



Original research article

# Health and energy preferences: Rethinking the social acceptance of energy systems in the United States



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## ABSTRACT

Does a person's health impact their opinions about energy sources? This article tests whether people with health problems prefer less physically harmful energy sources using data from a 2011 survey of 1382 U.S. residents. 19% of respondents reported their health as "only fair" or worse, and a smaller proportion of these people supported coal, natural gas, and nuclear energy than of respondents who had "good" or "excellent" health. The analysis finds significant differences in opinion by gender, age, and other demographic characteristics. These findings are consistent with previous U.S. studies on energy preferences. After controlling for political party, ideology, sex, age, education, race, religion, and geographical region, this article shows that people with health problems are not more likely to back renewable energy, but that they are significantly less likely to support coal, natural gas, and nuclear power. These results may be utilized by a variety of policy-oriented groups. They can help shape interest groups' advocacy strategies, advise decisions about what communities to avoid when developing energy facilities, and guide policymakers' attempts to initiate energy policy that will be supported by the public by increasing understanding about how energy preferences are formed.

## 1. Introduction

Energy policy currently occupies significant public attention, particularly around issues of sustainability and emission reduction. Public approval is useful for policies to be implemented successfully. Given the divergent attitudes toward different energy sources, policymakers must discern public opinion in order to appropriately guide energy policy. Understanding citizens' underlying preferences is crucial for designing effective policies. Investigating the effects of social variables may help shed light on how the general public will react to energy transition as well as how localized populations might respond to nearby investment in different types of energy facilities. This paper tests the hypothesis that people facing health challenges are likely to weight the health implications of energy sources more heavily when considering their preferences among them.

Americans vary in their preferences among economically viable sources of energy. Previous research shows the important roles political party, ideology, sex, age, and education play in explaining those preferences. However, the literature concerning the impact of individuals' health on their energy opinions is not well developed. This article attempts to fill that gap by exploring the role of physical health on opinions about four of the main sources of U.S. energy – coal, natural gas, nuclear, and renewables. Coal and natural gas impose heavy costs on the environment that can deteriorate peoples' health [1–3], and nuclear

power poses large-scale health risks to populations near nuclear facilities [4,5].

Knowing the impact of health on public energy preferences could be helpful to a variety of actors invested in this area of public policy. Not only will it help clarify the underlying drivers of public opinion about energy, but it can guide interest groups' strategies for approaching energy advocacy and advise policy decisions regarding the expansion of new energy facilities.

## 2. Prior literature and current hypotheses

A large body of literature studying U.S. energy preferences finds a dichotomy between support for renewable energy and support for the trio of coal, natural gas, and nuclear power for many socio-political variables. Characteristics that increase support for one group typically reduce support for the other.

## 2.1. Socio-demographics

Political party identification and ideology both affect energy preferences. Republicans and conservatives are more likely than Democrats and liberals to support pollution-intensive energy sources like natural gas [6,7].

Women are likely to weight the negative impacts of pollution and

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value emission reductions more than men [8,9]. Men are more likely than women to support energy sources which generate pollution and safety risks such as fracking and nuclear power [6,10]. This may be an effect of gender differences in risk perception. Using national surveys about environmental risks, Bord and O'Connor found that women are more concerned about such risks than men [8]. This difference in risk perception explains part of the influence gender has on peoples' opinions and may be the reason behind the much larger impact it has on opinions about nuclear power than other energy sources.

Support for fossil fuels such as coal and natural gas decrease with education [10]. However, these results are mixed as support for fracking is shown to increase with education so its effect on opinions about natural gas is unclear [6]. Slimak and Dietz found that more educated individuals are less concerned about risks that have extreme consequences but are unlikely to happen so more educated individuals will be more likely to support nuclear [11]. Education also increases the amount of "green" behavior individuals engage in, indicating that education will affect energy issues which are interconnected with environmental attitudes [12]. The more educated people are the more they will be influenced by environmental concern. This will result in lower opinions for energy sources which damage the environment as described in Section 2.2. Educated individuals are also likely to have higher incomes [13–15], and will be willing to pay more for mitigation of environmental damages [16,17].

Support for energy generated with nuclear, fossil fuels, and natural gas through fracking increases with age [6,10]. Older individuals are more likely to support coal, natural gas, and nuclear, and less likely to support renewable energy due to status quo and familiarity biases since they are likely to be more used to them than to renewable energy [18,19]. People who have experienced something before tend to downplay its risks and may, therefore, be more supportive of the status quo [20].

The effects of race are unclear. Greenberg found that white people are more likely than minorities to support renewable energy sources and less likely to support the use of fossil fuels, but Davis and Fisk found the opposite relationship in their survey on natural gas [7,10]. Mohai and Bryant claim that racial effects on environmental attitudes, which can be closely linked to energy opinions, are largely overstated, and found few significant differences between whites and African-Americans except in localized communities [21].

Religion does not appear to impact energy opinions directly, but it does affect risk perception so it may affect how people value risks and, therefore, how they think about energy production [11].

Energy opinions are also dependent on regional attitudes. Individuals from the Northeast and West regions of the U.S. are less likely than the rest of the country to support coal power due to increased concern about air quality and other pollutants [22]. However, work in this area needs development as this relationship is not absolutely clear. The region respondents are from may have a causal effect on their energy opinions since people from areas dominated by one type of energy infrastructure may be more likely to support energy sources they are used to [18–20]. Existing infrastructure in the area would also make it more likely for individuals to work, or know someone who works, in that energy sector and would therefore make them more likely to support that specific energy source since support for familiar energy sources can be reinforced via social networking [23]. However, this relationship is not clear, and needs to be investigated further.

## 2.2. Environmental justice

Although the direct effects of race are unclear, race and socio-economic status are important factors when discussing environmental justice. Substantial literature describes environmental inequality and environmental racism in the U.S. where poor and minority communities are often exposed to more environmental risks than more affluent demographics [24,25]. Championed by Robert Buller, studies about

Environmental Justice were driven by numerous accounts of environmental hazards being pushed onto minority communities which were poor and had little political power [26–29]. While racial differences may not be pronounced for large-scale environmental problems, African-Americans are likely to express greater concern about local environmental issues due to the disproportionate exposure to environmental harms that African-American communities are subjected to [21].

## 2.3. Environmental and health concern

Attitudes about different sources of energy are closely related to health and environmental concerns. Individuals' support for specific energy sources is highly connected to the perceived environmental damage they create [30]. Ansolabehere and Konisky found that perception of environmental harm drives opinions about the construction of new power plants, whether coal, natural gas, nuclear, or renewable [31].

Because of its heavy emission of pollutants and greenhouse gases [32] declining support for coal has been linked to rising environmental concern [30]. Davis and Fisk found opinions about natural gas and fracking to be strongly related to individuals' environmental concern as well, reinforcing the link between negative environmental effects and support [7]. Nuclear perceptions are highly dependent on the risk of disaster and the potential effects that would entail, though the dilemma of waste disposal is also an area of concern for individuals [30,22,33]. Concern over climate change has made renewable energy sources increasingly popular [34] since they provide a sustainable energy option that creates fewer negative externalities in the environment [35].

Environmental concern can stem from either anthropocentric or ecocentric philosophies. These alternative motivations independently impact individuals' environmental attitudes and behavior [36]. Ecocentrism has been reported as a stronger predictor of environmental behavior with people who are ecocentric engaging in ecofriendly behavior more often than anthropocentric individuals [37].

However, anthropocentric concerns are important as well. Concern about personal health is a substantial component of overall environmental concern; many people are worried about environmental degradation because they fear it will expose them, or others, to health hazards [38]. Baldassare and Katz show that perceived threats to individuals' personal environments which could jeopardize their health or well-being are a strong predictor for individuals' environmental behavior [39]. Environmental worry can be a product of anthropocentric interest in public health rather than environmental altruism so concerns over the environment and health are correlated [38]. Environmental concern should echo worry about impacts on health. Factors which contribute to concern over adverse health impacts should have similar effects on environmental concern since these two subjects are correlated.

## 2.4. Impact of energy sources on public health

Pollution from energy production can negatively impact human health [40]. If the public understands those impacts and acts rationally then health issues should play a major role in deciding their energy opinions.

Pollution from coal power plants directly contributes to diseases of the nervous system, heart, and cerebral-vascular system as well as increasing mortality among human populations [2]. These impacts represent serious health concerns. Understanding the implications they carry should impact individuals' opinions about coal energy through health and environmental concern. This paper hypothesizes that individuals in poor health should be less likely to support coal as an energy source than healthy individuals since people who suffer from health problems are likely to weight good health more, and be more concerned about their health, than those who are in good health and

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