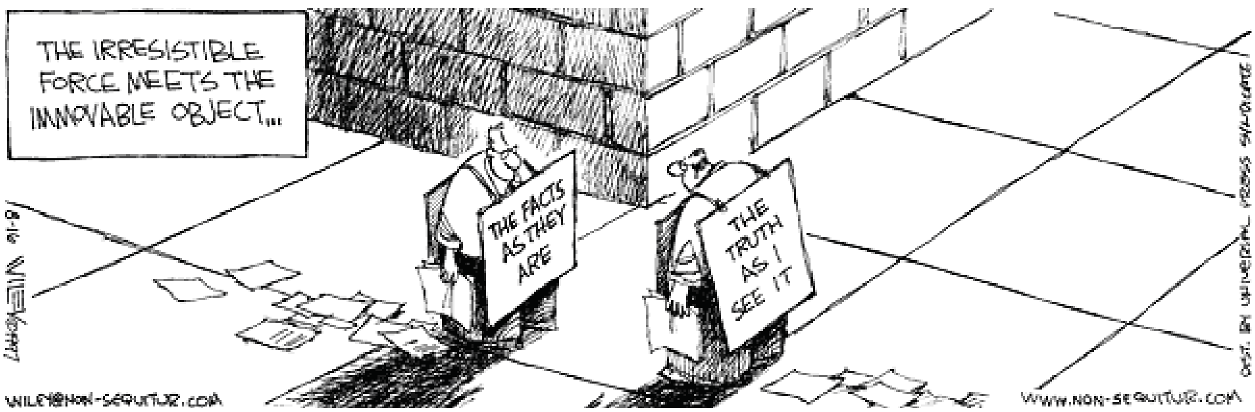
4. How Different Paradigms Affect Team Dynamics

How Different Paradigms Affect Team Dynamics on the LDRD: "Investigation of Public Discourse Methods in Energy Policy Decision-Making"

Observations by Jeffrey Joe

A Paradigm is a worldview underlying the theories and methodologies of a particular scientific subject.

Case in point



Jeffrey's Main Observation

The Facts as They Are	**The Truth as I See it**
• The INL • Scientific Empiricism • Empirical Social Science Research	• Deliberative Polling

How Jeffrey thinks the INL and Scientific Empiricism would arrange *Sources of Knowledge* and *Methods of Inquiry* along a continuum…

Source

The Facts as They Are — The Truth as I See It

The Facts as They Are		The Truth as I See It
Encyclopedia Britannica	Wikipedia	Single Author Blog

Inquiry

The Facts as They Are		The Truth as I See It
Scientific Empirical Research	Deliberative Polling	"Truthiness"

Truthiness = things that a person claims to know intuitively or "from the gut" without regard to evidence, logic, intellectual examination, or facts.

From http://en.wikipedia.org/wiki/Truthiness

For Fun

The Facts as They Are		The Truth as I See It
Microsoft	Google	Open Source Software

Affect on Team Dynamics

- I believe we're working from different Paradigms
- This is affecting what each of us view as an "acceptable standard of proof" for the research we conducting
  - The questions we are asking, not asking

- The methods we are using, not using

From the INL LDRD FY2008 Year End Report Steve wrote:

Since this research project started, a number of insights have been gained on how the interpersonal dynamics of collaboration among multi-disciplinary experts affects team functioning, the evolution of research, goal formation, and the deliverable production. Overall, the research team agrees that the research has evolved – in the sense that the kernel idea of the research is still intact, but improved by input from the team, and that the biggest issue/factor for our success has been the ability of our multi-disciplinary team to have mostly open dialogue about everyone's perspectives and interests.

The best example of how the research has evolved is seen in the following: most of the research team (if not all) knows that this project is studying the effects of public discourse (process) on participant's attitudes (content) and their interaction. There is a tendency, however, for some researchers to frame the interaction differently, and as a result prioritize one over the other. For example, in early drafts of the original LDRD proposal, there was one effort to develop a research plan that studied "content" and another effort to study "process", which are two fundamentally different research questions. Different people on the team were advocating to do research on questions that other people felt pretty confident they already knew the answer to, and vice versa. That is, those that knew the research literature on "process" were interested in studying "content" and those that knew the research literature on "content" were interested in studying "process".

5. Project Check-Off Meeting Example

Mid-point LDRD Project Meeting

Date: September 26, 2008
Time: 10:00 am to 4:00 pm MST

Location: Hatch C Conference Room
Student Union Building

Attendees

John Freemuth	**Steve Piet**
Ann Hunter	**Jeffrey Joe**
Patrick Wilson	**Eileen DeShazo**
Carole Nemnich	**Mike Louis**
Paulina Starkey	**Sheila Anderson**

Meeting Objectives

- Ensure everyone's roles and responsibilities are clearly understood
- Ensure everyone understands the remaining tasks and work that needs to be accomplished.
- Make sure everyone is committed to making it happen.

TOPIC	TIME	CONTENTS	FACILITATOR	REVIEW DOCUMENT
Review meeting objectives and agenda	**10:00-10:15**	• **Introductions** • **How GA's feel project fits with education goals** • **Review Meeting Objectives** • **Review agenda**	• ***Mike***	• ***Agenda***
Discuss ADP	**10:15-10:45**	• **Present lessons learned from ADP and discuss modification to research**	• ***Carole/Mike***	
Synopsis of Team Dynamics	**10:45-12:00**	• **Review team dynamics** • **Review strawman of team norms** • **Brainstorm things we should stop, start, or continue doing (dead rats)** • **Discuss lists and agree on team norms**	• ***Jeffrey*** • ***Mike***	***End of year LDRD report*** ***Strawman team norms***

TOPIC	TIME	*CONTENTS*	*FACILITATOR*	*REVIEW DOCUMENT*
		• **Discuss current roles and make adjustments as required**		
Lunch	**12:00-1:15**	• **Present results of Beta testing** • **Take Questionnaire** • **Provide Feedback and Discussion**	• ***Eileen***	• ***Questionnaire***
Discuss Project Status	**1:15-2:15**	• **Present current project plan and current status** • **Discussion of status and D-day date** • **State of the Project** • **Make adjustments to task responsibilities and where help from PI's are needed** • **Re-commit to project**	• ***Mike*** • ***Steve***	• ***Project plan*** • ***Steve's state of the project***
Discuss funding for FY'09	**2:15-2:45**	• **Present FY'09 budget**	• ***Mike***	• ***FY'09 Budget***
Break	**2:45-3:00**			
Housekeeping items	**3:00-3:30**	• **Brief team on work w/ Alberta** • **Discuss 3rd year budget and follow-up research**	• ***Steve*** • ***Mike***	
Meeting close	**3:30-4:00**	• **Next Steps** • **What went well and what didn't**	• ***Mike***	

Appendix E – Materials Used in the Deliberation Event & Follow-up Survey

1. Briefing Document and Development Materials

BRIEFING DOCUMENT
OPTIONS FOR MEETING ELECTRICITY DEMAND IN IDAHO
Energy Policy Institute
March 20, 2009

Table of Contents

Preface

Purpose of Document

The purpose of this document is to inform members of the public who are involved in a study of their preferences for ways that Idaho can meet future electricity demand. It is intended to provide only a baseline of information and was written to intentionally not lead the reader to specific conclusions.
The study is being conducted by researchers at the Energy Policy Institute (EPI), part of the Center for Advanced Energy Studies (CAES). CAES is a collaboration of Boise State University, University of Idaho, Idaho State University, and Idaho National Laboratory.

It discusses Idaho's electricity situation as well as several options for meeting future electricity demand. The advantages and disadvantages for five alternatives are discussed: *energy conservation and efficiency, fossil fuel electricity generation, hydropower electricity generation, nuclear electricity generation and non-hydro renewable electricity generation.* .

While other forms of energy are important, this document will focus on **electricity**. It will not discuss issues relative to fuels (petroleum fuels, bio-fuels, etc.) used for transportation, space heating or process heat unless electricity is somehow involved.

How This Document is Organized and How it Should be Used

This document has been organized so that each section will build upon the information provided in the previous section. It describes:

1.) How the electricity system works;
2.) National perspective on electricity;
3.) Idaho's current electricity situation;
4.) Five choices for meeting electricity demand;
5.) Important factors to consider.

As you read this document, you will find two Appendices useful as a quick reference. The Appendices provide quick comparisons between the five electricity options.

1) Appendix I contains a set of 8 tables that summarize the advantages and disadvantages of the five different electricity options.
2) Appendix II contains a table that summarizes and compares opportunities to improve each of the options.

Cited references will be posted on the Energy Policy Institute's website. The subscripted notations in the text indicate the reference used. Please go to: http://www.boisestate.edu/energypolicyinstitute/

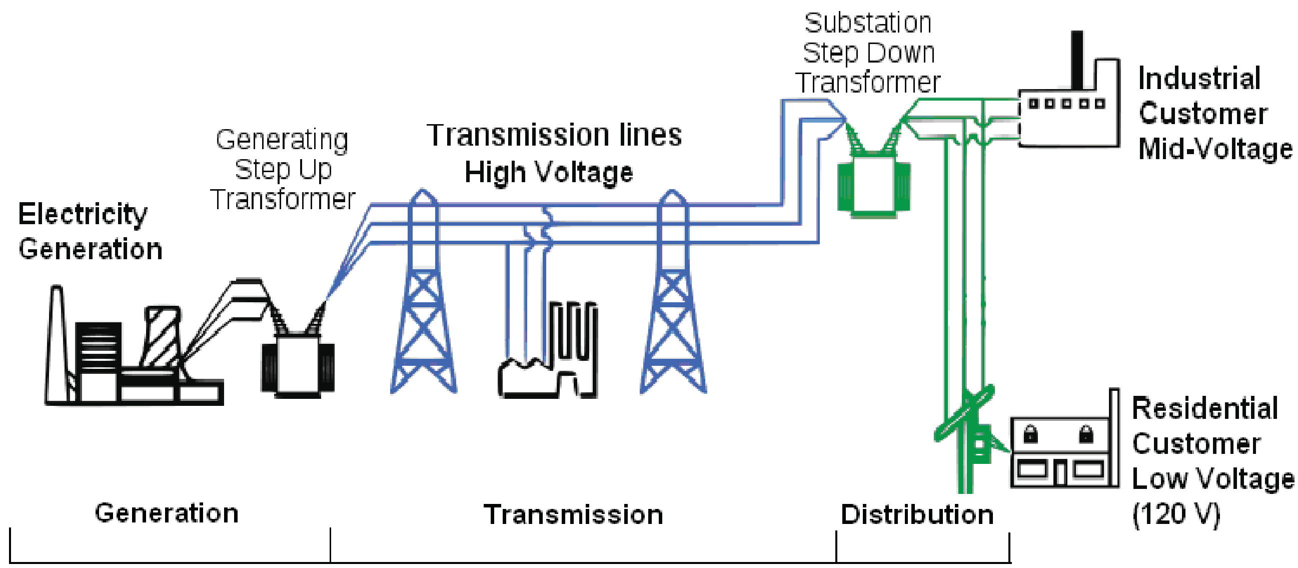
How the Electricity System Works

Electricity is one of the most widely used forms of energy. Electricity is flow of electrical power or charge. It is a secondary energy source, which means that we get electricity from the conversion of other sources of energy, like water, wind, coal, natural gas, sun, nuclear power and other natural sources, which are called primary sources. The energy sources that are used to make electricity can be *renewable* or *non-renewable*.

There are three parts to the system that provides consumers with electricity (See figure 1):

- electricity generation,
- transmission lines or the "grid,"
- the distribution system.

Figure 1: Typical Electricity System



Source: 56

Electricity generation is the process of converting non-electrical primary sources of energy into useable electricity. Although solar energy can be directly converted into electricity through photovoltaic panels, most electricity is produced by a rotating machine that drives a generator. These machines are typically driven by water (hydropower), wind, hot gases and, most commonly, steam. Steam for electricity is produced in several ways:

- From water that is boiled by burning either fossil fuels, biomass or by nuclear fission.
- From geothermal resources where hot water or steam under pressure in geothermal reservoirs in the earth's crust emerges from the ground and drives a turbine
- From a fluid heated by the sun (solar technologies that are not solar-photovoltaic)

Source: 7

After power is generated, it has to be stepped up in voltage to make the transfer of electricity over large distances more efficient. This is because the further electricity is generated from the place it is used, the more electricity is lost in moving it; and stepping up the voltage lowers the amount of electricity lost. Today in the United States, most electricity is generated away from most cities and towns. It is moved to substations by large, high-voltage **transmission lines**, often supported by tall metal towers. In the United States, the network of nearly 160,000 miles of high-voltage transmission lines is known as the *grid*.

When power has moved closer to where it will be used, the electricity is moved through a local **distribution system** made up of a series of substations, transformers and lower-voltage power lines until it is used by the customer.

Now that we have reviewed how electricity is delivered to our homes, there are three very important things to keep in mind about how the system is operated.

1. Electricity cannot be generated and then stored for later use.
2. The supply of electricity must always equal the demand.

The power grid that supplies the electricity coming into your home or business is designed to maintain a constant balance between consumer demand and the amount being supplied by generators. When there is an increase in demand for electricity then there must be an increase in the supply. Because electricity can not be effectively stored, producers of electrical power must react immediately to increase supply when demand rises or customers could experience power outages.

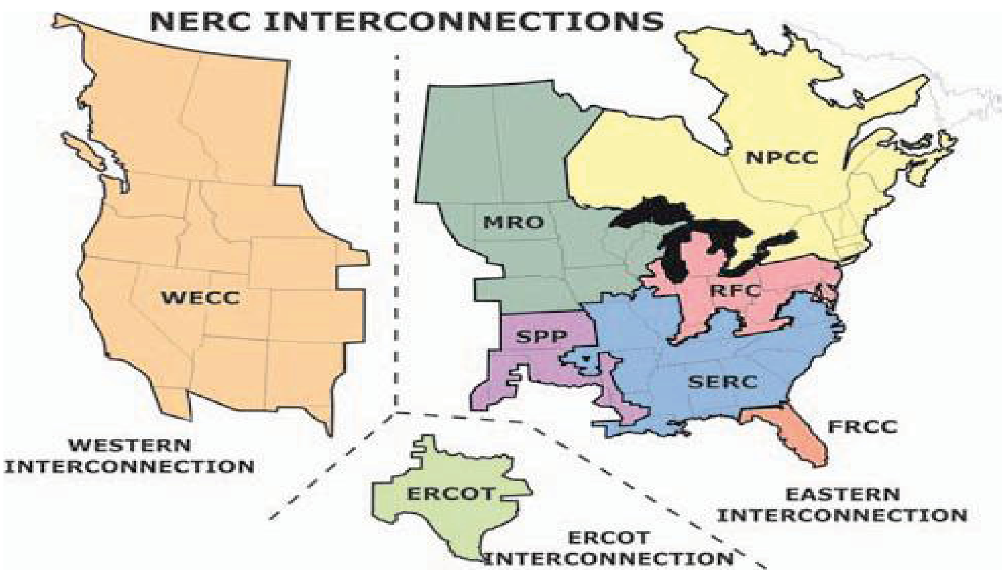
National Perspective of Electricity

There are a number of things to consider from a national and international perspective when exploring different options for meeting electricity demand in Idaho. They are:

1. The importance of a nationally/internationally interconnected electricity grid.
2. Issues with carbon emissions from burning fossil fuels and future national legislation.
3. National growth in demand for electricity.

The first issue to consider is that the electricity system is part of **an internationally interconnected grid**, not contained within state or national boundaries. As seen in figure 2, Idaho is part of the Western Interconnection, an electric grid that encompasses Alberta and British Columbia, Canada, south into Mexico and from the West coast over the Rocky Mountains to the Great Plains. This region of the grid is also tied to the Eastern Interconnection with several very limited DC transmission lines.

Figure 2: Map of North American Electric Reliability Council (NERC) Interconnections



Source: 50

Although having an Idaho only electricity system may seem like an attractive idea, the reality is that it would make electricity more costly, less reliable, less secure, and simply impractical for a number of reasons. Listed are a number of reasons why being part of a regionally dispersed grid is important:

- Idaho currently imports on average at least 50 percent of its electricity from outside the state. Without sources of electricity from outside the state, Idaho would not have sufficient electricity to meet current demand.
- Having multiple or redundant sources of electricity increases reliability. If one source goes down or is eliminated, there are others that can make up the difference. A diversity of resources decreases the risk that all will be unavailable at once.
- It allows wholesale markets and competition to develop among providers of electricity across a larger area that ultimately can reduce consumer costs.

- It can enable geographically remote generation sources such as renewables, to serve areas where electric supply is needed.

The second issue Idahoans needs to consider is the possibility of **future national carbon emission legislation** that could be imposed on our state. Whether or not one believes that changes in the Earth's climate are caused by humans, there may be legislation passed in the next few years that would either:

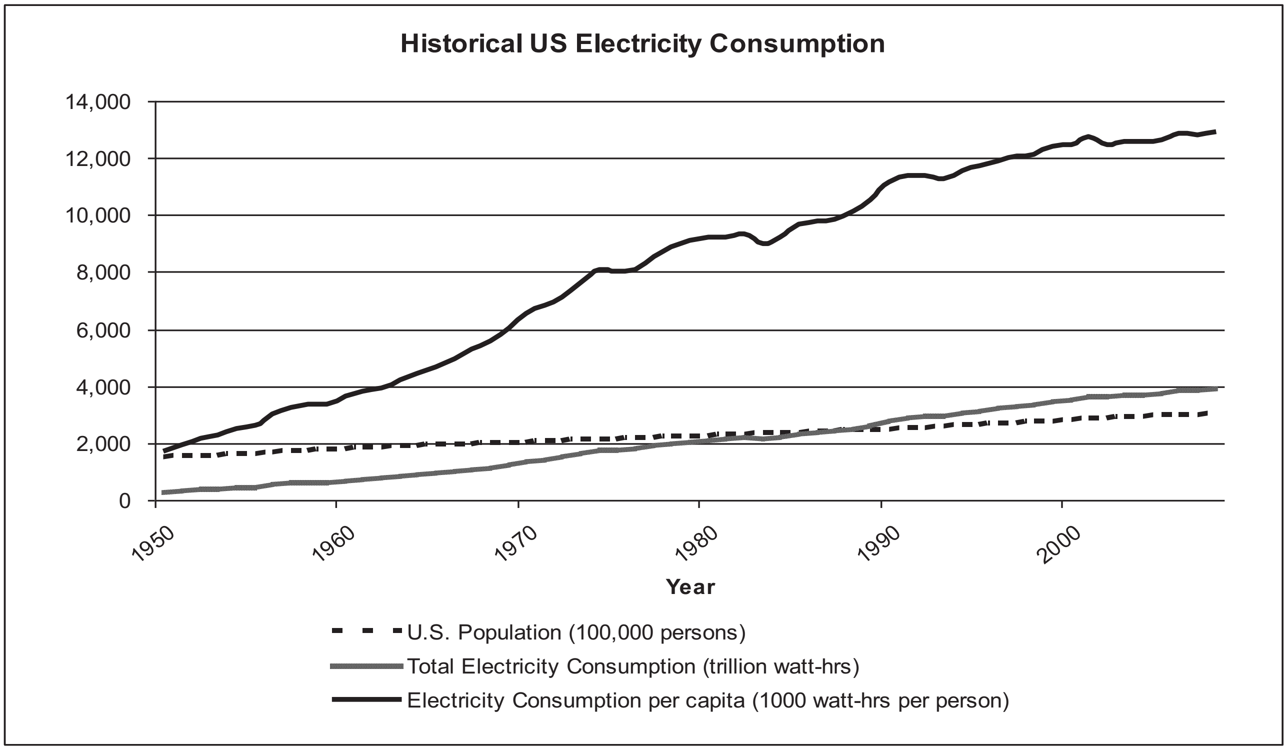
- promote renewable resources of generation that produce little or no greenhouse gases.
- increase the cost of greenhouse gas producing electricity generation sources (i.e. fossil fuels)

Promoting renewable sources of electricity that produce little or no greenhouse gases could come in the form of a national Renewable Portfolio Standard (RPS). This would impose a mandate that utilities buy a certain percentage of their electricity from renewable sources such as wind, solar, hydro, or geothermal. Nuclear is considered by many experts to be non-greenhouse gas producing, but it may not be included as a "renewable" source to fulfill national requirements for a national RPS. Similarly, hydropower projects with large dams forming extensive reservoirs that severely alter the flow of a river may not be included as a "renewable" source.

An increase in the cost of electricity generation that uses fossil fuels could come in the form of a "carbon tax" or as a "cap-and-trade" system. A carbon tax is a tax placed on the price of coal, natural gas or oil either purchased or consumed by an electric utility. A "cap-and-trade" is a system that would impose an overall limit or "cap" on the amount of greenhouse gases that can be produced nationally by providing emissions "allowances" to specific sources, such as investor-owned or public utilities. Emitters would then trade their allowances; some with unneeded allowances could sell them to sources that emit more then their allocation. Sources could also choose to reduce their emissions so as not to exceed their individual allowance. Cap-and-trade and carbon tax mechanisms effectively drive up the cost of carbon-based fossil fuels for generating electricity, also increasing the costs for consumers[82].

The third national issue that could impact Idaho has to do with the overall **increase in electricity demand in the U.S.** Figure 3 clearly shows that while the nation's population has been steadily increasing, the amount of electricity consumed per person has been increasing as well. And beyond traditional uses of electricity, future national legislation will likely promote cars, trucks and public transportation that are powered by electricity. If these trends continue, the United States will need to build electric generation facilities, find ways to conserve and use electricity more efficiently, or both. The growth in demand will put upward pressure on the price of fuel and capacity for generating electricity and accelerate depletion of non-renewable natural resources.

Figure 3: Historical consumption of electricity in the United States versus population growth



Sources: 24,57,58

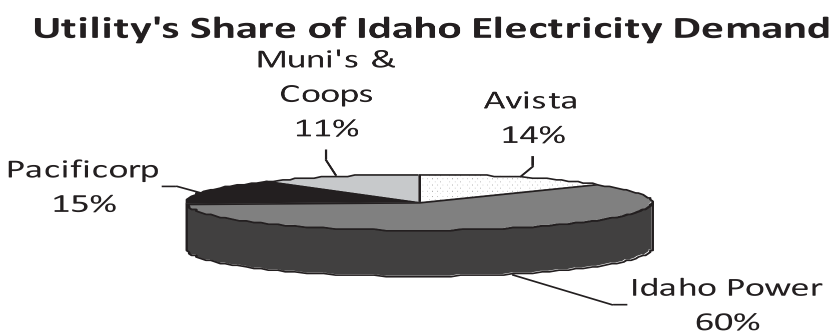
Understanding the inter-connectedness of the electricity system, potential federal legislation, and national demand trends will have an effect on Idaho's future choices for electricity. Our choices will also need to consider issues illustrated in the next section describing Idaho's current electricity situation.

Idaho's Current Electricity Situation

Overview

Figure 4 illustrates that three large investor owned utilities supply 88 percent of Idaho's electricity demand: Idaho Power, Avista, and Pacificorp. Idaho Power services the Treasure Valley and much of southern Idaho; Avista services northern Idaho; and the Rocky Mountain subsidiary of PacifiCorp services parts of eastern Idaho. There are smaller, local utilities owned by consumers (cooperatives or co-op's) and municipalities (muni's) that supply the more rural regions of the state.

Figure 4: Utility's share of Idaho electricity consumption



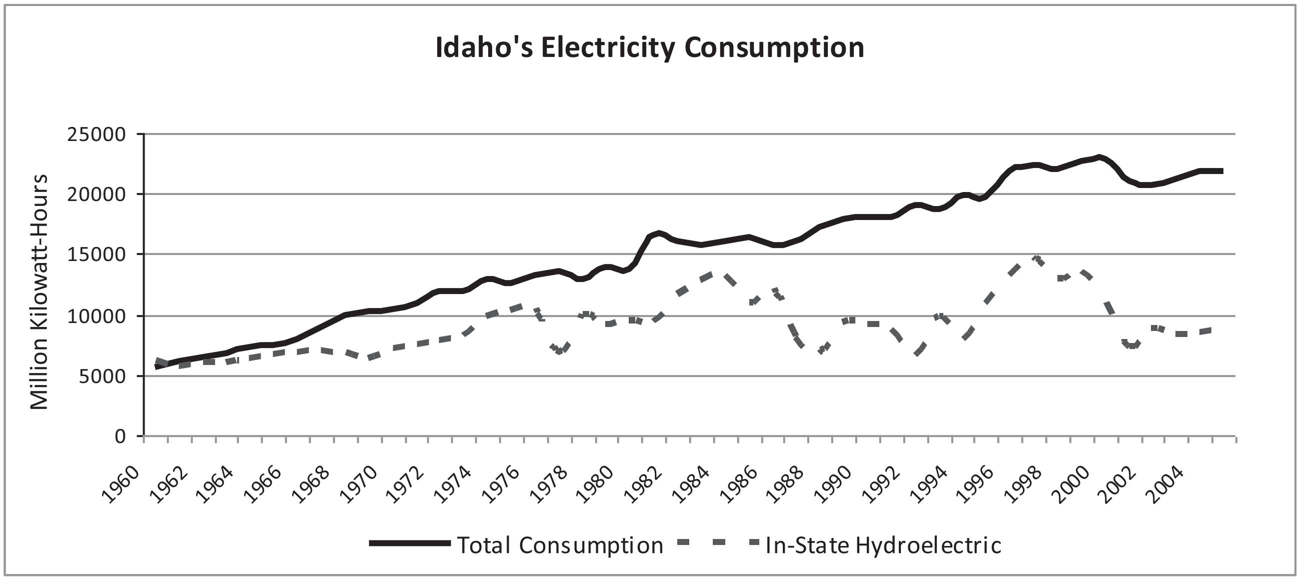
Source: 31

Idahoans currently consume approximately 23,600,000 megawatt-hours per year (MWh/yr) of electricity (2005) while only producing about 11,300,000 MWh/yr (2006)31. This means that Idaho currently imports a little over 50 percent of its electricity from outside the state. For illustration purposes, it would take either one or two new nuclear power plants, two or three new coal plants, about four Brownlee-sized dams, or 75 Wolverine Creek wind farms for Idaho to eliminate import of electricity into the state. (Note: one megawatt-hour is equivalent to the amount of electricity used by ten-thousand 100-watt bulbs for 1 hour).

Idaho is currently facing an uncertain energy future. According to the U.S. Census Bureau, Idaho was the fourth fastest growing state in 2006-2007 and the sixth fastest growing state in 2007-2008 59. That growth brings higher demand for electricity.

Idaho consumers, in 2007, on average paid the lowest retail electricity rates in the nation due to hydroelectricity sources. This may be at risk. Figure 5 shows how Idaho's in-state hydroelectricity generation is becoming a smaller percentage of the state's total consumption. Historically, as the state's consumption has grown, Idaho's utilities have historically chosen to source from relatively inexpensive coal plants in other states making Idaho's electricity consumption based less on hydropower. Current national policies may create financial disincentives for burning coal and natural gas making them more expensive. In addition, Idaho has long term contracts due to expire in the next several years with electricity suppliers in states that currently have higher electricity prices than Idaho. When contracts are re-negotiated, there is a risk that prices will reflect neighboring state's higher electricity prices.

Figure 5: Historical consumption of electricity versus in-state hydroelectricity production



Note: The year-to-year variation in hydroelectric production is dependent upon the quality of the water year.

Source: 83

This will inevitably put upward pressure on electricity rates as we consume from sources that will be more expensive than in the past.

Additional issues and challenges that Idaho currently faces:

- Currently, Idaho does not have adequate transmission capacity to meet the potential for increased demand, especially if that demand is met by more importation from out of state. Transmission capacity in Idaho is operating at near- or full-capacity during periods of peak demand. As a result, Idaho will require additional transmission capacity to integrate diverse resources into its energy mix. As demand increases, it will put more strain on the existing transmission system, which can put Idaho at risk for potential outages.
- The amount of electricity produced by hydropower is dependent on how much water is available in a given year.
- Idaho is rich in renewable energy resources, but has no commercially viable deposits of coal, oil, or natural gas[31].

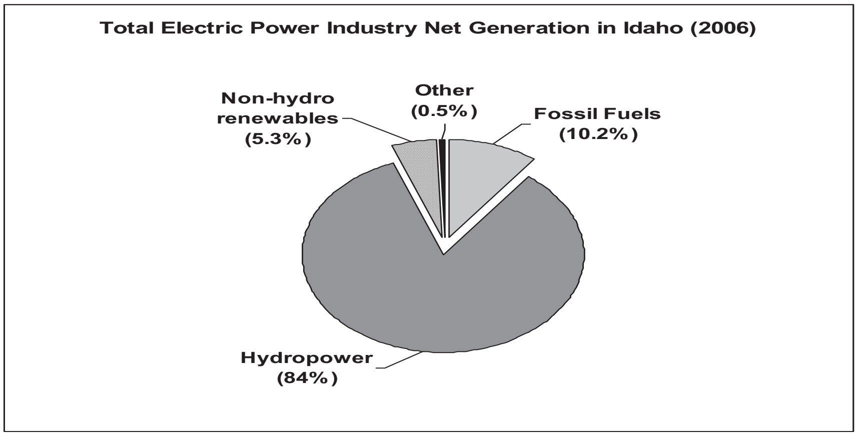
Electricity Production

There are currently three main types of electricity **production** within the borders of Idaho (figure 6):

1. hydropower generation
2. fossil fuel generation,
3. non-hydro renewable generation.

Hydropower is Idaho's dominant source supplying 84 percent of the total electricity produced in the state. Only 10.2 percent comes from **fossil fuels** of which 9.6 percent comes from natural gas. There are no utility oil-fired or coal-fired power plants in Idaho [33]. The little coal-fired generation the state does have (0.6 percent) is self-produced for owner consumption. Idaho also produces 5.3 percent of its total in-state production of electricity from **non-hydro renewable** sources. This includes 4 percent from biomass and 1.3 percent from wind power (Energy Information Administration, 2008c). There are several wind projects that are in different stages of development which may increase the percentage of wind. Idaho does have one operating geothermal power plant that began commercial operation in 2007 (not reflected in the graph), no commercial scale solar facilities and no **nuclear** power plants. However, during the last three years, there have been two companies that have been or are considering nuclear power plants in southwestern Idaho.

Figure 6: Total in-state electricity production by type in 2006

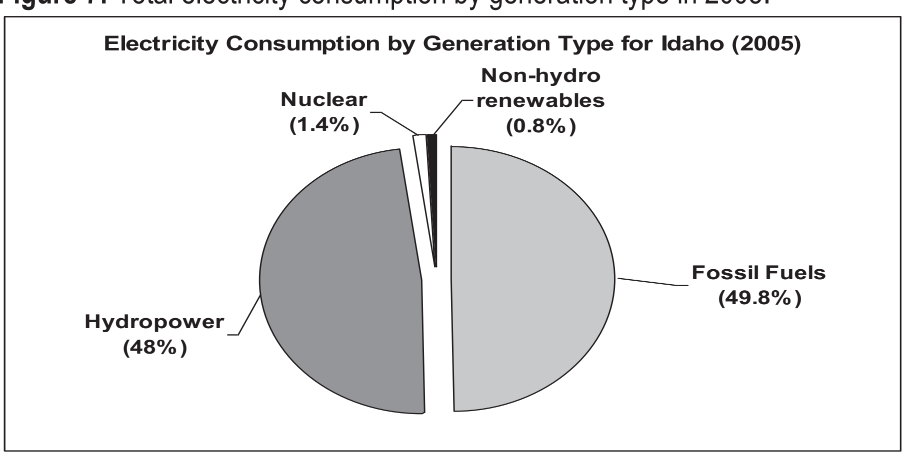


Note: Other category includes batteries, chemicals, hydrogen, pitch, purchased steam, sulfur, tires and miscellaneous technologies.
Sources: 16,20

Electricity Consumption

Although hydropower is by far the largest *production* source in the state, depending on the quality of the water year, Idahoan's *consume* as much or more from fossil fuel sources (49.8 percent), than from hydro-power (48 percent). This is because Idahoans must import more than half of their electricity which includes 42 percent from coal fired power plants, all located outside the state. An additional 8 percent comes from gas-fired power plants making up the remaining fossil fuel consumption. Idahoans do consume about 1.4 percent of their electricity produced from a nuclear power plant in south-central Washington 31 and only 0.8 percent from non-hydro renewable sources. **Sources:** 19,75,76

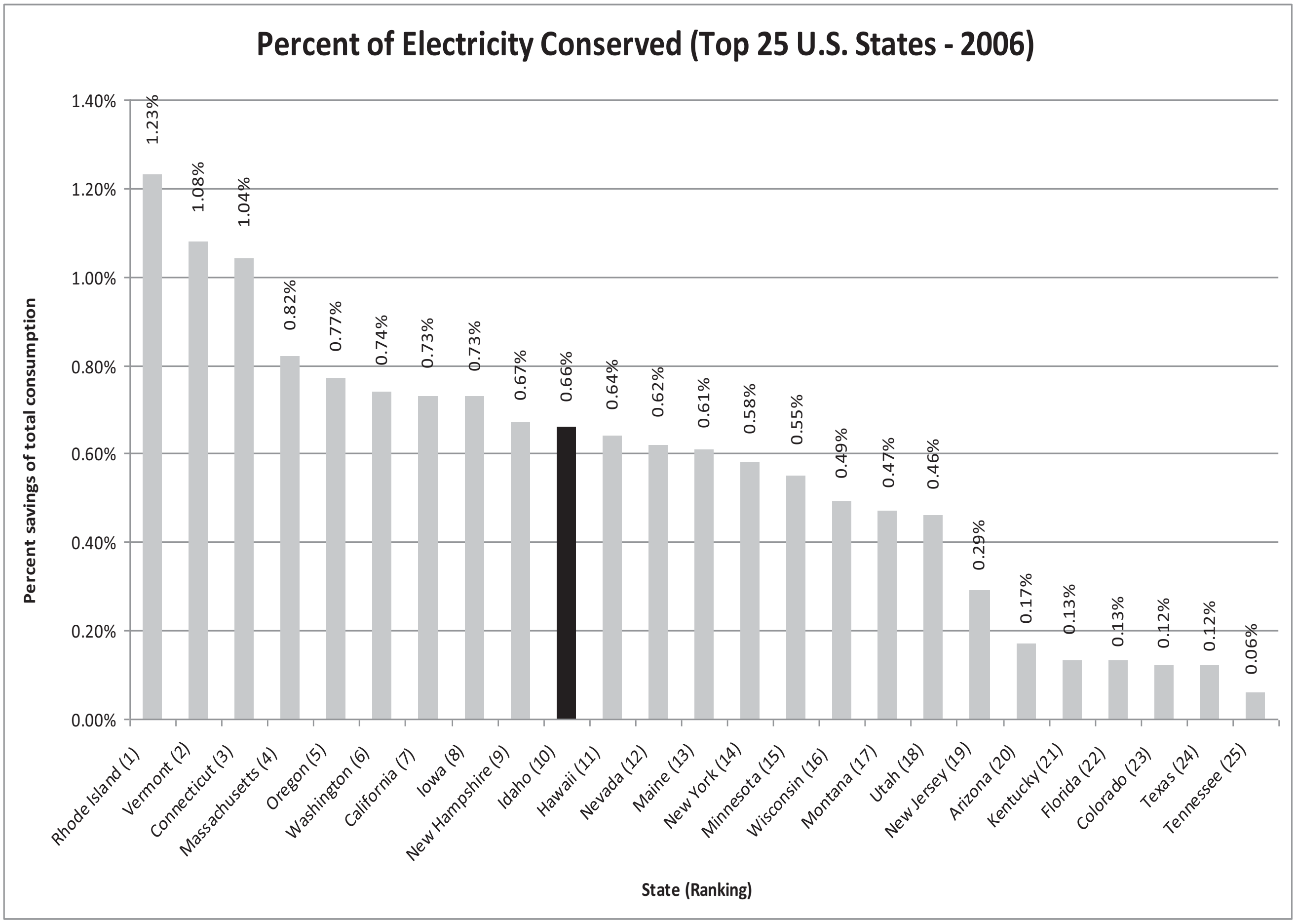
Figure 7: Total electricity consumption by generation type in 2005.



Source: 31

Another way the state and utilities have addressed electricity consumption is through conservation and efficiency measures. Most of Idaho's utilities plan for and invest in these measures and treat them as a resource to meet demand. Idaho's utilities saved approximately 151,000 MWh's or 0.66% of net total consumption in 2006 through energy conservation and efficiency measures (figure 8). For this period, Idaho ranked tenth compared to all other states.

Figure 8: State comparison of electricity conserved as a percent of total demand in 2006.



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Five Choices for Meeting Future Electricity Demand

Given the state's situation, Idahoans will need to make choices about how to handle future electricity demand growth. This study will explore five alternatives:

1. Energy Efficiency and Conservation
2. Fossil Fuels
3. Hydropower
4. Nuclear
5. Non-hydro Renewables

Energy Efficiency and Conservation

"Energy efficiency is the use of technology that requires less energy to perform the same function. Energy conservation is any behavior that results in the use of less energy" [13]. For example, a compact fluorescent light bulb (CFL) uses less energy than a regular incandescent bulb. They both produce the same amount of light, but the CFL is more ***efficient***. An example of energy ***conservation*** is when someone turns off the lights after leaving an empty room or turns the air-conditioner or furnace to a lower setting. Both result in less consumption of energy. ***Efficiency*** uses technology without sacrificing performance or comfort, while ***conservation*** requires us to be more careful in how energy is used so that less is wasted.

Electricity saved through energy conservation and efficiency can displace an equivalent amount of electricity that a utility would have to produce or buy from other utilities to meet demand.

There are two areas in the electricity system that energy conservation and efficiency can be implemented:

1. The supply-side.
2. The demand-side.

On the **supply-side**, utilities can upgrade their generation, transmission and distribution equipment. Better and newer equipment can make significant efficiency gains. Utilities can also make investments in the transmission and distribution system and find better ways to set up and run the grid. Electricity traveling down a wire suffers *line loss* caused by energy dissipating through the wire in the form of heat. From power plant to the customer, it is estimated that the United States loses approximately 10% of its total power through the electricity grid and the distribution system[47]. Placing generation sources closer to where the electricity is used can lessen line loss. This allows utilities to meet more demand with the same amount of generation capacity.

On the **demand-side,** consumers can implement conservation and efficiency measures solely as a desire to reduce their utility bills. Most often, demand-side measures are motivated by government policies or through a utility program. There are two types of programs or policies.

1. *Conservation programs and policies.* These are aimed at reducing the energy required to accomplish a task. For example, utility conservation programs may subsidize (assist with a money contribution) efficiency measures such as water heater blankets, energy- efficient light bulbs, and appliances for their customers. These subsidies are usually funded by the rates utilities are allowed to charge, usually

approved by the Public Utilities Commission. An example of a conservation policy might be a tax credits passed by the state or federal government for making energy-efficient purchases (i.e., Energy Star appliances, insulation, etc.).

2. *Demand response programs and policies.* The goal is to reduce electricity demand during periods when electricity use is high (peak morning and evening hours) to keep the utility from having to use more expensive sources of electricity. These do not necessarily reduce overall usage. One example of a program is to employ devices that utilities can use to remotely shut off energy intensive equipment such as air conditioners and industrial motors. Customers may receive a benefit by allowing their utility to call upon these devices when they are needed. The Public Utilities Commission or state legislature can also develop a policy mandating a variety of rate-making mechanisms, such as Time-of-Use (TOU) rates, which encourages customers to use electricity when the cost of producing that electricity is least expensive during off-peak hours.

Advantages of Energy Conservation and Efficiency:

- **Fewer emissions:** By reducing carbon-emitting generating resources, fewer greenhouse gases and other pollutants are emitted into the atmosphere, reducing pollution.
- **Quickest to implement:** Conservation changes in households and business are the most simple to implement of the five alternatives discussed in this document.
- **Reduction on bills:** Energy- efficient products and energy conservation reduce the amount of energy used, thus reducing bills. Home upgrades can help reduce 25 to 30 percent of the costs; however, this reduction can be as high as 50 to 60 percent.
- **Sustainable use of resources:** With less than 5 percent of the population in the world, the U.S. uses 25 percent of the world's energy resources. Conservation and efficiency can encourage the smart use of our energy resources, and there can be a decrease on the reliance of imports for fossil fuels.
- **Incentives for implementation:** Incentives are available through utility programs and tax code to partially offset up-front investment by consumers.
- **Total cost:** Energy conservation and efficiency has the lowest levelized cost of all options discussed. On average, a utility can displace the same amount of new generation capacity for about half the cost.
- **Independent of fuel supply and cost:** Energy conservation and efficiency is not affected by fuel availability or price volatility.
- **Other benefits:** Implementing energy efficiency can provide jobs in manufacturing, construction, energy auditing, and installation.

Sources: 13,25,29,35,41,43,48,51

Disadvantages of Energy Conservation and Efficiency**:**

- **Up-front costs:** Even though energy efficiency modifications may pay for themselves over time, consumers may not have sufficient funds to cover the up-front costs of improvements. The initial costs for energy efficient appliances or products could be a limiting factor for consumers.
- **Hazardous materials in some energy efficient devices:** Compact fluorescent light bulbs contain a small amount of mercury. Even though CFLs use less power and have a longer life, people may feel reluctant to changing their incandescent light bulbs to CFLs due to worries about disposal, potential air and water contamination or the unavailability of recycling facilities.
- **Increased indoor air pollution:** As air leaks are decreased in buildings, there is less air movement in and out to the environment. Therefore, there is increased accumulation of gases within buildings, including carbon dioxide (from natural gas combustion), radon and off-gasing of carpets and cleaning solvents.

- **Uncertainty:** Voluntary actions by a large number of people are needed to obtain significant outcomes. In the case of energy efficiency and conservation, electricity consumers may not replace appliances for more efficient ones until their current appliances have reached the end of their useful life. In the case of demand response programs, a utility is relying on customer's actions to reduce load as opposed to increasing generation at a power plant that is operated by the utility.

Sources: 48,76,77,78

<u>Research and Development Opportunities for Energy Conservation and Efficiency:</u>
Increasing the adoption rates of energy conservation and efficiency measures by electricity consumers is one of the biggest opportunities for improvement. Significant improvements are needed in the technology of devices that use electricity; but there are already a number of energy efficient replacements available on the market. It is ultimately up to the consumer to turn off lights when not in use or replace electrical devices with more efficient ones. This problem is inherently a social one, dependent on attitudes, knowledge, and behavior.

Examples of research that could help policymakers and utilities improve consumer adoption rates include: 1.) investigation of innovative alternatives that could motivate the public to adopt energy conservation and efficiency measures; 2.) analysis of alternatives to find those most accepted by stakeholders and members of the public; and 3.) development of policy decision-making processes and education that build public and stakeholder commitment. Research in this area is relatively inexpensive compared to technology-based research, and the effect of some improvements could be felt almost immediately.

Fossil Fuel Electricity Generation

Fossil fuel generation uses coal, oil or natural gas resources to create electricity. Fossil fuels are non-renewable sources of energy found beneath the Earth. Exploration, drilling, extraction and refining are necessary processes to obtain usable fossil fuels. Once fossil fuels are obtained, they are usually transported to power plants by ships, trucks, trains, oil tankers or pipelines. In the case of coal power for Idaho, several power plants are located at the mine site (out of state) and the electricity is transmitted through power lines into Idaho. When they are burned, fossil fuels usually heat water which produces steam, and the steam turns turbines that drive generators that produce electricity. **Sources:** 2,5,9,12,17,26,27,28,33

<u>Advantages of Fossil Fuels:</u>
- **Easy transportation:** Natural gas is transported to power stations relatively easily using existing pipelines. Natural gas is currently imported into the state through pipelines from Alberta, Canada and from southeast of the state.
- **Significant generation of electricity:** A single power station that burns coal or natural gas can produce large amounts of electricity.
- **Consistent supply of energy:** Fossil fuels are a controllable and predictable source of base-load electricity and can be used to integrate intermittent renewable resources. The U.S. has a 200-250 year supply of coal.
- **Flexibility:** Natural gas can be used for base load, intermediate, or peak power.
- **Total cost:** Current levelized cost of coal-fired and non-peaking gas fired generation are on par with other forms of base-load generation such as nuclear and hydropower.

- **Capital cost:** Initial capital investment cost ($575-$1,550/kW) for natural gas plants are relatively low.
- **Other Benefits:** Construction of plants and ongoing operation can increase jobs and the state and local tax base. Excess heat can be used as process heat for other applications beside electricity generation.

Sources: 19,46,76

Disadvantages of Fossil Fuels:

- **Lack of Availability**: There are no commercially viable deposits of oil, natural gas, or coal in Idaho, although there are sources in surrounding states.
- **Total cost:** The levelized cost of natural gas fired generation used to meet peaks is the most expensive source of electricity but is necessary to balance variation in the system. Cost of coal will likely increase dramatically with legislation to limit carbon.
- **Capital cost**: Initial capital investment cost ($2,550-$5,350/kW) for coal plants are moderate to moderately high.
- **Fossil fuels are non-renewable resources:** Reserves of fossil fuels vary. There are still reserves of 200 to 250 years for coal in the United States; however, the availability of natural gas is much less certain. Once resources in an area are exhausted, different areas need to be drilled or mined in order to satisfy current demand. If known fossil fuel reserves diminish and demand remains high, prices will increase.
- **Emission of pollutants and greenhouse gases:** The process of combusting fossil fuels produces harmful emission, including carbon dioxide and sulfur dioxide. These contribute to environmental problems such as acid rain and climate change. Burning coal produces the largest amount of emissions per MWh produced for electricity generation, and is also associated with mercury emissions and contamination. In contrast, the combustion of natural gas produces the lowest amount of emissions for production of electricity from a fossil fuel.
- **Area requirements:** With the exception of natural gas plants, which are relatively small and can be placed in urban areas, large coal-fired power plants require up to four square kilometers of land. Surface mining disturbs larger areas than underground mining. Wildlife and plant habitats can be destroyed.
- **Responsiveness and leadtime:** Timeframe for siting large fossil fuel power plants can be lengthy (especially coal) due to environmental permitting, and NIMBY (not in my backyard) issues
- **Undesirable presence:** Power generating plants are aesthetically displeasing and their establishment in areas close to neighborhoods is unwelcome. Gas can be highly explosive and must be handled properly.
- **Consumption of water and potential contamination:** Power plants often consume large amounts of water for steam production and cooling. Large quantities of water are used to remove coal impurities and the overall mining process can contaminate water. Aquatic life can be affected from all processes. In addition, drilling can cause contamination of underground water and runoff can affect surface waters.
- **Mining and extraction impacts:** The processes of drilling and extraction can leave harmful waste products. Solid waste (i.e., wastewater sludge, residues not completely burned, ash) and waste-water can contain high levels of contaminants. Drilling processes can contaminate ground and surface water. The only fossil-fired source that does not produce substantial amount of solid waste is natural gas.

Sources: 26,27,28,46,70,71,72,73

Research and Development Opportunities for Fossil Fuels:

In the United States, the building of fossil fuel electricity generation plants (especially coal) has slowed considerably given local opposition and the likelihood of legislation that may increase the cost of burning fossil fuels. Methods to capture and store gases that potentially warm the atmosphere from fossil fuel emissions present the most opportunity. There are a number of efforts under way to study how to capture and store carbon, but researchers are a number of years from making it commercially viable, even if there is sufficient funding (see Appendix II; Table 9).

Hydropower Electricity Generation

Hydropower uses natural or artificial water flow to create electricity. Electricity is generated when moving or falling water turns blades in a turbine, spins a generator, and produces electricity. When water is stored in a reservoir, it can be released to create electricity when demand is high[15]. Hydroelectricity plants can be large or small. Rivers with a high flow, or with a high drop, produce a large amount of energy.

Advantages of Hydropower:

- **Large amount of developed capacity:** Idaho has a significant amount of developed capacity of hydroelectric resources providing a predictable and controllable source of base-load electricity.
- **Low electricity rates:** Rates from hydro power are low because very high capital costs can be spread across a long useful life (50 years) of the asset and there are no fuel costs. Idaho's hydroelectric facilities have fully amortized capital costs.
- **No greenhouse gas emissions.** Operating a hydropower plant emits no greenhouse gases.
- **Time-tested technology:** Hydro technology has been proven and time-tested. Engineers can control the flow of water through turbines to produce electricity so long as they comply with other operating constraints for water rights, flood control, fish flows, recreation, transportation, etc.
- **Total Cost:** Hydropower has no fuel cost and Idaho's existing facilities have fully amortized capital costs.
- **Other benefits**: Impoundment hydropower creates reservoirs, providing recreational opportunities, but can change the natural landscape. Dams also help with water supply, irrigation and flood control. The construction of hydropower plants and their ongoing operation can increase jobs and the state and local tax base.

Sources: [66]

Disadvantages of Hydropower:

- **Disruption of fish migration:** Salmon and other salmonids need to swim to the ocean and then return to their spawning grounds. Encountering impoundments/dams affects their migration and fish populations can decrease. Pressure changes, turbulence, and other types of stress from turbine passage or fish ladders may cause fish to get disoriented and may cause injury or death.
- **Dependence on water flows:** Dams depend on seasonal flows of water. In Idaho, water for hydropower largely comes from snowpack, which varies yearly. If there is a winter drought, hydropower plants may have to operate at reduced capacity. Early spring run-off may need to be "spilled" from dams without producing electricity to prevent flooding. A slow, late spring runoff scenario helps create more water for electricity generation, especially during seasonally-high demand periods.
- **Impact on local natural environment:** Hydropower facilities compete with other land uses. Natural sites could be affected and cause an impact on wildlife and plant habitat. Historical sites and local cultures could also be affected. The magnitude of the effect depends on the type of hydroelectric plant. Large hydroelectric plants with dams and reservoirs have large land use impacts while run-of-river plants have much smaller impacts.
- **Impact to the aesthetics of the area:** Dam and reservoirs change natural landscape (i.e., flowing rivers). Impact is much lower from run-of-river power plants.

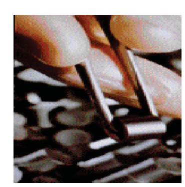
- **Impact on water quality and flow:** Water in the reservoir is stagnant compared to a free-flowing river. Water-borne sediments and nutrients can be trapped, resulting in the undesirable growth and spread of algae and aquatic weeds". Low dissolved-oxygen downstream of the dam can be harmful to riverbank habitats.
- **Lack of location for new dam construction:** There are few potential sites for additional large-scale hydropower dams. The best locations have already been used and other potential locations are problematic due to the large amounts of land flooded for reservoirs. Further expansion is limited to the conversion of existing dams without generating capacity, the addition of more efficient turbines and/or generators to existing hydropower facilities, and the use of small sites with limited electricity capacity. There are other technologies that do not require large dams and impoundments (i.e., run-of-river plants).
- **Economic dislocation:** Dam could displace existing economic benefits (i.e., agriculture, white water rafting, etc.).
- **Catastrophic dam failure:** There is a small risk of dam failure causing potential property damage or even loss of life (e.g. Teton Dam disaster, 1976)

Sources: 23,66,69,76

Research and Development Opportunities for Hydropower:
The biggest area of opportunity for hydropower-generated electricity is to eliminate or lessen the effect of dams on salmon migration and survival. Dams impede migration by blocking passage and by affecting water temperature and water quality, which impact migrating fish. A combination of solutions have been tried on many dams in the Columbia River System, including fish ladders and elevators, trapping and transporting fish around dams by truck, diverting fish away from turbines, installing fish-friendly turbines and increasing flow by releasing water to flush juvenile salmon downstream. Research is helping to improve these measures and determine effectiveness (see Appendix II; Table 9).

Nuclear Power Electricity Generation

Nuclear power uses uranium to create electricity. "Nuclear energy is energy in the nucleus (core) of an atom. Atoms are tiny particles that make up every object in the universe. There is enormous energy in the bonds that hold atoms together"[11]. Nuclear energy needs to be released from the atoms to produce electricity. Energy is released by a process called fission, where atoms are split apart to form smaller atoms[11].



Uranium is the fuel normally used to produce the nuclear reaction. It is a non-renewable element found in rocks. "Nuclear plants use a certain kind of uranium, U-235, as fuel because its atoms are easily split apart"[11]. Mining, extraction and processing (including enrichment) are necessary to obtain uranium in order to use it as fuel for nuclear electricity generation [11]. Processing produces one-half inch-sized fuel pellets that are stacked into fuel rods.

Fuel assemblies are located in the center of reactors at a nuclear power plant. The fission process produces heat that makes water boil to produce steam. This steam turns turbines that drive generators to produce electricity. At a cooling tower, the steam is turned back into water for re-use[11]. As nuclear fuel is used, radioactive waste accumulates, which slows the reaction process to the point that the fuel rods are no longer useful for producing electricity and need to be disposed and replaced.

Advantages of Nuclear:

- **Amount of energy:** The fission process allows for a large amount of energy to be released from a small amount of fuel. One pellet contains "the same amount of energy as 150 gallons of oil"[11].
- **Efficiency:** Large amount of electricity can be generated with a small amount of fuel. Existing nuclear plants operate at more than 90 percent capacity on average (Nuclear Energy Institute, 2007).
- **Highly reliable:** The United States gets about 20 percent of its electricity from nuclear power providing a reliable source of base-load power. The U.S. has 104 operating nuclear power plants.
- **No greenhouse gas emissions:** Operating a nuclear power facility emits no greenhouse gases.
- **Fuel transportation cost:** Because the amount of fuel needed to generate a large amount of electricity is very small, transportation cost of fuel is relatively low.
- **Total Cost**: Nuclear power is on par with other base-load forms of electricity generation such as coal and natural gas due to low fuel associated cost and plant efficiency.
- **Regulatory structure**: The U.S. Nuclear Regulatory Commission (NRC) regulates commercial nuclear power plants and other uses of nuclear materials through licensing and inspection. Nuclear power plants must pay into trust funds that will be used to decommission plants when their useful operating life is over and must pay a surcharge on fuel to offset disposal costs.
- **Other benefits**: The construction of nuclear plants and their ongoing operation can increase jobs and the state and local tax base. Excess heat can be used as process heat for other applications beside electricity generation.

Sources: [1,11,46,64]

Disadvantages of Nuclear:

- **Costly regulation:** The NRC enforces federal laws for operating nuclear power plants. These regulations increase cost, e.g., nuclear plants are forced to set aside funds for waste disposal and decommissioning of power plants when they stop operation. Other forms of power do not have to do these things.
- **Capital costs:** Technology and scale of plants require extremely high construction costs. Nuclear power requires the highest initial capital investment cost ($5750 to $7550 per kW) of all the electricity options discussed.
- **Storage of radioactive waste:** The most hazardous radioactive waste remains toxic for a very long time and is more than 10,000 times more toxic than the natural uranium ore that was mined to make the original fuel. There is currently no long term disposal or storage solution for radioactive waste.
- **Water use:** Nuclear power plants, like fossil fuel plants, require consumption of water. The amount of water needed depends on how efficient the plant is; however, the numbers are quite similar among all thermal power plants.
- **Connections to nuclear weapons**: Nuclear energy has been perceived as connected or related to the fabrication of nuclear weapons. However, uranium used as fuel (fresh or used) cannot be used in nuclear weapons, which requires highly-enriched weapons-grade uranium. All nuclear materials, weapon material and existing weapons are guarded worldwide. The U.S. operates on a "once-through" process and does not recycle fuel because of cost and nuclear weapons proliferation concerns.
- **Responsiveness and lead time:** The length of time to obtain a license and to construct a nuclear power plant is highly uncertain and can range from 6 to 10 years, although new licensing processes are expected to reduce the length of time.
- **Area requirements:** Nuclear power generating plants require up to four square kilometers of land, slightly larger than coal or natural gas, but immensely smaller than wind or hydroelectric dams for the same amount of energy produced. Beyond this space, the Nuclear Regulatory Commission requires an area with relatively low population, which can be evacuated if needed.

- **Mining and extraction impacts:** Improper mining and extraction of uranium can contaminate local water supplies and can be a threat to worker health and safety.
- **Undesirable presence:** Power generating plants are aesthetically displeasing and their establishment in areas close to neighborhoods is unwelcome.
- **Perception of safety**: There is a public perception of insecurity regarding the potential for accidents or terrorist attacks U.S. nuclear power plants have an excellent safety record. The only major commercial power plant accident in 1979 was at Three Mile Island in Pennsylvania. This accident raised questions about adverse effects from radiation. However, after an extensive investigation, results showed that "in spite of serious damage to the reactor, most of the radiation was contained and that the actual release had negligible effects on the physical health of individuals or the environment" [74]. Control and operating training has been implemented in nuclear power plants to avoid potential accidents. In addition, this accident led to the establishment of the Institute of Nuclear Power Operations, through which the nuclear industry shares information on operational best practices.
- **Perceptions of trust**: There is an inherent lack of trust perpetuated by a legacy of secrecy and lack of transparency from Cold War era weapons programs.

Sources: 46,74,76,77,78,80,81

Research and Development Opportunities for Nuclear:
Perhaps the most common concern about nuclear power is radioactive waste. When nuclear fuel comes out of a nuclear power plant, it is over ten thousand times more toxic than the natural uranium ore that was mined to make the original fuel. If all the used nuclear fuel is disposed, it remains more toxic than uranium ore for almost a million years.

There are two approaches to deal with this waste, *direct disposal* or *recycle*. *Direct disposal* requires a geologic repository to isolate the material from air, land, and water. The U.S. does operate an underground repository located in several hundred million year old salt beds dedicated for government use. Disposal of U.S. commercial nuclear power used fuel is planned for Yucca Mountain, Nevada. Although a license application to construct the Yucca Mountain facility was submitted last summer, there is no guarantee the license will be granted or the repository built. If a license is ever granted, the Yucca Mountain geologic repository would be filled with the waste that that would exist at the time the repository opened and additional sites would be needed.

A *recycling* approach removes material useful as fuel from residual waste. The residual waste, less toxic than uranium ore in 1000 years, must still be disposed. The useful material is processed back into fuel to generate nuclear power. Other countries with the largest nuclear power programs (France, Japan, Russia) recycle used nuclear fuel. The U.S. recycle research program aims at recycling the used fuel in such a way as to achieve better waste savings with less concern about nuclear weapon production. (see Appendix II; Table 9).

Non-Hydro Renewable Electricity Generation

In this study, we will consider three non-hydro renewable energy sources to generate electricity:

1. Solar,
2. Geothermal,
3. Wind.

Solar electricity generation uses the light and radiant heat from the sun. A photovoltaic or solar cell is used to convert solar energy directly into electrical power. Solar thermal power plants produce electricity "when the heat from solar thermal collectors is used to heat a fluid which produces steam that is [then] used to power [a] generator"[18].

Geothermal electricity generation uses heat generated within the earth. This heat could be found "in the form of hot water, steam or rocks, near the surface of the earth's crust"[75]. Electricity is generated either by steam directly from a geothermal reservoir or from hot water from a geothermal reservoir (usually below the boiling point of water) that is used to heat a liquid with a lower boiling point used to turn a turbine generator. In this sense, geothermal is similar to coal, natural gas, oil, or nuclear power plants - gases are heated to turn a turbine.

Wind electricity generation uses wind to generate electricity. When the wind blows, it turns blades on a wind machine. The blades are connected to a hub and shaft that turns an electric generator to produce electricity. A typical wind machine stands as tall as a 20-story building and has three blades that span 200 feet. "The largest wind machines in the world have blades longer than a football field" [21]. Wind energy can be used to generate electricity and "the energy potential in the wind is expressed by wind power classes ranging from 1 (least energetic) to 7 (most energetic). "In general, wind regimes of Class 4 or higher are considered economically viable for utility-scale wind farms" [75].

<u>Solar Electricity Generation Advantages:</u>

- **Renewable source:** Solar electricity uses sunlight, which is free and a non-depleting resource.
- **No greenhouse gas emissions:** Operating a solar energy facility emits no greenhouse gases.
- **No additional requirements:** Solar energy does not require water or any other resources (other than maintenance) to generate electricity.
- **Scalability:** Solar PV plants can be built in increments depending upon need.
- **Availability:** The output from a solar generation facility typically ramps up in the morning, peaks in the afternoon, and drops off in the evening which matches a utility's load shape during high use summer months.
- **Other benefits:** Implementing solar can provide jobs in manufacturing, installation, and operations resulting in increased state and local tax base.

<u>Solar Electricity Generation Disadvantages</u>**:**

- **Capital and total costs:** Very high capital cost ($4500 to $6300 per kW) of solar panels makes solar energy one of most expensive forms of electricity on a levelized cost basis. Although as the technology to produce panels gets less expensive, with zero fuel costs, many experts believe that it will become more competitive with other forms of generation.
- **Variable energy output:** Energy production varies due to night time and changing sunlight levels.
- **Large area requirements:** Large surface areas are needed to install solar panels in order to produce useful amounts of electricity.
- **Site location:** Location of sites with significant resources may not be close to transmission lines, electricity users, or located on protected land.

Sources: 33,46

Geothermal Electricity Generation Advantages:

- **Renewable source:** The Earth's core is continuously producing heat, providing an unlimited source of heat.
- **Clean energy:** Geothermal fields produce about 17 percent of the carbon dioxide that a relatively clean natural-gas-fueled power plant produces, and very little of the nitrous oxide or sulfur-bearing gases. Binary plants, which are closed-cycle operations, release essentially no emissions. Energy can be extracted without burning a fossil fuel such as coal, gas or oil. There is no need to transport resources or have facilities to process them.
- **Reliable and non-variable:** Geothermal energy is always available. Geothermal power plants have average availabilities of 90 percent or higher, against 75 percent for coal plants. It is a base-load electricity resource.
- **Scalability:** Facilities can be built in increments depending upon need.
- **Total cost:** Although initial capital costs are relatively expensive, high efficiency factors and zero fuel costs make geothermal electricity one of the most in-expensive forms of base-load power in terms of levelized cost.
- **Other benefits:** Implementing geothermal can provide jobs in manufacturing, installation, and operations resulting in increased state and local tax base.

Geothermal Electricity Generation Disadvantages**:**

- **Finding a suitable resource:** Finding a suitable geothermal resource for power generation is difficult. (Geothermal Energy Association, 2009). Investments of millions of dollars are required to confirm a commercially viable resource".
- **Capital costs:** Moderately high initial capital cost ($3000 and $4000 per kW) but has high efficiency and uptime.
- **Site location:** Location of sites with significant resources may not be close to transmission lines, electricity users, or located on protected land.

Sources: 30,33,46,77

Wind Electricity Generation Advantages**:**

- **Renewable source:** Wind generated electricity uses wind, which is a free and non-depleting resource.
- **Total cost:** "Wind energy is one of the lowest-priced renewable energy technologies available today, costing between $0.04 and $0.06 cents per kWh," where a high quality wind resource is available[67].
- **No additional requirements:** Wind energy does not require water or any other resources (other than maintenance) to generate electricity.
- **No greenhouse gas emissions:** Operating a wind turbine emits no greenhouse gases.

- **Scalability:** Facilities can be built in increments depending upon need.
- **Other benefits:** Implementing wind can provide jobs in manufacturing, installation, and operations resulting in increased state and local tax base.

Wind Electricity Generation Disadvantages**:**

- **Capital cost:** Even though the cost of wind power has decreased ($1900 to $2500 per kW), the installation of this technology requires a high initial investment to get an equivalent amount of power due to the intermittency of wind.
- **Effect on wildlife:** Birds and bats could be harmed or killed by wind machines and sage grouse habitat could be affected.
- **Intermittency of wind:** The wind does not blow all the time. Both can vary significantly or may not be available when power is needed. Wind energy is most available at night rather than when power is most needed during the day. Intermittency is problematic for utilities as other resources must be available on short notice if the wind suddenly stops blowing.
- **Area requirements:** Wind farms can have a large footprint since turbines need to be spaced far enough apart so that the turbulence produced does not affect other turbines. However, the space between the turbines can be used for other purposes, such as growing crops or as cattle range.
- **Undesirable presence:** Wind machines can be unwelcome due to visual impacts and noise produced by rotor blades. “Wind resource development may compete with other uses of the land,” which can be more valued than electricity generation[23].
- **Site location:** Location of sites with significant resources may not be close to transmission lines, electricity users, or located on protected land.

Sources: [33,46,77]

Research and Development Opportunities for Non-hydro Renewable Electricity Generation:

One of the largest research and development opportunities for non-hydro renewable energy is the intermittent nature of wind and sun. Two areas of research could solve this problem. One potential solution could be the development of large batteries, which could store energy when it is being generated and release it onto the grid when needed. Battery technology of this size and scale doesn’t exist. Even if these batteries were available, it could increase the cost of electricity, possibly significantly. Research to develop this type of battery technology will likely take years. Other potential solutions include pumped storage and the development of better forecasting tools.

Another method is to build enough geographically dispersed wind turbines and solar resources and connect them by a “smart grid” so that the electricity could be moved to wherever it is needed. Most of this technology is available, but there are opportunities to make it more affordable, to develop policies that standardize grid technology and to encourage utilities to make investments. The initial investment to create a national *smart grid* could run in the hundreds of billions of dollars (see Appendix II; Table 9).

Important Factors to Consider

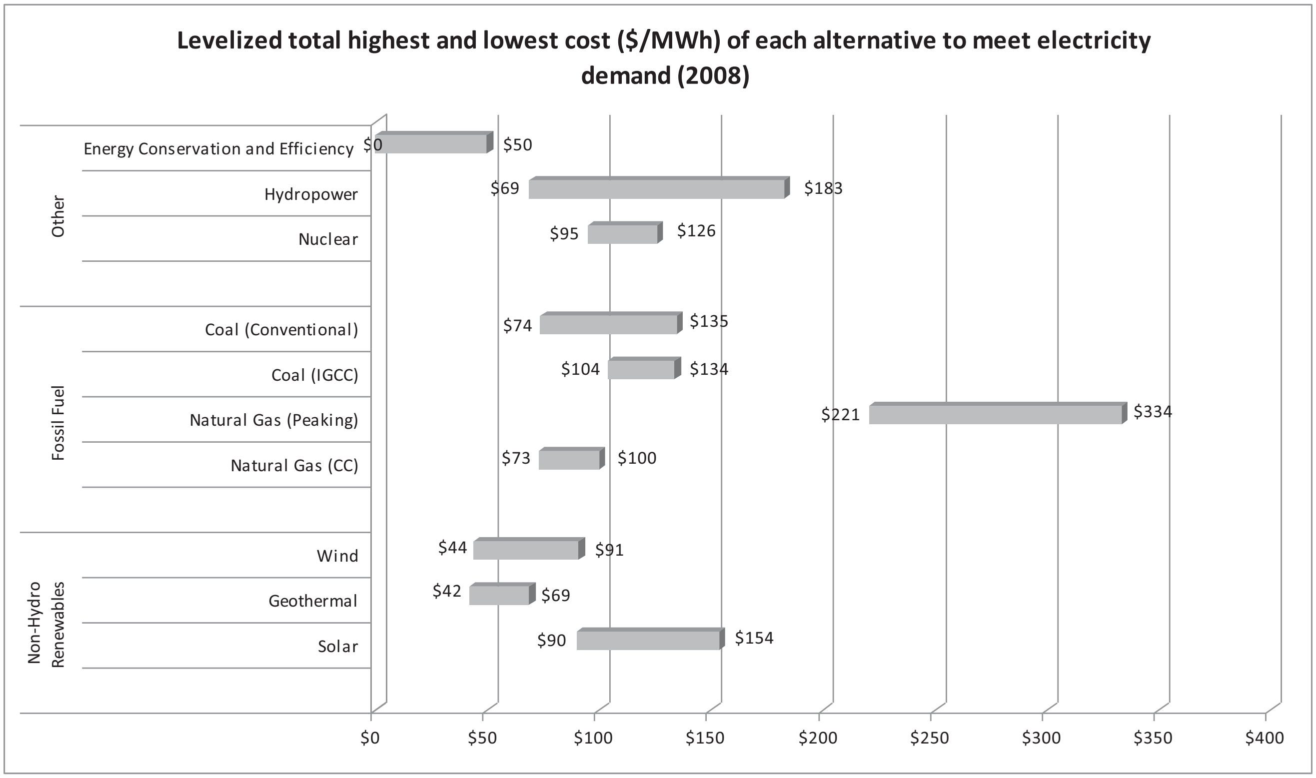
There are a number of factors to consider when choosing different alternatives for meeting electricity demand. For simplicity, a set of categories have been developed that covers many of the important factors. Some are fairly objective (such as *cost*) while others are more subjective (such as *trust* or *harm to aesthetics*). Tables 1 through 8 in the Appendix I compare the advantages and disadvantages of each electricity alternative for the 8 different factors below.

- **Safety and Security**: No personal harm, property damage or accidents as a direct result of human actions or naturally occurring events (See Appendix I; Table 1).
- **Reliability and Predictability:** The ability of an electricity option to perform consistently and maintain its functions both short-term and long-term and under normal and unexpected circumstances (See Appendix I; Table 2).
- **Trust:** An expectation that an electricity industry or regulating body will fulfill policies, ethical codes, laws and previous promises (See Appendix I; Table 3).
- **Harm to the Environment:** Harm to air, land, water, wildlife or other natural resources (See Appendix I; Table 4).
- **Cost:** Negative impact on taxes, government subsidies, bills paid directly to utilities by consumers, private investment, and/or reduction in property values (See Appendix I; Table 5).
- **Responsiveness and Adaptability:** Time to construct or add to electricity generation facilities; or ease with which an electricity option can change in order to meet temporary or permanent growth or reduction in electricity demand (See Appendix I; Table 6).
- **Harm to Aesthetics:** Negative impact on the way that something looks, sounds, smells (See Appendix I; Table 6).
- **Benefits:** Additional advantages and value resulting from a particular electricity option beyond the primary benefit of meeting electricity demand (See Appendix I; Table 7).

Economics

The definition of cost in the previous section is all encompassing and can be difficult to quantify for comparison. One proven method to get some measure of comparison is to develop a levelized cost for the different alternatives for meeting electricity demand. It incorporates all operational costs (fuel, operations, and maintenance), as well as the upfront costs like capital costs distributed over every megawatt-hour (MWh) of electricity the generation source would produce or the efficiency measure would save over a fixed period (20 years). Although not entirely accurate, it can give some indication of what might happen to customer rates if a particular alternative is chosen over another that is equal in capacity. This is especially true in a regulated environment like most of Idaho, where cost is one of the factors used to determine consumer rates. Figure 9 illustrates a levelized cost for all of the alternatives under consideration in this study. A range of high and low costs are given to reflect differences in the size of facilities, differences in technology, and differences in fuel prices within each category.

Figure 9: Levelized total cost ($/MWh) for each alternative to meet electricity demand (2008)



Sources: 46,84

Notes:

1. Required debt, equity return, capital structure, and economic life were held constant.
2. Investment cost, capacity factors, operating costs, fuel costs and federal tax incentives were differentiated as appropriate for each technology.
3. Renewable energy credits or carbon emission offsets and transmission costs were not considered.
4. Levelized cost for hydropower includes both small and conventional hydropower.
5. Integrated Gas Combined Cycle (IGCC) may allow for the capture of carbon dioxide if the technology is ever developed.
6. Peaking plants are only run during high demand periods of the day and not built for efficiency. Low efficiency and sporadic use is reflected by a significantly higher levelized cost.

Appendix I

Table 1: Safety and Security (advantages and disadvantages)**:** No personal harm, property damage, or accidents as a direct result of human actions or naturally occurring events.

SAFETY AND SECURITY	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages					
Disadvantages	~ Energy-efficient innovations in homes could increase indoor pollution.	~ Improper mining and extraction can be a threat to worker health and safety. ~ **Natural gas:** Can be highly explosive if not handled properly.	~ Potential for release of radioactive material from sites. ~ Threat of loss or theft of nuclear material for terrorist use. ~ Connection to nuclear weapons. ~ Improper mining and extraction can be a threat to worker health and safety.	~ There is potential for catastrophic dam failure however the probability is very low due to time-tested technology.	

Appendix I

Table 2: Reliability and Predictability (advantages and disadvantages)**:** The ability of an electricity option to perform consistently and maintain its functions both short term and long term, under normal and unexpected circumstances.

RELIABILITY AND PREDICTABILITY	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages		~ No commercially viable deposits of oil, natural gas, or coal in Idaho ~ **Coal:** A reliable and predictable source of base load electricity. The U.S. has a 200-250 year supply of coal. A single plant can produce a large quantity of electricity ~ **Natural gas:** It is transported relatively easily using existing pipelines.	~ Significant amount of energy produced with small amount of fuel. ~ Predictable and controllable source of base-load electricity.	~ Significant generating and water storage capacity in Idaho. ~ Technology is proven and time-tested. ~ Predictable and controllable source of base-load electricity.	~ **Solar, wind and geothermal:** Use of renewable resources. ~ **Solar and wind:** No extra resources needed (i.e., fuel, water) ~ **Geothermal:** High availability of geothermal energy.
Disadvantages	~ Forecasted impact of conservation and efficiency measures are difficult to predict due to variability in consumer behavior.	~ Fossil fuels are non-renewable resources. ~ **Natural gas:** Supply of natural gas is variable due to competing uses causing wide price fluctuations.		~ Capacity is dependent on seasonal flow of water.	~ **Solar and wind:** Availability and intermittent nature of wind is problematic for meeting demand. ~ **Wind and geothermal:** Location of sites with significant resources may not be close to transmission lines, electricity users, or located on protected land.

Appendix I

Table 3: Trust (advantages and disadvantages)**:** An expectation that an electricity industry or regulating body will fulfill policies, ethical codes, laws, and previous promises.

TRUST	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages			~ The U.S. Nuclear Regulatory Commission (NRC) regulates commercial nuclear power plants and other uses of nuclear materials through licensing and inspection.		
Disadvantages			~ Legacy of secrecy and inherent lack of transparency from Cold War era weapons programs		

Appendix I

Table 4: Impact to the Environment (advantages and disadvantages)**:** Harm to air, land, water, wildlife, or other natural resources.

IMPACT TO THE ENVIRONMENT	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages	~ Reduction in emission of greenhouse gases. ~ Encourages wise and sustainable use of resources.		~ No greenhouse gas emissions. ~ Nuclear power plants pay into trust funds that will be used to decommission plants when their useful operating life is over	~ There is no emission of greenhouse gases.	~ **Solar, wind and geothermal:** There is minimal emission of greenhouse gases or other sources of pollution.
Disadvantages	~ Hazardous materials in some energy efficient devices (i.e., mercury in compact fluorescent light bulbs).	~ Combustion of fossil fuels generates significant amounts of green-house gasses and other air contaminants. ~ Power plants can consume large amounts of water for steam production and cooling. ~ Solid waste and waste water can be a toxic contaminant. ~ Improper mining and extraction of can contaminate air and local water supplies. ~ **Coal and oil:** Large land area may be required (up to 4 sq. km) for power generating plants.	~ Lack of a long-term viable option to dispose or store radioactive waste. ~ Large areas of land may be required for plants and to provide a safety buffer in case of a radioactive release. ~ Improper mining and extraction of uranium can contaminate the air and local water supplies. ~ Power plants can consume large amounts of water for steam production and cooling.	~ Disruption of fish migration. ~ Impoundments can take large amounts of land used by wildlife and other competing uses. ~ Impact on water quality and flow.	~ **Solar and wind:** Large land area is required to install solar panels and wind mills. ~ **Wind:** Mills could harm or kill birds.

Appendix I

Table 5: Costs (advantages and disadvantages)**:** Negative impact on taxes, government subsidies, bills paid directly to utilities by consumers, private investment, and/or reduction in property values.

COSTS	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages	~ Reduces consumer electricity bills by providing an inexpensive alternative to generation and by reducing usage. ~ On the average, can displace the same amount of new generation capacity for about half the cost. ~ Not dependent on cost of fuel.	~ **Coal:** Coal-fired power plants provide one of the cheapest sources of base-load electricity. This is partly an artifact that the plants are built and fully amortized. ~ **Natural Gas:** Low initial capital investment cost ($575-$1,550/kW) .required.	~ Total levelized cost of nuclear power is on par with other base-load forms of electricity generation such as coal and natural gas. ~ Because the amount of fuel needed to generate a large amount of electricity is very small, transportation cost of fuel is relatively low.	~ Hydropower has no fuel cost and existing dams have fully amortized capital costs giving Idaho one of the lowest average electricity rates in the country.	~ **Solar, wind and geothermal:** Free access to fuel source. ~ **Wind:** Incentive provided by government. Production Tax Credit is of $0.021/kWh. ~ **Wind and geothermal:** Low levelized total cost.
Disadvantages	~ Up front cost of conservation and efficiency measures can be a barrier to implementation.	~ Cost of burning fossil fuels, especially coal, may dramatically increase with future penalties on emission of carbon dioxide and other green-house gases. ~ **Coal:** Moderately high initial capital investment ($2,550-$5,350/kW) required.	~ Highest initial capital investment ($5,750 – 7,550/kW) required of all options ~ Highly regulated nature of nuclear plants can increase cost of operation including waste fuel disposal costs, plant de-commissioning costs, licensing costs, etc.		~ Moderate to high initial capital investment required. **Solar:** $4,500 - $6,300/kW **Wind:** $1,900 -$2,500/kW. **Geothermal:** $3,000 - $4,000/kW.

Appendix I

Table 6: Responsiveness and Adaptiveness (advantages and disadvantages)**:** Time to construct or add to electricity generation facilities; or ease with which an electricity option can change in order to meet temporary or permanent growth or reduction in electricity demand.

RESPONSIVENESS AND ADAPTIVENESS	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages	~ Conservation and efficiency measures are relatively quick to implement. ~ Utility and tax incentives available to partially offset consumer investment.	~ Natural gas can be used for based load, intermediate, or peak power.			~ **Solar, wind and geothermal:** Capacity is scalable, able to increase by adding incremental units relatively quickly.
Disadvantages	~ Limitations on results that can be achieved due to dependency on consumer behavior	~ Timeframe for siting large fossil fuel power plants can be lengthy (especially coal) due to environmental permitting, and NIMBY (not in my backyard) issues.	~ The length of time to obtain a license and construct a plant can range from 6 to 10 years.	~ Further expansion is limited to conversion of existing dams without generating capacity or to very small sites with limited electricity capacity.	~ **Geothermal:** Finding a suitable geothermal resource for power generation is difficult and can cost millions of dollars.

Table 7: Harm to Aesthetics (advantages and disadvantages)**:** Negative impact on the way that something looks, sounds, smells.

AESTHETICS	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages				~ Reservoirs provide recreational areas.	
Disadvantages		~ aesthetically displeasing and establishment in areas close to neighborhoods is unwelcome..	~ aesthetically displeasing and establishment in areas close to neighborhoods is unwelcome.	~ Dam and reservoirs change natural landscape (i.e., flowing rivers).	~ **Wind:** aesthetically displeasing and establishment in areas close to neighborhoods is unwelcome.

Appendix I

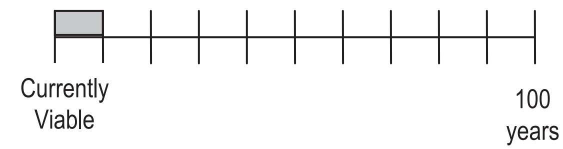
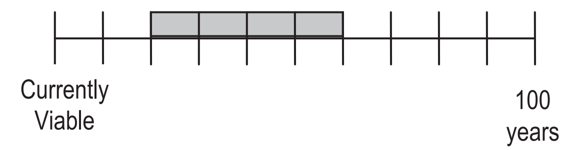
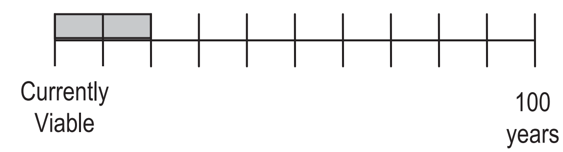
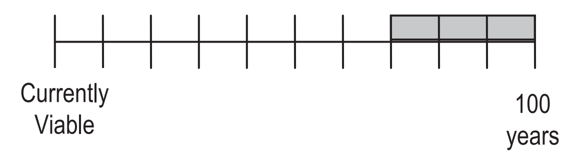
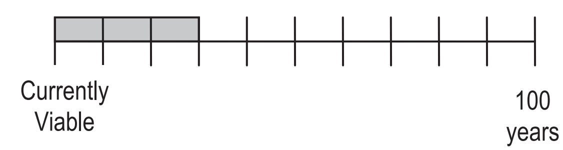
Table 8: Benefits (advantages and disadvantages)**:** Additional advantages and value resulting from a particular electricity option beyond the primary benefit of meeting electricity demand.

BENEFITS	Energy Conservation and Efficiency	Fossil Fuels	Nuclear	Hydropower	Renewable
Advantages	~ Installation of conservation and efficiency measures can increase jobs and state and local tax base.	~ Generates process heat for other applications beside electricity generation. ~ Construction of plants and ongoing operation can increase jobs and state and local tax base.	~ Generates process heat for other applications beside electricity generation. ~ Construction of plant and ongoing operation can increase jobs and state and local tax base.	~ Recreation opportunities can increase jobs and state and local tax base. ~ Dams help with water supply, irrigation and flood control.	~ **Solar, wind and geothermal:** Construction of plant and ongoing operation can increase jobs and state and local tax base.
Disadvantages				~ Dam could displace existing economic benefits (i.e., agriculture, white water rafting).	

Appendix II

This table summarizes a key research and development opportunity for each alternative that will help make it a viable for meeting future electricity demand. It summarizes the problem needing to be solved and if solved, the potential for improvement. Included is an indicator of the timeframe required for the improvement or technology to be commercially viable.

Table 9: Opportunities for Research and Development

Energy Alternative	Problem	Potential for Improvement	Time to Viability (opinion of expert panel)
Energy Conservation and Efficiency	**Low adoption rates of conservation and efficiency measures by consumers**	**In 2006, Idaho only conserved 0.66% of total consumption. The Northwest Power and Conservation Council's goal for western utilities is approximately 6% for 2013.**	
Fossil Fuel Electricity Generation	**Efficiently capturing and storing gases (CO_2) that potentially warm the atmosphere**	**If carbon can be captured and stored successfully from the emissions of burning coal, there is enough coal to supply current rates of consumption for approximately the next 200 years.**	
Hydropower Electricity Generation	**Dam's effects on salmon migration**	**Without removal of dams, salmon migration levels will never return to pre-dam levels, although mitigation measures could partially restore them**	
Nuclear Electricity Generation	**Lack of cost effective and secure method for radioactive waste disposal**	**If re-processing research is successful, Yucca Mountain would be the only waste repository needed this century.**	
Non-Hydro Renewable Electricity Generation	**Intermittency issues with wind and solar sources of electricity generation**	**Combinations of energy storage, smart grid technology, and diversity of sources could allow Idaho to supplement capacity using renewable sources.**	

2. Subject Matter Experts – Selection, Biographies and Related Materials

Subject Matter Expert Selection Criteria

Subject Matter Expert Selection Criteria Questions
July 2008

Primary References: Ehrmann & Stinson (1999), Gellar (2008), and Lavin (2007).

Questions to ask about the SME candidate's domain of expertise, knowledge, and validity of their methodology/process/approach:

1. How much knowledge does the SME candidate have of their discipline? Can the SME candidate:
    a. Explain something technical and complex?
    b. Set the stage factually, so the issues are in context?
    c. Get a matter before the public that would not otherwise get that far?
2. What method, process, or methodology does the SME candidate use to expand and verify (validate) their knowledge?
3. Would the SME candidates testimony pass the 5 rules of legal admissibility:
    a. Is the testimony testable through the scientific method?
    b. Has it been subjected to peer review or publication?
    c. Can the expert express the known or potential rate of error of the operation, in order to properly weigh the reliability of the process on which the testimony is based? (Does the expert know what weaknesses or holes there are in their research and/or their methodology?)
    d. Are there standards controlling the technique's (methodology's) operation?
    e. Is the technique/process/approach/methodology generally accepted in the relevant scientific community?
4. How did the SME candidate develop their expertise: formal education, on-the-job experience, or both?

Questions to ask about the SME candidate's credibility:

5. Would the participants perceive the SME candidate as trustworthy?
6. How well does the SME candidate project confidence and authority?
7. [Repeat] How did the SME candidate develop their expertise: formal education, on-the-job experience, or both?
8. Can the SME candidate make honest recommendations to the group without being bound to their organization or their superiors? Does the SME candidate have any conflicts of interest?
    - Can we detect, respond, and mitigate the possibility of the SME candidate having a hidden agenda (financial, political, or personal)?

Questions to ask about whether the SME candidate fits in the model of "SME as a teacher"?

9. Can the SME candidate provide multiple interpretations or perspectives in a balanced manner?
10. Does the SME candidate have the ability to show in a non-confrontational manner how a given interpretation, or way of thinking about some facts (i.e., framing) reveals certain implicit values (i.e., their ability to show how each perspective is grounded in a certain

set of values)

11. Does the SME candidate have the ability to be transparent (i.e., open and forthright) when expressing their personal values and biases.
12. Does the SME candidate use real-world language, not ivory-tower language? (Present information and answer questions clearly?)
13. Does the SME candidate give learning-focused presentations (not motivation-focused presentations)?
14. Can the SME candidate be open to many views and maintain impartiality? (Not focus on "selling" a single view?)
15. Does the SME candidate cite research to support points? (Reference primary sources as much as possible? Limit references to secondary sources?)
16. Does the SME candidate stick close to the data and support numbers with statistical tests when possible? (Does not exaggerate to sell – is conservative?)
17. Does the SME candidate contribute to civil and open dialogue? (Names those who don't agree, but does not engage in name-calling?)
18. Does the SME candidate share their knowledge with the participants and then identify which answers others give are correct?
19. Does the SME candidate facilitate the participants' learning:
    a. By interjecting comments where they know a fact that group would not?
    b. By helping others construct the content in their own minds (e.g., internalize and personalize it), rather than giving them cut and dried facts to memorize? [Doing this has the potential for each person to come away with a slightly different perspective on how the information fits into the world. This kind of diversity can aid in coming up with novel solutions, especially when multiple solutions of this nature are combined through the coordinated collaborative effort of the group.]

Question to ask about the "intangible" qualities and abilities of the SME candidates:

20. Does the SME candidate possess a familiarity with the current situation and a background in similar situations, which, through critical thinking and inference, draw upon this familiarity to make better judgment calls in the current situation?
21. How adept is the SME candidate at responding to unscripted questions?

Other questions to ask:

22. Will the SME candidate willingly follow the expectations and "ground rules" we establish? (Be a team player)?
23. Is the SME candidate available?

References:

Ehrman, J. R., & Stinson, B. L. (1999). Joint Fact Finding and the Use of Technical Experts. In *The Consensus Building Handbook.* Edited by L. Susskind, S. McKearnan, and J. Thomas-Larmer. Thousand Oaks, CA: Sage Publications, Inc., pp. 375-399.

Gellar, E.S. (2008). *Leading people-based safety: Enriching your culture.* Virginia Beach, VA: Coastal.

Lavin, R., Dreyfus, M., Slepski, L., Kasper, C. (2007). Said another way: subject matter experts: facts or fiction? Nursing Forum, 42 (4), 189-95.

Subject Matter Expert Selection Process – Recruiting & Selection

Subject Matter Expert Recruitment Letter

Dear :

I am writing to ask you if you are willing to participate as an expert speaker and panelist for one of my research projects. Your involvement in our study would be compensated with an honorarium.

I am part of a team of researchers from Boise State University, the Idaho National Laboratory (INL), Idaho State, and the University of Idaho, under the guidance and sponsorship of the Energy Policy Institute (EPI) and the Center of Advanced Energy Studies (CAES) has assembled a joint research team. We are conducting a study to understand how engaging the public in different ways affects their preferences and support for various electricity generating options. The study will draw a random sample of participants from a population within the Treasure Valley (i.e., the region around Boise, ID). Participants will take surveys prior to and directly after being subjected to different types of public discourse about various electricity generating alternatives, including: written briefing documents, oral presentations by experts, and deliberation with other citizens.

We are seeking balance, openness and inclusiveness in this social science research project. To that end, we are not just identifying colleagues and acquaintances to see if they will participate in our research. Since this is scientific research, and because EPI and CAES are our sponsors and our values are for balance, openness, and inclusiveness, if you agree to be considered, you will have to go through a vetting process, which includes but may not be limited to:

- Filling out a short self-assessment questionnaire
- Participating in an initial 45 minute interview phone call by the researchers

If you are selected as a speaker and panelist, you will also be required to:

- Participate in an afternoon of prerequisite training
- Co-author briefing documents on the issue of electricity generation that will be distributed to the participants
- Come to Boise State University to participate in the actual experiment (This will be an all day event)

Funding for the study is through resources under the discretion of the four institutions that make up CAES and EPI: Boise State University, the INL, Idaho State University, and the University of Idaho. None of the funding is directly from the United States Department of Energy or from corporate interests.

I have included an abstract and the slides from a presentation that one of my colleagues, Eileen deShazo, made at the 2008 Idaho Academy of Sciences Conference in case you want to know more about this research.

Please let me know whether you are interested by DATE. I, or someone from our research team, will be calling you in the next few days to follow up with you. If you know of some other experts who may be willing and available to participate, please provide their name(s) and contact information. If you have any questions, please feel free to contact me, or the following people:

Sheila Anderson
Department of Sociology,
Social Work & Criminal Justice

Jeffrey Joe
Human Factors, Instrumentation and Control Systems Department
Idaho National Laboratory

Subject Matter Expert Self-Assessment Form

Subject Matter Expert Self-Assessment Questionnaire

		(Yes, No)
	Are you able and willing to participate? You will receive an honorarium in the amount of $$ Participation includes, but may not be limited to: • Filling out this short self-assessment questionnaire • Participating in an initial 45 minute phone interview by the researchers If you are selected as a speaker and panelist, you will also be required to: • Co-author briefing documents on the issue of electricity generation that will be distributed to the participants • Participate in an afternoon of prerequisite training • Come to Boise State University to participate in the actual experiment (This will be an all day event)	

If yes, continue....If no ask question at bottom about other alternative experts.

		(1-low, 5-high)
Nuclear Power	How *technically knowledgeable* are you about nuclear power as an alternative for generating electricity?	
	How knowledgeable are you about the *social* impacts of nuclear power?	
	How knowledgeable are you about the *economic* impacts of nuclear power?	
	How knowledgeable are you about the *environmental* impacts of nuclear power?	
		(1-Con, 5 Pro)
	To what degree to you consider yourself to be either *in favor* or *against* nuclear	

	power?	

Fossil Fuels		(1-low, 5-high)
	How *technically knowledgeable* are you about fossil fuels as an alternative for generating electricity?	
	How knowledgeable are you about the *social* impacts of fossil fuels?	
	How knowledgeable are you about the *economic* impacts of fossil fuels?	
	How knowledgeable are you about the *environmental* impacts of fossil fuels?	
		(1-Con, 5 Pro)
	To what degree to you consider yourself to be either *in favor* or *against* fossil fuels?	

Conservation & Efficiency		(1-low, 5-high)
	How *technically knowledgeable* are you about conservation and efficiency?	
	How knowledgeable are you about the *social* impacts of conservation and efficiency?	
	How knowledgeable are you about the *economic* impacts of conservation and efficiency?	
	How knowledgeable are you about the *environmental* impacts of conservation and efficiency?	
		(1-Con, 5 Pro)
	To what degree to you consider yourself to be either *in favor* or *against* conservation and efficiency?	

Renewables[1]		(1-low, 5-high)
	How *technically knowledgeable* are you about renewables[1] as an alternative for generating electricity?	
	How knowledgeable are you about the *social* impacts of renewables?	
	How knowledgeable are you about the *economic* impacts of renewables?	
	How knowledgeable are you about the *environmental* impacts of renewables?	
		(1-Con, 5 Pro)
	To what degree to you consider yourself to be either *in favor* or *against* renewables?	

[1]For this research, renewables are defined as electricity produced using solar, wind, or geothermal energy

Hydro-power		(1-low, 5-high)
	How *technically knowledgeable* are you about hydropower as an alternative for generating electricity?	
	How knowledgeable are you about the *social* impacts of hydropower?	
	How knowledgeable are you about the *economic* impacts of hydropower?	
	How knowledgeable are you about the *environmental* impacts of hydropower?	
		(1-Con, 5 Pro)

	To what degree to you consider yourself to be either *in favor* or *against* hydropower?	

Are there other qualifications that you believe are relevant and want to mention?

Are there any other experts that you feel could serve as an alternate?

Do you have any comments or questions?

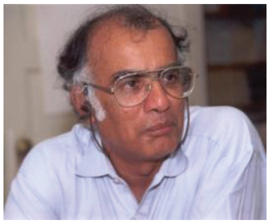
Subject Matter Experts Biographies

Ralph Bennett

Director –International and Regional Partnerships at the Idaho National Laboratory. With 18 successful years as a principal investigator, manager and director at Idaho National Laboratory, Dr. Bennett has a wealth of experience in international and regional circles around INL. He currently serves as technical director for the Generation IV International Forum (GIF), a collaborative of 10 leading nations developing advanced nuclear energy systems. He has also facilitated a number of laboratory initiatives with the Regional Development Alliance, Idaho universities and the state of Idaho.

Pat Ford

Executive Director – Save Our Wild Salmon. Pat has lived in Idaho from the age of two, but it was four years in New York City, at college, that made him an Idahoan. He has been a full-time conservationist since 1977, save for six years in the 1980s when he wrote about conservation, mostly for High Country News. He helped found the Save Our Wild Salmon Coalition in 1992, and has worked for it since. Pat has served on the boards of seven conservation organizations in Idaho, the Northern Rockies, and Northwest, but has been smart enough recently to reduce that to two. He lives in Boise, near his daughters Leigh and Annie, grandson Max and granddaughter Danica, and the mountains named and unnamed of central Idaho. Pat has made salmon the center of his work for 18 years because the creature and its connections to nature and culture instruct him in oh so many things. As Henri Fabre said a century ago about bees, salmon are a magic well: the more you know, the more there is to know.



Arjun Makhijani

President of the Institute for Energy and Environmental Research in Takoma Park, Maryland. He earned his Ph.D. from the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley in 1972, specializing in nuclear fusion.

A recognized authority on energy issues, Dr. Makhijani is the author and co-author of numerous reports and books on energy and environment related issues. He was the principal author of the first study of the energy efficiency potential of the US economy published in 1971. He is the author of *Carbon-Free and Nuclear-Free: A Roadmap for U.S. Energy Policy* (2007).

In 1989 he received The John Bartlow Martin Award for Public Interest Magazine Journalism of the Medill School of Journalism, Northwestern University, with Robert Alvarez; was awarded the Josephine Butler Nuclear Free Future Award in 2001 and the Jane Bagley Lehman Award of the Tides Foundation in 2008; and was named a Ploughshares Hero, by the Ploughshares Fund (2006). In 2007, he was elected a Fellow of the American Physical Society. He has many published articles in journals such as *The Bulletin of the Atomic Scientists* and *The Progressive*, as well as in newspapers, including the *Washington Post*.

Dr. Makhijani has testified before Congress, and has appeared on ABC World News Tonight, the CBS Evening News, CBS 60 Minutes, NPR, CNN, and BBC, among others. He has served as a consultant on energy issues to utilities, including the Tennessee Valley Authority, the Edison Electric Institute, the Lawrence Berkeley Laboratory, and several agencies of the United Nations.

Bob Nielson

Former manager of Renewable Energy & Power at the Idaho National Laboratory

Mr. Neilson is recently retired, but the former manager of Renewable Energy & Power at the Idaho National Laboratory (INL), providing oversight for R&D programs in bioenergy, geothermal energy, hydropower, wind power, and distributed energy systems. He is the Executive Director of the Academic Center for Excellence, Inc., an Associate Director of the Intermountain West Geothermal Consortium, and an adjunct faculty member for the University of Idaho. Mr. Neilson earned his B.E., Engineering Science, M.S., Materials Science, and M.S., Industrial Management, from the State University of New York at Stony Brook.

Marsha Smith

Idaho Public Utilities Commissioner. Marsha H. Smith is serving her fourth term on the commission. Her current term expires in January 2015. Smith, a Democrat, served as commission president from November 1991 to April 1995.

Commissioner Smith is the immediate past president of the National Association of Regulatory Utility Commissioners (NARUC), serves on the NARUC Board and Executive Committee and is a past chair of NARUC's Electricity Committee. She is an elected director of the Western Electricity Coordinating Council Board of Directors, co-chair of the National Action Plan for Energy Efficiency and co-chair of the Steering Committee of the Northern Tier Transmission Group. She represents Idaho on the Western Interconnection Regional Advisory Body and chaired the Western Interstate Energy Board's Committee for Regional Electric Power Cooperation from October 1999 to October 2005. She is a member of the National Council on Electricity Policy Steering Committee, the Harvard Electricity Policy Group, the Executive Committee of the Western Conference of Public Service Commissioners, the Idaho State Bar and board vice president of the Log Cabin Literary Center.

Smith received a bachelor of science degree in biology/education from Idaho State University, a master of library science degree from Brigham Young University and her law degree from the University of Washington.

Before her appointment to the commission, Commissioner Smith served as deputy attorney general in the business regulation/consumer affairs division of the Office of the Idaho Attorney General and as deputy attorney general for the Idaho Public Utilities Commission. She was the commission's director of Policy and External Affairs and chair of the NARUC Staff Subcommittee on Telecommunications.

A fourth-generation Idahoan, Commissioner Smith has two sons.

David Solan

Assistant Professor of Public Policy & Administration – Boise State University
Dr. David Solan specializes in energy policy and politics, and he performs research for the Center for Advanced Energy Studies' Energy Policy Institute.

Prior to BSU, Dr. Solan worked as a senior advisor at the US Environmental Protection Agency, reporting to the Deputy Administrator (COO) and the head of the Office of Research and Development on management and energy issues. He also served as an energy policy specialist on a committee and directed a legislative office in the US House of Representatives.

He received his PhD and MA from the University of Delaware, and he has a BA from Drew University.

Mark Stokes

Manager of Power Supply Planning, Idaho Power Company.
Mark has 17 years of experience at Idaho Power Company and has been in his current position as the Manager of Power Supply Planning for the past three years. The Power Supply Planning Department is responsible for resource planning, load forecasting, fuel management, and cogeneration and small power production contract management.

Mr. Stokes is a graduate of the University of Idaho with a Bachelor of Science Degree in Civil Engineering. He also has a Masters Degree in Business Administration from Northwest Nazarene University and is a registered professional engineer in the State of Idaho.

3. Communication to Participants

Pre-survey invitation letter & reply postcard

CAES

Center for Advanced Energy Studies

December 15, 2008

Dear (participant's first name here),

Enclosed is a questionnaire that we would like for you to complete and return within seven days. This questionnaire is the preliminary step in a study taking place in the Treasure Valley in April of 2009. The Center for Advanced Energy Studies is conducting this research which investigates the trade-offs that Idahoans face when considering complex energy policy decisions. The purpose of the research is to provide valuable information to policy makers and researchers in the area of Idaho's energy policy. We know that your time is valuable and thank you in advance for your participation.

The Center for Advanced Energy Studies (CAES) is a partnership of four Idaho institutions: Boise State University, Idaho State University, University of Idaho, and the Idaho National Laboratory.

Your privacy is very important. As such, your answers will be confidential. The information collected in this survey will be compiled with survey data from seven Idaho counties; your responses will not be identifiable by name or county. Any personally identifiable information will not be published or referred to in public. Due to the make-up of Idaho's population, the combined answers to some of the demographic questions *may* make an individual person identifiable. Do not answer these questions if you are uncomfortable doing so. And, we will not sell, lease, loan, or otherwise divulge your personal information.

- You must be 18 years of age and living in Idaho to participate in this study.
- Please read each question and the answer options carefully.
- When answering the questions, you should provide your personal opinions – **there are no right or wrong answers**. Answer the questionnaire based on what you **currently think** as a citizen.
- You may answer "No Opinion" or "Don't Know/Not Sure" for any question. Please use this option whenever you don't have an opinion or don't know the answer to a question.

The survey takes approximately 15-20 minutes to complete. When you have completed the survey, simply fold the booklet in half, seal it with tape, and return by prepaid postage as soon as possible, but no later than January 10, 2009. *Please do not put your name or address on the survey.*

An invitation for an upcoming event in Boise is also enclosed. This event will take place on April 18, 2009 and will bring Idahoans together to explore how energy options in our state are considered and addressed. A stipend will be paid to cover your costs. Participation is limited. If you would like to participate or to learn more, return the invitation as soon as possible and we will contact you with more information as the event nears.

We sincerely thank you for your time and participation!

Carole Nemnich
Boise State University
208-426-1835
carolenemnich@boisestate.edu

Reply postcard for opt-in

04G106 (Bulk mail info)

Social Science Research Center
Attn: Carole Nemnich
1910 University Drive, Mail Stop 1935
Boise, ID 83725

CAES Citizen Energy Event Invitation

_______ Yes, I want to participate.
______ No, I do not want to participate.
______ I am interested and would like to know more.

Please provide your contact information so that we may follow up with you as the event nears:

Name: ____

Mailing Address: ___________________________________

Physical Address (if different than mailing address above)

____

Phone Number: ____________________________________

By providing this information, you are giving CAES and the University partners permission to contact you regarding this event. This information will be used only for the purpose of this study. We will not sell, lease, loan, or otherwise divulge your personal information..

Other communications to respondents, recruits, control group for post survey

Sample mailing for event participant – versioned by treatment group

Dear -------,

Thank you for agreeing to come to the Idaho Electricity Options event on Saturday, April 18. This packet contains the following items:

- Agenda
- Parking Instructions
- Boise State University Campus Map
- IRS form I-9*
- Event Ground Rules
- "Options for Meeting Electricity Demand in Idaho" Briefing Document
- Briefing Document Instructions
- Briefing Document Errata Sheet

This event will be unique for southwest Idaho. You are part of a randomly selected group of Idaho citizens from seven Idaho counties who have agreed to participate in this event. In conjunction with this conference, we are conducting research to measure the effect of information on your attitudes and preferences. As such, this event is not open to the public or the press. We will provide balanced information about Idaho's electricity generation options. After the event, we will ask you to take another survey so that we might understand what, if any, changes the information makes to your attitudes and perceptions about energy. You will not be required to share your attitudes and preferences with other conference attendees.

We think you will enjoy the day's activities and the information we provide.

*Please note, the State requires us to collect this information so that we may pay you a stipend for your participation. Please fill out the form and bring it with you to the event. Your privacy is important! We handle your personally identifiable information as strictly confidential.

If you have additional questions, or decide not to attend, please contact Carole Nemnich at 208-426-1835 or carolenemnich@boisestate.edu

On behalf of the entire research team, thank you for participating.

Sincerely,

Sample of Recruiting Letter

March 9, 2009

Name
Address
Address

Dear ,

You recently returned a survey and a postcard regarding our CAES Citizen's Energy Event to be held Saturday, April 18 at Boise State University. Your postcard did not indicate if you are interested in participating along with other Idaho citizens in this exciting event. April 18 is right around the corner and we do hope you will consider joining us. Enclosed a list of 'Frequently Asked Questions' that may answer questions you have. Please do not hesitate to contact me at the number or email address below if you have a question we have not anticipated.

The Center for Advanced Energy Studies (CAES) is conducting this research to investigate the trade-offs that Idahoans face when considering complex energy policy decisions. The purpose of this research is to provide information to policy makers and researchers about what Idaho citizens think the future electricity picture should look like in our state. The event will bring Idahoans together to explore how energy options in our state are considered by citizens. You do not need to know anything about energy generation to participate. We know your time is valuable and will pay you a small stipend to cover your costs of attending.

If you would like to participate or to learn more, please call or email me as soon as possible so we can provide you with more information as the event nears. Please note that the phone number or e-mail address that you provide for contact will be used only for the purpose of this event and will greatly assist us in contacting you in a timely manner with instructions as the event approaches.

We sincerely thank you for your time and we do hope that you can join us and other Idaho citizens for this exciting and informative event!

Sincerely,
Signature
The Center for Advanced Energy Studies (CAES) is a partnership of four Idaho institutions: Boise State University, Idaho State University, University of Idaho, and the Idaho National Laboratory.

Facilitator Training for Idaho Electricity Options Event April 11, 2009

1. **Introductions** 11:15 – 11:20 Carole

2. **Purpose of meeting and review agenda** 11:20 – 11:30 Carole

3. **Facilitation in general** 11:30 – 12:15 Carole

Structure and process; not content.
Leadership without the reins. An egoless activity.
What facilitators believe about people.

Create process awareness - Facilitator 'owns' the process, not the content. Define the roles in the meeting; seek agreement on objectives/outcomes; check participant expectations.

Manage the discussion flow. Maintain and regain focus; use 'group memory'; use a 'parking lot', sidetrack and spell check button; redirect or boomerang questions to the group; use body language to control the dynamic; and, intervene to de-escalate problems.

Build agreement for the outcomes; process and content. Present the idea; check for understanding; and, check for agreement.

Handout: Deborah Allen's guidelines
Example of simple FTN guide

Attributes and techniques of a good facilitator; ask, don't tell.
Neutrality, assertiveness, active listening, questioning, paraphrasing, summarizing, synthesizing, staying on track, getting/giving feedback, collecting ideas and testing assumptions.
Consensus building, and the language of inclusion.
Do you know 'em when you see 'em?

The scribe: Summarizing and preserving the ideas of the group in the words of the group. Assisting the facilitator as agreed.
May act as timekeeper. Backup for the day.

Handout: '*Managing the Flip Chart*' by Ingrid Bens

4. **Facilitation for the event** 12:25 – 12:40 Carole

Background – why are we doing this?
What do the participants know about the meeting?

Experimental design & limits – what are the ‘boundaries’ imposed by the experimental design?

Roles for the facilitator and the recorder/note taker/scribe – and possibly time keeper.

5. **Review the facilitation guide** for the event & role play. 12:45 – 1:45 All

Note: Participation of all is important

6. **Get ready for the event** on 4/18. 1:45 – 1:55 Carole

Materials to review prior to the event

- Deborah Allen’s guidelines
- Energy Options briefing document
- Ground Rules for the event
- Facilitation guide for the event
- ‘*Managing the Flip Chart’* by Ingrid Bens.

Be prepared!

Visit your room prior to the start (suggest during registration between 8 and 8:30 am) to make sure you have all the materials you need and your room is set up and ready to go!

Come to the event and listen to the presentation at 8:45 am. This will prepare you for the discussion at 10:30 am.

Be in your room no later than 10:25 am to welcome your group.

Return to your room no later than 1:55 pm to welcome your group back.

Room set up:

- Horseshoe shape
- Avoid empty chairs
- Flip chart and wall for posting pages in clear view

7. **Any questions?** Anything else? 1:55 – 2:00 All

Questions? Call me: Carole Nemnich 208 426-1835

Checklists for Facilitator

Prior to 10:30 Make sure assigned room is set up and camera is ready.
Materials check:
- Flip charts
- Tape
- Markers
- Sharpies
- Large post-it notes/comment cards
- Clock

Morning Small Discussion Group Session 10:30 - Noon

10:30 – 10:35 Welcome participants and get them seated quickly. Scan the badges to make sure that they all belong to your group (badge is coded). If a person is not on your list, send them out of the room to find a staffer.

- ☐ Explain your role (facilitator)
- ☐ Introduce the note taker (scribe and camera).
- ☐ Hand out several comment cards or sticky notes to all participants.

10:35-10:40 Provide an Overview of What We Are Going to Do

1. Discuss the current electricity situation in the Treasure Valley;
2. Discuss the different electricity options available; and,
3. Develop two or three questions from the group to ask of the expert panelists at lunch session.

- ☐ Explain that participants can write down their questions at any time during the session on the comment cards or sticky notes they now have.

10:40 – 11:00 Discuss Idaho's Current Electricity Situation
Discussion Starter Example Questions: What are the current types of electricity generation options in Idaho? What are the top issues that Idaho is facing regarding its current energy generation needs? What are the issues for Idaho's future energy generation needs?

- ☐ Did everyone get a chance to speak?
- ☐ Did any questions for the experts come up during the discussion?

11:00-11:40 Discuss the Different Electricity Options Available
Did the group discuss each of these? If not, prompt the group to consider the option.   *Example: No one has brought up the nuclear power generation option. What do you think about Nuclear power as a source of electricity?*

- ☐ Nuclear Power
- ☐ Fossil Fuels (oil, coal, natural gas, etc.)
- ☐ Hydroelectric Power
- ☐ Renewable Energy (wind, solar, geothermal, biofuel/biomass, etc.)
- ☐ Conservation & Efficiency (more efficient uses of existing energy resources)

11:40-12:00 Generate Questions for the Expert Panel

- ☐ Each participant provides1 or 2 questions for the experts.
- ☐ Each participant reads aloud the questions they formed for the experts.
- ☐ The note taker should capture the questions on the board for everyone to see.
- ☐ Combine the redundant or very similar questions. You may need to reword.
- ☐ Each participant gets 3 votes to prioritize the questions for the experts. (Instruction: each participant may vote all 3 votes for one question, or 1 vote per question, or any combination.) Make sure everyone votes.
- ☐ Put the questions in priority order in front of the group. Validate that the priority looks right.

AT 11:55:
☐ Note taker: Write the questions neatly (if needed) onto the comment cards and note the priority order (1, 2, 3).

☐ Inform participants to proceed to lunch in designated location.

AT NOON:
☐ Submit the questions to the graduate assistant or staffer who will take them to the moderator.

Afternoon Discussion and Survey: 2:00-3:30

2:00-2:05   Provide an Overview of What We Are Going to Do
Discuss how the questions and answers informed the participants; and,
Take the last survey. --Take a survey

2:05-3:00   Discussion

☐ Using the comprehensive list of questions generated by all of the groups, ask participants to respond to the answers from the expert panel to the questions. *For example: Do you think the expert panelists answered the questions you have about electricity generation options? Did you hear any new information? Did the answers they gave change your mind or cause you to rethink what you knew about electricity options in Idaho?*

If your group finishes the discussion before 3:00, have them complete the survey. **No later than 2:55, instruct the participants to take out the survey and fill it out completely.**

☐ Inform participants to go to the registration table when they are done with the survey and turn it in.

3:00-3:30 Complete Post Survey

Guidance for Moderator and Subject Matter Experts

Guidance for the Plenary Session Moderator and Subject Matter Experts

Jeffrey Joe
March 2009

This document describes what the Plenary Session Moderator (i.e., moderator) and Subject Matter Experts (SMEs) should expect to see, and what is expected of them, during the Deliberation Polling experiment we are conducting. Specifically, this document contains: 1) a description of what will happen on the day of the Deliberation Polling experiment, 2) the roles and responsibilities for the moderator (John Freemuth) and SMEs, and 3) the “ground rules” the participants are expected to follow during the experiment.

I. Description

This research study is using a methodology called Deliberative Polling. Deliberative Polling is based on the premise that legitimate public policy decision making arises from the open deliberation of an informed citizenry. Deliberative Polling collects public opinions by issuing a baseline survey to a randomly selected and representative sample of the public. A subset of the larger survey sample is then requested to participate in small-group deliberations. The deliberation involves reviewing carefully balanced briefing documents, consulting and engaging in moderated dialogue with competing experts and opinion leaders, and participating in facilitated small group discussions. After deliberation, these participants fill out the public opinion survey again. If the deliberation process is conducted with sufficient methodological rigor, then the resulting changes in opinion would represent the conclusions the public would reach, if they had opportunity to become more informed of the issues and engaged.

Specifically, in January 2009, a baseline survey was issued to 5000 citizens living in the Southeast region of Idaho. A postcard describing how participants could to participate in an all day deliberation activity was included, and participants were requested to return the postcard if they were interested in participating in the deliberation exercise. Of those that expressed interest, a subset was selected and invited to participate in an all day deliberation event. The subset selected was also sent a briefing document a few weeks in advance of the deliberation event and were requested to read it in order to become familiar with the topic and associated issues.

On the day of the deliberation event, all participants will register, will be welcomed and given some preliminary instructions regarding the experiment. All participants will then attend a plenary session where a presentation is given by one of the experimenters on information contained in the briefing document. All the participants will then be told that there will be a panel of subject matter experts (SMEs) that will be available in the next phase of the experiment to answer questions, and that they should begin formulating questions. Participants assigned to the Deliberation groups treatment will then be asked to go to their assigned small break out groups to develop questions for the SMEs. At the same time, the participants assigned to the Non-Deliberation groups will be asked to write down questions individually for the SMEs (e.g., conference simulation). Then all participants will be asked to return to plenary session with questions to ask the SMEs. Questions will be given to the Moderator, who will ask the questions in order to mask the origin of the question. Questions from the Deliberation Groups will be addressed first and the others from individuals as time allows.

At this point, all participants will be given a feedback survey to answer. Those in the Non-Deliberation groups will also answer the post-test opinion poll survey, will be thanked for their time, and will be dismissed. The Deliberation groups only will fill out the feedback survey and will then requested to go back to their small groups and to continue to deliberate. After this second small-group deliberation, the participants will join the SMEs in second plenary where the questions they generated will be answered. After the second plenary session ended, the participants will be asked to fill out their feedback survey and the post-test opinion poll survey. Both preference and support will be measured for different options to meet electricity demand. When they completed both surveys, the remaining participants will be thanked for their time and dismissed.

II. Roles and responsibilities

Plenary Session Moderator's roles and responsibilities:

- Ask the questions the participants generated to the SME panel
- Ensure that each SME on the panel has the opportunity to answer each participant's question
- Enforce the rule that each SME only has 1 minute time to answer each participant's question
- Maintain impartiality
- Encourage participation
- Enforce ground rules (see list of ground rules below)
- Keep the experiment on schedule
- Coordinate and communicate meeting logistics
- Promote civil discussion
- Keep plenary group and SMEs focused on task
- Provide multiple interpretations or perspectives in a balanced manner.

- Show in a non-confrontational manner how a given interpretation, or way of thinking about some facts (i.e., framing) reveals certain implicit values. Be able to show how each perspective is grounded in a certain set of values.

  Note: the facilitators of the small group discussion will have a similar role and responsibilities during the small group deliberation discussions. This should be compared and integrated with what Brett Ingles and Deborah Allen created for facilitators.

SME roles and responsibilities

- ***Answer the participant's question directly in 60 seconds or less.***
    - You may draw upon your expertise and critical thinking skills to make inferences and state your opinion regarding the issues in question. However, when expressing your inferences or opinions, you must be transparent (i.e., open and forthright) to others about what personal values and biases are also being expressed. Also keep in mind there is a 60 second time limit for every SME response, regardless of how much personal opinion is being included in the answer.
- ***Facilitate the public's learning***:
    - *Help the public construct the content and formulate the issues in their own minds (e.g., internalize and personalize it), rather than telling them what to think, or giving them cut & dried facts to memorize.*
    - Present information and answers to questions clearly. Use real-world language, not ivory-tower language when explaining something technical and complex.
    - Set the stage factually, so the issues are in context. Inform the public when you know facts or issues that they do not.
- Contribute to civil and open dialogue. You can name those who don't agree with you, but do not engage in name-calling.
- If possible, cite research to support points. If possible, stick close to the data and support assertions with statistical tests. Reference primary sources as much as possible. Limit references to secondary sources.

III. "Ground rules" or Guidelines for members of public participating in Deliberation Day

Typically, the norms of Western society provide some general guidance on how people are to behave in interpersonal situations. Sometimes, however, additional guidance is needed. The following "ground rules" are suggested for Deliberation Day plenary sessions and small group discussions. They are provided here so that the Plenary Session Moderator and SMEs understand what standards of conduct the participants will be expected to follow. No claims are made that this list is exhaustive. More input is needed.

- Everyone in the room has equal rank

- Civil and open communication is expected:
  - Listen actively
  - Participate openly and honestly
  - Share the airtime – recognize that there are others who may want to talk
  - Be aware that there may be many views & take part in friendly disagreement
  - Limit side conversations

- Asking questions:
  - There are 'innocent' questions – ones simply asking for clarification
  - There are 'hostile' questions – ones that are meant to trap, attack, or otherwise get someone else to say something that can then be criticized for being 'wrong'.
  - Both 'innocent' and 'hostile' questions are okay, but know the difference
  - There are no 'stupid' questions

- Be aware that:
  - Facts, beliefs, perceptions, and unknowns exist
  - All are okay
  - Assumptions and educated guesses may be made
  - Recognize when this may be occurring and what effect it may have on you

- Be aware that:
  - Sometimes we evaluate ideas
  - Sometimes we evaluate or judge people because of their ideas, what they say, how they look, etc.
  - Both are okay, but know the difference

- Administrative issues:
  - Please turn off cell phones
  - What else???

5. Post-event Study – Script for Phone Interviews

Post-event Study
Interview Script

Follow-up Interviews for LDRD Project

Hello,
Thank you for participating in our Deliberative Polling study related to energy policy options, held in Boise in April, 2009. To help us understand the long-term outcomes of the event, we are contacting participants and inviting them to participate in a 30-minute interview. If you agree to participate (your participation is voluntary), we would like to arrange a time that we could ask you some questions about your views on different energy options and your evaluation of the deliberative poll process itself. If you agree to participate, you will help our research team learn about what types of public engagement processes are most effective and useful for society.
As part of this process I am required to give you a little information about the study and your role in it.
The University of Idaho Institutional Review Board has approved this project. There are no risks to you from participating. Anything you tell us will not be connected to your name in any publication or report from the study. (In other words, it is entirely confidential). We will not release your name to anyone outside our study. You may choose to stop the interview at any time, and you may decline to answer any specific question. If you would like to know more about the project, Patrick Wilson, from the University of Idaho, would be happy to talk to you. I would be happy to provide you that contact information. (Department of Conservation Social Sciences, University of Idaho pwilson@uidaho.edu, 208 885-7911). I would also be happy to answer any questions you have now or later.
Do you agree to participate in this study? [If no: Thank you very much. Have a nice day].
Participant Name ____ Date ___________________
Consent? ______ NO _______ Yes. Interviewer name: _________________

[If yes] when would be a convenient time for you to talk? I would be happy to talk now or at another time.
Interview scheduled for: ______________________

To help this go faster, I'd like to tape record the interview. Is that ok with you? ________

The first 5 questions are the same as some on the questionnaire you completed in April.

1. On a scale of -5 (not at all preferred) to +5 (very preferred) how would you rate your preference for each of the following electricity options? (if you are neutral or do not have an opinion, you may say that as well) (hydropower, nuclear, energy conservation, fossil fuels, and renewables)

The following questions ask for your opinions and personal experiences. There are no right or wrong answers, and we would like you to answer with your honest opinions.

1. How do you think the deliberative poll experience affected your knowledge and attitudes about energy options for Idaho, if at all? Were there any aspects of the process that were especially influential for you personally?
Probe for each of the 5 options after the general question; be sure to ask clarifying questions

2. What do you think are the strongest arguments for and against each of the options? (probe for each of the 5 options)

3. Did you feel that you had adequate opportunity to share your views with other participants during the deliberative poll, or did you think there were not sufficient opportunities?

BRIEFING DOCS PARTICIPANTS

1. Did you find the briefing documents to be objective or not objective? (please explain) (Probe: Comprehensive? Informative?)

2. Did you share the briefing documents with other people? (If yes, who did you show them to?)

SMALL GROUP DISCUSSION PARTICIPANTS

1. How well do you think the purpose of small group discussions was communicated?

2. Did anything in the small group discussion influence your opinions about energy options? (If yes, Please tell me about that.)

3. Did you feel included in the discussions? Did you feel as if anyone dominated the discussions? (If yes, how do you think that affected the other participants?)

4. Did you feel the discussion strayed from the topic or stayed on topic? (If it strayed, was that a problem for you?)

5. How did you feel about the amount of time allocated for discussing the given topics?

PANEL PARTICIPANTS

1. What did you think about the expert panel? (Probe: were the members trustworthy, biased, knowledgeable, objective?) Did any panelist stand out in your mind? Why?

2. Did anything a panelist said affect your opinions on any of the energy options?

3. What did you think about the question and answer format for the panel?

These questions ask about your thinking since the deliberative poll.

1. Have you changed your mind about how much you support any of the five energy option since the DP? (If yes, Please tell me how your thinking has changed and what made you change your mind.)

2. Have you looked into any of the energy options following the deliberative poll? (if yes, Please tell me about that)

4. Did you talk about your experience of the DP with anyone else? (If yes, who did you talk to and what did you tell them? Did you talk about any of the information you learned?)

5. Have you encouraged other people to look into energy issues? (If yes, who have you talked to?)

6. Have you gotten involved in any way in energy policy issues since the DP? (could include workplace, civic action, etc) (If yes, please tell me about your activities)

ALL PARTICIPANTS

We're nearly done. I have just two more questions about the deliberative polling process.

1. How useful (or not) do you think DP is as a way to inform citizens on current issues?

2. Would you consider participating in another DP in the future or would you prefer not to participate? Why?

3. Do you have any other observations you would like to make about the any part of the process?

4. Would you like a copy of the final report?

Thank you very much for your time!

Appendix F - Communication to Participants

1. Pre-survey invitation letter & reply postcard

Center for Advanced Energy Studies

December 15, 2008

Dear (participant's first name here),

Enclosed is a questionnaire that we would like for you to complete and return within seven days. This questionnaire is the preliminary step in a study taking place in the Treasure Valley in April of 2009. The Center for Advanced Energy Studies is conducting this research which investigates the trade-offs that Idahoans face when considering complex energy policy decisions. The purpose of the research is to provide valuable information to policy makers and researchers in the area of Idaho's energy policy. We know that your time is valuable and thank you in advance for your participation.

The Center for Advanced Energy Studies (CAES) is a partnership of four Idaho institutions: Boise State University, Idaho State University, University of Idaho, and the Idaho National Laboratory.

Your privacy is very important. As such, your answers will be confidential. The information collected in this survey will be compiled with survey data from seven Idaho counties; your responses will not be identifiable by name or county. Any personally identifiable information will not be published or referred to in public. Due to the make-up of Idaho's population, the combined answers to some of the demographic questions *may* make an individual person identifiable. Do not answer these questions if you are uncomfortable doing so. And, we will not sell, lease, loan, or otherwise divulge your personal information.

- You must be 18 years of age and living in Idaho to participate in this study.
- Please read each question and the answer options carefully.
- When answering the questions, you should provide your personal opinions – **there are no right or wrong answers**. Answer the questionnaire based on what you **currently think** as a citizen.
- You may answer "No Opinion" or "Don't Know/Not Sure" for any question. Please use this option whenever you don't have an opinion or don't know the answer to a question.

The survey takes approximately 15-20 minutes to complete. When you have completed the survey, simply fold the booklet in half, seal it with tape, and return by prepaid postage as soon as possible, but no later than January 10, 2009. *Please do not put your name or address on the survey.*

An invitation for an upcoming event in Boise is also enclosed. This event will take place on April 18, 2009 and will bring Idahoans together to explore how energy options in our state are considered and addressed. A stipend will be paid to cover your costs. Participation is limited. If you would like to participate or to learn more, return the invitation as soon as possible and we will contact you with more information as the event nears.

We sincerely thank you for your time and participation!

Carole Nemnich
Boise State University
208-426-1835
carolenemnich@boisestate.edu

2. Reply postcard for opt-in

04G106 (Bulk mail info)

Social Science Research Center
Attn: Carole Nemnich
1910 University Drive, Mail Stop 1935
Boise, ID 83725

CAES Citizen Energy Event Invitation

_______ Yes, I want to participate.
______ No, I do not want to participate.
______ I am interested and would like to know more.

Please provide your contact information so that we may follow up with you as the event nears:

Name: ____

Mailing Address: ___________________________________

Physical Address (if different than mailing address above)

____

Phone Number: ____________________________________

By providing this information, you are giving CAES and the University partners permission to contact you regarding this event. This information will be used only for the purpose of this study. We will not sell, lease, loan, or otherwise divulge your personal information..

3. Other communications to respondents, recruits, control group for post survey

Sample mailing for event participant – versioned by treatment group

Dear -------,

Thank you for agreeing to come to the Idaho Electricity Options event on Saturday, April 18. This packet contains the following items:

- Agenda
- Parking Instructions
- Boise State University Campus Map
- IRS form I-9*
- Event Ground Rules
- "Options for Meeting Electricity Demand in Idaho" Briefing Document
- Briefing Document Instructions
- Briefing Document Errata Sheet

This event will be unique for southwest Idaho. You are part of a randomly selected group of Idaho citizens from seven Idaho counties who have agreed to participate in this event. In conjunction with this conference, we are conducting research to measure the effect of information on your attitudes and preferences. As such, this event is not open to the public or the press. We will provide balanced information about Idaho's electricity generation options. After the event, we will ask you to take another survey so that we might understand what, if any, changes the information makes to your attitudes and perceptions about energy. You will not be required to share your attitudes and preferences with other conference attendees.

We think you will enjoy the day's activities and the information we provide.

*Please note, the State requires us to collect this information so that we may pay you a stipend for your participation. Please fill out the form and bring it with you to the event. Your privacy is important! We handle your personally identifiable information as strictly confidential.

If you have additional questions, or decide not to attend, please contact Carole Nemnich at 208-426-1835 or carolenemnich@boisestate.edu

On behalf of the entire research team, thank you for participating.

Sincerely,

Sample of Recruiting Letter

March 9, 2009

Name
Address
Address

Dear ,

You recently returned a survey and a postcard regarding our CAES Citizen's Energy Event to be held Saturday, April 18 at Boise State University. Your postcard did not indicate if you are interested in participating along with other Idaho citizens in this exciting event. April 18 is right around the corner and we do hope you will consider joining us. Enclosed a list of 'Frequently Asked Questions' that may answer questions you have. Please do not hesitate to contact me at the number or email address below if you have a question we have not anticipated.

The Center for Advanced Energy Studies (CAES) is conducting this research to investigate the trade-offs that Idahoans face when considering complex energy policy decisions. The purpose of this research is to provide information to policy makers and researchers about what Idaho citizens think the future electricity picture should look like in our state. The event will bring Idahoans together to explore how energy options in our state are considered by citizens. You do not need to know anything about energy generation to participate. We know your time is valuable and will pay you a small stipend to cover your costs of attending.

If you would like to participate or to learn more, please call or email me as soon as possible so we can provide you with more information as the event nears. Please note that the phone number or e-mail address that you provide for contact will be used only for the purpose of this event and will greatly assist us in contacting you in a timely manner with instructions as the event approaches.

We sincerely thank you for your time and we do hope that you can join us and other Idaho citizens for this exciting and informative event!

Sincerely,
Signature
The Center for Advanced Energy Studies (CAES) is a partnership of four Idaho institutions: Boise State University, Idaho State University, University of Idaho, and the Idaho National Laboratory.

Appendix G – Human Subjects Review

1. Institutional Review Board Human Subjects Review Approval
2. Renewal Approvals and Modifications

1. IRB Human Subjects Review Approval Form

BOISE STATE UNIVERSITY

1. Office of Research Compliance
(Phone) 208.426.5401
Institutional Review Board

HumanSubjects@boisestate.edu

Notification of Approval

Principal Investigator: Carole Nemnich
Co-Investigator: Dr. John Freemuth
Title: LDRD Societal Nuclear Energy Research Survey
IRB Approval Number: EX 041-09-056

Federal Wide Assurance #: 0000097

Review: Exempt

Protocol Annual Expiration Date: December 17, 2009

Protocol Three-Year Expiration Date: December 17, 2011

Date: December 18, 2008

Dear Carole Nemnich:

This letter is to officially notify you of the approval of your protocol application by the Boise State University (BSU) Institutional Review Board (IRB). Your protocol is in compliance with this institution's Federal Wide Assurance 0000097 and the DHHS

Regulations for the Protection of Human Subjects (45 CFR 46), and has been classified as exempt.

All forms regarding human subject research are available online. Please submit all forms and relative correspondence for the IRB electronically to the Office of Research Compliance e-mail, HumanSubjects@boisestate.edu.

Your approved protocol is effective for 12 months. If your research is not finished within the allotted year, the protocol must be renewed by the annual expiration date indicated above. Under BSU regulations, each protocol has a three-year life cycle and is allowed two annual renewals. If your research is not complete by the three-year expiration date indicated above, a new protocol application must be submitted.

Modifications/Amendments
All additions or changes to your protocol once the research has begun must be brought to the attention of the IRB. Complete and submit a "Modification/Amendment Form" indicating any change to your project. Modifications are reviewed by the IRB and must be approved before the changes may occur.

Annual Renewal
As the principal investigator, you have the primary responsibility to ensure the "Continuing/Annual Form" is submitted in a timely manner. Any problems or adverse events that occurred during the project must also be noted in the annual renewal, with a description of what was done to prevent recurrence.

About 60 days prior to the expiration date of the approved protocol, the Office of Research Compliance will send you a renewal reminder notice. **If the annual renewal form is not received by the protocol's annual expiration date, the protocol will be considered "closed/non-active" and a final report will need to be submitted. To continue the research project after it has closed, a NEW protocol application will need to be submitted for IRB review and approval.**

Final Report
When your research is complete or discontinued, please submit a "Final Report Form." An executive summary or other documents with the results of the research may be included.

If you have any questions or concerns, please contact the Office of Research Compliance, 426-5401 or HumanSubjects@boisestate.edu.

Thank you and good luck with your research.

Mary E. Pritchard

Dr. Mary E. Pritchard
Chair, BSU Institutional Review Board

2. Renewal Approvals and Modifications

Modification

Modified application: consent with no audio/visual/photo recording.

(Amended) CONSENT TO BE A RESEARCH PARTICIPANT

BOISE STATE UNIVERSITY

The Center for Advanced Energy Studies (CAES) and the Energy Policy Institute at Boise State University are conducting a research study investigating **Public Discourse Methods in Energy Policy Decision-making.** The purpose of this study is to assist energy technology developers, researchers, and policy decision makers understand how different levels of discourse influence the publics' attitudes and beliefs about various electricity generation options.

You were asked to participate in this study because you were a randomly selected resident of one of seven Idaho counties, you are 18 years of age or older, and you have opted to participate in this study.

What you should expect:

1. You completed an opinion survey about various types of electric energy generation. This survey, mailed to your home address, was returned to us. You received a post card invitation, and may have returned it to us indicating an interest in participating in the event on April 18, 2009. We may have contacted you by phone to confirm your attendance, as well.
2. You received a document by mail entitled "Options for Meeting Electricity Demand in Idaho" that provides background about Idaho's electricity options, and explains the pros & cons of the various electricity generation types. You are encouraged to read the document prior to the event.
3. You agreed to participate in a conference-style event where information about the various types of electrical energy generation will be presented and subject matter experts answer your questions.
4. You will participate in a small group session where you share your opinions and understanding with other citizens about electricity generation options.
5. You will provide feedback about your particular experience during the sessions you attend and take an opinion survey at the end of the day.

By design, the survey questions and the event are non-confrontational. However, participation may provoke strong feelings that may cause you to feel uncomfortable or upset. You are free to decline to answer any questions you do not wish to answer or to stop your participation at any time.

Confidentiality and privacy:
Participation in this research *may* involve a loss of privacy. (This may inadvertently happen because of the composition of Idaho's population, the small sample size of the study, and the research design.) However, your personal information and responses to the survey questions are confidential and are handled and stored with your privacy in mind. Only staff directly involved in the recruiting for the research had access to your personally identifiable information. The answers you provided to the survey questions, and your opinions and attitudes, are kept separate

from your personal information. This data is stored on a secure server &/or in a secure room with limited access (to the research team only). No individual identities will be used in any reports or publications that may result from this study. Separate consent to use your image is below.

No direct benefit:
You will not receive a direct benefit from participating in this study. However, the information that you provide will help energy technology development professionals, policy decision makers, and researchers to better understand how different levels of citizen discourse contribute to preferences for certain electricity generation options.

There is no cost to you to participate in this study, other than your time and travel.

You will be paid $75 for full participation in the event at Boise State University on April 18, 2009. You will be eligible for full compensation when you turn in the final survey i at the conclusion of the event. You will be required to complete a form so that Idaho State University (a partner in the study) may pay you via check. A check will be mailed to your address within 14 to21 business days after the event. You may not be eligible for full compensation if you do not complete the final survey of the day.

Who do I contact with questions:
If you have any questions or concerns about participation in this study, you should contact Carole Nemnich at Boise State University's Social Science Research Center at carolenemnich@boisestate.edu or 208-426-1835.

If for some reason you do not wish to contact the research team member listed above, you may contact the Boise State University Institutional Review Board, which is concerned with the protection of volunteers in research projects. You may reach the board office between 8:00 AM and 5:00 PM, Monday through Friday, by calling (208) 426-5401 or by writing: Institutional Review Board, Office of Research Compliance, Boise State University, 1910 University Dr., Boise, ID 83725-1138.

University of Idaho

University Research Office
Institutional Review Board
PO Box 443010
Moscow ID 83844-3010

Phone: 208-885-6162
Fax: 208-885-5752
hac@uidaho.edu

To: Patrick Wilson, Associate Professor
Department of Conservation Social Sciences
College of Natural Resources
University of Idaho
Moscow, ID 83844-1139

From: Traci Craig, Ph.D.
Chair, University of Idaho Institutional Review Board (IRB)
University Research Office
Moscow, Idaho 83844-3010

IRB No.: IRB00000843

FWA: FWA00005639

Date: October 14, 2010

Project: **Modification:** LDRD Societal Nuclear Energy Research Survey (Protocol No. 08-178), Modification Approved October 19, 2009; **Original approval date December 24, 2009**

On behalf of the Institutional Review Board at the University of Idaho, I am pleased to inform you that the proposed protocol modification for the above-named research project has been approved as offering no significant risk to human subjects.

The approval for this project is valid for one year from the date of the **original approval** at which time you will need to request an extension before the project expires. Should there be significant changes in the protocol for this project, it will be necessary for you to resubmit the protocol for review by the Committee.

BOISE STATE UNIVERSITY

Office of Research Compliance
Institutional Review Board
HumanSubjects@boisestate.edu | 208.426.5401

DATE: November 16, 2009

TO: Carole Nemnich (PI)
John Freemuth (co-PI)

FROM: Institutional Review Board (IRB)
C/o Office of Research Compliance

SUBJECT: IRB Notification of Approval for Renewal of
EX 041-09-056, *LDRD Societal Nuclear Energy Research Survey*

The Boise State University (BSU) Institutional Review Board (IRB) has reviewed and approved the annual renewal of your protocol application. **Your protocol's original annual expiration still applies**. This notification does not extend or change your annual renewal date; it only approves your renewal.

Review Type: Exempt, First Annual Renewal
Approval Number: EX 041-09-056
Annual Expiration Date: December 17, 2010

Your approved protocol is effective for 12 months. If your research is not finished within the allotted year, the protocol must be renewed by the annual expiration date indicated above. Under BSU regulations, each protocol has a three-year life cycle and is allowed two annual renewals. If your research is not complete by **December 17, 2011**, a new protocol application must be submitted.

About 30 days prior to the annual expiration date of the approved protocol, the Office of Research Compliance will send a renewal reminder notice. The principal investigator has the primary responsibility to ensure the ANNUAL RENEWAL FORM is submitted in a timely manner. If a request for renewal has not been received 30 days after the annual expiration date, the protocol will be considered closed. To continue the research after it has closed, a new protocol application must be submitted for IRB review and approval.

All additions or changes to your approved protocol must also be brought to the attention of the IRB for review and approval before they occur. Complete and submit a MODIFICATION/AMENDMENT FORM indicating any changes to your project.

When your research is complete or discontinued, please submit a FINAL REPORT FORM. An executive summary or other documents with the results of the research may be included.

All relevant forms are available online. If you have any questions or concerns, please contact the Office of Research Compliance, 426-5401 or HumanSubjects@boisestate.edu.

Thank you and good luck with your research.

Mary E. Pritchard

Dr. Mary E. Pritchard
Chairperson,
Boise State University Institutional Review Board

Consent form for participation in 4/18/09 event

Please return the signed original of this consent form to Boise State University. You should keep a copy for your records.

PARTICIPATION IN RESEARCH IS VOLUNTARY. You are free to decline to be in this study, or to withdraw from it at any point. Your decision to participate in this study is entirely up to you. You do not need any specialized knowledge to participate. You must be at least 18 years of age and reside in Ada, Boise, Canyon, Elmore, Gem, Owyhee or Payette County, Idaho.

I give my consent to participate in all aspects of this study:

________________________________ ________________
(Signature of Study Participant) Date

________________________________ ________________
Signature of Person Obtaining Consent Date

Appendix H – Background Study References & Sources

1. Background Study References and Sources

1. Background Study References and Sources

Research Study Reference Sources

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Appendix I – Annual Project Reports to Sponsor

Annual project reports to the INL LDRD Program – 2007, 2008, 2009

2007

Investigation of Public Discourse Methods in Energy Policy Decision-making

Project ID: CA115
PI: Steven Piet
Team: John Freemuth (Boise State), Mike Louis (Boise State), Carole Nemnich (Boise State), Eileen DeShazo (Boise State), Patrick Wilson (University of Idaho), Ann Oakes Hunter (Idaho State), Jeffrey Joe (INL)

Public opinions regarding nuclear energy at an “actionable” depth are difficult to measure because of the polling methods that are currently used. Here, “actionable” means sufficient to improve mutual dialogue or to guide technology research, development, or deployment. This project examines the effect of deliberation (deliberative polling) relative to other public engagement methods, considering three challenges.

First, simple answers of “yes” or “no” to nuclear energy provide inadequate understanding of how to improve mutual understanding or guide technology innovation to address public concerns.

Second, the opinions recorded are often highly variable, which can lead to results that are misleading, inaccurate, and difficult to use as the basis for decision making. One source of variability is that the exact wording of questions can determine which underlying heuristics relevant to the question are triggered. The term “heuristics” refers to the mental short-cuts, underlying beliefs, and paradigms that everyone uses to filter and interpret information, to interpret what is around us, and to guide our actions and decisions. The heuristics dominating public evaluation need to be better understood, as well as how to catalyze discussion and dialogue that goes beyond pre-existing heuristics.

Third, current polling methods typically survey either (a) everyone in randomly selected samples independent of their knowledge or intensity of feeling or (b) only those very intensely interested, sufficient to participate in public hearings or file lawsuits. Neither provides an understanding of how and why attitudes and intensity vary among the public at large.

Objectives

The objectives of this research are follows:

1. Investigate different methods of public involvement and interactive discourse needed to increase the level of understanding about the nation’s energy future primarily dealing with nuclear energy within a context of the overall energy generation mix.
2. Provide an in-depth understanding of the public’s perception of current issues and roadblocks to nuclear energy and the various weights given to those issues when informed by public values.
3. Gain insights on technological innovation that can improve or worsen public evaluation of nuclear energy.

Approach

The team will involve a random sample of the public and subject them to three methods: written briefing documents, a traditional technical conference, and a deliberation session. A survey will measure public opinion on issues dealing primarily with nuclear energy and other alternatives which will be administered in a way to understand the separate and interaction effects of each treatment (improvement relative to the state-of-the-art). There is no attempt to "rig the game" toward any particular position.

The current state-of-the-art (for example "Deliberative Polls[R]") can measure changes in a sample of public opinion by citizens informed by using deliberation with a random sample of the population to be studied. We propose that by coupling such methods with a discussion and agreement-seeking style of facilitation during deliberation, the scope of disagreements in public opinion about proposed (in this case nuclear power) solutions required to meet future energy demand will be reduced. The opposite could occur - deliberative discussion could transform a wide range of relatively lightly-held initial opinions into 2-3 deeply held polarized positions. (History records that a deeply held minority position can overwhelm a lightly-held majority position.) This work is important because it will help engineers and scientists to understand methods required to engage the public needed to inform them to reach sound public judgment on scientifically laden public policy issues. The experimental design includes other novel aspects allowing researchers to understand: the separate effects of different types of public discourse, the effects of incorporating group learning principles in the facilitation, perceptions of an informed public on issues dealing with nuclear energy, and insights on public evaluation of issues that could help steer technology directions.

Accomplishments

This project was started in August 2007. The FY2007 accomplishments therefore relate to establishing the team via subcontracts and an initial meeting in September 2007. The team has clarified key methodological issues, as follows:

- What is the population to be sampled? The project will focus on the area best understood by the team - all or part of Idaho. A challenge is the relatively low population density of Idaho; it is impractical to ensure a representative sample of all areas via attending physical discussion meetings. So, sampling the entire state would require identifying ways to use technology to electronically deliberate.
- What is the unit of analysis? By including demographic questions in the survey instrument and using individuals as the unit of analysis, the team will be able to perform analysis using crosstabs that would provide flexibility to characterize several different communities and groupings.
- What is the sample size? Criteria to make a decision included cost, practicality, acceptable level of error, etc.
- What is the scope of survey questions to ask? It was decided that to ask questions that may be nuclear focused, but that it also be done in a context of alternative energy generation technologies.
- What and when to measure?
    - From pre to post testing, measure shifts in the mean as well as changes to the magnitude of the variance. This would include ways to measure the level of understanding, acceptance of ideas, and level of consensus.
    - Measure the intensity and motivations for participating in the study. It was also suggested to perform an exit survey that would ask why individuals decided to participate.

- Measure assumptions and other factors used by participants to make decisions. This may include religious and political orientations, levels of optimism/pessimism, ability to deal with ambiguity, assumptions about natural resources and the environment, etc.
- Measure differences based on the type of normalizing information provided to participants (i.e., position papers from different interests vs. neutral briefing documents)
- Determine where nuclear falls on a continuum of other generation technologies and solutions.
- Finally, when particular positions are taken, why did they take them? What kind of knowledge has an affect on public acceptance? Etc.
- Do not administer the survey after every treatment to the same groups because of learning curve bias (unless the data was taken over a long period of time such as in a time-series analysis). It was decided that those groups exposed to treatments would only undergo a pre and post test and the control group would only be exposed to a single post test.

Other information

No funding yet
No publications yet
No intellectual property yet

3 collaborations with universities
Boise State University (John Freemuth, Mike Louis, Carole Nemnich)
Idaho State University (Ann Oakes Hunter)
University of Idaho (Patrick Wilson)

One student involved (masters thesis)
Eileen DeShazo (Boise State)

2008

Project Number: CA115
Title: Investigation of Public Discourse Methods in Energy Policy Decision-making
Principal Investigator: Steven Piet
Co-Investigators: Jeffrey Joe (INL); John Freemuth, Mike Louis, Carole Nemnich, Eileen DeShazo, Mark Bathrick (Boise State University); Ann Hunter, Sheila Anderson (Idaho State University); Patrick Wilson, Paulina Starkey (University of Idaho)

TECHNICAL APPROACH

Public opinions regarding nuclear energy at an “actionable” depth are difficult to measure because of limitations of current public engagement methods. Here, “actionable” means sufficient to improve mutual dialogue or to guide technology research, development, or deployment. This project examines the effect of deliberation (“deliberative polling”) relative to other public engagement methods, considering three challenges.

First, simple answers of “yes” or “no” to nuclear energy questions provide inadequate understanding of how to improve mutual understanding or guide technology innovation to address public concerns.

Second, the opinions recorded are often highly variable, which can lead to results that are misleading, inaccurate, and difficult to use as the basis for decision making. One source of variability is that the exact wording of questions can determine which underlying heuristics relevant to the question are triggered. The term “heuristics” refers to the mental short cuts, underlying beliefs, and paradigms that everyone uses to filter and interpret information, to interpret what is around us, and to guide our actions and decisions. The heuristics dominating public evaluation need to be better understood, as well as how to catalyze discussion and dialogue that goes beyond pre-existing heuristics.

Third, current polling methods typically survey either (a) everyone in randomly selected samples independent of their knowledge or intensity of feeling or (b) only those very intensely interested, sufficient to participate in public hearings or file lawsuits. Neither provides an understanding of how and why attitudes and intensity vary among the public at large.

TECHNICAL OBJECTIVES

Fundamentally, this project is aimed at finding a middle ground between two extremes.

One viewpoint is that there is no way to meaningfully involve the public in highly complex, technical decisions because most members of the public lacks the technical understanding and few people will spend the time to understand the issues in depth. This viewpoint leads to Environmental Impact Statements and related engagements of the public occurring only after key framing decisions have been made, with the exception of a final go/no-go decision. Shaping and down-selection of alternatives has already happened, a stage where public values and priorities could be helpful. This approach is sometimes called Decide-Announce-Defend-Lawsuit.

The other extreme viewpoint is that the public should be fully engaged in all facets of technological decisions that will impact them and future generations, and no decisions should be made in the absence of consensus. Yet, consensus on a complex technical issue rarely (if ever) occurs. This approach could perhaps be called Paralysis-by-Analysis.

Applied to nuclear power, the first extreme would merely ask - do you support more nuclear power? The second extreme would have every technical facet open to public debate and decision before proceeding. Neither helps guide technology development. The draft R&D plan aims at a practical middle ground, to test at a practical level whether there is “actionable” information that can be obtained by deliberative polling and testing whether different “treatments” matter and (if so) how they matter.

Accordingly, our research questions have been condensed to the following:

- How do different types of public discourse (treatments) affect the public’s preference and resulting support for different options to meet electricity demand?
- How do different types of public discourse (treatments) affect the public’s support for technical research or policy alternatives that could eliminate or improve different options for meeting electricity demand?
- How do different types of public discourse (treatments) and the public’s intensity of opinion, psychological and demographic factors, social values, environmental factors, and assumptions affect their preference and support of different options for meeting electricity demand? As a corollary, how do these affect the likelihood and level of support/preference for improvements in energy options?
- How will the participants’ evaluations of the different treatments (e.g., the deliberative polling process vs. plenary only vs. only briefing materials), the speakers, mediators, and

facilitators (e.g., their knowledge, interaction styles, etc.) affect their support for different options for meeting electricity demand?

The detailed R&D plan has been prepared on schedule. Detailed hypotheses and pre/post survey instruments have been subjected to review by professional colleagues.

The process for selecting subject matter experts for focus group presentations has been started, as has the process for preparing briefing papers. Prior to conducting public focus groups, two primary things are still to be done - further polishing of the survey instruments and assembling final briefing papers and presentations. The deliberative focus groups will be held in the Spring of 2009, followed by extensive quantitative and qualitative analyses.

If these focus groups are successful, the third year of the project will more deeply explore views relative to nuclear technology development and explore attitudes evolving over time.

RESULTS AND ACCOMPLISHMENTS

This project was started in August 2007. The multi-institution and multi-disciplinary team is functioning well. Since this research project started, a number of insights have been gained on how the interpersonal dynamics of collaboration among multi-disciplinary experts affects team functioning, the evolution of research, goal formation, and the deliverable production. Overall, the research team agrees that the research has evolved – in the sense that the kernel idea of the research is still intact, but improved by input from the team, and that the biggest issue/factor for our success has been the ability of our multi-disciplinary team to have mostly open dialogue about everyone's perspectives and interests.

The best example of how the research has evolved is seen in the following: most of the research team (if not all) knows that this project is studying the effects of public discourse (process) on participant's attitudes (content) and their interaction. There is a tendency, however, for some researchers to frame the interaction differently, and as a result prioritize one over the other. For example, in early drafts of the original LDRD proposal, there was one effort to develop a research plan that studied "content" and another effort to study "process", which are two fundamentally different research questions. Different people on the team were advocating to do research on questions that other people felt pretty confident they already knew the answer to, and vice versa. That is, those that knew the research literature on "process" were interested in studying "content" and those that knew the research literature on "content" were interested in studying "process".

We have turned the original high-level hypothesis into (a) a set of specific research questions, (b) a matrix of treatments for different groups of participants, (c) a set of detailed hypotheses for each research question, and (d) a draft pre/post survey instrument. The draft R&D plan appears capable of answering the research questions and testing the original hypotheses.

The team has identified a series of “treatments” in support of the project’s objectives as follows:

Group 0 - Control - surveys, no information given to participants
Group I - pre and post surveys, presentations
Group II - pre and post surveys, deliberation session
Group III - pre and post surveys, briefing documents
Group IV - pre and post surveys, briefing documents and presentations
Group V - pre and post surveys, briefing documents, deliberation session

It is well known that survey instrument design is critical to obtaining valid results associated with human testing. To maximize quality, we have (a) analyzed the literature, (b) asked Idaho stakeholders what questions and issues they would ask focus groups and received suggestions from nine outside the team, (c) analyzed and re-analyzed draft questions within the diverse team, and (d) conducted tests.

Going in to the first test, we were operating under several assumptions. First, we assumed that participants would take the survey in a linear fashion. Next, we felt that the very detailed construct definitions we provided would be helpful to the participant. Finally, we were sure that the Likert-type scales used in our answer sets were the best way to capture the opinions of the test participants. In short, we assumed that the participants would see the survey in the same way we viewed it.

The first five test participants finished the surveys in an average of 13 minutes, which was surprisingly short. The participants offered much feedback, taking seriously the task we had asked them to undertake - to be brutally honest with their feedback. They did not disappoint. We gained insight, much of it surprising, into how someone unfamiliar with the project might approach the survey portion of our research. It turns out that extremely detailed, exhaustive construct definitions were distracting and confusing. The answer sets broke what could have been one larger question into five or eight, extending the length of the survey needlessly. We had also taken for granted that participants would understand what we meant by “renewables” or “fossil fuel.”

The next beta test incorporated suggestions from the first test participants; we changed the question answer sets from separate Likert scales into matrices. We changed the order of the questions and cut the construct definitions down to the bare minimum amount of wording. Through these changes, we were able to keep all questions in the survey, yet we reduced the number of pages by 3 ½ and improved the flow of the survey. This is important to help reduce fatigue for participants and to keep them engaged in the process. Of the four participants in the second beta test, one had been part of the first beta test. She was thrilled with the changes we made. The other participants had minor suggestions but were also happy with the survey. Interestingly, it took an average of 25 minutes for the participants to complete the questionnaire. From what we could determine, the increase in time was due to participants feeling engaged and interested, encouraging thorough consideration of each question.

SUMMARY AND CONCLUSIONS

In short, we have built an multi-institution, multi-discipline team prepared to conduct intensive and probing focus groups, as well as an R&D plan, survey instrument, protocol, and hypotheses for the current topic. This is aimed at complex technological questions.

2009

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Co-Investigators: Jeffrey Joe (INL); John Freemuth, Mike Louis, Carole Nemnich, Eileen DeShazo, Mark Bathrick, Kendelle Vogt (Boise State University); Ann Hunter, Sheila Anderson, Stephen Sorensen (Idaho State University); Patrick Wilson, Troy Hall, Paulina Starkey (University of Idaho)

The ground is littered with projects that failed because of strong public opposition. This LDRD project’s objective is to add to the Energy Policy Institute’s tool box to reduce project risk through encouraging the public to engage in more critical thought and be more actively involved in public or social issues. Early in a project, project managers and decision-makers can talk with no one, pro and con stakeholder groups, or members of the public. Experience has shown that talking with no one incurs high risk because opposition stakeholders have many means to stop most (if not all) energy projects. Talking with organized stakeholder groups provides some risk reduction from mutual learning, but organized groups tend not to change positions except under conditions of a negotiated settlement. Achieving a negotiated settlement may be impossible. Furthermore, opposition often arises outside pre-existing groups. Standard public polling provides some information, but does not reveal underlying motivations, intensity of attitudes, etc. Improved methods are needed that probe deeper into stakeholder (organized groups and members of the public) heuristics to increase the potential for change of opinions and/or out-of-box solutions. The term "heuristics" refers to the mental short-cuts, underlying beliefs, and paradigms that everyone uses to filter and interpret information, to interpret what is around us, and to guide our actions and decisions. Our team is two-thirds through the project to investigate stakeholder discourse methods in energy-policy decision making.

Background and Motivation

The traditional project approach is Decide-Announce-Defend (DAD) in figure 1. The traditional approaches to engaging stakeholder groups and individuals are neglect, education, or negotiate. "Neglect" is based on the premises that it is right and safe (from the project risk standpoint) to ignore those stakeholders potentially impacted by a decision and/or that they have nothing to contribute to a decision. We believe it is neither right nor safe and that diverse stakeholders can meaningfully contribute.[1] "Education" is based on the premises that "if only they understood, they would agree" and that there is a high fraction of stakeholders paying attention and willing and able to change their position. "Negotiation" is based on the premises that a straightforward in-between compromise between two opposite positions is worth pursuing and that those without prior positions nor organized groups representing their positions can be left out. "Negotiation" is often inadequate.

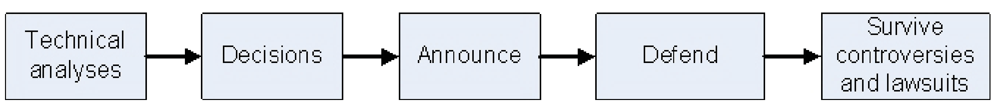

Figure 1. The traditional DAD project approach

The literature and common experiences indicate that people are, and must be, "cognitive misers"; they only devote as much time to an action or decision as they perceive is required. The types of potential behavior have been described as follows with increasing cognitive effort required in going down the list:[2]

- Skill-based (auto pilot), do it the way it has always been done, interpret new information on the basis of existing heuristics. Appropriate for a familiar task or situation. Low attention required.
- Rule-based (if this, then do that), recognize when to apply a different heuristic or weight heuristics differently.
- Knowledge-based (think it through), analyze the situation and develop a new approach or new heuristic if needed. Appropriate for unfamiliar task or situation. High attention required.

[1] An example: Some of this team previously conducted focus groups for the potential next generation nuclear plant, which would produce hydrogen as one of its products. One participant considered hydrogen from his personal experience - the practice of making gas in his home safer by adding an odorant - and wanted to know if this would be used for hydrogen from the power plant. The "experts" had given this little thought nor had an answer ready.
[2] Adapted from James Reason, Managing the Risks of Organizational Accidents, 1998.

A telephone poll tends to invoke skill-based behavior based on existing heuristics; there is not time for assimilation of new information or use of potential rule or knowledge-based behavior. This tells us whether a project or energy option is supported, but does not tell us how those being sampled will respond to new information and discussion over the required years or decades of a project or R&D program. That would require understanding heuristics and how they may change.

So, we are left with a trap: we need to understand heuristics and how they may change, but this requires more cognitive effort than skill-based behavior and simple polling methods and thus heuristic change is both difficult to induce and difficult to measure. Only focus groups and other deliberative methods can trigger rule-based and knowledge-based behavior, probe into heuristics, and possibly change heuristics. Even better would be longitudinal observations to measure time dependent changes. This project conducted a detailed set of focus groups in FY2009 and will probe longitudinal changes in FY2010.

Why do we care about potential changing of heuristics? First, sometimes out-of-box thinking is the only pathway to a sustainable solution.

> **"**Problems cannot be solved at the same level of awareness that created them.**"** attributed to A. Einstein

Second, if opinions are already polarized (as they tend to be in energy matters), only some change somewhere can lead to a sustainable solution that isn't sabotaged by one side or the other. Third, energy projects require years if not decades to completion: knowledge, stakeholder values, and available resources often change significantly in such time periods. Options that are initially in agreement or convergence with knowledge, values, and resources can drift out of convergence, leading to failure.[3]

Heuristics are difficult to change as pointed out by Economics Nobel Prize winner D. Kahneman. Heuristics change only with a big shock to the system (punctuated equilibrium) or sustained pressure over time (incrementalism) and if a person (or group) is sufficiently motivated and able to process new information. When new information is processed with existing heuristics, it can serve to merely anchor existing opinions. Heuristic changes are difficult to cause and therefore difficult to measure in semi-controlled situations - the shocks or the time for changes to occur can be inadequate, as suggested in figure 2.

[3] S. J. Piet et al, "Making Sustainable Decisions Using the KONVERGENCE Framework," Waste Management 2003, Tucson, Arizona, February 2003.

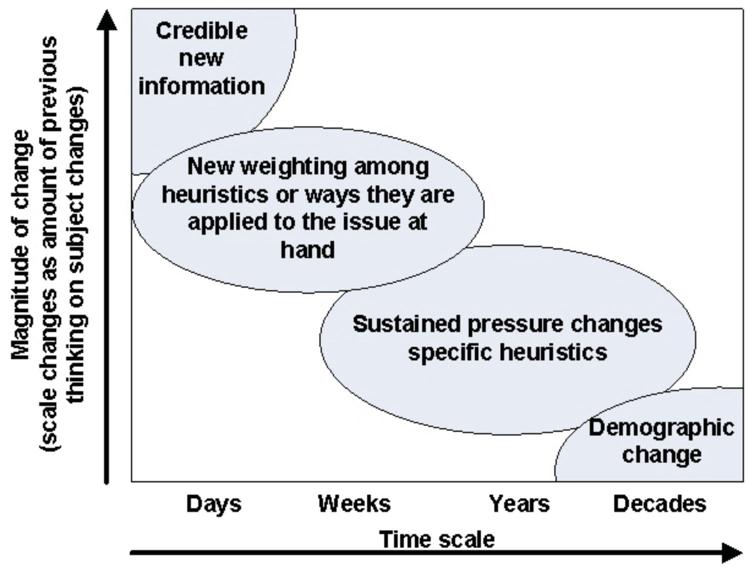

Figure 2. Changing heuristics, heuristic weighting, or how heuristics are applied to an issue is difficult.

Technical Objectives and Approach

The technical objectives of this research project were to answer the following questions:

- How do different types ("treatments") of public discourse affect the public's preference and resulting support for different options to meet electricity demand?
- How do different types of public discourse affect the public's support for technical research or policy alternatives that could eliminate or improve different options for meeting electricity demand?
- How do different types of public discourse and the public's intensity of opinion, psychological and demographic factors, social values, environmental factors, and assumptions affect their preference and support of different options for meeting electricity demand? As a corollary, how do these affect the likelihood and level of preference/support for improvements in energy options?
- How will the participants' evaluations of the different treatments, the speakers, mediators, and facilitators affect their support for different options for meeting electricity demand?

Our underlying model is shown in figure 3. The survey instrument was designed to measure reflective (directly expressed) preference, importance among attributes, evaluation of energy options for each attribute (the weighted sum of attributes gives us the formative preference for each participant), and support measured by how much of a $100 utility bill should be given to each energy option - fossil, nuclear, hydro, renewable, or energy conservation and efficiency. The survey instrument then proceeded to ask participants to imagine a key improvement to each energy option and then asked how that would change their preferences. This was posed to obtain "actionable" information in the sense of probing changeability of preferences and importance of potential R&D achievements. We also asked standard demographic questions, political viewpoint, and evaluation of energy expert panelists.

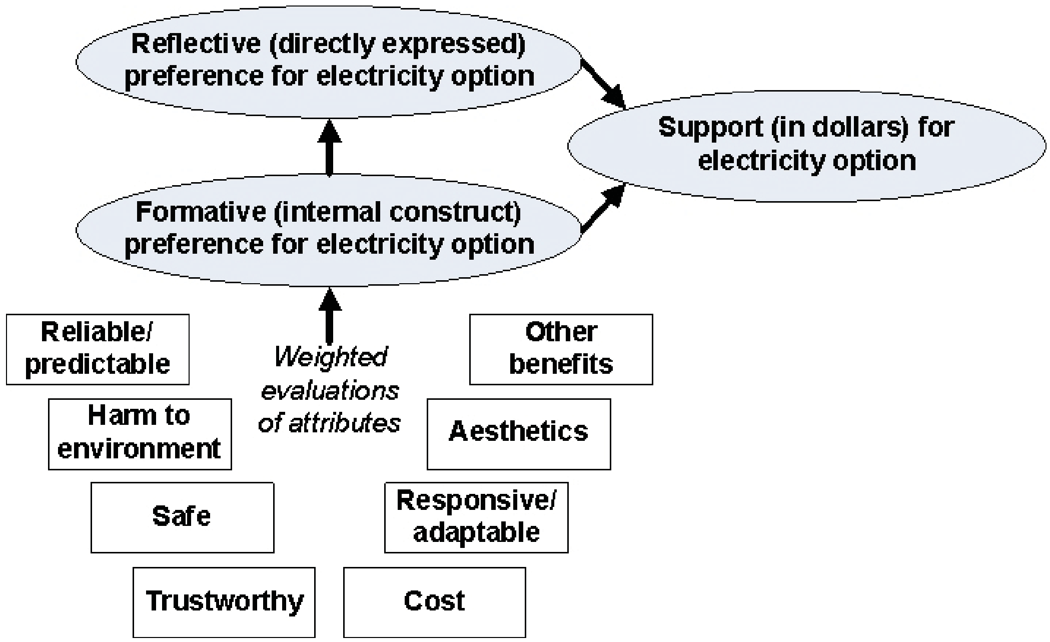

Figure 3. Our model motivating our experimental design

We obtained mail-in responses and then asked a subset of responders to attend focus groups. The experimental matrix of the focus groups varied discourse methods or "treatments" was as follows:

- Survey only - control group
- Session with seven experts (no deliberation)
- Session with seven experts and deliberation
- Briefing paper only
- Briefing paper, session with seven experts (no deliberation)
- Briefing paper, session with seven experts and deliberation

Results and Accomplishments

This year's research effort culminated in March 2009 when 511 citizens returned a detailed energy policy survey and April 2009 when 76 Idaho Citizens from the Treasure Valley (near Boise) participated in focus groups. Analysis of the huge data set is still underway and it is premature to give a complete description of what we are still learning. Furthermore, in the last year of the project we will interview some of the participants to obtain some longitudinal data, e.g., did their participant lead to more or less attention to energy issues, did they search out new information sources?

Preliminary observations include the following:

- Reflective preference, formative preference, and support were not totally consistent with each other, although there were positive correlations among them. The treatments and expression of importance of attributes were designed to test the relationships among these three preference/support measures.
- The percent of all respondents that expressed reflective preference for energy options was 92% for renewables, 92% conservation, 87% hydro, 69% nuclear, and 47% fossil. The distribution for nuclear and fossil showed polarization; with "strongly support" and "strongly oppose" the two most common answers (-5 and +5 on a 9 point scale).

- The percent of all respondents that would put a non-zero amount of their $100 toward each of the energy options was 89% renewables, 85% conservation, 81% hydro, 66% nuclear, and 52% fossil.
- Few among all respondents would put more than 50% of their $100 to a single energy options. "Few" is 10% for renewables, 8% nuclear[4], 7% hydro, 2% conservation, 0% fossil. That is, 10% of respondents would put $100 of $100 into renewables.
- The eight attributes in figure 3 were independent of each other, except for some clustering revealed by a preliminary factor analysis: safety, trustworthiness, environmental harm clustered for fossil and nuclear (indicating that these reflect a combined underlying view of each technology) and safety, environmental harm, aesthetics, and other benefits clustered for hydro.
- 90% of those who received the briefing paper viewed it positively, meaning our multi-discipline and multi-viewpoint approach to preparing the briefing paper achieved credibility among those with different energy option preferences.
- Participants' assessment of the credibility of the seven energy experts varied. We are investigating cause and effect - were experts with views matching pre-test opinions viewed more credibly or did the credibility of experts lead to different post-test opinions?
- There was no decisive change in opinion on any of the energy options among focus group participants. There were increases and decreases in reflective preference among treatments. Formative preference increased slightly for conservation and fossil. Support increased slightly for fossil and decreased slightly for renewables.
- We have not yet analyzed for consistency between attribute importance as directly expressed by participants versus attribute importance back-calculated from their reflective preference and their assessment of each energy option for each attribute.
- We have not yet analyzed for the impact of postulated R&D achievements.
- In general, the changes were subtle and conclusions are limited by the statistical power of the experiment.

The team has made these public presentations and documents.
- M. C. Louis and C. De Sy, Letter to potentially interested stakeholders asking input, December 12, 2007.
- E. R. DeShazo, et al, Investigation of Public Discourse Methods in Energy Policy Decision Making, Annual Meeting of the Idaho Academy of Sciences, March 27, 2008.
- Energy Policy Institute, "Options for Meeting Electricity In Idaho," March 23, 2009.
- M. C. Louis presenter, Energy Policy Institute, "Options for Meeting Electricity Demand in Idaho," April 18, 2009.
- M. C. Louis presenter, Comparing Methods to Inform Public Opinion: A Multi-Institution Study on Options to Meet Electricity Demand in Idaho," American Democracy Project meeting, Baltimore, Maryland, June 12, 2009.

We have also these internal working documents:
- J. C. Joe, E. R. DeShazo, Stakeholder and Literature Question Database, February 5, 2008.
- J. C. Joe, E. R. DeShazo, Literature Review Matrix, March 3, 2008.
- J. C. Joe, M. C. Louis, C. D. Nemnich, E. R. DeShazo, Research Plan, Investigation of Public Discourse Methods In Energy Policy Decision-Making July 25, 2008.
- Survey questionnaire, March, 2009.

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[4] Recall that participants were randomly selected from Ada county Idaho, which includes Boise and is 270 miles from the Idaho National Laboratory. So, we are unlikely to have any INL employees in the sample.

Summary and Conclusions

If existing decision support tools and approaches were adequate, energy policy would not be in the condition it is in. We aim to build on and integrate multi-disciplinary efforts to improve stakeholder and public engagement. The final year of the project will complete our analysis of focus group results, add longitudinal data, and produce various publications. Improving the EPI tool box strengthens its potential as a 1-stop place to shop for energy policy and adds potential value and reduces risk to INL and CAES projects. The goal of testing these deliberative processes in this research is to understand how we might break the current gridlock on these issues and allow real policy deliberation and learning to occur - the kind that improves dialogue and understanding, guides technology research, development, and deployment, and most importantly, facilitates our ability to make the tough decisions that will ensure our energy future.

Appendix J - Fact Sheets from the Study

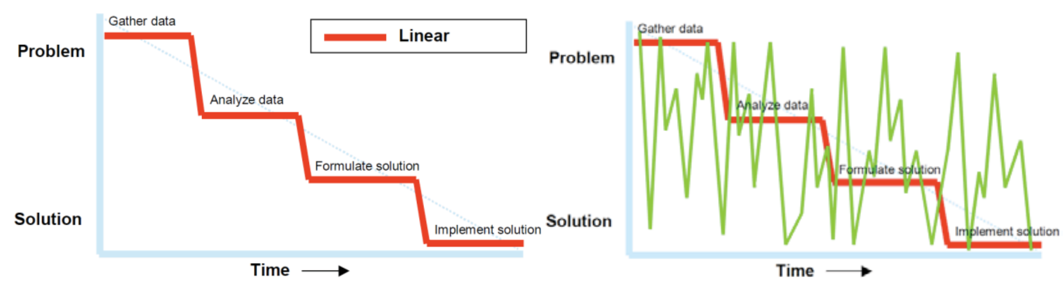
1. Fact Sheet - **Wicked Problems: Why They are Important, and What Can Be Done About Them?**
By Jeffrey C. Joe, on behalf of the BSU-ISU-UI-INL Team

A wicked problem is one that is difficult or impossible to solve because of incomplete, contradictory, and changing requirements that are often difficult to recognize. A wicked problem is often one whose solution requires large groups of individuals to change their mindsets and behaviors. Moreover, because of complex interdependencies, the effort to solve one aspect of a wicked problem may reveal or create other problems. Wicked problems are characterized by the following:

1. The solution depends on how the problem is framed and vice-versa (i.e. the problem definition depends on the solution).
2. Stakeholders have radically different worldviews and different frames for understanding the problem.
3. The constraints that the problem is subject to and the resources needed to solve it change over time.
4. The problem is never solved definitively[1].

Many of today's most pressing societal issues are wicked problems, and the "do nothing" option will almost certainly lead to an unsustainable future. For example, the challenge of addressing the United States' energy needs has relatively high levels of technical complexity, increased polarization of views/opinions, and competing science. And ignoring our energy needs and hoping it will go away will not solve the problem.

It is also important to point out that the traditional "management by objectives" (MBO) approach is ineffectual on wicked problems[2]. As Figure 1 shows, the MBO approach was designed for well-understood problems, and essentially "Works by defining the objective, identifying tasks to reach that objective, developing a schedule for starting and finishing each task, and then monitoring the progress of each task"[3]. The MBO approach is ineffectual because the dynamics of wicked problems are not understood well enough, as illustrated by the green line.



Many strategies have been proposed that can be used to address wicked problems, and while all of the strategies have a "management by discovery" element to them (see footnote 3), most fall within three general classes: Authoritative, Competitive, and Collaborative (see footnote 1). While there are pros and cons to each strategy, and choosing which strategy to use is a function of personality and the specific wicked problem being addressed (among other things), it should also be pointed out that none of these strategies explicitly incorporate MBO principles. Giving up MBO can be difficult – it is similar to breaking an old habit. Nevertheless, looking to other strategies may yield new and revolutionary solutions to problems once thought impossible to solve. Some problems that are thought to be unsolvable are not that way by their nature, but by the approach taken to solve them.

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[1] Rittel, Horst, and Melvin Webber; "Dilemmas in a General Theory of Planning," pp. 155–169, Policy Sciences, Vol. 4, Elsevier Scientific Publishing Company, Inc., Amsterdam, 1973. [Reprinted in N. Cross (ed.), Developments in Design Methodology, J. Wiley & Sons, Chichester, 1984, pp. 135–144.], http://www.uctc.net/mwebber/Rittel+Webber+Dilemmas+General_Theory_of_Planning.pdf

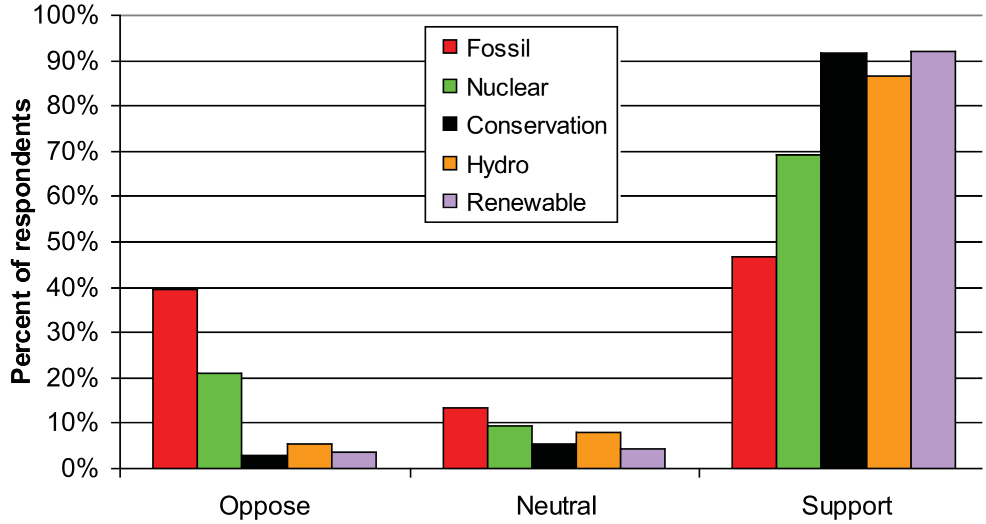
[2] Conklin, J. Wicked Problems & Social Complexity, (http://cognexus.org/wpf/wickedproblems.pdf) Chapter 1 of Dialogue Mapping: Building Shared Understanding of Wicked Problems, Wiley, November, 2005.

[3] Klein, G. and Rothman, J. (2008). New Directions: Staying on course when your destination keeps changing. The Conference Board Review, November 2008.

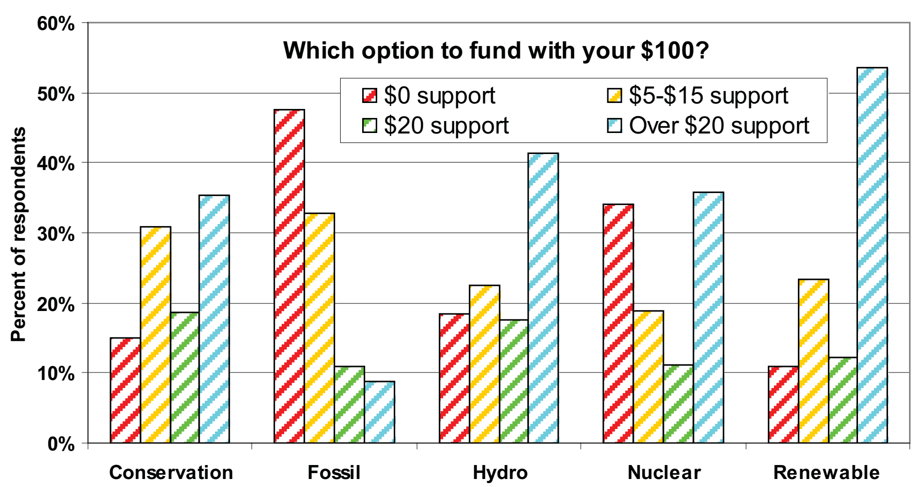
2. Fact Sheet - Which Energy Options were Supported by Surveyed Idahoans?

Steven J. Piet, on behalf of the BSU-ISU-UI-INL Team

An Energy Policy Institute (EPI) team from Boise State, Idaho State, University of Idaho, and Idaho National Laboratory conducted focus groups in 2009, probing attitudes about energy options. Randomly selected people in Ada County were invited to complete a survey with five electricity options: fossil (coal, natural gas), nuclear, conservation and efficiency, hydro power, and renewable energy (wind, solar). When asked their support or opposition, renewables and conservation had the most support (and least opposition), followed by hydro, nuclear, and then fossil.



Another question was how to allocate $100 among energy options. With 5 options, an equal share to each would be $20, and our results generally showed support was diversified across all of the options. The percent of all respondents that would put a non-zero amount of their $100 toward each of the energy options was 89% renewables, 85% conservation, 81% hydro, 66% nuclear, and 52% fossil, similar to the percentages that expressed some support in the previous question. Few would put more than half of their $100 to a single energy option. "Few" is 10% for renewables, 8% nuclear, 7% hydro, 2% conservation, 0% fossil. That is, 10% of respondents would put at least $50 of $100 into renewables.



3. Fact Sheet - Observing and Intervening in Meetings to Improve Outcomes
By Jeffrey C. Joe, on behalf of the BSU-ISU-UI-INL Team

One reason meetings go poorly is when the meeting participants are not adept at handling discussions that have opposing opinions, strong emotions, and high stakes[4]. Most people are not naturally adept at this type, because it tends to cause a stress-based response. Stress can manifest itself as unwarranted aggressiveness or defensiveness, leading to mistrust, communication breakdowns, and "stuck" meetings.

This fact sheet provides suggestions on improving meeting outcomes[5]. Active listening and making insightful observations as part of interventions during meetings can help get meetings "unstuck" because they help identify what the 'root causes' are of the issue(s). And once the underlying causes are understood, the chances that the situation can be addressed improve.

1. **Observe the situation carefully.** Anticipate and/or pay attention to when the discussion has opposing opinions, strong emotions, and high stakes. This is different from paying attention to the *topic* of the discussion. Nevertheless, it is under these conditions that one will most likely need to perform an intervention.
2. **Actively listen while withholding judgment.** Actively listen to and understand all of the opinions being voiced. Actively listening can be enhanced if you can deduce what the underlying heuristics are that are influencing the expressed opinions. Even if you have a strong opinion, suspend judgment, hold your criticism, and avoid arguing or selling your point right away.
3. **Reflect and summarize**. Learn to mirror the other person's information and emotions by paraphrasing or summarizing key points. Test your diagnosis of their heuristics to deepen understanding. You don't need to agree or disagree. Reflecting is a way to indicate that you heard and understand. Don't assume that you understand correctly or that the other person knows you've heard him. Active listening is first about understanding other opinions, then about being understood.
4. **Intervene.** Share your observations of what interpersonal dynamics you are seeing. As you gain a clearer understanding of other's perspectives, you can then introduce your observations and diagnoses of why the meeting is getting stuck. For example, you see person (or group) A and person (or group) Z have opposing opinions, and they both have a lot invested in the outcome of the decision. Your intervention would be to point out a) the differences in opinions between the two, b) how everyone recognizes that there's a lot riding on the decision to be made, c) how people may be assuming the decision is an either/or, and d) that there may be a decision that is a win-win.
5. **Think about the greater good.** Getting a meeting unstuck depends entirely on moving beyond just thinking about yourself and what you want. Whether you are concerned about appearing stupid and try to win every argument, or are concerned that there is a scarcity of resources and you need to get yours (to either survive or increase your power), the key to getting meetings unstuck is to remove your ego from the situation and work towards win-win solutions[6].

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[4] This fact sheet is primarily derived from Crucial Conversations: Tools for Talking When Stakes are High (2002) by Kerry Patterson, Joseph Grenny, Ron McMillan, and Al Switzler.

[5] Some of these suggestions are derived from: The six skills for successful active listening (2008) by George Ambler. http://www.thepracticeofleadership.net/2008/11/09/the-six-skills-for-successful-active-listening/

[6] Some believe conflict should be avoided at all costs. I do not. Conflict happens, but it can and should be healthy. Conflict is healthy when it leads to the exploration of new ideas, the thoughtful testing of assumptions, positions, and beliefs, and when it stretches the imagination.

4. Fact Sheet - Public Communication Planning Checklist for Project Managers
Steven J. Piet, on behalf of the BSU-ISU-UI-INL Team

Early in a project, project managers and decision-makers may decide to talk with no one, pro and con stakeholder groups, or members of the public. Experience has shown that **talking with no one** incurs high risk because opposition stakeholders have many means to block energy projects. **Talking with organized stakeholder groups** provides some risk reduction from mutual learning of positions; however, organized groups tend not to change positions except under conditions of a negotiated settlement.

Achieving a negotiated settlement may be impossible. Furthermore, opposition often arises outside pre-existing groups. **Standard public polling** provides some information, but does not reveal underlying motivations, intensity of attitudes, etc. Improved methods are needed that probe into stakeholder heuristics to increase the potential for change of opinions and/or out-of-box solutions. The term "heuristics" refers to the mental short-cuts, underlying beliefs, and paradigms that everyone uses to filter and interpret information, to interpret what is around us, and to guide our actions and decisions. The following is an important checklist of questions to think about for project managers.

1. Audience assessment relative to your message/position

- What are their likely dominant values and beliefs or heuristics?
- What is their prior level of knowledge of the topic?
- What are their values relative to the topic?
- What do they perceive to be the available resources relative to the topic?
- What do they want to come out of the communication/activity?
- What role do they play in identifying and selecting solutions to the topic?
- What will make them participate?
- What will keep their attention during the activity?
- What will motivate them to action after the communication/activity?
- What is their psychological distance from the topic?

2. Which of these objectives will be most beneficial for you to use?

- Understand/test heuristics? If so, do you know how you will use the information?
- Reinforce their existing heuristics?
- Change weighting among existing heuristics?
- Change heuristics or make new ones?
- Gain new information from participants? If so, do you know how you will use it?
- Provide new information to participants? "Education" is based on the premises that "if only they understood, they would agree" and that there is a high fraction of stakeholders paying attention and willing and able to change their position.
- Negotiate among stakeholders? "Negotiation" is based on the premises that a straightforward in-between compromise between two opposition positions is worth pursuing and that those without prior positions nor organized groups representing their positions can be left out.
- Build your credibility or that of your organization?
- Take some action after the communication/activity? What action?

3. Assess your process and presentation materials relative to your objective?

- Are you in one-way "tell" mode or two-way "dialogue" mode?
- Likely to reinforce existing heuristics or possibly change their heuristics?
- Are you addressing the needs and objectives of your audience?
- How will you assess success, what are your metrics of success?

5. Fact Sheet - Citizen Support for Nuclear in Idaho

Ann Hunter, on behalf of the BSU-ISU-UI-INL Team

An Energy Policy Institute (EPI) team from Boise State, Idaho State, University of Idaho, and Idaho National Laboratory conducted deliberation groups in April 2009, probing attitudes about energy options. Participants expressed their preferences for nuclear, fossil, renewable, energy conservation and hydroelectric power by responding to questions that asked their formative preference, reflective preference, level of support, support for solving challenges, and the likelihood of a solution to energy outcomes.

A few of the interesting results are those concerning ***nuclear energy*** and the ***allocation of income tax returns to solve the problems of nuclear power***. Note the following—all of which are the changes, on average, after deliberation in the April event [a]:

- Republicans, as a group would increase their allocation from pre- to post-survey by $22.
- Past research has shown that political ideology is a good predictor of support for nuclear power. Republicans tend to support nuclear as a way to meet electricity demand. And, Republicans support solutions to the problems of nuclear power more strongly after being 'educated' about nuclear power. This education can occur through any number of communication mediums (e.g., balanced reading materials, talking with experts, and/or talking with peers).

- People reading the briefing document and attending the deliberative event increased their allocation by $16 from pre- to post-survey when controlling for gender and for political party.
- People reading the briefing document and attending the deliberative event increased their allocation by $18 from pre- to post-survey when controlling for marital status and event groups.
- Past research has shown gender, political views, and marital status affect support for nuclear power. Women, liberals, and divorced people tend to support nuclear power less. However, when accounting for the effects of gender, political views, and marital status, when people read balanced information about ways to meet electricity demand, including the use of nuclear power, people tend to increase their support for solutions to the problems for nuclear power.
- Compared to other occupational groups, professionals would increase their allocation of funding to nuclear solutions by $16.
- Compared to other occupational groups, those in service occupations would decrease their allocation by $22.

- As people become more knowledgeable about the different ways to meet electricity demand, their occupation affects the extent to which they support solutions to the problems of nuclear power (e.g., occupation acts as a filter of information).

[a] Event Group 3 received pre and post tests and the briefing document.

The following tables provide further detail of the analysis.

Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Nuclear Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Nuclear		
	B	F Values	N
Political Party		5.905**	100
Republican	22.316*		
Event Groups		2.395**	
Group 3	16.524**		
Years of Education[a]			
Education x Event Group x Covariate		2.455*	99
Gender (Female=1)[a]			
Event Groups		2.346*	100
Group 3	16.005*		
Age		8.926**	96
Pre-survey (Covariate)		4.602*	
Age x Event Groups x Covariate	2.225*		
Years in Idaho[a]		NS	99
Marital Status		4.042*	99
Divorced	38.467***		
Event Group		2.379*	
Group 3	18.114*		
Income		NS	88
Civic Engagement		NS	100
Employed Full Time (1=Yes)		NS	100
Self-Employed		NS	100

Absolute Values for Change in **Level of Support** for Research to Solve Challenges of Nuclear Controlling for Effects of Independent Variables, Covariates (Q14)

Variables	Level of Support for Nuclear		
	B	F Values	N
Professional Occupation[a]	15.748**	7.929**	100
(1=Professional)			
Event Group		2.505*	
Group 3	15.898*		
Professional x Group x Covariate		2.331*	
Service [a]	-22.461**	8.424**	100
Event Groups		2.793*	
Group 3	17.585*		
Service Occupation x Groups x Covariate		2.116*	
Sales[a]		NS	100
Farming and Forestry [a]	-71.628	11.363**	25
Construction		NS	38
Production[a]		NS	37
Government		NS	43
Household members 18 or over[a]	NS	5.717**	100
Event Group		2.719*	
Group 3	17.589		
Household members 17 or under		NS	28

*p<.05 **p<.01 ***p<.001 [a] Interpret with caution: violation of homogeneity of variance

6. Fact Sheet – Heuristics: How Soft Sciences Can Help Hard Engineering
Steven J. Piet, on behalf of the BSU-ISU-UI-INL Team

As a researcher, you won't have impact and the INL can't be world class unless our research influences heuristics. "Heuristics" are the mental short-cuts, underlying beliefs, and paradigms that everyone uses to filter and interpret information, to interpret what is around us, and to guide our actions and decisions.

Consider: what induces you to read one journal article or report and not another? What impact will your next article have? Your research is supposed to be something new; will it merely reinforce existing heuristics (even if it shouldn't) or will it have impact?

My fellow engineers don't always process and filter information in allegedly logical ways. All humans (even engineers) are cognitive misers, we spend as little time analyzing something as we think we have to; we depend on our existing heuristics to filter and process information. The ability to change heuristics is even more difficult than you probably imagine.

As a result of recognizing the persistence of heuristics, I'm changing my technical writing. Consider this change in the first sentences of a journal article nearing publication.

1st version - factually correct but boring and uninteresting. Worse, the broader insights and heuristic changes (beyond the specifics of the now-defunct GNEP program) aren't brought to the reader's attention.

> *This paper summarizes analyses associated with potential deployment of GNEP technologies and infrastructure.*

2nd version - still boring, doesn't quickly and explicitly attack the tendency to analyze fuel cycle options in a static way.

> *Years of performing dynamic simulations of advanced nuclear fuel cycle options provide insights into how they could work and how one might transition from the current once-through fuel cycle. This paper summarizes those insights from the context of the 2005 objectives and goals of the U.S. Advanced Fuel Cycle Initiative (AFCI).*

Current version - harder hitting start, try to change existing "static analysis" heuristic to dynamic analysis by pointing out in the first sentence something basic about life and then point out a related reality in the real world of competitive industrial analysis.

> *Nothing in life is static, so why compare fuel cycle options using only static, equilibrium analyses? Competitive industry looks at how new technology options might displace existing technologies and change how existing systems work. So too, our years of performing dynamic simulations of advanced nuclear fuel cycle options provide insights into how they might work and how one might transition from the current once-through fuel cycle. This paper summarizes those insights with the context of the 2005 objectives and goals of what was then the U.S. Advanced Fuel Cycle Initiative (AFCI).*

Another example - In radiation safety, we have the linear, no threshold (LNT) theory, which says that the risk to humans is linear with radiation exposure, down to zero, i.e., any exposure has risk. Writing in 1998 on behalf of the French Academy of Science after their extensive review of the subject, M. Tubiana wrote, "*Unfortunately, the linear no-threshold model, which had been initially selected for its simplicity, became with time a dogma in some radioprotection circles and those who did not agree with it were considered to be heretics, trouble makers, or just stupid*." Yet, 12 years later, the LNT theory is still the dominant heuristic. Why? If the bad science behind LNT was to be realized, sooooo much would change.