



Energy sources, public policy, and public preferences: Analysis of US national and site-specific data

Michael Greenberg*

Edward J. Bloustein School of Planning and Public Policy, Rutgers University, 33 Livingston Avenue, Suite 100, New Brunswick, NJ 08901-1958, United States

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ABSTRACT

To understand public preferences for energy sources, 2701 US residents were surveyed; 2101 of the respondents lived within 50 miles of a major nuclear facility. Over 90% wanted greater reliance on solar and wind, and over 70% wanted more reliance upon hydroelectric sources. Less than one-third wanted more use of oil and coal. Nuclear and natural gas sources were closer to an even split. Notably, those who lived near nuclear facilities favored the same sources, although a larger proportion of these respondents favored increasing use of nuclear power than in the national sample. These results are consistent with other United States surveys. The study found striking differences in preferences by age, ethnicity/race and other demographic characteristics that need in-depth investigation in order to help decision-makers and everyone else better understand public preferences about energy policy choices.

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1. Introduction

Once again energy policy has taken center stage because of concerns about fuel sources and prices, climate change, Middle-Eastern tensions, nuclear proliferation, and other energy policy issues, doubtless well known to readers of this journal. This paper will not add to the scientific, economic, and national security elements of an ongoing debate. Yet, US experiences have taught us that implementable policy solutions require public support or at least tolerance. We need to know the preferences and perceptions of the US population, especially of those who would live near facilities that would produce the energy and manage its waste, and we should try to understand reasons for their preferences.

This paper describes the results of a mid-year 2008 survey of 2701 residents of the United States. Notably, 2101 lived within 50 miles of 11 major existing nuclear power, waste management or laboratory facilities. The purposes of the research summarized in this paper were to answer two multi-part research questions:

1. What proportion of US residents preferred to increase reliance on coal, dams/hydro, natural gas, nuclear, oil, solar, and wind? Were the preferences of those who lived near a major nuclear power plant, waste management or research laboratory similar to those who did not? How much variation existed among the 11 sites?

2. What factors, such as, risk perceptions, knowledge about nuclear facilities, trust of authority, location, and demographic characteristics were associated with these preferences?

As described below, many surveys have measured the US population's interest in different fuel sources. A contribution of this survey was to compare the preferences of those who lived near nuclear power and waste management facilities with those who did not.

2. Context

2.1. An overview

There is an enormous literature on public preferences for different energy sources, perhaps 1000 public opinion polls during the last 20 years. The author has not read every one of these reports; however, he has read several hundred, and excellent review papers (Farhar et al., 1980, 1994, 1996) and poll summaries are available. With regard to public preferences for alternative energy sources, surveys can be divided into two types: (1) general public opinion polls that ask about energy preferences as part of a larger effort to monitor public opinion about health, education, gay rights, abortion, environment, energy and many other issues; and (2) hypothesis-driven dedicated surveys about energy policy that measure preferences and try to link them to underlying explanatory factors.

This section begins by summarizing some of the more recent general public opinion polls from the years 2006–2008 (Polling

* Tel.: +732 932 4101x673; fax: +732 932 0934.

E-mail address: mrg@rci.rutgers.edu

Report, 2008) that compare multiple energy sources. In June 2008, FOX News/Opinion Dynamics Poll asked 900 registered voters nationwide about actions that could be taken to reduce the country's dependence on foreign oil and make the United States more energy independent: 51% favored building more nuclear power plants, 41% were opposed, and 9% were unsure. In contrast, 76% favored increasing drilling for oil in the United States, 77% favored drilling for oil in the Gulf of Mexico, 53% favored drilling for oil in the Alaskan wildlife refuge, 30% favored rationing gasoline and oil, and 13% favored increasing the federal tax on gasoline.

In June 2008, NBC News/Wall Street Journal provided 1000 registered voters nationwide with a list of actions to control an increase in energy and gas prices. They were asked to pick one option. Twenty-seven percent chose wind and solar, 24% Alaska exploration, 19% energy conservation, 16% offshore exploration and 10% nuclear power.

Gallup polled 1000+ US residents regarding their preferences for solving the nation's energy "problems" during the period 2003–2008. The options provided were producing more oil, gas and coal, or emphasizing conservation. With little change from year to year, about 30% chose more production and 60% conservation. CBS News/New York Times polls in 2005 and 2007 yielded relatively similar results.

The CBS News/Times polls also included more questions about fuel sources. For example, their April 2007 survey found that 45% approved of building more nuclear power plants to generate electricity and 47% disapproved; 36% approved building a new nuclear power plant in their community and 59% disapproved. In the same survey, 41% approved building more coal-fired electricity generating stations, and notably, this proportion rose to 69% if new methods of burning coal, which "cost more but produce less air pollution" were used. Also in the same poll, a slightly higher proportion favored using natural gas, which was described as the "cleanest of all fossil fuels". Lastly, the same poll found between 75% and 87% supported using solar, wind power, and other renewable energy sources. As added context, 92% favored requiring car manufacturers to produce cars that are more energy efficient.

A July–August 2006 national survey of 1478 adults (Los Angeles Times/Bloomberg) found that 61% supported the use of nuclear power as a source of energy in order to decrease the use of fossil fuels.

Overall, these polls showed a clear preference for renewable sources of energy, so-called clean air fossil fuels, like natural gas, and major reservations about coal and nuclear fuel to generate electricity.

As part of her review of more than 700 polls, Farhar (1996) noted that the public has consistently chosen renewable energy and energy efficiency over fossil fuels and nuclear fuel options, that is, she confirms the findings of these recent surveys. She notes, however, that support for renewables declines as the public learns more about them, especially their cost, whereas people become less concerned about nuclear as they acquire more actual risk information.

While each of these general public opinion polls contributes to our understanding of public preferences, relatively few are as useful as they could be. The most important reason is that energy-related questions are almost always only part of opinion polls that focus on a variety of policies, elected officials and political parties—that is, there are far too few questions about energy policy-related issues to truly understand what the data are saying. With some exceptions, it is difficult to track changes over time in these surveys because of the problem of external validity, that is, questions asked at different times, places, different formats, and sometimes in different languages. So there is a serious problem of comparing apples and watermelons.

A key limitation in almost every general public opinion poll is the sparse list of predictor variables; typically these indicators are limited to age, gender, education and a few other standard demographic characteristics that are of concern to political analysts. The literature offers a variety of plausible hypotheses, which can be tested, such as the importance of trust, values, but these have rarely been systematically examined in the published literature.

2.2. Several recent hypothesis-driven polls

MIT has conducted several surveys that address some of these shortcomings (Ansolabehere, 2007). In 2002 and 2007 they asked approximately 1200 respondents questions primarily focused on nuclear power. However, they also asked about public preferences for coal, hydro/dams, gas, nuclear, oil, solar and wind energy. Because the same questions were asked about seven potential sources, comparisons were feasible. For example, in the 2007 survey over half of the respondents wanted solar and wind use to "increase a lot". Sixty-seven percent wanted oil use reduced and 48% wanted coal use reduced to produce electricity. The survey also showed that nuclear energy produced the most contrasting views. Eleven percent did not want it used at all, and yet 36% wanted its use increased. The authors noted that during the five years, oil slipped considerably in public support, and coal was considered less desirable because of its link to global warming. Nuclear power gained slightly and approached natural gas in terms of favorability.

The MIT study was designed around a research question, which was the relative role of perceived harm, cost of energy, and other factors in explaining public preference for expansion or contraction. It found that perceived harm was a strong explanatory factor for coal and nuclear sources, and the perceived cost was important for gas, hydro/dams and oil. It also explored the relationship between waste management and energy sources. For example, about two thirds of respondents said that they would support a significant expansion of nuclear power if the waste storage problem could be more effectively solved (Ansolabehere, 2007). Notably, the public was not sanguine about solving the nuclear waste storage problem using existing waste management approaches.

Poortinga et al. (2006) (see also Bickerstaff et al., 2006) surveyed 1491 residents of the United Kingdom 15+ years old about energy-related issues. They asked about respondents' reaction to the same seven sources of energy noted above and biomass (wood, crops, human and animal waste). Next they asked about nuclear power and climate change, concern about the benefits and risks associated with energy options, and trust of authority. The results were not dissimilar to their US counterparts. Much more support (75–85%) for wind, solar, and hydroelectric sources and much less for coal (38%), nuclear (36%), and oil (39%). Like the MIT study, the authors structured the survey to answer specific hypotheses-driven questions. The authors observed that the UK public saw both climate change and nuclear power as undesirable, but that nuclear power was a reluctant preference if it can help reduce global climate change.

From a policy perspective, these two surveys improve our understanding more than the general political surveys because each comprehensively explored multiple policy choices and then tied them to logical explanatory factors. Indeed, the risk analyses and environmental psychology literatures have observed a set of five factors that should help us understand these energy-related preferences. Briefly, (more details about questions used in the survey are provided below), first, the literature suggests that familiarity with type of energy and sites would be predictive

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