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Public Views on Wind Energy in the Rocky Mountain Region of the United States: Distinct Attitudes, Exposure, and Other Key Predictors of Wind Energy[1]

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ABSTRACT: Renewable energy is often framed by policymakers and the media as an environmental or 'green' issue motivated by global climate change and the need for greenhouse gas reductions. However, some researchers studying social responses to renewables have found that factors other than opinions about climate change may be more influential in determining support for renewables. This study analyzes survey data from a study of five communities in the Rocky Mountain region of the U.S. experiencing wind energy development to examine the relationship between environmental beliefs, climate change opinions, and support for renewable energy. Results show that views on renewable energy comprise a distinct dimension of public views on energy, environment, and climate, suggesting that public support for renewable energy is less related to environmental beliefs than to some other factors, including beliefs about economic benefits and concerns about landscape impacts. Findings also indicate that the frequency with which individuals see nearby wind turbines is strongly related to their level of support for renewable energy, while physical proximity is not. Overall, results suggest that ceasing to frame renewable energy as an environmental issue and instead framing it in a way that invokes locally relevant social values may garner broader public support.

Keywords: environmental beliefs; renewable energy; wind energy; United States

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1. Introduction

Renewable energy enjoys broad public support across the world [29], yet often experiences significant challenges due to social opposition at the local or community level [4,5]. Understanding how and why local residents respond to nearby large-scale renewable energy generation systems is an important factor in paving the way for a smoother transition to a renewable energy future. Not only can public acceptance of renewable systems influence the rate of development, but understanding the experiences of individuals and communities residing near large-scale renewable energy facilities is critical since, as is the case for fossil-fuel based energy production, adverse impacts may arise that highlight issues of power, rural disparity, and environmental justice [38]. Furthermore, debates over local renewable energy development have been shown to be complex, multifaceted, and qualified by a range of contextual factors [11,52,4], such as impacts on the local economy, local landscape aesthetics, and community autonomy. Continued social science research is needed to increase scientific knowledge about how and why individuals form their opinions about renewable energy, and to consider issues of power and justice that may be present in the renewable energy development process.

However, across the field of energy studies, social science makes up less than 20% of research, and overall remains relatively limited compared to research from disciplines such as engineering, economics, and business [43]. As Sovacool (2014) points out, "human-centered" research methods, such as surveys, interviews, and focus groups, are even more underutilized, yet are "necessary if one is to uncover the multidimensional role that attitudes, habits, and experience have in shaping energy consumption" (p. 11) – and, we would add, in shaping individuals' energy preferences and policy support.

This study analyzes how residents of communities in the Rocky Mountain region of the United States located in close proximity to new or proposed wind energy facilities are forming opinions and beliefs about such developments, and what variables are related to these opinions. The Rocky Mountain region has experienced notable growth in installed renewable energy capacity over the last decade. Furthermore, the region has been documented as having significant potential for additional growth in both wind and solar energy generation [48]. Additionally, this area of the western United States is notable for its large tracts of open space, rural communities, and public land ownership. Thus, findings from this study may be particularly useful in similar contexts across the world where large-scale renewable energy facilities are being constructed in less densely populated areas that are valued for recreation, landscape aesthetics, and/or communal prerogatives.

We focus on the factors that influence how individuals and communities in the Rocky Mountain region respond to renewable energy development, including whether they support or oppose such development, and why. We are interested in the role that both general environmental beliefs, as well as local factors – such as where in space wind turbines are built, for example – play in shaping the way that individuals judge renewable energy. While renewable energy is frequently framed by the media, policymakers, and activists as an environmental issue, particularly in terms of mitigation of global climate change [46,53], the influence of individuals' environmental beliefs on their level of support for renewable energy remains debatable. Some researchers have noted that even environmentalists are divided over renewable energy [1,51], while others have found that environmental 'skeptics' can be some of the most ardent supporters, supporting renewable energy for economic or other reasons [24]. Environmental issues such as climate change have become increasingly polarizing in several national contexts, such as in

Australia, the United Kingdom, and especially in the United States [34,33]. As such, local responses to renewable energy development may be influenced by the extent to which renewable energy is construed as an environmental issue. For example, Olson [37] found that a central component of oppositional discourse toward wind energy in central Wyoming was the belief that renewable energy development was part of the 'liberal environmental agenda'.

This study directly addresses a research question highlighted in Sovacool's important state-of-knowledge article, urging energy researchers to ask "What types of politics can make the numerous energy and climate *policies* we discuss achievable?" [emphasis in original] (2014:21). That is, we believe that in certain regions and contexts, overlaying an environment-based rationale over renewable energy development might unnecessarily and detrimentally politicize the issue and present additional obstacles going forward. The Rocky Mountain region of the US is an important geographic area in which to study public responses to renewable energy because of its conservative politics and its legacy of tension between local and extralocal interests over environmental regulations, land use, and felt anger over 'federal overreach' on both these issues [32]. Thus, any insights about how renewable energy might be received by communities in our study area could be very useful for predicting human responses to new energy systems across the world in regions with similar political and geographic contexts.

Utilizing survey research from five communities (n=906), we examine the role that a variety of environmental beliefs (including climate change opinion, opposition to environmental policies, and support for different energy sources) play in shaping renewable energy attitudes. We also explore the influence of proximity and visual exposure to turbines, beliefs about impacts on landscape aesthetics, and beliefs about economic impacts, providing further insight into what factors are relevant in shaping public views toward renewable energy.

2. Literature Review

2.1 Environmental beliefs and public responses to renewable energy

Nationally representative survey data consistently show broad public support for renewable energy [29,2,3]. The most recent study from the Yale Project on Climate Change Communication found that that 79% of Americans either "strongly" or "somewhat" support government funding of research to further develop renewable energy technologies, and that 66% of Americans support policies requiring electric utilities to source at least 20% of energy from renewable sources, even if it places an extra financial burden on their households [29]. How does support for renewable energy connect to individuals' environmental beliefs? Ansolabehere and Konisky [3] find that while most Americans do factor in environmental considerations in their energy preferences, they tend to do so at the local level rather than in the abstract, incorporating concerns over local health and pollution problems into their energy attitudes instead of relying on general environmental beliefs, such as the feeling of urgency about mitigating global climate change. The authors also found that attitudes about climate change are either weakly correlated or not correlated with individuals' preferences about which fuel source is used to generate electricity, including renewable energy [2].

The relationship between environmental beliefs and renewable energy attitudes may become even less strong at the local level, once residents have some type of personal experience with nearby renewable energy development. Wolsink [53] has argued that the environmental framing of renewable energy "is not in line with the frame that is applicable from a local perspective" and furthermore that "attitudes towards wind power are fundamentally different from attitudes towards wind farms" (pg. 2695) because a whole new range of factors are introduced by personal experience. While some studies have found that a pro-environmental orientation is positively

related to individuals' level of support for renewables [28,35], others have found the opposite effect [16]. Even those with a high level of environmental concern may be divided, citing environmental impact-based rationales on both sides of the debate [51]. Some research has also shown that individuals who identify as 'environmentally skeptic' and who do not view fossil fuels as harmful can be some of the biggest supporters of renewable energy [24,42]. Larsen and Krannich [28] find that pro-environmental orientation is positively related to renewable energy attitudes when surveying individuals about their general level of support for renewables, but that the influence of environmental beliefs drops out completely when the same individuals are asked about how they would feel about nearby development of wind or solar energy facilities.

Clearly, there is more to understand in terms of the relationship between environmental beliefs (including climate change opinions) and renewable energy attitudes. Meanwhile, the framing of renewable energy as an environmental issue could have unintended and adverse effects in certain social and political contexts. It is important to continue to examine this relationship in order to understand the factors influencing how communities and individuals respond to renewable energy development.

Researchers like Devine-Wright [11] argue that public reactions to renewable energy systems are of a "complex, multidimensional nature" (pg. 129), appear to be context-dependent, and change over time [16]. Scholars have theorized a range of factors that may help to explain and predict public support or opposition. Before describing our study, we briefly review several of these.

2.2 Landscape aesthetics and place attachment

One of the most commonly cited reasons for opposing renewable energy development

(especially wind energy) is its perceived impact on the aesthetics of surrounding landscapes. Or, as Wolsink [53] puts it succinctly, "It's the landscape, stupid!" (pg. 2695). Devine-Wright and others [12,10,11] propose that landscape impacts go beyond aesthetics, posing disruptions to identities individuals form in relation to a particular landscape construction or meaning. Place attachment theory highlights how individuals become emotionally 'attached' to places, and how proposed changes to those places can incite distress, anger, and political action to protect those places from change [23,10]. The place-protection thesis was developed to counter the self-interested or "NIMBY" allegations often employed by planners, the media, and energy developers to explain local opposition to proposed renewable energy development [8,54,9].

2.3 Economic rationale

Another idea used to explain why communities or residents support or oppose renewable energy employs a relative deprivation framework. In this framework, communities in greater need of economic development are believed to be more likely to accept, and even welcome, renewable energy development [31,12, 47, 49]. The expectation of economic returns appears to be one of the top reasons why local residents support nearby wind energy development, at least in some contexts [42; 24]. Several scholars have proposed that greater economic benefits for individuals and communities may be key in creating more acceptable projects [6]. Additionally, economic benefits, such as lease or royalty payments to landowners and tax payments to counties, appear to be distributed very unevenly, creating potential inequities between those who are positioned to benefit from renewable energy development and those who are not [19,7,36].

2.4 ‘Democratic deficit’

The lack of opportunity for local residents to be engaged in renewable energy planning and siting processes is another common explanation for why community opposition may arise [21,39,41,30,6,15,53). Hindmarsh and Matthews [20] referred to this as the “democratic deficit” in wind energy planning. This explanation often invokes dimensions of procedural justice and fairness [40,38].

2.4 Proximity

There has been debate about the role of proximity, with some research showing that the closer individuals live to renewable energy facilities, the more likely they are to display opposition [31,45,49]. However, other studies have found no effect or the opposite effect [7,26,51], and “the nature, strength and spatial scale of this effect may vary according to local context and 'value' of the land" [49, pg. 2705]. Given these mixed findings, the present research examines the influence of visual accessibility (how often individuals see or anticipate seeing the wind turbines) on residents’ perceptions of renewable energy.

A multiplicity of mechanisms seem to be driving attitude formation toward renewable energy, which may be different for the general public in the abstract than for local residents confronted with the reality of a specific renewable facility. Given the environmental framing of renewable energy in the media and policy arenas, the mixed research findings on this relationship, and the possible adverse consequences of this environmental frame, this research assess the relative influence of environmental beliefs on renewable energy attitudes, compared to a range of other factors. We use survey data from five communities in the Intermountain West experiencing wind energy development. The central questions guiding the present study are: 1)

In what ways and to what extent are renewable energy attitudes, environmental beliefs, climate change opinion, and attitudes toward other energy sources intercorrelated? 2) How well do environmental beliefs and climate change opinions explain renewable energy attitudes, compared with landscape aesthetics, economic expectations, community engagement, and proximity? Overall, we expect that attitudes toward local renewable energy development will be less influenced by general environmental beliefs and climate change opinions than they are by other factors, such as beliefs about economic benefits and landscape factors, such as visual accessibility of turbines.

3. Materials and Methods

3.1 Study sites

This research uses data from a 2014 survey of five communities in the Intermountain West (total n=906): Milford and Monticello, Utah; Ammon/Iona/eastern Idaho Falls, Idaho (referred to hereafter as 'eastern Idaho Falls'); and Rawlins and Saratoga, Wyoming. These areas were chosen purposively to represent a spectrum of community experiences with and responses to renewable energy development. Two of the areas (Milford and the Ammon/Iona/eastern Idaho Falls site) have over the past several years experienced the construction and operation of large-scale commercial wind power facilities located in close proximity to those communities. The other three study areas (Monticello, Rawlins, and Saratoga) are located near proposed commercial wind power projects that were in advanced permitting stages but not yet developed at the time of data collection. Key informant interviews conducted in March 2014 provided preliminary insights about support and opposition within each community. The locations of the five study sites are shown in Figure 1, and descriptions follow.

Figure 1: Map of study locations.

3.1.1 Utah study sites: Milford and Monticello

Both Utah study areas are rural towns characterized by small populations and remote locations. Milford (population 1,420 at 2010 Census) is located in the southwest part of Utah in Beaver County, 230 miles from Salt Lake City. Between 2009 and 2014, First Wind (now part of SunEdison) constructed in two phases a 306-megawatt wind energy facility across a flat desert valley about ten miles north of Milford. Key informant interviews with community leaders prior to survey research highlighted a notably high level of community support for this project (perhaps partially because the developer involved a local high school teacher and his students in the development process). This is currently the largest wind facility in Utah.

Monticello (population 1,958 in 2010) is located in San Juan County 54 miles south of Moab, the state's popular red rock, mountain biking and off-road vehicle destination, and 288

miles from Salt Lake City. Monticello is characterized by its legacy as a former uranium-processing town and continues to exhibit the effects of a major economic downturn that followed the end of the uranium boom in the 1960s. In 2006, Wasatch Wind proposed a 60-megawatt wind farm on private land immediately west of Monticello. At the time of data collection a conditional use permit had been obtained from county officials and environmental studies were complete, though construction did not begin until 2015. Key informant interviews with community leaders and media research revealed some community tension over this project, partially because it was sited on the lower shoulder of a nearby mountain and some residents believed it could negatively impact landscape aesthetics as well as recreation and tourism.

3.1.2 Wyoming study sites: Rawlins and Saratoga

Both Wyoming study sites are located in Carbon County, to the northwest (Rawlins) and southeast (Saratoga) of the proposed Chokecherry and Sierra Madre Wind Energy Project. As proposed this would be among the largest of wind energy facilities in the US, with a total of 1,000 turbines producing up to 3,000 megawatts of energy. The project would be built by the Power Company of Wyoming in a "checkerboard" area comprised of both federal public lands administered by the US Bureau of Land Management and private land owned by Anschutz Corporation. Since this project includes public lands, the siting and permitting process requires a substantial public involvement process along with extensive environmental review and approval through the Environmental Assessment process as required by the U.S. National Environmental Protection Act (NEPA). At the time of data collection a conditional use permit had been approved by the Carbon County commission, and the project was in the midst of the federal NEPA review process.

Rawlins (population 9,259) is a small urban community located on a major interstate highway in the south-central part of the state, 149 miles west of Cheyenne. For several decades Rawlins has served as a regional hub for conventional (coal, oil and gas) energy development activity and related industries. Saratoga (population 1,690) is located about 40 miles southeast from Rawlins and 20 miles south of Interstate 80. Situated alongside the North Platte River, Saratoga is a destination for fly-fishing and hunting enthusiasts as well as substantial numbers of retirees and seasonal residents attracted to the rural and natural amenity conditions of the area.

3.1.3 Idaho study site: Ammon/Iona/eastern Idaho Falls

This study site was selected to encompass a "rural-urban fringe" area on the eastern edge of the Idaho Falls metropolitan area (metro population of 136,108). Between 2006 and 2012, four different wind energy facilities with a combined total of 215 turbines were constructed along ridgelines immediately to the east, with turbines highly visible from most locations throughout the area. Key informant interviews with community leaders prior to the survey data collection highlighted that these wind energy facilities were built relatively quickly and without much public awareness or input. The study area included the small towns of Ammon (population 13,816) and Iona (population 1,803), as well as surrounding unincorporated portions of Bonneville County.

We believe the five selected study areas represent a reasonable cross-section of the Rocky Mountain region, where commercial-scale wind power development has grown considerably in the last ten years.[2] The Rocky Mountain region refers to states that contain part

[2] For example, in the states encompassing our study sites: since 2005, the installed capacity of wind energy in Idaho has grown from 75 megawatts (MW) to 973 MW, in Wyoming has grown from 288 MW to 1,410 MW, and in Utah has grown from virtually no wind power to 327 MW.

of the Rocky Mountain Range, which runs north-south through Montana, Idaho, Wyoming, Colorado, Utah, and New Mexico. However, we also recognize that the specific nature of the study areas and their populations may nevertheless impose limitations on the research. Because all had direct experience with nearby utility-scale renewable energy development, residents' views may be different from what might occur within more broadly representative statewide or regional samples or in areas where such developments have been sited at greater distance from local communities. The "public lands" context of the region and broad-based anti-federalist sentiments may also influence local reactions to such projects, even though across our study areas only one (Milford) had experience with renewable facility development involving mostly public lands. Finally, four of the study communities are rural and one is a rural-urban fringe area, contexts that differ greatly from the major metropolitan areas where a majority of the region's population resides.

3.2 Data collection

Data were collected using a drop-off/pick-up survey methodology [44] and tailored survey design principles [13]. A list of all residential properties was created for each community (including both rental units as well as resident-owned properties) using public utility and tax assessment records, supplemented where necessary by visual enumeration of units in multiple-residence facilities such as mobile home parks and apartment complexes. Random samples of 250 addresses were drawn for each area, with additional addresses also randomly drawn to allow for replacement vacant residences or households where no one could be contacted following repeated attempts across multiple days. Survey materials were personally delivered to the adult

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See the US Department of Energy website for more information: http://apps2.eere.energy.gov/wind/windexchange/wind_installed_capacity.asp

member of each sampled household whose birthday had occurred most recently, a straightforward and effective method for randomizing within-household selection of survey participants [13]. Following delivery members of the project team then returned (usually within 24-48 hours) to retrieve completed questionnaires. Response rates were high in all of the study areas (64% in Rawlins, 72% in Saratoga, 74% in eastern Idaho Falls, 76% in Milford, and 79% in Monticello).

3.3 Measurement procedures

3.2.1 Renewable energy attitudes: general and local

Scale construction details for energy-related latent variable measures are described in Table 1. General attitudes toward renewable energy were measured using a five-item summated scale asking for respondents' level of support for solar, wind, and renewable energy generally. The scale as a whole was internally reliable as a measure of renewable energy support (Cronbach's alpha = 0.835). We also measured respondents' level of support for the development of local wind energy using a single question asking whether or not they would have voted for the local wind farm, if given the chance to vote.

3.2.2 Attitudes toward other energy sources

To measure respondents' level of support for using coal, natural gas, and nuclear fuel sources to produce electricity, we constructed three-item summated scales for each energy source (Table 1). Each scale was found to be internally reliable (Cronbach's alphas: coal scale = 0.877; natural gas scale = 0.812; nuclear energy scale = 0.914).

3.2.3 Environmental beliefs (NEP score)

To measure general environmental orientation, the survey included ten items from the New Environmental Paradigm (NEP) scale (see Appendix A) developed by Dunlap et al. [14]. The NEP scale intends to measure individuals' fundamental or "primitive" environmental beliefs, specifically whether or not (and how much) individuals have incorporated awareness and concern about the environment into their worldview. According to [14], individuals with an ecological worldview believe to some extent that human society has the ability to upset the balance of nature and that limits to growth and consumption are necessary to live in harmony with nature. The "new environmental paradigm" refers to the rise of a new public consciousness about the environment and humans' impact on it, and stands in contradiction to what Dunlap and colleagues refer to as the "dominant social paradigm" in which individuals believe humans stand apart from and are masters over nature. Dunlap and colleagues constructed a multi-item New Environmental Paradigm scale (NEP scale) to measure this latent construct. In the present study, five items from the full 15-item NEP scale were not included due to questionnaire space considerations, as well as evidence from prior research that some items may not contribute uniformly to a single measurement dimension.[3] Internal reliability was found to be high for the ten NEP items used (Cronbach's alpha = 0.843).

[3] The items dropped were (1) Plants and animals have as much right as humans to exist; (2) The balance of nature is strong enough to cope with the impacts of modern industrial nations; (3) Despite our special abilities humans are still subject to the laws of nature; (4) Humans were meant to rule over the rest of nature; (5) Humans will eventually learn enough about how nature works to be able to control it.

Table 1

Energy-related summated rating scales and scale items

Latent variable scales	Reliability (Cronbach's alpha)	Component Items
General support for renewable energy	0.835	Should we increase or reduce the use of solar power in the United States? *(5-point Likert scale from "reduce a lot" to "increase a lot")* Should we increase or reduce the use of wind power in the United States? *(5-point Likert scale from "reduce a lot" to "increase a lot")* Do you disapprove or approve of using renewable energy sources to generate electricity? *(5-point Likert scale from "strongly disapprove" to "strongly approve")* How environmentally harmful do you think wind energy is? *(5-point Likert scale from "very harmful" to "not harmful at all")* How environmentally harmful do you think wind energy is? *(5-point Likert scale from "very harmful" to "not harmful at all")*
Support for coal	0.877	Should we increase or reduce the use of coal-fired power plants in the United States? *(5-point Likert scale from "reduce a lot" to "increase a lot")* How environmentally harmful do you think coal fired power plants are? *(5-point Likert scale from "very harmful" to "not harmful at all")* Do you disapprove or approve of using coal to generate electricity? *(5-point Likert scale from "strongly disapprove" to "strongly approve")*
Support for natural gas	0.812	Should we increase or reduce the use of natural gas-fired power plants in the United States? *(5-point Likert scale from "reduce a lot" to "increase a lot")* How environmentally harmful do you think natural gas-fired power plants are? *(5-point Likert scale from "very harmful" to "not harmful at all")* Do you disapprove or approve of using natural gas to generate electricity? *(5-point Likert scale from "strongly disapprove" to "strongly approve")*
Support for nuclear energy	0.914	Should we increase or reduce the use of nuclear energy in the United States? *(5-point Likert scale from "reduce a lot" to "increase a lot")* How environmentally harmful do you think nuclear energy is? *(5-point Likert scale from "very harmful" to "not harmful at all")* Do you disapprove or approve of using nuclear energy to generate electricity? *(5-point Likert scale from "strongly disapprove" to "strongly approve")*

3.2.4 Climate change / global warming beliefs

To measure respondents' beliefs about the seriousness of global warming, we use a single-item question that asked "Which of the following statements comes closest to your views about climate change and global warming?" The four response categories represented increasing belief in the seriousness of global warming and the need for government action (Very serious and should be high priority for government; Serious but does not need to be high priority right now; Not serious and can be addressed years from now if needed; Does not exist at all).[4]

3.2.5 Opposition to government environmental policies

To measure the relationship between environmental beliefs, including climate change, and opinions toward renewable energy, we considered it important to control for attitudes towards government environmental policies. Anti-federal sentiments related to government regulation of land and natural resources have been a fixture of western U.S. politics for decades. We therefore wanted to disentangle individuals' environmental beliefs from opinions about government regulation of the environment. To measure attitudes toward environmental policies, a scale was constructed based on eight items asking respondents about their broad feelings about environmental regulations in the United States as well as about particular environmental policies (see Appendix A). Internal consistency of this scale was found to be high (Cronbach's alpha = 0.880).

[4] Question was derived from a 2009 CBS News/New York Times poll to allow for comparison with national public opinion.

3.2.6 Proximity and visual accessibility of turbines

A self-reported measure of proximity to the local wind farm was obtained, which asked respondents how far they live from the wind energy facility (or will live, once the facility is built).[5] The survey also included a measure of how frequently the respondent sees the wind energy facility (or expects to see it once it's built).[6] We expect this variable to be more predictive than the commonly used spatial proximity variable, because close spatial proximity does not directly translate into a higher frequency with which individuals may see the wind turbines. Visual accessibility is influenced by topographic and other spatial factors such as how high in elevation turbines are placed and whether or not residents' line of sight to turbines is blocked by obstructions such as buildings or vegetation.

3.2.7 Landscape concerns, economic beliefs, and participation

The survey measured a variety of beliefs regarding utility-scale wind energy. Using a five-point Likert scale, respondents were asked if they thought utility-scale wind power was an unattractive feature of the landscape. To measure respondents' beliefs about the economic impacts of wind energy development, a four-item scale (including questions about economic benefits like jobs and tax revenues) was constructed to tap a latent construct indicating belief in the idea that wind power development brings economic benefits to the local area (see Appendix A). The scale was found to be reliable (Cronbach's alpha = 0.759). Last, to measure whether respondents felt they had been given adequate opportunity and information to participate in the

[5] The proximity measure used a four-option answer consisting of the following: (1) Less than one mile; (2) Between one and five miles; (3) Between five and ten miles; (4) More than ten miles.

[6] The visual accessibility measure used a four-option answer consisting of the following: (1) Every day; (2) A few times a week; (3) A few times a month; (4) A few times a year or less.

planning process for the local wind energy facility, a two-item scale (see Appendix A) was constructed (Cronbach's alpha = 0.817).

3.2.8 Sociodemographic variables

The survey gathered information from respondents on a number of sociodemographic characteristics. Age, education, and income have been identified as relatively stable predictors of environmental concern [50,25], while the effect of gender has received mixed and inconsistent support, though females generally exhibit higher levels of concern, especially in terms of health and safety risks of environmental problems [56].

Political party affiliation and political ideology have also been identified as consistent predictors of environmental beliefs [25,34]. This study uses a measure of political orientation comprised of a 5-point scale (Very Conservative /Moderately Conservative /Moderate /Moderately Liberal /Very Liberal).

The influence of religion on environmental beliefs has been mixed in research findings, with some scholars finding that Judeo-Christians have lower levels of environmental concern and exhibit less support for environmental policies [17,18], while others find contradictory results [55]. To capture any correlations with religious affiliation, the survey asked whether respondents were Mormon, Protestant, or Catholic (the major religions of our study area), or whether they have no religious affiliation.[7]

3.2.9. Community of residence

[7] A small number of respondents reporting other religious affiliations were dropped from the analysis.

To capture community-level variation in the dependent variables not captured by the locally relevant variables mentioned above, we include dummy variables for four of the five communities, with Milford, Utah, as the reference category. Milford was chosen as the reference category because it seemed to be the most socially benign of the five study sites and had the highest level of community support overall.

3.3 Analysis

We use a multi-stage analysis to address the research questions. First, bivariate correlation matrices are examined to understand the inter-relationships between respondents' environmental beliefs (NEP score), attitudes toward environmental policies, beliefs about climate change, level of approval for coal, natural gas, nuclear, and renewable energy, and level of support for local wind energy development. This first, basic analysis stage provides a foundation for understanding how individuals' opinions about different energy sources relate to environmental beliefs, and also illuminates how renewable energy opinions compare or relate to opinions about other energy sources.

Next, we conduct a principal-components factor analysis (principal components extraction). This approach provides the opportunity to further examine the relationships between environmental and energy attitudes as a whole, while looking for clustering of certain variables. In particular, we examine the dimensionality of individuals' environmental beliefs and energy attitudes to investigate whether or not renewable energy attitudes comprise a distinct attitudinal dimension.

Last, we estimate two multivariate regression models – one for respondents' general support for renewable energy, and one for respondents' support for the local wind farm in the

community. Multivariate regression allows us to determine which variables are most useful in understanding what influences individuals' views toward renewable energy, including sociodemographic characteristics, community of residence, political views, environmental views, beliefs about the economic and aesthetic impact of local renewable energy, participation in the siting process, and both proximity and visual exposure to the local wind energy facility.

4. Results

Sociodemographic characteristics of survey participants are reported in Table 2. The majority of respondents were over 45 years old. The gender distribution was relatively evenly split between male and female. Nearly fifty percent of residents reported an annual household income between $25,000 and $75,000, with 14% under $25,000 and 21% over $100,000. Twenty-two percent of respondents had a bachelor's degree, and 11% had a post-graduate degree. While respondents were most likely (49%) to identify as either "conservative" or "very conservative," a significant portion (38%) said they are also identify as politically moderate. Four out of ten were affiliated with the Mormon faith, while 25% were Protestant, 14% were Catholic, and 20% did not affiliate with a religion.

Table 2: Descriptive statistics for independent variables.

Variable	Categories	N	%	Census°
Age*	18-24	41	4.7%	8.6%
	25-34	174	19.9%	13.9%
	35-44	182	20.8%	11.7%
	45-54	147	16.8%	12.2%
	55-64	158	18.1%	11.3%
	65+	173	19.8%	11.6%
Income	Under $24,999	110	13.6%	-
	$25,000-$49,999	207	25.6%	-
	$50,000-$74,999	191	23.6%	-
	$75,000-$99,999	129	16.0%	-
	$100,000-$124,999	90	11.1%	-
	$125,000-$149,999	41	5.1%	-
	$150,000-$199,999	24	3.0%	-
	$200,000 or more	16	2.0%	-
Median Household Income	*$50,000-$74,999*	*808*	-	*$50,919*
Education	High school or less	509	26.9%	39.80%
	Some college/associates	353	39.8%	36.80%
	College graduate	194	21.9%	16.70%
	Post-graduate	101	11.4%	7.50%
Gender	Male	475	53.6%	50.3%
	Female	410	46.4%	49.7%
Length of Residence	Less than 1 year	45	5.0%	-
	1-2 years	46	5.2%	-
	2-5 years	82	9.2%	-
	6-10 years	119	13.3%	-
	More than 10 years	601	67.3%	-
Religious affiliation	Mormon	317	40.5%	51.1%
	Catholic	110	14.1%	6.0%
	Protestant	196	25.1%	6.30%
	No affiliation	159	20.3%	33.30%
Political orientation	Very conservative	138	16.0%	-
	Moderately conserative	282	32.6%	-
	Moderate	332	38.4%	-
	Moderately liberal	86	10.0%	-
	Very liberal	26	3.0%	-
Community	Milford, UT	189	20.9%	-
	Monticello, UT	196	21.6%	-
	Idaho Falls, ID	185	20.4%	-
	Rawlins, WY	158	17.4%	-
	Saratoga, WY	178	19.7%	-

**Age measured as continuous, but reported here categorically for clear*

°Census characteristics for comparison derived from county-level averages.

4.1 Environmental beliefs and energy attitudes

This study's first goal was to examine the relationships between various environmental and energy attitudes. To address this, correlational analysis was conducted. Table 3 reports the Pearson's r statistic showing the strength and direction of association between all variables[8]. First, respondents' NEP scores (the measure of an overall pro-environmental orientation / belief system) are strongly and positively correlated with a belief in the seriousness of global warming (0.556), and strongly and negatively correlated with individuals' level of opposition toward government environmental policies (-0.634). Environmental beliefs are moderately and negatively correlated with support for both fossil fuels energy sources (coal: -0.495; and natural gas: - 0.454) as well as nuclear energy (-0.367). However, environmental beliefs are only weakly associated with general support for renewable energy development (0.174), and not at all associated with level of support for the local wind farm.

Second, the correlation matrix overall reveals an interesting pattern: the associations of the three environmental attitude variables (NEP, environmental policies, and climate change) are consistently stronger with the coal, gas, and nuclear energy variables than they are with either of the renewable energy variables. This suggests that, at least in places that have experience with renewable energy development, factors other than environment-related attitudes and beliefs may be more influential in opinion formation toward renewable energy

Lastly, the relationships overall between general support for renewable energy and the environmental beliefs and energy attitudes variables were stronger than the correlations with the

[8] Several of the variables had highly skewed distributions. As such, we also conducted a Spearman's Rho analysis (a test used for non-parametric variables) for comparison. Results were very similar – the largest difference in effect sizes between the two tests was still less than 0.1, and more often the difference was 0.03-0.05. Since the difference was negligible, we report Pearson's r.

variable measuring support for the local wind energy facility. This finding provides support for Wolsink's [53] aforementioned argument that "attitudes towards wind power are fundamentally different from attitudes towards wind farms" (pg. 2695).

Table 3
Bivariate correlations of environmental beliefs and attitudes toward different energy sources

	1.	2.	3.	4.	5.	6.	7.	8.
1. NEP score	1.000							
2. Opposition to environmental policies	-0.634***	1.000						
3. Belief in seriousness of climate change	0.556***	-0.653***	1.000					
4. Pro-coal	-0.495***	0.661***	-0.546***	1.000				
5. Pro-natural gas	-0.454***	0.533***	-0.465***	0.587***	1.000			
6. Pro-nuclear energy	-0.367***	0.442***	-0.372***	0.389***	0.499***	1.000		
7. Pro-renewable energy (general)	0.174***	-0.415***	0.311***	-0.307***	-0.213***	-0.314***	1.000	
8. Pro-renewable energy (local)	0.046	-0.279***	0.198***	-0.185***	-0.143***	-0.152***	0.577***	1.000

Note: Pairwise correlations; n ranges from 725 to 864 observations.
Pearson's r correlation coefficient.
**p<0.05, **p<0.01, ***p<0.001.*

Next, a factor analysis was conducted to further examine whether variation in the environmental and energy attitudes variables exhibited a common covariance structure, or if instead there is evidence that any of the variables clustered together in a way that might indicate the presence of separate attitudinal dimensions (factors). Table 4 shows results for the principal-components factor analysis (principal components extraction) with orthogonal (varimax) rotation. The factor analysis indicates the presence of two distinct factors. The first dimension includes six variables with high factor loadings: the NEP scale used to measure general environmental beliefs, attitude toward government environmental policies, attitude toward climate change, and levels of support for coal, natural gas, and nuclear energy. This factor grouping reveals that respondents' environmental beliefs are related to how they judge fossil fuel and nuclear energy. The second, separate dimension includes both measures of support for

renewable energy. This finding provides additional evidence that, for individuals in these study communities, renewable energy is not an issue that is closely linked to attitudes or beliefs about environmental protection and climate change mitigation.

Table 4

Factor analysis of environmental and energy attitudes

	Rotated factor loadings*	
Variable	Factor 1	Factor 2
NEP score	-0.744	
Oppose environmental policies	0.810	
Seriousness of climate change	-0.701	
Pro-coal	0.724	
Pro-natural gas	0.687	
Pro-nuclear energy	0.543	
Pro-renewable energy (general)		0.685
Pro-renewable energy (local)		0.653
Eigenvalue	3.077	1.109
Proportion of variance explained, cumulative	0.805	0.290

**Principal components extraction with varimax rotation. Only factors with eigenvalues > 1 were retained.*

4.2 Environmental beliefs compared with other predictors

The second issue addressed by this research examines how well different measures of environmental beliefs explain renewable energy attitudes, compared with other predictors identified as important in the literature. This question is addressed using multivariate logistic regression for two dependent variables: general renewable energy attitudes and support for local wind energy. Because the variable measuring support for renewable energy had a positively skewed distribution, it was transformed into an ordinal variable with three categories of support (none to low, medium, and high), and ordered logistic regression was used.[9] Binary logistic

[9] The range for the three-item scale was 5-25. The "none to low" category included scores less than or equal to 19, the "medium" category included scores from 20-24, and the "high" category included scores of 25. Various categorization schemes were tested in the multivariate regression,

regression was employed when the local attitude measure was the dependent variable, because that measure had only response categories (yes and no).

The independent variables were grouped into several categories (sociodemographic characteristics, environmental beliefs, local factors, and community of residence) and each category was regressed upon the dependent variable in two cumulative models, the first with just the sociodemographic controls, political orientation, and religious affiliation, and the second with the attitudinal, proximity, and community predictor variables.[10] This method provides insight into the effect of the predictor variables of interest while holding sociodemographic characteristics constant.

4.2.1 Sociodemographic influences on likelihood of supporting renewables

Table 5 presents the results of the general renewable energy attitudes regressions, and Table 6 presents the results of the local wind energy attitudes regressions. Logistic regression odds ratios are reported and can be interpreted as follows: any statistically significant coefficient higher than 1.000 indicates that a variable is associated with greater likelihood of support for renewable energy, and coefficients less than 1.000 indicate that a variable is associated with lower likelihood of having favorable attitudes toward renewable energy.

Looking first at the regression for general renewable energy attitudes (Table 5), results indicate only one significant sociodemographic coefficient in the final model, meaning that once

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including 3-, 4-, and 5-category constructions. Because results did not different significantly, the 3-category ordinal variable was used for simplicity in interpretation.

[10] Given political polarization over climate change and the relationship between party identity and views on climate change, we were concerned about potential problems of multicollinearity involving these variables. However, multicollinearity tests including calculation of the Variance Inflation Factor revealed that multicollinearity was not a problem in any of the regression analyses (VIF scores for all independent variables were less than or equal to 2.6).

other variables are accounted for, only gender has any relationship with an individuals' likelihood of supporting renewable energy (negative relationship, with men about half as likely as females to express support). While being more politically liberal (odds ratio=1.587) was statistically significantly related to general support for renewable energy in the first regression model, this relationship appears to be fully attenuated with the addition of the rest of the predictor variables in Model 2.

The results from the local wind energy attitudes regressions (Table 6) present a different picture. While being older (odds ratio=0.986) and being more liberal (odds ratio=1.835) show an initial relationship with the outcome variable, these relationships disappear with the addition of the other variables in Model 2. In Model 2, results show that those who are more highly educated are about fifty percent more likely to support local wind energy development, while those who identify as Catholic are much less likely to support local wind energy than those who indicated no religious affiliation.

Table 5

Multivariate ordered logistic regression estimates of general support for renewable energy (odds ratios).

	Model 1	Model 2
Sociodemographic variables		
Age	1.001	1.011
Income	0.901	1.043
Education	0.881	0.879
Male	0.496***	0.552**
Political orientation (1=very conservative, 5=very liberal)	1.587***	1.027
Religious affiliation (ref.=none)		
Mormon	1.301	0.756
Catholic	0.581	0.597
Protestant	0.661	0.766
Environmental attitudes		
NEP score		0.991
Opposition to env. policies		0.920***
Belief in climate change		0.960
Local factors		
Unattractive feature		0.535***
Economic benefit		1.211***
Participation		0.997
Location		
Proximity to wind farm		1.105
Visual accessibility		0.937
Community *(reference=Milford, UT)*		
Monticello, UT		1.358
Rawlins,WY		0.185***
Saratoga, WY		0.292***
Idaho Falls, ID		0.622
cut1		
_cons	-1.138	0.007***
cut2		
_cons	1.176	0.186
N	515	515
Prob>chi2	0.000	0.000
AIC	2.011	1.639
BIC	-2137.4	-2278.3
Pseudo R2°	0.064	0.263

*Ordered logistic regression estimates due to categorical nature of dependent variable. Odds ratios are provided. *p<0.05; ** p<0.01; *** p<0.001*

°McFadden's R2 is reported as the "pseudo R2".

Table 6

Multivariate binary logistic regression estimates of support for local wind energy facility (odds ratios).

	Model 1	Model 2
Sociodemographic variables		
Age	0.986*	0.996
Income	0.949	1.156
Education	0.957	1.493*
Male	0.960	1.601
Political orientation (1=very conservative, 5=very liberal)	1.835***	1.045
Religious affiliation (ref.=none)		
Mormon	1.279	1.058
Catholic	0.499*	0.269*
Protestant	0.919	0.644
Environmental attitudes		
NEP score		1.014
Opposition to env. policies		0.950
Belief in climate change		1.089
Local factors		
Unattractive feature		0.234***
Economic benefit		1.506***
Participation		1.193*
Location		
Proximity to wind farm		1.165
Visual accessibility		0.600**
Community *(reference=Milford, UT)*		
Monticello, UT		0.474
Rawlins,WY		0.285*
Saratoga, WY		0.133**
Idaho Falls, ID		0.237**
_cons	1.427	22.474
N	542	542
Prob>chi2	0.000	0.000
AIC	1.185	0.582
BIC	-2731.02	-3006.140
Pseudo R2°	0.072	0.593

*Binary logistic regression estimates due to categorical nature of dependent variable. Odds ratios are provided. *p<0.05; ** p<0.01; *** p<0.001*

°McFadden's R2 is reported as the "pseudo R2".

4.2.2 Environmental beliefs, opposition to environmental policies, and climate change opinions

Regression results suggest that general environmental beliefs, attitude toward government environmental policies, and belief in the seriousness of global warming have very small influence on the likelihood that individuals will support renewable energy generally as well as locally. The full model of the renewable energy attitudes regression (Table 5) indicates that the only environmental beliefs variable with a statistically significant relationship to renewable energy attitudes is the variable measuring individuals' level of opposition to government environmental policies, but the magnitude of this relationship is negligible (odds ratio=0.920). With regard to predictors of support for local wind energy attitudes (Table 6), none of the three variables measuring environmental beliefs show statistically significant relationships to the dependent variable. This finding provides further evidence supporting the findings of both the correlational analysis and the factor analysis: residents of our study areas generally do not factor in environmental-based reasoning when formulating their opinions about renewable energy development. Other factors are clearly at play, which we now turn to.

4.2.3 Local factors: Landscape aesthetics, economics, and participation

Strongly related to individuals' level of support for renewable energy generally and for local wind energy were feelings about the aesthetic impact of wind energy. Respondents who believed wind energy facilities were an unattractive feature of the landscape were half as likely to support renewable energy in general (odds ratio=0.535) and also much less likely to support local wind energy development (odds ratio=0.234) than were residents who did not think wind

energy was unattractive. This finding lends support for the place-protection thesis proposed by Devine-Wright [10] and others.

Conversely, results suggest that if individuals believe the construction of nearby wind energy facilities brings economic development to the area, they are twenty-one percent more likely to have a more favorable attitude toward renewable energy and about fifty percent more likely to support local wind energy development than residents who did not believe wind energy would bring economic benefits. In the model examining support for the local wind energy facility, this economic variable is especially notable because of all the predictor variables it appears to have the strongest positive and statistically significant relationship with the dependent variable (odds ratio=1.506).

The 'democratic deficit' thesis appears to be a factor at play in local wind energy attitudes, but not attitudes toward renewable energy generally. Table 6 indicates that respondents who thought there was sufficient opportunity and information for participating in the local wind energy planning process were about twenty percent more likely to support the local wind farm (odds ratio= 1.193). However, this independent variable did not show a relationship with participants' general renewable energy attitudes. This makes sense, and we would expect residents who felt they were left out of the planning process for a local wind energy facility to be less supportive of that facility. However, residents would not necessarily expand this rationale to all renewable energy development.

4.2.4 Location: Proximity versus visual accessibility

In addition to responses regarding residents' proximity to wind power facilities, the survey measured how often individuals saw (or anticipated seeing) the local wind farm. The

regression results for both general (Table 5) and local (Table 6) renewable energy attitudes indicate that distance from the wind energy facility is not a force driving respondents' general renewable energy attitudes, contrary to the proximity thesis. Instead, it appears that frequency of seeing these facilities is a much more important factor. Residents who see (or expect to see) the wind farm more often were significantly less likely to express support for local wind energy developments (odds ratio=0.600). However, this was only a factor in residents' attitudes toward *local* wind energy, not renewable energy generally.

4.2.5 The "social gap" in renewable energy support between communities

The results for both dependent variables indicate that different communities react differently to wind energy development, suggesting that there are additional contextual factors at play not captured more specifically in this analysis. All communities except Monticello, Utah, were far less likely to support local renewable energy development than Milford, Utah (the reference community). Figures 2 and 3 provide further evidence of this, showing varying magnitudes of the "social gap" between general support for renewable energy and support for local wind energy [5]. For the measure of general support for renewable energy, the mean scores for all five communities did not differ much, ranging from 20 to 23. However, for the measure of support for the local wind energy facility, responses varied widely across the study areas, with 85% of residents in Milford, 80% in Monticello, 76% in Rawlins, 61% in Saratoga, and only 48% in the Idaho Falls area indicating that they supported the local wind energy facility. These results highlight that the width of the "social gap" varies by community, depending on the community's overall response to local renewable energy facilities.

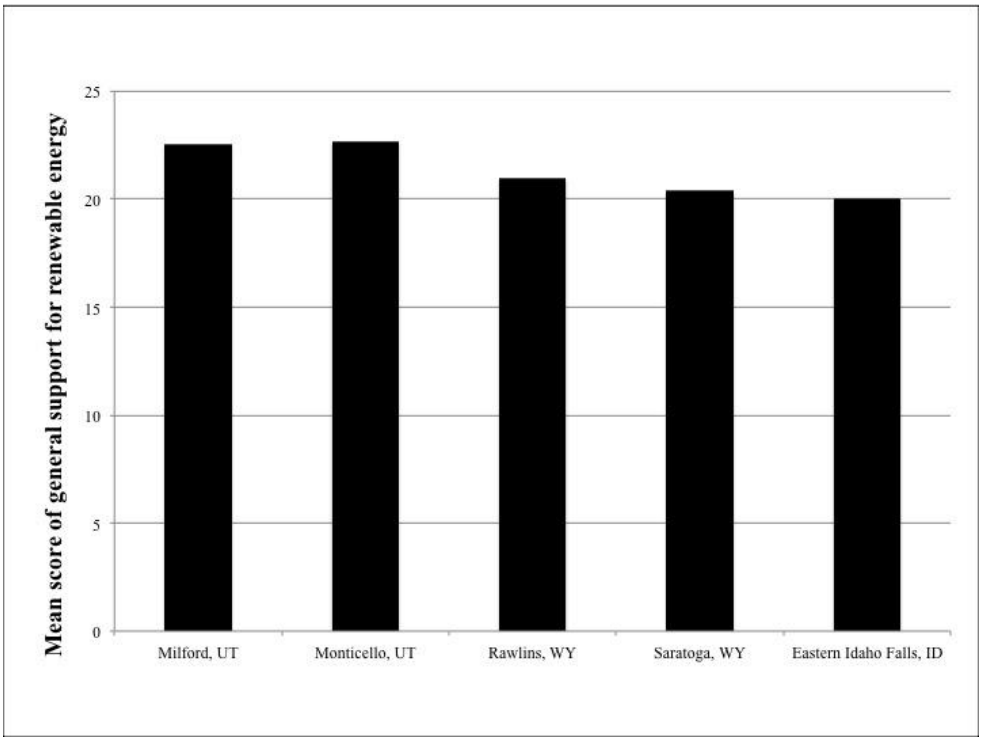

Figure 2: Distribution of mean scores by community of general support for renewable energy.

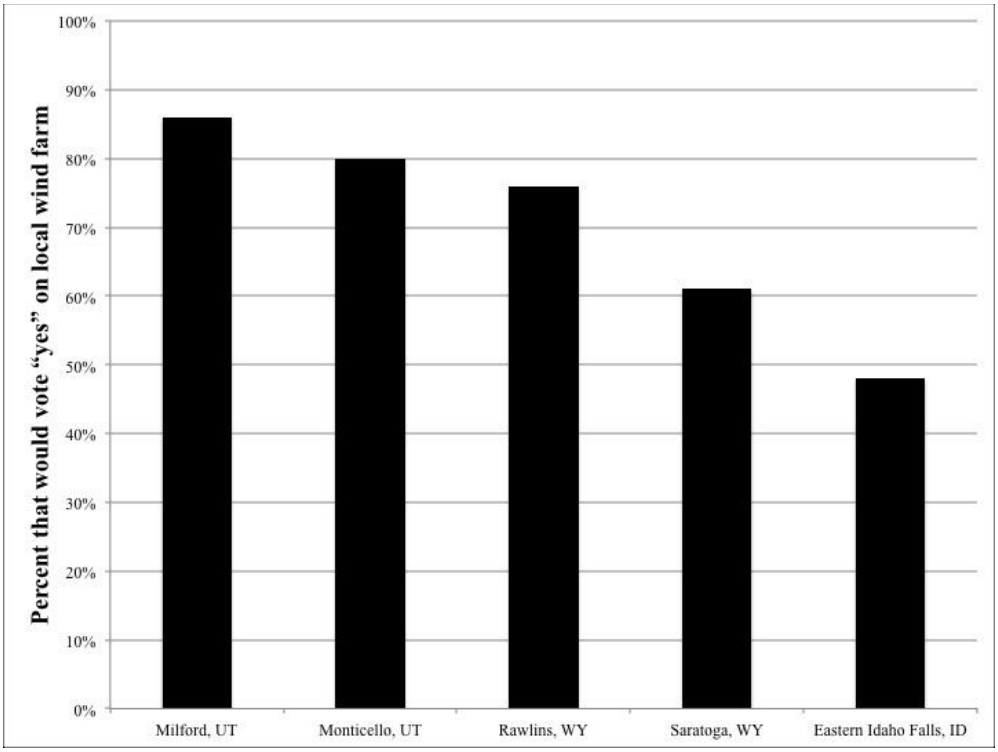

Figure 3: Percent residents in community that would vote "yes" to the local wind energy facility.

5. Discussion and Conclusion

This research analyzed the relationship between a variety of environmental beliefs and attitudes toward renewable energy and other energy sources in communities with some level of experience with local wind energy development. Survey results indicated that respondents' environmental beliefs, attitudes toward environmental policies, and beliefs about climate change were weakly or not related to how they felt about renewable energy. In fact, results suggest that renewable energy attitudes comprise a separate dimension altogether of environment- and energy-related attitudes. Other factors, such as beliefs about the economic benefits of local renewable energy development and the perceived impact on place aesthetics, were found to be stronger forces driving renewable energy attitudes.

The relationship between environmental beliefs and renewable energy attitudes is clearly not settled, and appears to be locally context-dependent. While some researchers have found environmental beliefs to be a predictor of attitudes toward local renewable energy, the relationship has been found to be sometimes positive and other times negative [16,22,28,35]. Furthermore, other scholars have found that in certain regions where a vast majority of residents are politically conservative, individuals who are highly supportive of renewable energy may simultaneously and openly express environmental skepticism [24]. Given the increasing political polarization over environmental issues in countries like the United States and Australia, connecting renewable energy with an explicitly environmental framing in some contexts may be irrelevant at best – that is, not effectively drawing the public support it intends to draw – and inflammatory at worst, repelling environmentally skeptical individuals or those whose political beliefs position them in opposition with many environmental policies.

The present study indicates that, in the context of several communities in the Rocky Mountain region of the U.S. that are experiencing wind energy development, environmental beliefs are a weak force in determining how individuals respond to and perceive renewable energy, if a force at all. This finding echoes Wolsink's 2007 argument [53] as well as several more recent studies that have shown the importance of other factors, such as individuals' beliefs about and experience with the economic development potential of renewable energy [31,24,12, 42,47,49]. This observation, we believe, highlights an important area for future research, especially since renewable energy continues to be framed by the media, policy makers, and activists as a strategy for addressing environmental and/or climate change concerns, both of which are hugely polarizing issues, especially in the United States. The danger of maintaining the environmental connotation is that policies, funding allocations, and programs designed to foster renewable energy research and development could become even more politically divisive, stalling quick decision-making about further renewables deployment and creating new political roadblocks.

Several possible explanations for the observed disconnect between respondents' environmental beliefs and their level of support for renewable energy emerge. First, our findings indicate that other factors are far more important in determining how individuals form their opinions about renewable energy – factors that are likely more immediate and pressing in residents' everyday lives, such as the effects that residents perceive renewable energy facilities may have on the local economy or the local landscape. Jepson et al. [24], made a similar observation qualitatively in the context of wind energy development in Texas, another area of the U.S. characterized by conservative policies and antagonism toward environmental policies but where support for renewable energy development seems relatively high. More broadly, the

disconnect between environmental beliefs and renewable energy support in our data may be indicative of the collective environmental consciousness of rural communities in the Rocky Mountain region, informed by conservative politics and a history of tension with environmental interests and the federal government over environmental regulations and land use policies [32]. That is, it is possible that residents in this area are simply less likely to employ an environmental rationale when forming opinions about issues like energy development than might be the case in other regions with differing sociocultural and political contexts.

The large differences in how residents of the five study communities felt about local wind energy are also noteworthy. Some of these differences are likely due to variations in local economic contexts. For example, Saratoga is a natural resource amenity community that has become a retirement and tourist/recreation destination that attracts new year-around and seasonal residents as well as shorter-term visitors from other regions [27]. In that context Saratoga residents would seem more likely to view the construction of a major wind farm as a threat to the amenity-based and tourism economy, due to aesthetic impacts on the surrounding landscape. Conversely, Milford, Utah, is a railroad town situated in the western Utah desert that does not rely on tourism, and the nearby wind farm was constructed on land that had little aesthetic value and that is barely visible from town. In eastern Idaho Falls, the strong negative association is more likely related to an unusually high level of dissatisfaction with several visually prominent wind farms built along higher-elevation foothills to the east. Qualitative research could shed light on these and other potentially important contextual nuances to further our understanding about how the public may respond in different situations.

Last, this research provides evidence suggesting the proximity thesis [e.g. 45] is not a satisfactory explanation for public opposition to renewable energy development, but that the

visibility of these facilities is more important. Our results indicate that the frequency at which individuals see (or anticipate seeing) wind turbines is strongly related to how they feel about the local wind energy facility, while their physical proximity to them is not. In making decisions about where to place turbines, one implication of this finding is for planners and developers to balance information on wind resource availability in specific locations with the greater likelihood for social opposition when turbines are developed in visually exposed areas, such as on higher-elevation ridgelines in close proximity to areas characterized by residential land uses.

Some implications of this study emerge from the finding that, in certain regions, neither general environmental views nor belief in climate change predict opinions about renewable energy. Those engaged in the advancement of renewable energy (whether from political, activist, or business standpoints) in politically conservative contexts may find it useful to cease to frame development of wind or solar energy as an environmentally motivated issue. In the Rocky Mountain region of the U.S., where highly contentious debates over environmental and natural resource issues continue to dominate the dual stage of politics and media, renewable energy may find a broader base of support when it is framed in other terms, such as the economic opportunities that large-scale renewable energy development may bring to communities. In states like Utah where the governor and other political leaders have expressed skepticism about the reality of human-induce global warming,[11] attaching renewable energy development to environmental issues like climate change could negatively influence public opinion and acceptance of renewable energy technologies such as wind power.

[11] Governor Gary Herbert openly voiced skepticism about climate science during the 2009 and 2013 Western Governor's Association meetings (see http://archive.sltrib.com/story.php?ref=/news/ci_12597475, http://archive.sltrib.com/story.php?ref=/sltrib/politics/56535232-90/energy-climate-governors-gov.html.csp)

Research that continues to seek understanding in terms of what factors drive public opinion – especially public opposition to renewable energy facilities and policies – is an integral component of the global low-carbon energy transition because it can help to forestall unexpected social and political roadblocks. Our study of the Rocky Mountain region of the United States illuminates an important dimension of public response to renewable energy likely present in politically conservative parts of other regions of the US, and other countries as well. Future work should continue to explore this aspect of the social and political reactions toward a still-evolving global transition toward increased utilization of low carbon energy technologies.

Appendix A

Scale construction for predictor variables

Latent variable scales	Reliability *(Cronbach's)*	Items
Environmental beliefs (NEP scale)	0.843	*5-point Likert scale response options ranged from: "strongly disagree" to "strongly agree." Four items reverse coded to ensure consistent directionality.* We are approaching the limit of the number of people the earth can support. Humans have the right to modify the natural environment to suit their needs When humans interfere with nature it often produces disastrous consequences. Human ingenuity will insure that we do NOT make the earth unlivable. Humans are severely abusing the environment. The earth has plenty of natural resources if we just learn how to develop them. The so-called "ecological crisis" facing humankind has been greatly exaggerated. The earth is like a spaceship with limited room and resources. The balance of nature is very delicate and easily upset. If things continue on their present course, we will soon experience an ecological catastrophe.
Opposition to government environmental policies	0.880	Environmental regulations in the U.S. … *(5-point Likert scale from "are excessively strong" to "need to be a lot stronger.")* *Seven policy items follow; 5-point Likert scale response option ranging from "strongly support" to "strongly oppose." One item was reverse coded to ensure consistent directionality.* Setting higher emissions and pollution standards for business and industry Spending more government money on developing solar and wind power. Spending government money to develop alternate sources of fuel for Imposing mandatory controls on carbon dioxide emissions and other Opening up more land owned by the federal government for oil and gas More strongly enforcing existing federal environmental regulations. Setting higher emissions standards for automobiles.
Economic benefit	0.759	Utility-scale wind power provides economic benefit to the local area *(5-point Likert scale from "strongly agree" to "strongly disagree")* Utility-scale wind power creates new job opportunities for local residents (5-point Likert scale from "strongly agree" to "strongly disagree") Do you believe increased tax revenues will result from the construction of a utility-scale wind facilities near your community? *("yes" or "no")* Do you believe increasedjob opportunities will result from the construction of a utility-scale wind facilities near your community? *("yes" or "no")*
Opportunity to participate	0.817	Do you agree or disagree that you have had adequate opportunity to participate in public meetings or other parts of the planning process for the wind power facilities proposed near your community? *(5-point Likert scale from "strongly disagree" to "strongly agree")* Do you agree or disagree that you have received adequate information about the proposed wind power facility during the pre-construction planning period? *(5-point Likert scale from "strongly disagree" to "strongly agree")*

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