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Citizen preferences for possible energy policies at the national and state levels

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A R T I C L E I N F O

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A B S T R A C T

Without knowledge of citizen preferences, policy makers most often rely on their intuition to infer such preferences or on biased information provided by special interest groups. Using a choice-modeling approach, the study features two large-scale, field-research projects—one done nationally in the US, and another composed of separate data collection efforts across eight states where energy policies have a high profile in public discourse. The results suggest four outcomes of energy policies are most important to citizens at the national level: 1) environmental quality, 2) energy costs, 3) job creation, and 4) greenhouse gas emissions. This pattern of importance for the outcomes of energy policy persists across important demographic groups including those related to political-party affiliation. At the state level, the four preferred outcomes of energy policies seen at the national level also appear—although in a different order of preference in some states. Further analysis of citizens' willingness to change energy policy at the state level suggests that risk aversion characterizes citizens' views about revising energy policy.

1. Introduction

Conflict characterizes efforts to develop policies that result in cheap, secure and clean energy (Griffin, 2014, p. 3). Although technology improvements related to fracking used in oil and gas exploration have boosted the ability of markets in recent years to deliver cheap and secure energy in what is being termed the Shale Revolution (Braziel, 2016), markets continue to struggle in delivering clean energy cheaply and in sufficient quantities to be considered secure (Lee et al., 2016).

Policymakers contend with uncertainty pertaining to public attitudes and acceptability of outcomes of energy systems (Butler et al., 2015). This study offers an empirical approach for reducing uncertainty in policymaking by capturing citizen preferences for possible energy policies at the national and the state levels.

This study features two large-scale, field-research projects—one done nationally in the US, and another composed of separate data collection efforts across eight states where energy policies have a high profile in public discourse. In this way, the study reports on how citizens view the outcomes of energy policies made at two primary levels of government. This study also offers insight on how citizens perceive the risk associated with possible energy-policy changes and how citizen perceptions align with concepts from behavioral economic theory (Thaler, 2015).

2. Background

2.1. Coping with uncertainty in policymaking

Policy makers are bombarded with survey information that presents the views of those who have the most to gain or lose if a policy is implemented (Leggett, 2014). Such survey information is usually presented as part of lobbying efforts. Here, the survey information is presented as free-floating polling numbers lacking context or any trade-off for citizens. In addition, public opinion surveys key-in on sound-bite issues and fail to deal with detailed policy options and do not include any meaningful discussion about trade-offs.

Despite the low-level of valuable information on citizen preferences in energy policy currently available to policy makers, energy industry consultancies now understand the implications of a networked world for extractive companies and for energy service companies. Accenture notes the coming importance of public engagement in energy policy:

> *"In the future, consumers will need to understand the trade-offs and competing objectives in energy policy to provide suitable support to political officials and regulators. Governments need to find ways to educate and include the public in choices for the longer-term changes. It is critical that consumers be aware that there are no simple solutions and that any choice will have direct implications. This awareness will allow*

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policymakers to begin a more informed debate about future energy policy."

(Accenture, 2010)

Accenture's call implies that citizens can rapidly learn about issues related to energy and the environment. Obtaining the expertise of knowledgeable elites from across society would be attractive to those scholars advocating "cognitive democracy" as a means for solving complex issues facing society, such as energy policy (Farrell and Shalizi, 2015; Noveck, 2015). By comparison, those advocating collective intelligence or crowdsourcing cite variations of Condorcet' Jury Theorem when asserting that large groups perform better when making a decision (although large groups will not be infallible) (Dietrich and Spiekermann, 2013; Landemore, 2012; Surowiecki, 2004). In such crowdsourcing, each person votes independently and each voter is assumed to be competent. Importantly, each voter receives equal weighting in the tabulation and analysis of the votes.

2.2. Deriving citizen preferences through choice modeling

Such equal weighting is a hallmark of survey research in social science and in commercial marketing research. Conjoint analysis is one approach for deriving the relative importance among product attributes for customers in new product development (Hair et al., 2010). It is particularly effective in informing marketing managers how to improve current or planned offerings (McQuarrie, 2016, p. 277) because it puts respondents in a series of trade-off situations.

Conjoint analysis is a decompositional modeling technique developed on the idea that individuals can evaluate objects based on the distinct amounts of value provided by each attribute (Hair et al., 2010). Conjoint analysis can be fielded in a variety of ways and can return ranked data, rating data, or merely the self-stated importance weights given by respondents to different features. This latter approach is termed self-explicated conjoint.

In pursuit of measuring citizen policy preferences in trade-off situations, Peterson put respondents in trade-off situations in order to gauge the relative importance citizens accord to different dimensions of living in society, such as freedom, conservation of the environment, economic opportunity and cost of living (Peterson, 2006). This research utilized conjoint analysis and featured primary data from respondents in three countries (the US, France and Turkey).

A conjoint study can also be designed as a discrete choice experiment (DCE) through the construction of a hypothetical market that can be administered in the field using a survey approach (Louviere et al., 2006; Carson et al., 1994; Louviere and Woodworth, 1983). DCE methods are a method of stated preference elicitation. They consist of several choice sets with each set comprised of mutually exclusive hypothetical alternatives from which respondents choose their preferred one. Because these configurations have been mathematically generated, the importance weights for the entire groups can be derived. By comparison, conjoint analysis allows modeling at the individual level, so that the importance weights for the attributes and the varying levels of each attribute are the principal output of the conjoint analysis. Despite this limitation, Bayesian methods with bootstrapping can be employed with discrete choice studies, so that the importance weights at the individual respondent-level can be estimated. Policy researchers have applied DCEs for a variety of purposes, such as 1) deriving natural environment valuations (Hoyos, 2010), 2) estimating preferences for green-energy type (Borchers et al., 2007), 3) quantifying public preferences for the siting of wind farms, (Álvarez-Farizo and Hanley, 2002), as well as informing decision-making in healthcare policy (Lancsar and Louviere, 2008).

In sum, DCEs offer policymakers a sophisticated method for deriving citizen preferences for policy outcomes. The analysis of DCEs offer researchers the relative importance weights for separate dimensions of comprehensive policies that might be implemented. In this way, the results of DCEs represent collective intelligence about the public interest in policy domains, such as energy and the environment. The use of DCEs in policy research takes advantage of policymakers' and their staff members' expertise in interpreting the outputs of quantitative statistical methods to derive the aggregated value individuals might have for policy outcomes. DCEs offer citizens a means to participate directly in policymaking by informing policymakers about citizen priorities.

3. Research questions

Prior to conducting the discrete choice experiment (DCE) in field research, we set the research objectives and then conducted supporting qualitative research (Louviere et al., 2006). The qualitative research phase was combined with a literature review of national political parties' published stances on energy and environmental issues. We ultimately wanted to assess the preferences of citizens for energy policy components via a survey. Too often in survey research, respondents are presented with a series of individual items and simply asked to rate how important each item is to them. The problem with this approach is that it does not account for the trade-off context for most choices humans typically encounter, so it fails to capture the reality of actual decision-making and the mental processing being used.

Our first objective was to assess how preference for environmental outcomes of energy policies compare to preferences for outcomes for consumers' energy consumption and for economic development in society. Our second objective was to conduct sub-group analysis in each study to better understand the possible moderating effects of important demographic variables, such as political-party affiliation. In this way, we intended to better understand the public interest by assessing the degree of fragmentation or unity about priorities for energy policy outcomes. Our third objective was to assess bounded-rational views of citizens when put in trade-off situations concerning risky choices (Jones et al., 2006; Kahneman and Tversky, 1979). In other words, we intended to better understand how citizen support for policy choices would be characterized by risk aversion.

Translating our objectives into research questions results in the following:

RQ1: How will environmental outcomes of energy policy compare in preference to outcomes for energy consumption and for economic development?

RQ2: What would be the pattern of preferences across sub-groups defined by political-party affiliation?

RQ3: How much risk-aversion will citizens manifest in anticipated response to changes in outcomes of energy policies?

4. Study 1

4.1. Developing components of a comprehensive federal energy policy

We conducted a series of in-person and phone interviews with staff members of elected representatives in Congress, as well as with academics, and leaders of NGOs focused on energy issues, such as the Center for the New Energy Economy (based at Colorado State University). Additionally, researchers interviewed author and environmentalist Auden Schendler, Vice President of Sustainability at the Aspen Skiing Company. These interviews began in the April of 2012 and continued up to the deployment of Study 1 (fielded nationally in September 2013). After analyzing the content of these interviews, researchers decided to focus on energy and environment elements of the two dominant political parties in the US. Accordingly, researchers used the 2012 Democratic Party platform (Democratic Party, 2012) and the Republican Governors Public Policy Committee's (RGPPC) energy policy proposals (RGPPC, 2012) to develop the focal policy outcomes for the discrete-choice task in the national survey of Study 1.

In general, the Democrats and Republicans addressed similar issues, but gave emphasis to different methods. For example, the 2012 Democratic Party Platform listed “All of the Above Energy Strategy” in the section titled “Economy Built to Last” (Democratic Party, 2012). Here, the Democrats included oil and natural gas in the mix of fuels for the nation's energy portfolio, but singled out “clean coal” for inclusion, as well as non-fossil fuels, such as wind, solar, biofuels, geothermal, hydropower, and nuclear. The Democrats proposed a “sustainable energy–independence” and promised to balance environmental protection with development. Improving the energy efficiency of buildings and cars were offered as ways to reduce the consumption of fossil fuels which would help the US become less-reliant on foreign imports of these fossil fuels.

The Democratic Party Platform discussed the environment in the section “Ensuring Safety and Quality of Life”. Reducing pollution, and acknowledging the science of climate change both received emphasis. Carbon pollution received explicit treatment. The Democratic Platform asserted that Republican leaders deny the benefits of the Clean Air and Clean Water Acts (Democratic Party, 2012).

The Republican governors’ discussion of a new energy policy mentioned “renewables”, rather than “clean energy”, but did not position renewables as the lead element in achieving energy independence, as the Democrats did. The Republican governors (32 of the 50 governors in 2012) proposed four main points regarding energy policy: 1) energy security (similar to “energy independence”—meaning a stable and reliable energy supply for citizens and all sectors of the economy), 2) environmental cooperation (acknowledging environmental gains supported by economic progress and asserting that state governments should play the primary role in regulation), 3) energy affordability, and 4) energy as an economic driver that powers modern civilization (RGPPC, 2012). The Republican governors opposed “market distorting subsidies, particularly to individual market participants” (p. 26), but supported improvements in energy efficiency as a common-sense solution.

A more nuanced aspect of energy policy that neither the Democrats nor the Republicans addressed was the time to implement solutions. A business aphorism is “time is money”. In the realm of environmental policies, “grandfathering” has allowed pre-existing sources of energy generation (such as coal-fired power plants built before 1970) to have more lax treatment in the Clean Air Act of 1970 (Revesz and Lienke, 2016). (A grandfather provision allows an old rule to apply in existing situations while a new rule will apply to all future cases.) As a result, such grandfathering has delayed and dampened the intended effect of such legislation. Accordingly, we decided to include a time dimension for implementing policy.

Table 1 presents the eight components of a hypothetical, comprehensive federal energy-policy and the corresponding levels for these eight components. This is the design of the discrete-choice experiment that respondents would take in an online survey. The levels were chosen to make sure there would be enough discriminating power when respondents faced differing levels for a component across two comprehensive policies they would have to choose.

On the left side of Table 1, the first column represents the eight components of a hypothetical, comprehensive federal energy policy. The three right-most columns represent the corresponding levels for these eight components. In an online survey, respondents were presented with two possible configurations of energy policies with different levels for the eight components. Then, the respondent chose the most preferred.

Table 2 presents one of the choice tasks in the study. To help the respondents orient themselves to the task environment, researchers composed short, two to four-sentence descriptions for each of the eight components comprising the hypothetical, comprehensive energy-policy. The study consisted of a series of choice tasks that would proceed according to an experimental design previously derived using Sawtooth CBC software (Sawtooth Software, 2009). A different set of differently-configured comprehensive policies would be presented in each choice task. After this, the choice-based conjoint software using a mother logit-model would derive the individual estimates of the relative importance for each of the eight components.

4.2. Results for Study 1

A professional research-firm, SDR Consulting, conducted the sampling services for the study as well as the web-hosting. Two-hundred and seventy-seven respondents completed the online survey during September 2013. Researchers employed quota sampling based on important demographic categories, such as gender, ethnicity and region. Table 3 presents the sample profile in percentages with accompanying national comparisons from the 2010 US Census (US Census Bureau, 2016), as well as Gallup's estimate of political party affiliation in the US (Jones and, 2016). As can be seen, the sample profile of Study 1 is very close to those of national comparisons.

In this choice-based conjoint study, researchers employed the %CHOICEFF SAS macro to design the study. Researchers used the criteria recommended by Sawtooth to determine and to evaluate the quality of the design that considered both the complexity of the design and the sample size. (Specifically, researchers ensured that all aggregate-model standard-errors for the utility of the features were less than 0.05 using random synthetic-data for the planned design and sample size.)

After completing the design, researchers turned to Sawtooth Software's CBC/HB product (Sawtooth Software, 2009) to estimate the model. This software features a Hierarchical Bayes approach to derive the relative importance of each of the eight components of a

Table 1
Components and Levels of Energy Policy used in Study 1.

Component description	Option 1	Option 2	Option 3
1. Impact policy has on environmental quality (land, water and air resources)	Negatively impacts quality 2%	No impact on the environment	Positively impacts quality 2%
2. Impact policy has on my energy costs	20% increase in my energy costs	No change to energy costs	20% decrease in my energy costs
3. Impact policy has on economic vitality	Create 50,000 + new jobs	No change in jobs	
4. Impact policy has on greenhouse-gas emissions (GHG)	Increase GHG emissions by 20%	No change to GHG emissions	Decrease GHG emissions by 20%
5. Impact policy has on US energy security (reduce dependence on non-North American sources of energy which is currently at 23%)	Cut our dependence on non-North American oil in half	No impact	
6. Time required to implement policy	Less than one year	1–5 years	5 + years
7. Level of government financial assistance required by the policy (subsidies, rebates, tax credits, loan guarantees)	No financial assistance required	Financial assistance required	
8. Impact policy has on US's energy efficiency (Includes items like changes to household temperature, MPG standards and minimum energy efficiency standards for appliances)	Reduce energy usage by 30%	No impact	

Table 2
Example of Choice Task in Study 1 Please consider the two policies shown below and select the policy that you prefer. Again, these are not actual policies, but rather just different options for the components that might make up an energy policy.

Component description	Test Policy 1	Test Policy 2
Time required to implement policy	Less than one year	1–5 years
Impact policy has on US energy costs	20% increase in energy costs	No change to energy costs
Level of government financial assistance required by the policy (subsidies, rebates, tax credits, loan guarantees)	Financial assistance required	No financial assistance required
Impact policy has on greenhouse-gas emissions (GHG)	Increase GHG emissions by 20%	Decrease GHG emissions by 20%
Impact policy has on US energy security (reduce dependence on non-North American sources of energy which is currently at 23%)	No impact	Cut our dependence on non-North American oil in half
Impact policy has on economic vitality	No change in jobs	Create 50,000 + new jobs
Impact policy has on citizen's energy related behavior (Includes items like changes to household temperature, MPG standards and minimum energy efficiency standards for appliances)	Reduce energy usage by 30%	No impact
Impact policy has on the environment (protection for land, water and air resources)	Negatively impacts environment by 20%	No impact on the environment

Which policy do you like best?
- ○ Test Policy 1
- ○ Test Policy 2

hypothetical, federal energy policy (Orme and Williams, 2016). The priors for the hierarchical Bayes (HB) runs were as follows: prior variance = 1.0, prior degrees of freedom = 5. (These are the current default software settings).

Researchers used the average percent certainty (Hauser, 1978) or the equivalent rho-squared (ρ^2) values in the analysis to assess the fit of the model and determined the ρ^2 of 0.544 represented a respectable fit. (The average percent certainty or ρ^2 is a fit measure used in logit applications. It is the difference between the log likelihood for the chance model and the log likelihood for the estimates, divided by the log likelihood for the chance model.) While no software is perfect, the rho-squared value is the best measure of fit provided in the Sawtooth software. Ben-Akiva and Lerman (1985, p. 91) describe ρ^2 as analogous to R^2 used in regression.

Choice-based conjoint (CBC) analysis produces estimates of the relative importance for each component in the study. The results of CBC modeling in Study 1 suggest that citizens gave the most importance to environmental quality (land, water and air resources) when considering energy initiatives that might be enacted by the federal government. Of the eight components depicted in Fig. 1, the impact a future policy has on environmental quality emerged as the most important followed by the impact a policy has on energy costs, and then job creation. The priority for reduced GHG ranked fourth in importance. The study made a distinction between greenhouse gas (GHG) emissions and environmental quality because environmental quality is sense perceptible to humans living on the surface of the earth, while the collection of GHGs occurs in the upper atmosphere of earth and must be reported by specialized measurement.

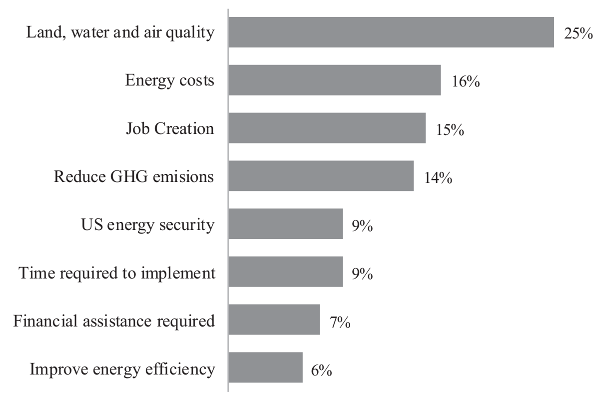

Fig. 1. Relative Importance of the Eight Policy Components of Study 1.

Results of the discrete-choice modeling disclosed that respondents identifying as Republicans, Democrats and Independents gave most importance to environmental quality across eight dimensions of future

Table 3
Sample Profile Percentages for Study 1 (n = 277) with National Comparisons.

Political affiliation		Study 1	Gallup 2015	Age		Study 1
	Democrat	33.7	29.0		< 35	33.4
	Republican	28.0	26.0		35–59	44.0
	Independent	37.7	42.0		60 +	22.6
Gender		**Study 1**	**2010 Census**	**Education**		
	Male	48	49.2		No College	30.5
	Female	52	50.8		Some College	29.0
					4+ years College	40.2
Marital Status				**Home Ownership**		
	Married	50.9	51.7		Own Home	67.1
	Not Married	49.1	48.3		Rent	32.9
Ethnicity				**HH Income**		
	Black	12.8	12.3		< $35k	30.8
	Hispanic	12.2	17.0		$35–74k	37.2
	White	70.3	63.0		$75k	28.0
	Other	4.7	5.6		No response	4.0
Region				**Residence**		
	East	19.3	17.9		Center City	43.1
	Midwest	24.4	21.6		Surrounding City	23.9
	South	35.8	37.1		Suburban	22.3
	West	20.5	23.3		Rural	10.8

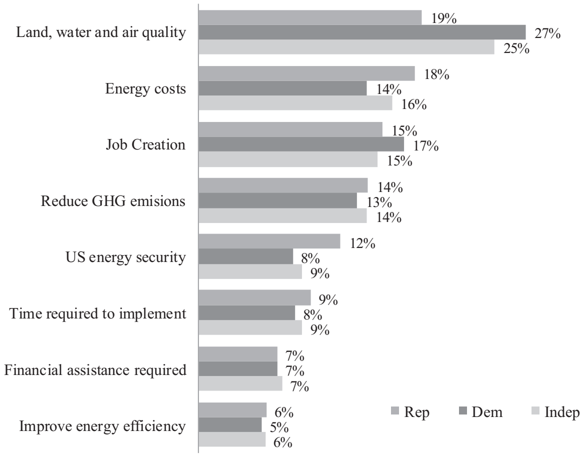

Fig. 2. Relative Importance of the Eight Policy Components of Study 1 by Political Party Affiliation.

energy policy. Notably, those identifying as Democrats and Independents imparted more importance to this dimension than did Republicans.

Fig. 2 is similar to Fig. 1 but presents the results of CBC modeling broken out by the political affiliation of respondents. As can be seen, Republicans placed environmental quality in future energy legislation lower in importance than Democrats. Republicans placed more importance in future energy legislation on energy costs and energy security. But importantly, the pattern of responses across the other dimensions of possible energy policies was similar across the voting groups.

In sum, results of Study 1 suggest that if future energy policy could only include the three most important policies, these would be 1) improved environment quality, 2) reduction in energy costs, and 3) job creation.

5. Study 2

5.1. Developing components of a comprehensive energy policy for states

With the results of the national study in hand, a second-round of interviews began in which results of the national study were shared with those informants in the first round of interviews. In this second round of interviews, we widened the set of informants, to include energy-focused researchers at think tanks (such as Resources for the Future, the Brookings Institution, and RepublicEN) as well as lobbyists and members of the press based in Washington, DC. Many of the informants in this second round of interviews recommended focusing subsequent research on states in which energy issues were actively discussed in the media and public forums.

> "You really have three buckets or tiers of states for energy policy focused on a state's uptake of clean energy," said Jeff Lyng, Senior Policy Advisor for the Center for the New Energy Economy (Lyng, 2014). "There are the veteran states, such as California, New York, Colorado and Massachusetts. There are those in the middle, such as Nevada, Minnesota and North Carolina that are slower on the uptake. Then, you have states which have made a clear decision to invest in traditional energy, such as Wyoming and Kentucky."

These recommendations corresponded to scholarly interest in state policies (Delmas and Montes-Sancho, 2011; Peterson and Rose, 2006). Researchers have noted that since the early 1990's, state governments have driven US energy policy (Carley and Browne, 2013). The emerging importance of policy-making at the state level because of the EPA's June 2014 Clean Power Plan regulations (EPA 111d) proved to be a deciding factor in turning the research to states, rather than continuing with a focus on the entire US (Cory and Aznar, 2014). Accordingly, study 2 focused on states, rather than the national level.

In choosing the components that would comprise the hypothetical energy policy at the state-level, we retained the four most-preferred components from Study 1 because these four accounted for at least 14 per cent of the importance in the choice-based conjoint results (compared to 6–9 per cent for the other four components). These four most preferred components were: 1) environmental quality (land, air, and water resources) in your state, 2) your energy costs, 3) job creation in your state, and 4) greenhouse gas emissions. Based on the interviews and search of pending energy legislation at the state level (CNEE, 2014), we created two components from the job creation component of Study 1—job creation in traditional industries in your state, and creation of renewable energy jobs in your state.

Researchers chose three other components for Study 2: 1) your energy consumption, 2) renewable energy used in your state for electricity generation, and 3) costs incurred by your state to implement the energy policy. This last component became relevant because the implementation of the EPA's June 2014 Clean Power Plan regulations (EPA 111d) would require the closure of certain coal-fired electricity generation plants which would burden some states with sizable costs for transitioning to other sources of energy for electricity generation.

Table 4 presents the set of components and their corresponding levels used in the discrete-choice tasks of Study 2.

5.2. Results for Study 2

Study 2 featured eight separate data collection efforts across eight states from October 2014 to May 2016 (Kentucky, Massachusetts, Minnesota, Nevada, and Wyoming done in October 2014. North Carolina and Colorado done in February 2015. New York done in May 2016). Researchers used judgement sampling to select states where energy policies have a high profile in public discourse. Interviews with industry experts (described below) guided the selection of these states. In general, we wanted states in the study that 1) represented different regions of the country, and 2) had a citizenry that heard about energy issues in public discourse.

As researchers conducted this state-level data collection effort, researchers shared the results with informants from previous rounds, as well as with staff members of 1) the Department of Energy in Washington, DC, 2) the North Carolina Department of Environmental Quality, and 3) the National Association of Regulated Utility Commissioners (NARUC). Additionally, researchers conducted an interview with the Environment and Energy Affairs Director of Duke Energy North Carolina to gain the perspective of investor-owned utilities. The purpose of this third round of interviews was to better understand how those involved with policy making at the federal, state, and local levels think about energy issues. Like the second round of interviews, these interviews served as a validity check on the results of the field work of Study 2. In general, these informants expressed enthusiasm for gauging citizen preferences for energy policy outcomes in different states, as well as respect for the methods used in Study 2.

"Imagine that—consulting citizens about possible energy policies," said Heidi VanGenderen with a tinge of irony about the low development of citizen involvement in policy making. VanGenderen served as Director of External Affairs in the Office of Congressional & Intergovernmental Affairs at the U.S. Department of Energy when interviewed (VanGenderen, 2014).

Similar to Study 1, researchers employed a Hierarchical Bayes approach to derive the individual estimates of the relative importance of each of the eight components of a hypothetical energy policy at the state level using Sawtooth Software's CBC/HB v5.5.2. In this design, respondents made 12 separate choices among pairs of policy options (Louviere et al., 2010). Table 5 presents the sample sizes of the data collection efforts along with the model metrics for the discrete-choice model for each state. Researchers used the average percent-certainty or

Table 4
Components and Levels of Energy Policy Used in Study 2.

Component	Option 1	Option 2	Option 3
1. Impact policy has on greenhouse-gas (GHG) emissions	Increase GHG emissions by 20%	No change to GHG emissions	Decrease GHG emissions by 20%
2. Impact policy has on your energy costs	20% increase in my energy costs	No change to my energy costs	20% decrease in my energy costs
3. Impact policy has on environmental quality (land, water and air resources) in your state.	Negatively impacts quality 2%	No impact on the environment	Positively impacts quality 2%
4. Impact policy has on traditional energy related industries (such as coal, oil and natural gas) in your state	Reduces jobs by 10% in traditional energy industries like coal, oil and natural gas	No Impact on jobs in traditional energy industries	Increases jobs by 10% in traditional energy industries like coal, oil and natural gas
5. Impact policy has on job creation in your state due to expanding new energy technologies	State's unemployment rate goes down 1%	No change in state's unemployment rate	
6. Impact policy has on your energy consumption	10% reduction	5% reduction	No reduction
7. Impact policy has on your state's cost of implementing energy policy	Each state carries full cost for its implementation	States in a region share costs for a state's implementation	Implementation costs shared across all US
8. Impact policy has on the amount of renewable energy used in your state for electricity generation	By 2025, 25% of electricity generated by renewable energy	No mandatory percent for electricity generated by renewable energy	

Table 5
Sample Sizes and Model Metrics for Study 1 and Study 2.

		n		Model ρ^2 (rho-squared)
Study 1				
	US	277		0.544
Study 2				
	KY	179		0.521
	MA	177		0.521
	MN	169		0.513
	NV	183		0.481
	WY	169		0.479
	NC	215		0.509
	CO	223		0.509
	NY	328		0.591
	7 state sum	1643	8 state average	0.516

rho-squared (ρ^2) values across all runs to assess the fit of the model and determined the ρ^2 of 0.516 was similar to the respectable fit of 0.544 obtained in Study 1.

When placed in trade-off scenarios for developing future energy legislation, the respondents in each of eight states gave the most importance to GHG emissions, followed by energy costs, environmental quality (land, water and air resources), traditional jobs and then renewable energy jobs. Fig. 3 depicts these results.

Differences across the states on the importance of the energy-policy outcomes can be observed in Fig. 4a. However, in Fig. 4b, one can observe that the top three energy-policy outcomes across the states are either GHG emissions, energy costs or environmental quality. The exceptions would be Wyoming's third-highest importance for traditional energy jobs, and Nevada's third-highest importance for renewable energy jobs,

The interviews conducted during Study 2 helped researchers gauge the face validity of the results and to better understand the heterogeneity across the eight states. For example, Massachusetts has relatively high costs for energy and endured harsh winters in 2013 and 2014. Respondents in Massachusetts gave most importance to the component of energy costs with 20.4 per cent. Overall, Colorado posted the highest preferences for environmentally-oriented components with 22.4 per cent for both GHG emissions and environmental quality. These were the highest of any preferences for any component across the eight states. North Carolina respondents gave most preference to GHG emissions, while Minnesotans gave most preference to environmental quality. Wyoming – a coal state, but with pristine mountain and desert regions—posted very similar preference across four of the top five components with renewable energy jobs receiving less importance.

Kentucky is a state with relatively high costs for electricity generation and depends on coal for much of the electricity generated there. Kentucky is a coal state and one that faces the forced shutdown of coal-fired electricity-generating plants if the Clean Power Plan regulations (EPA 111d) go into effect. On February 9, 2016, the Supreme Court

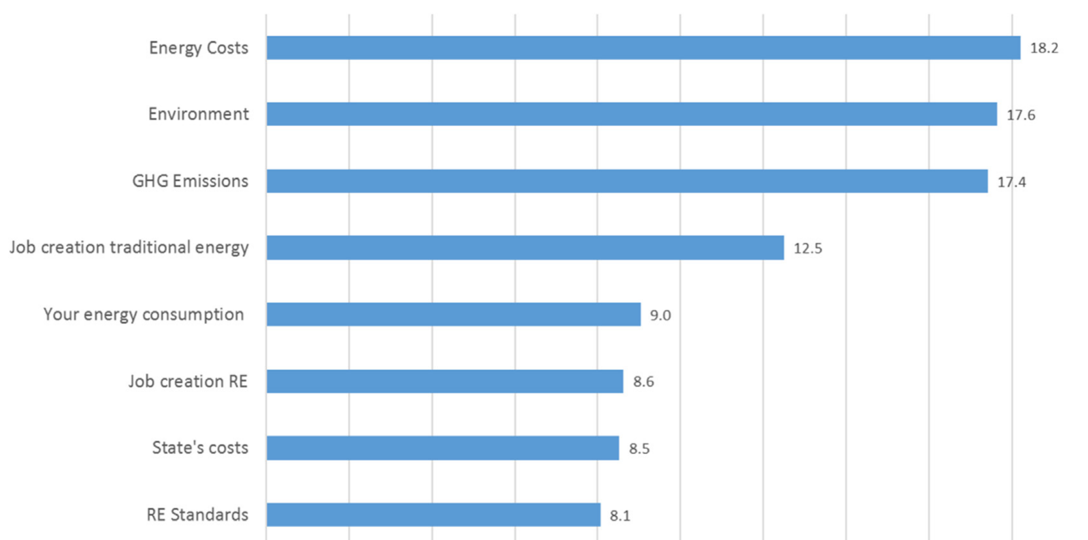

Fig. 3. Eight-State Aggregate of Policy Dimension Importances for Study 2.

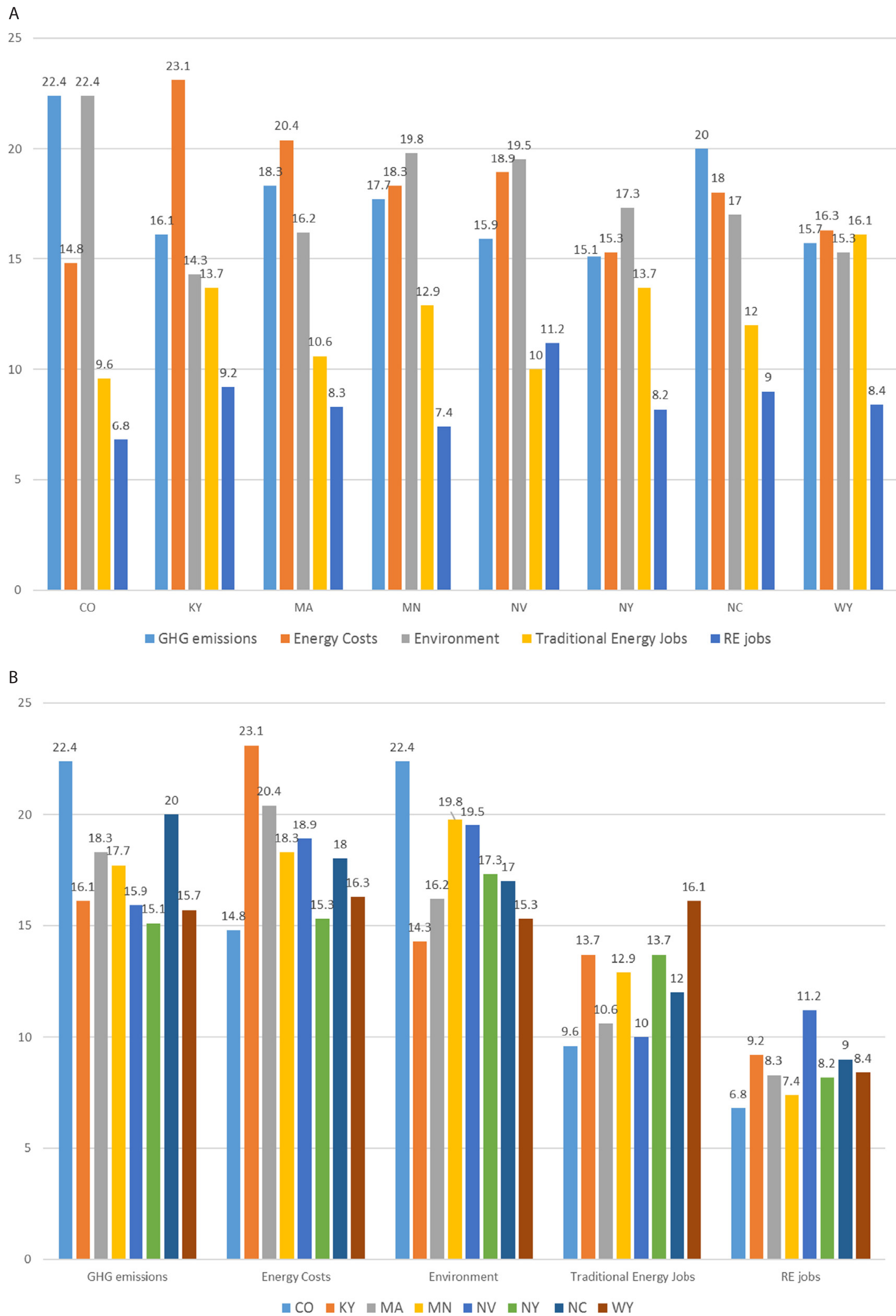

Fig. 4. a. Importances of Top-Five Policy Components by State in Study 2, **b.** States by Importances of Top-Five Policy Components in Study 2.

stayed implementation of the Clean Power Plan pending judicial review (EPA, 2016). On October 9, 2017, the Trump administration announced plans to repeal the Clean Power Plan (Friedman and Plumer, 2017). Some states, such as New York and Massachusetts, (as well as some environmental groups) plan to sue the EPA once the repeal is finalized. Additionally, a rancorous 2014 US Senate election in Kentucky put the coal issue in the foreground of much of the election race eventually won by Republican Sen. Mitch McConnell. Energy costs were most important among the eight components of a state energy-policy in Kentucky with 23.1%. However, greenhouse gas emissions came in second with

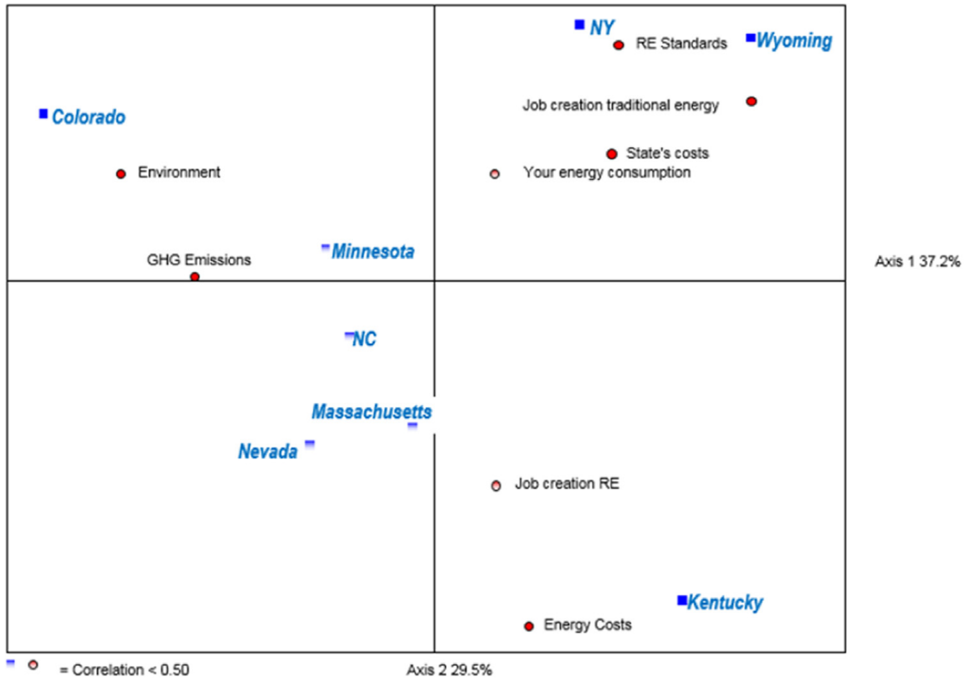

Fig. 5. Correspondence Map of Differences in Importance of Policy Dimensions by State.

16.1%, followed by land, air and water quality with 14.3%, and then job creation in the traditional energy sector with 13.7%.

While heterogeneity characterized the results across the eight states, a pattern persisted across the eight states suggesting that four of the eight dimensions were major ones. The correspondence map below in Fig. 5 captures the way the states varied regarding the differences in importance citizens gave to the different dimensions of energy policy. (A cross marks the origin of the plot for the map.) For example, Wyoming's respondents gave most importance to job creation in the traditional energy sector and renewable energy standards (Specifically, the preference for no mandated renewable energy standards here.). Compared to the rest of the states, respondents in Wyoming were most concerned with traditional energy jobs, but posted less importance for energy costs when compared to the other states (likely because energy costs are relatively inexpensive in Wyoming) (Stewart, 2015). Nevada is much more concerned about job creation for renewable energy (Likely because of a recent surge in renewable energy jobs that emerged near Las Vegas) and is also more focused on the environment (Cardwell and Ward, 2014). New Yorkers placed a relatively high degree of importance on environmental quality. As can be seen, New York is positioned high on the vertical axis along with environmental quality. New York is positioned furthest away from energy costs in the bottom of the chart. This distant positioning from energy costs represents the lower importance accorded to energy costs by New Yorkers than what those in other states accord to energy costs.

In sum, the correspondence map of Fig. 5 offers a perceptual map of the data in Fig. 4a. The proximities of the points in the perceptual map of Fig. 5 suggests the similarity or difference of the objects plotted. Accordingly, Wyoming is positioned with the importance of traditional energy jobs, Kentucky and Massachusetts with energy costs, Nevada with renewable energy jobs, and Colorado, Minnesota and North Carolina with GHG emissions and environmental quality.

Key findings from Study 2 follow. First, across the eight states of Kentucky, Massachusetts, Minnesota, Nevada, Wyoming, North Carolina, Colorado and New York there were notable differences on the importance placed on the outcomes likely resulting from different energy policies. Second, despite notable differences across the eight states, the trade-off approach discloses a general pattern of agreement about the top three energy policies. Researchers identified three preferred policies among possible state-level energy policies: 1) GHG emissions, 2) energy costs, and 3) environmental quality. Notably, two of these three were environmentally-related.

5.3. Assessment of risk-aversion towards changes in components of energy policies

Discrete–choice analysis derives part-worth utilities for each level of each component. As in conjoint analysis, the relative importance for a component can be computed by taking the range of the part-worth utilities for the levels of a component and dividing this range by the sum of all the ranges of the components in the study. The resulting fraction represents the percentage of importance accounted for by the focal component.

In order to derive the percentage loss or gain in support for a component, researchers multiplied these part-worth values by codes developed to reflect the degree of support for a policy in which the level of a component appeared. After each of the twelve choice tasks in the study, respondents were asked “For the policy option you preferred in this task, do you support the policy, support with concerns, or not support the policy?” Researchers then coded respondents’ answer to this question by assigning a code of 1 to answers reflecting support, .7 to answers reflecting support with concerns, and a 0 to answers reflecting no support. For those policy options not chosen, researchers assigned a 0 to support, .3 to support with concerns, and a 1 to no support. Researchers multiplied each respondent's part-worth utility for the levels of a component by the corresponding code in order to gauge the combined importance/support of the components. This combined importance/support was then used to conduct sensitivity analysis for changes in support when levels of the components were changed one at a time.

In order to conduct senstitivity analysis, the relative importances of each component were set to reflect the status quo level for the component or to reflect the level representing “no change”. With these levels set, researchers computed the baseline percentage supporting such a status quo or no change stance across the components of the energy policy. Then, the impact of changes to support for changes in components of policies could be assessed by using the importance/support terms previously derived.

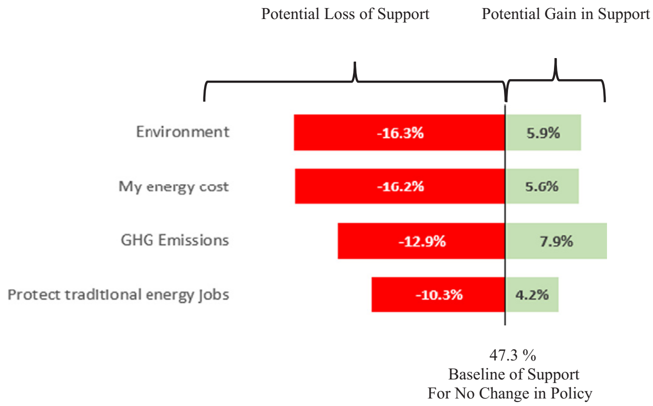

Fig. 6. Impact of Component Changes (Adverse and Positive) from Baseline of Support for No Change in Policy - 8 States.

Fig. 6 represents the impact of component changes (adverse and positive) from a baseline of support for no change in policy across the eight states. The numbers in percentages to the left of the center line represent the difference in support between the most-adverse level for the corresponding component and the level of "no change". The numbers in percentages to the right of the center line represent the difference between the most positive level and no change. For example, 47.3 per cent of the combined samples across the eight states support a policy slate of "no changes". From this baseline, researchers conducted sensitivity analysis to estimate that going from no change in greenhouse gas emissions as an outcome for the comprehensive policy to one in which there was an outcome of a 20% increase in GHGs would result in a 16.3% reduction in support for the comprehensive policy (Changing support for the comprehensive policy from 47.3 per cent to 31.0 per cent.) Conversely, keeping the levels of the other components in the comprehensive policy the same, but having an outcome of a 20% decrease in GHGs would result in an increase of 5.9 per cent (Changing support for the comprehensive policy from 47.3 per cent to 53.2 per cent.).

The value of this sensitivity analysis for elected officials, and their staff members can be seen in Fig. 7 which depicts the results for an individual state (here, North Carolina) by political party affiliation. The upper-left chart depicts the overall sample in the state and the corresponding sensitivity analysis for making unfavorably regarded changes (to the left of the center line) or favorably regarded changes (to the right of the center line) in the components of GHG emissions, of energy costs, or of environmental quality. As can be seen, the unfavorably regarded changes have around a three times greater impact in terms of loss of support when compared to the favorably regarded changes in terms of gain in support. This general pattern is consistent across the sub-groups of Fig. 7 (Democrats in the upper right, Republicans in the lower-left, and Independents in the lower-right.)

The implications of Fig. 7 to elected officials, in particular, is being able to better gauge the changes in the citizenry's support for outcomes of policy changes that could be made. If adverse changes have to be made, the cost in loss of public support can be understood. Likewise, if positive changes could be made, the uptick in public support can also be understood. Overall, Figs. 6 and 7 capture the risk-averse posture of the respondents in Study 2 regarding changes to energy policy.

Using a conjoint/trade-off approach and modeling citizen support can provide policy makers direct measures of support for future energy policies. As became evident in the assessment of risk aversion for policy changes in Study 2, the possible negative outcomes associated with a policy have much more impact on the level of support than do the positives—about two to three times as much impact. This mirrors Prospect Theory which asserts that losses loom larger than gains for most persons (Kahneman and Tversky, 1979).

The important concept of Prospect Theory is depicted in Fig. 8. Here, the same size of loss (the left side of the horizontal axis) when compared to the same size of gain (the right side of the horizontal axis) registers a much larger negative value (on the vertical axis) than what the corresponding gain registers (on the vertical axis). This captures the pronounced risk aversion individuals manifest in a variety of choice situations—and importantly, how individuals responded to the prospect of taking a negative outcome for a component of an energy policy. Policy makers would be wise to be mindful of the impact of the negative outcomes associated with various components of an energy policy and at the same time highlight the likely positive outcomes in their communications about a possible energy policy.

6. Discussion

Importantly, a functional methodology was identified in these two studies for obtaining citizen preferences among energy policy outcomes. Evidence for this can be seen in the respectable rho-squared statistics for the models, as well as the positive assessments given in interviews with expert informants throughout the study.

The two studies addressed three research questions and developed answers for each. First, environmental components of energy policy consistently placed in the top-four most-important components across Studies 1 and 2. Second, there was only a small effect for political-party affiliation in Study 1 suggesting the potential for policy makers to find

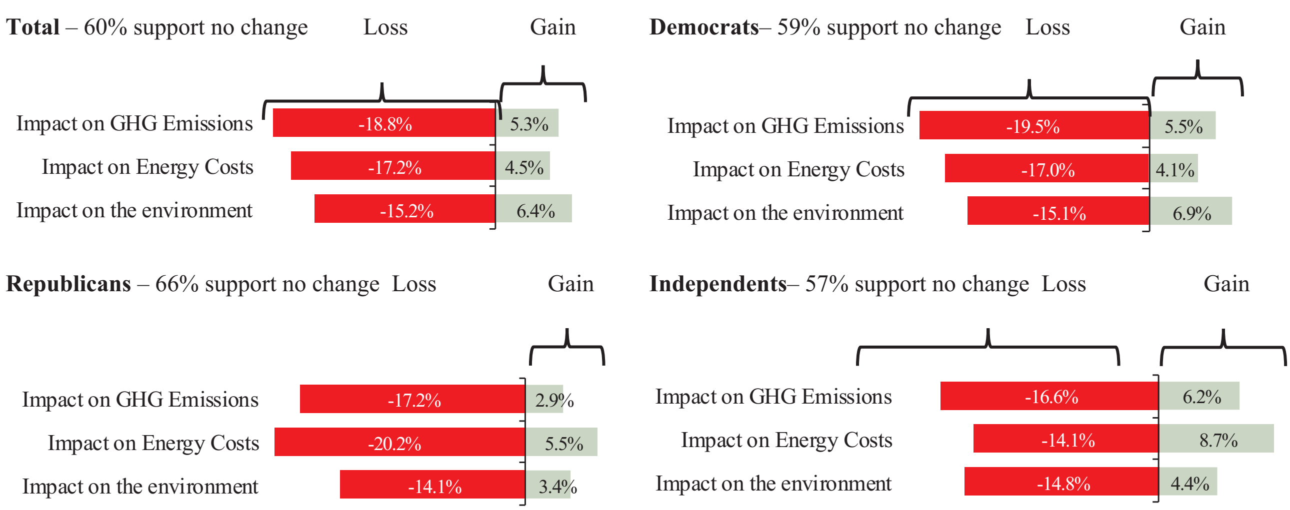

Fig. 7. Impact of Component Changes for North Carolina and for Political-Party Affiliation Groups in the State.

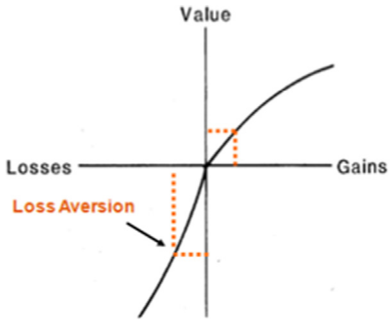

Fig. 8. Loss Aversion as Depicted in Prospect Theory.

common ground. Third, respondents across all states in Study 2 manifested risk aversion for obtaining a negative outcome of an energy policy component. This aligns with Prospect Theory's assertion that losses loom larger than gains for humans.

As Gaski (2013, p. 12) notes, the idealized public interest "is never quite handed down from the heavens on tablets of stone". Despite the challenges of determining whether the public interest would imply government intervention or a non-intervention to allow markets to fully function, the need for better understanding citizen perspectives in policy making remains an important—although a frequently missing ingredient in effective policy making.

The findings of this study point to the potential for a more fully-developed approach to using citizen inputs in energy policy-making. This is very much in the Jeffersonian tradition of public administration where citizens inform public administrators about their preferences in policy formation (Kettl, 2000). The results also point to a timely opportunity for bolstering a dialogue between policy makers at all levels and the public about the development of new energy policies that would protect the environment, address job creation, and contain costs for energy.

In recent years, federal energy policy development has taken a path in which few pieces of legislation are enacted, because of a highly polarized environment in Congress. The last major energy law came in 2007 and since then, the US has moved out of energy security fears to becoming the world's leading producer of oil and gas (Davenport, 2016). Meanwhile, the President and the executive branch of the federal government have relied on regulatory initiatives by the Environmental Protection Agency to address climate change issues, such as the Clean Power Plan which is now in dispute.

The results of the national survey featured in Study 1 suggest that there is more commonality among citizens regarding energy policy than what might be suggested by a media with a 24-hour news cycle and need for drama to drive ratings. This could be seen in the pattern of identical rankings for the importance of the components across the subgroups representing Democrats, Republicans and Independents. Study 2 (which focused on eight states where energy policies are actively discussed in public forums) echoed this finding of Study 1. Here, across all political-party affiliation sub-groups, the pattern of risk aversion to negative outcomes of changing individual components of an energy policy dominated the gains in support that might accrue to positive outcomes of changing the same components of energy policy. In this way, the effect of citizenship—or caring about the common good—-appeared to eclipse the effect of political orientation.

Developing comprehensive energy policy is enormously challenging because energy policies must be compatible with other policies for economic growth, national security and environmental stewardship (Anderson, 2015). The trade-off decisions required of respondents in the study reflect the multi-policy synchronization needed in today's complex policy making realm.

Traditional energy-policy research focuses on simply measuring support for current policies. Often, the public is greatly influenced by media sound-bites and political discourse leading to findings that can change almost weekly. Using a choice-based conjoint or discrete-choice modeling approach puts respondents in a series of trade-off decisions that allow researchers to derive citizens' underlying value for current and possible energy policies that might be enacted at the state and/or federal level.

In the meantime, some states have been successfully developing and implementing effective energy policy. Results from this study highlight the unique differences in the receptiveness to different components of energy policy across the eight states of Study 2. For example, Wyoming is most concerned with traditional energy jobs, but less so for energy costs. Nevada is much more concerned about job creation for renewable energy and is also more focused on the environment. Kentucky is most concerned about energy costs, followed by Massachusetts. Colorado, Minnesota, North Carolina and New York give most importance to protecting the environment.

Despite differences across the states, results of this research suggest there is likely more agreement than previously thought. For example, while there were differences in importance for energy policies across political affiliations in Study 1, the rank ordering of the components in each political party were the same. The key implication here is that while small differences do exist for citizens identifying with differing political perspectives, the overall pattern of which policies are important and which are least important is striking.

7. Limitations and future research

Not all possible energy policies could be included in this study. Others such as net metering policies in states and interconnection standards that would allow for decentralized electricity generation through small-scale generation are popular state-level energy policy instruments (Carley and Browne, 2013). For manageability, the scope of the study had to be narrowed to eight dimensions of energy policy (the "components" in Tables 2, 5). In order to obtain meaningful results, only two to three levels for each of these dimensions could be included in the field study. However, the research did represent a well-designed and well-executed discrete-choice study. Notably, the results had a high degree of face validity as states with relatively high costs for energy, such as Kentucky and Massachusetts, gave most importance to energy costs.

Policy making at the state level will matter much in the coming years. In 2013, the Edison Electric Institute, the utilities trade organization, published a report that became famous for its candor in assessing the threat to utilities from distributed energy generation (Kind, 2013). As more homes mount solar panels, the utilities' costs must be absorbed by a smaller group of customers. The result of this would be increasing utility bills—which would lead to more consumers mounting solar panels. In late December 2015, the Nevada Public Utilities Commission announced a retroactive rate change so large that it threatens the rooftop solar market there and in this way the state government in Nevada took the side of the utilities in this case (Leslie, 2016). By comparison in April 2014, New York's Public Service Commission began a process that would change utilities from monopolies of electricity generation within designated territories to electricity distributors that rely more and more on renewable energy provided by many providers.

Because of Study 2's focus on multiple states, the need to better understand policy diffusion across states becomes important. It is now timely to develop theoretical perspectives to better explain why some states take more aggressive approaches in pursuing new energy policies, while others do not. Accordingly, attractive states from which to obtain data in the next round of research would be states that have pursued the most aggressive approach in developing new energy policies—such as California. An update on citizens' preferences in a state that has chosen energy policies to apparently thwart rooftop solar, such as Nevada, would be in order now, as well.

8. Conclusions and implications

This study offers not only insights into citizen valuation of energy policy outcomes at the national level in study 1, but also at the state level in study 2. Importantly, this study also offers researchers an approach for conducting similar research to inform policymaking in the future at all levels—city, state and federal.

At the city level, congestion pricing—a toll on drivers that enter the center of the city during peak hours—can offer cities a way to accomplish many goals at once (Eliasson, 2017). For example, traffic can be reduced, and use of mass transit can be increased (and with it, greenhouse gas emissions can be reduced along with particulate matter put into the air by automobiles). The toll also generates funding for mass transit and other improvements in cities (Bloomberg and Pope, 2017, p. 29). In the future, researchers could include such proposed congestion pricing to city-dwellers for the purpose of better understanding how such congestion pricing is valued in a set of possible energy policies. Some of these other energy policies might include 1) improving city air quality, 2) introducing pedestrian zones downtown, 3) offering incentives for rooftop gardens with trees, or 4) initiating mandates for painting the roofs of apartments and commercial buildings white in order to reduce the need for air conditioning of buildings that absorb heat with roofs of darker colors.

Former Colorado Governor Bill Ritter sees the real leadership for energy policy at the state and local levels now, because most of the skirmishes over energy policies occur at these levels in the current period of legislative gridlock of Washington, DC (Ritter, 2016, p. 193). For example, the three largest sources of greenhouse gas emissions are 1) buildings, 2) transportation systems, and 3) power plants. State and local governments regulate or influence these.

As can be seen across eight states in study 2, researchers of this study successfully engaged citizens of these states about complex energy policy issues related to these. In the future, similar studies could be designed and fielded that address other issues relevant for states, such as 1) the subsidies offered for renewable energy adoption, 2) the mandate of solar panels for new building construction, 3) the rates for feed-in tariffs offered to those with renewable energy generation equipment, and 4) the regulation of oil and gas production in the state. In sum, the methodology offered to researchers from this study could prove to be transformative for the debate and development of energy policies at the state and local levels.

Looking further into the future, the need for innovative energy policy will become more pronounced as improved electric vehicles (EVs) arrive in the marketplace (Schwieter and Flaherty, 2015). Joint commitments by multiple stakeholders to invest in new types of energy infrastructure for these EVs will be needed (Press and Arnould, 2009). Accordingly, energy policymaking will need to keep pace with changes in energy markets as distributed energy generation begins accounting for more of the energy consumed in communities.

With the methodologies presented in this study, policy researchers can better identify the common ground among stakeholders in the changing energy markets of the future. The study disclosed a surprising degree of agreement among citizens regarding preferences among energy policies that would reduce environmental harm while lowering energy costs. Because many citizens manifest a pronounced risk-aversion toward outcomes of energy policies they perceive to be negative, well-grounded research methods of citizen preferences will increase in importance for policymaking at all levels.

References

Accenture, 2010. The New Energy World: The Consumer Perspective, (available at ⟨http://accenturehighperformancebusiness.com/SiteCollectionDocuments/PDF/Accenture-New-Energy-World-Consumer-Perspective-Video-Transcript.pdf⟩ (Accessed 25 August 2015).

Álvarez-Farizo, B., Hanley, N., 2002. Using conjoint analysis to quantify public preferences over the environmental impacts of wind farms. An example from Spain. Energy Policy 30 (2), 107–116.

Anderson, W.C., 2015. The challenges facing comprehensive energy policy. Strateg. Plan. Energy Environ. 34 (3), 72–80.

Ben-Akiva, M.E., Lerman, S.R., 1985. Discrete Choice Analysis: Theory and Application to Travel Demand. MIT Press, Cambridge, MA.

Bloomberg, M., Pope, C., 2017. Climate of Hope: How Cities, Businesses, and Citizens Can Save the Planet. St. Martin's Press.

Borchers, A.M., Duke, J.M., Parsons, G.R., 2007. Does willingness to pay for green energy differ by source? Energy Policy 35 (6), 3327–3334.

Braziel, E.R., 2016. The Domino Effect: How the Shale Revolution is Transforming Energy Markets, Industries and Economies. NTA Press, Houston, TX.

Butler, C., Demski, C., Parkhill, K., Pidgeon, N., Spence, A., 2015. Public values for energy futures: framing, indeterminacy and policy making. Energy Policy 87, 665–672.

Cardwell, D., Ward, M.L., 2014. A huge solar plant opens, facing doubts about its future, New YorkTimes, Feb 13, 2014. (Accessed 30 July 2016) [available at ⟨http://www.nytimes.com/2014/02/14/business/energy-environment/a-big-solar-plant-opens-facing-doubts-about-its-future.html]⟩.

Carley, S., Browne, T.R., 2013. Innovative US energy policy: a review of states' policy experiences, Wiley Interdisciplinary reviews. Energy Environ. 2 (5), 488–506.

Carson, R.T., Louviere, J.J., Anderson, D.A., Arabie, P., Bunch, D.S., Hensher, D.A., Johnson, R.M., Kuhfeld, W.F., Steinberg, D., Swait, J., Timmermans, H., 1994. Experimental analysis of choice. Mark. Lett. 5 (4), 351–367.

Census Bureau, U.S., 2016. Population, (Accessed 31 July 2016) [available at ⟨http://www.census.gov/topics/population.html]⟩.

CNEE, 2014. Advanced Energy Legislation Tracker, Center for the New Energy Economy. Colorado State University (Accessed 30 July 2016). ⟨http://www.aeltracker.org/]⟩.

Cory, K., Aznar, A., 2014. Informing electricity systems of the future: key analysis needs. Electr. J. 27 (9), 73–82.

Davenport, C., 2016. Rare Bipartisan Backing in Senate for Energy Bill. New York Times, pp. A21.

Delmas, M.A., Montes-Sancho, M.J., 2011. US state policies for renewable energy: context and effectiveness. Energy Policy 39 (5), 2273–2288.

Democratic Party, 2012. The 2012 Democratic Party Platform, (Accessed 28 July 2016), [available at ⟨https://www.democrats.org/party-platform]⟩.

Dietrich, F., Spiekermann, K., 2013. Epistemic democracy with defensible premises. Econ. Philos. 29 (1), 87–120.

Eliasson, J., 2017. Congestion pricing. The Routledge Handbook of Transport Economics.

EPA, 2016. Clean power plan for existing power plants, Environmental Protection Agency (Accessed 30 July 2016) [available at ⟨https://www.epa.gov/cleanpowerplan/clean-powerplan-existing-power-plants⟩].

Farrell, H., Shalizi, C.R., 2015. Pursuing cognitive democracy. In: In: Allen, D., Light, J. (Eds.), From Voice to Influence: Understanding Citizenship in a Digital Agepp. 211–231.

Friedman, L., Plumer, B., 2017. E.P.A announces repeal of major Obama-era carbon emissions rule, *New York Times*, October 9. (Accessed 5 January 2018) [available at ⟨https://www.nytimes.com/2017/10/09/climate/clean-power-plan.html]⟩.

Gaski, J.F., 2013. To serve man: a marketing manifesto (and an article that should not have been necessary). J. Public Policy Mark. 32 (1 Spring), 6–17.

Griffin, J.M., 2014. Smart Energy Policy: An Economist's Rx for Balancing Cheap, Clean, and Secure Energy. Yale University Press.

Hair Jr., J.F., Black, W.C., Babin, B.J., Anderson, R.E., 2010. Multivariate Data Analysis, Seventh edition. Prentice Hall.

Hauser, J.R., 1978. Testing the accuracy, usefulness, and significance of probabilistic choice models: an information-theoretic approach. Oper. Res. 26 (3), 406–421.

Hoyos, D., 2010. The state of the art of environmental valuation with discrete choice experiments. Ecol. Econ. 69 (8), 1595–1603.

Jones, B.D., Boushey, G., Workman, S., 2006. Behavioral rationality and the policy processes: toward a new model of organizational information processing. In: Peters, Pierre, Jon (Eds.), Handbook of Public Policy, B. Guy. SAGE Publications, Thousand Oaks, CA, pp. 49–74.

Jones, JeffreyM., 2016. Democratic, Republican Identification Near Historical Lows, Gallup, (Accessed 31 July 2016) [available at ⟨http://www.gallup.com/poll/188096/democratic-republican-identification-near-historical-lows.aspx?Version=print]⟩.

Kahneman, D., Tversky, A., 1979. Prospect theory: an analysis of decision under risk. Écon.: J. Econ. Soc. 47 (2), 263–291.

Kettl, Donald F., 2000. Public administration at the Millenium: the state of the field. J. Public Adm. Res. Theory 1, 7–34.

Kind, P., 2013. Disruptive Challenges: Financial Implications and Strategic Responses to a Changing Retail Electric Business. Edison Electric Institute.

Lancsar, E., Louviere, J., 2008. Conducting discrete choice experiments to inform healthcare decision making. Pharmacoeconomics 26 (8), 661–677.

Landemore, H.E., 2012. In: Hélène Landemore, Elster, Jon (Eds.), Democratic Reason: The Mechanisms of Collective Intelligence in Politics. Collective Wisdom: Principles and Mechanisms. Cambridge University Press, Spring.

Lee, D., Kim, M., Lee, J., 2016. Adoption of green electricity policies: investigating the role of environmental attitudes via big data-driven search-queries. Energy Policy 90, 187–201.

Leggett, M., 2014. Personal communication in Washington, DC, June 24th with Chief Counsel for the US Senate Republican Committee on Energy, the Environment and Agriculture.

Leslie, J., 2016. Nevada's Solar Bait-and-switch. New York Times, pp. A21.

Louviere, J.J., Hensher, D.A., Swait, J.D., 2006. Stated Choice Methods: Analysis and Applications. Cambridge University Press.

Louviere, J.J., Flynn, T.N., Carson, R.T., 2010. Discrete choice experiments are not conjoint analysis. J. Choice Model. 3 (3), 57–72.

Lyng, J., 2014. Personal Communication, November 2nd.
McQuarrie, E.F., 2016. The Market Research Toolbox, Fourth edition. SAGE Publications, Thousand Oaks, CA.
Noveck, B.S., 2015. Smart Citizens, Smarter State: The Technologies of Expertise and the Future of Governing. Harvard University Press, Cambridge, MA.
Orme, B., Williams, W., 2016. What are the optimal HB priors settings for CBC and MaxDiff Studies?, Sawtooth Software Research Paper Series. Retrieved from ⟨http://www.sawtoothsoftware.com/download/techpap/HBPriors2016.pdf⟩.
Peterson, M., 2006. Identifying quality-of-life priorities for societal development: using a market orientation to benefit citizens. J. Macromarketing 26 (1), 45–58.
Peterson, T.D., Rose, A.Z., 2006. Reducing conflicts between climate policy and energy policy in the US: the important role of the states. Energy Policy 34 (5), 619–631.
Press, M., Arnould, E.J., 2009. Constraints on sustainable energy consumption: market system and public policy challenges and opportunities. J. Public Policy Mark. 28 (1), 102–113.
Revesz, R.L., Lienke, J., 2016. Struggling for Air: Power Plants and the "War on Coal". Oxford University Press, Oxford, UK.
RGPPC, 2012. An energy blueprint for America: Policy solutions for a new energy economy. Republican Governors Public Policy Committee Energy and Environment Working Group, August 22, 2012.
Ritter Jr., B., 2016. Powering Forward: What Everyone Should Know About America's Energy Revolution. Fulcrum Publishing, Golden, CO.
Sawtooth Software, 2009. CBC/HB v5 Software for Hierarchical Bayes Estimation for CBC Data. (Updated August 20, 2009), Sequim, WA: Sawtooth Software. (Accessed 29 December 2016) [Retrieved from ⟨https://www.sawtoothsoftware.com/download/ssiweb/CBCHB_Manual.pdf]⟩.
Schwieters, N., Flaherty, T., 2015. A Strategist's Guide to Power Industry Transformation. Strategy & Business.
Stewart, J.B., 2015. Coal Industry Wobbles as Market Forces Slug Away. New York Times, pp. 1.
Surowiecki, J., 2004. The Wisdom of Crowds. Anchor, New York.
Thaler, R.H., 2015. Misbehaving: The Making of Behavioral Economics. W. W. Norton, New York.
VanGenderen, H., 2014. Personal Communication, December 10th.