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LETTER

Nonpartisans hold the key: how proximity to utility scale renewable energy projects influences attitudes towards climate mitigation policy

Shan Zhou[1,*], **Zhengyan Li**[2] and **Aseem Prakash**[3]

[1] Department of Political Science, Purdue University, West Lafayette, IN, United States of America
[2] Department of Politics and Public Administration, University of Hong Kong, Hong Kong Special Administrative Region of China, People's Republic of China
[3] Department of Political Science, University of Washington, Seattle, WA, United States of America
[*] Author to whom any correspondence should be addressed.

E-mail: zhou1487@purdue.edu

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Abstract

Not-in-my-backyard (NIMBY) literature notes public opposition to projects that impose local costs but generate public goods. However, whether NIMBY experience has spillover effects on support for related policy goals remains underexplored. As a typical case of NIMBYism, utility-scale renewable energy projects have faced significant local opposition across the U.S. In this paper, we investigate if an individual's proximity to such projects correlates with their support for broader climate goals. Drawing on individual responses from three waves of cross-sectional U.S. Nationscape survey data (2019–2021), we constructed a comprehensive dataset by combining them with geocoded information on all utility-scale renewable energy projects for this period, as well as with county-level socioeconomic, political, and policy information. Our regression results show that proximity to wind or solar projects does not significantly influence climate policy preferences among Democrats or Republicans. However, for political Independents, living near wind turbines correlates with reduced opposition to climate policies, specifically large-scale investments for clean energy technology. These findings suggest that climate attitudes linked to renewable energy exposure are contingent on political affiliation. While strong partisans (Democrats and Republicans) remain unaffected by direct exposure to renewable energy projects, Independents—who are less anchored by partisan narratives—are more responsive to personal experience. Exposure to wind power does not necessarily create strong supporters for climate policy, but it shifts Independents away from outright opposition. The results highlight the necessity of more targeted approaches to expand public support for climate policies.

1. Introduction

As a low-carbon energy source, renewable energy offers a sustainable alternative to fossil fuels and is widely considered a viable technical solution to climate mitigation. However, the deployment of renewable energy, particularly large-scale projects, often brings complex social and political implications. While renewable energy provides public goods, such as air pollution and greenhouse gas reduction that benefit society as a whole, the local benefits and costs of such projects are often unevenly distributed. Some individuals may experience negative externalities, such as visual impacts on the landscape and property value reductions, which frequently lead to opposition (Johansson and Laike 2007, Swofford and Slattery 2010, Krause *et al* 2016), a dynamic commonly associated with NIMBYism (Not In My Backyard). Conversely, others may welcome these projects due to associated local benefits, such as increased tax revenues and lease payments (Shoeib *et al* 2021). Scholars term this as 'Yes-In-My Backyard, YIMBY' (Greenberg 2009, Firestone and Kirk 2019, Uji *et al* 2021).

Despite the extensive research on local responses to renewable energy projects, much of the debate focuses on attitudes toward hypothetical or proposed facilities *prior* to siting (Carley *et al* 2020), with less attention given to individuals assessment of the project post-siting. Further, it is not clear how exposure to renewable energy projects might shape attitudes towards climate policies that are not directly related to these projects. Given the rapid development of utility-scale renewable energy in the United States over the past decades, a significant portion of the American population lives in the vicinity of (with visual exposure) of renewable energy projects. It is possible that this personal experience may persuade individuals that the negative aspects of renewable projects were overstated. Alternatively, they may find these projects violating local aesthetics or spoiling the local landscape in a manner they did not expect. This positive or negative reaction might have a spillover effect on their attitudes toward climate policies and energy transition.

In this study, we move beyond the traditional NIMBY/YIMBY debate about local opposition to proposed or hypothetical projects to examining how actual exposure to renewable energy projects, namely wind and solar farms—shapes public attitudes toward broader aspects of climate policy. Using a unique dataset that integrates 3 waves of Nationscape survey responses (2019, 2020, and 2021) spanning both the first Trump Administration and Biden Administration, geocoded wind and solar farm locations and county level socio-economic indicators in the United States, we estimate OLS regression models to assess the relationship between proximity to a renewable energy project and support for public investments for clean energy technology. Our results indicate that the effect of proximity to renewable infrastructure varies by partisanship rather than following a uniform pattern. While proximity to wind or solar farms does not significantly alter climate policy attitudes among Democrats or Republicans, it has a distinct effect on political Independents: those living near wind turbines are less likely to oppose incentives for clean technology. These findings highlight important nuances in the political implications of renewable energy infrastructure. Strong partisans, whether Democrats or Republicans, tend to hold frozen climate policy preferences that remain largely unaffected by personal experience, whereas Independents, who lack firm partisan anchors, are more receptive to shifting their policy preferences in response to direct exposure to renewable energy projects.

2. Literature review

2.1. External factors influencing climate policy attitudes

Past research on climate policy attitudes has largely focused on the impact of demographic and psychological factors, such as education, age, income, gender and political orientation (McCright *et al* 2013, Park and Vedlitz 2013, Bergquist *et al* 2022). An emerging group of studies starts to investigate the influence of external factors. Based on the prospect theory, people learn from stimuli (e.g. hazard events) and change their perceived risk (Kai-Ineman and Tversky 1979). The stimuli can be composed of simple observable outcomes, which provide information for decision making as a substitute for more comprehensive and broader understanding of complex systems (Kai-Ineman and Tversky 1979). Due to the large and noticeable climate impacts, recent studies debate whether personal experiences of climate-related natural disasters can influence attitudes, although the empirical evidence is largely inconclusive. For instance, Owen *et al* (2012) find those who have recently experienced extreme weather events (heat waves or droughts) in the U.S. are more likely to support environmental regulations. Soni and Mistur (2022) find that the number of natural disasters significantly drives public support for environmental spending in the U.S. Baccini and Leemann (2021) find that personal experience of a flooding event is associated with a significant increase in vote-share supporting pro-climate policies using referendum vote data in Switzerland. However, a U.S.-based study concludes people living in areas that are more exposed to climate risks do not necessarily show higher support for climate policy alternative than other respondents (Park and Vedlitz 2013). Gärtner and Schoen (2021) find personal experiences of extreme local weather did not shape their climate policy preferences, using panel survey data from German voters.

Beyond personal experiences of extreme weather events, exposure to large scale renewable energy infrastructure may also serve as a stimulus that affects individual beliefs and perceptions. Renewable energy infrastructure, such as wind and solar farms, are visible markers of climate mitigation policy activities. Individuals living close to these facilities might frequently encounter them as they travel for work or personal reasons, making these facilities a feature of their surrounding environment. Direct exposure to renewable energy projects provides tangible information about the local experiences and impacts of climate policies, revealing new realities that may or may not align with prior expectations (Van der Linden 2015, Carley *et al* 2020, Uji *et al* 2021). Climate policy attitudes can be shaped and updated when people start to experience the real effects of a policy (Drews and van den Bergh 2016) and when the perceived policy impacts on oneself have changed (Dechezleprêtre *et al* 2022).

Exposure to renewable energy infrastructure affects climate policy attitudes through the balance of benefits and costs that it reveals (Boudet 2019). Individuals assess the economic, environmental, and social benefits of renewable energy projects against potential costs, such as aesthetic changes, noise, or economic disruptions (Devine-Wright 2009, Ko *et al* 2023). If exposure demonstrates a limited negative impact or that the benefits—such as job creation, and increased local revenue—exceed the costs, support for renewable energy investment increases. Conversely, if exposure reveals more substantial costs—such as noise pollution, aesthetic concerns, or ecological disruption—opposition strengthens. When exposure indicates that both positive and negative aspects are present in similar magnitudes, individuals may become more uncertain about their stance.

2.2. Partisan filtering of exposure

In this section, we discuss how exposure to renewable energy infrastructure affects climate policy attitudes across partisan groups. Much of the survey research reveals strong partisan differences in climate attitudes and policy preferences in the United States. For instance, Smith *et al* (2024) find that climate change beliefs and attitudes of Americans exhibit symmetric patterns of polarization. Mayer and Smith (2023), Mayer and Smith (2024) further document partisan divides over specific climate policy instruments, such as fossil fuel taxes, renewable energy subsidies and bans on old household appliances. Similarly, Marcos *et al* (2023) report that Democrats and Republicans differ significantly in their perceptions of carbon tax fairness and willingness to accept such policy. Given this well documented partisan polarization, we expect that the impact of exposure to renewable energy projects on climate policy attitudes is likely to vary across political groups.

Partisans have already been repeatedly exposed to political narratives about renewable energy. Narratives refer to the ways people construct disparate facts into stories to rationalize and make sense of reality (Patterson and Monroe 1998). Political actors convey political information through narratives, while citizens understand the political world through information processing built upon the narrative cognitive structures (McLaughlin *et al* 2019). In the case of renewable energy, Democrats frequently encounter narratives emphasizing climate benefits and economic opportunities (Gustafson *et al* 2020), while Republicans are more likely to hear messages emphasizing costs and threats to fossil fuel industries (Hawes and Nowlin 2022). When exposed to a local renewable project, individuals are likely to interpret their experience in ways that align with their partisan predispositions (Egan and Mullin 2017). Research on confirmation bias and motivated reasoning suggests that people tend to selectively focus on information that is consistent with their existing political dispositions while discounting contradictory evidence (Taber and Lodge 2006, Li 2024). When exposed to renewable energy infrastructure in one's neighborhood, Democrats may focus on the positive aspects of renewable projects, while Republicans emphasize the negatives, reinforcing pre-existing partisan positions and leading to a null or muted effect on support. Therefore, we hypothesize that exposure to large-scale renewable energy infrastructure is not significantly associated with climate policy attitudes of either Democrats or Republicans.

Independents, however, generally are more open to persuasion compared to political partisans (Franz and Ridout 2007). They lack strong partisan cues or messages shaping their opinions on renewable energy. Without a predefined political filter, they are more likely to engage in open-ended evaluation, considering both the benefits and costs revealed by their exposure. Since Independents are more open to new information, their attitudes are more likely to be influenced by their direct experience, making the effect of exposure to renewable energy infrastructure more prominent for them than for strong partisans. Hence, we hypothesize that exposure to large-scale renewable energy infrastructure is significantly associated with climate policy attitudes of Independents.

3. Data and methods

3.1. Data description

In this paper, we combine the Nationscape survey data with wind and solar project location data in the United States to investigate the correlation between personal exposure to large-scale renewable energy infrastructure and climate policy attitudes, and how it differs across partisans. The Nationscape survey was a major initiative funded by Democracy Fund, the Klarman Family Foundation, and UCLA. The survey study was designed and managed by UCLA researchers, with design input from the Democracy Fund Voter Study Group. The survey was conducted online and fielded by Lucid, running in the leadup to and months after the 2020 U.S. election. As one of the largest public opinion surveys ever conducted in the United States, it surveyed around 6 250 people each week over 80 weeks between 2019 and

2020[4] and collected U.S. respondents' views on key political and social issues. In addition, the survey data were weighted to be representative of the U.S. adult population.

3.2. Dependent variable

Our dependent variables measure public attitudes toward public investments for clean technology—a key climate policy instrument that is closely tied to renewable energy development. We utilize data from the three phases of the Nationscape survey conducted between 2019 and 2021, covering both the first Trump Administration and Biden Administration, and focus on the following question:

> '*We'd like to know whether you agree or disagree with each of the following policies: Make a large-scale investment in technology to protect the environment.*'

In our main analysis, we code the categorical responses as follows: 'Agree' = 1, 'Not sure' = 0, and 'Disagree' = −1. We treat this as a continuous variable (*support_envt*) on a three-point scale where higher values indicate stronger support. This approach assumes a unidirectional effect, where exposure to renewable energy infrastructure either increases or decreases support for the policy. However, the effect may be more nuanced, potentially shifting responses in different directions. For instance, exposure could reduce uncertainty (shrinking the 'Not sure' category) while increasing both support and opposition, or vice versa. To capture these potential dynamics, we construct three separate dummy variables: one for supportive attitudes ('Agree' = 1, others = 0), one for uncertain attitudes ('Not sure' = 1, others = 0), and one for oppositional attitudes ('Disagree' = 1, others = 0), and separately assess the impact of personal exposure on each category of attitude.

3.3. Independent variables

We construct two explanatory variables to capture respondents' exposure to renewable energy infrastructure: one (*windinzip*) measuring whether any wind turbines exist within a respondent's zip code, and the other (*solarinzip*) measuring whether any solar farms exist within the same area. We focus on wind turbines and solar farms separately because prior research suggests local opposition to wind projects as opposed to solar projects (Ko *et al* 2023). To create the two variables, we link Nationscape survey respondents' zip codes with geocoded wind turbine data from U.S. Geological Survey and solar power generation facility data from the Environmental Protection Agency eGrid dataset.

3.4. Control variables

We are most interested in examining the interaction of exposure and partisanship on climate policy support. In addition, additional individual characteristics may independently influence climate policy support. Thus, our model controls for individual-level factors such as respondents' gender, race and ethnicity, household income, and education level. The data for these individual characteristics were obtained from the Nationscape survey responses.

Since the siting of large-scale renewable energy projects is not randomly distributed across geographic areas, we include several county-level covariates that may influence renewable energy deployment patterns, including median household income, total population and the presence of a county ordinance restricting wind energy. We apply a natural logarithm transformation to county median household income and county population to normalize the distributions and reduce skewness in the data. Appendix table A1 presents a summary of variable operationalization, data source and descriptive statistics. Appendix table A2 shows the pairwise correlation coefficients between variables. The pairwise correlation coefficients among covariates range from 0 to 0.7115. With only one coefficient slightly exceeding 0.7 and all others below 0.5, multicollinearity does not appear to be a major concern.

3.5. Data analysis

In the main analysis, we operationalize public support on a three-point scale and estimate OLS regression models for the full sample and three subsamples (Democrats, Republicans, and Independents). We also estimate models separately for the three subsamples (Democrats, Republicans, and Independents) where policy support is operationalized as three dummy variables.

All models include county and year fixed effects, with standard errors clustered at the county level. This approach controls for county-level, and time-invariant factors that may influence support for renewable energy, such as wind and solar technical potential, as well as broader temporal trends that shape public attitudes, such as the 2020 presidential election and shifts in national energy policy. To assess potential multicollinearity among the independent variables, we computed variance inflation factors (VIFs) for all regression models. The results indicate that all VIF values are well below the commonly accepted threshold of 5, suggesting that multicollinearity is not a concern in our analyses.

[4] The Nationscape project ran from July 2019 through February 2021 and was released in three distinct phases. Phase 1, released in January 2020, includes survey responses collected between 18 July 2019, and 26 December 2019. Phase 2, released in August 2020, covers data collected from January 2020 through July 2020. Phase 3, released in December 2021, includes responses gathered between August 2020 and February 2021. For a detailed overview of the survey methodology, sampling strategy, and user guidelines, see Vavreck and Tausanovitch (2021).

Table 1. Effect of exposure to renewable infrastructure on climate policy attitudes.

	DV: Support for Climate Policy (*support_envt*)			
	(1) Dem	(2) Rep	(3) Ind	(4) All
Windinzip	−0.0001	−0.0558	0.0728*	0.0139
	(0.0379)	(0.0472)	(0.0413)	(0.0200)
Solarinzip	0.0014	0.0154	0.0258	0.0116
	(0.0179)	(0.0222)	(0.0212)	(0.0115)
Age	0.0015***	−0.0046***	−0.0025***	−0.0015***
	(0.0003)	(0.0004)	(0.0004)	(0.0002)
Female	−0.0573***	−0.0948***	−0.0661***	−0.0738***
	(0.0103)	(0.0157)	(0.0138)	(0.0069)
Hispanic	−0.0687***	0.0169	−0.0221	−0.0225**
	(0.0182)	(0.0290)	(0.0234)	(0.0112)
Black (reference—white)	−0.1084***	0.0136	−0.0289	−0.0619***
	(0.0143)	(0.0433)	(0.0223)	(0.0106)
Other race (reference—white)	0.0078	0.1184***	0.0095	0.0276***
	(0.0187)	(0.0267)	(0.0210)	(0.0103)
Household income	0.0026***	0.0008	0.0006	0.0013**
	(0.0008)	(0.0011)	(0.0011)	(0.0006)
Education	0.0216***	0.0002	0.0276***	0.0183***
	(0.0032)	(0.0041)	(0.0036)	(0.0018)
Democrat (reference—independent)				0.1996***
				(0.0091)
Republican (reference—independent)				−0.2374***
				(0.0096)
Constant	14.5951	22.7529	6.8806	−7.6216
	(15.2840)	(23.5248)	(26.4381)	(11.7477)
N	50 512	42 954	39 091	142 238
R^2	0.1098	0.1380	0.1258	0.1142

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

4. Results

4.1. Main analysis

Table 1 presents the results of the OLS regression models, examining the relationship between exposure to wind or solar energy infrastructure and support for climate policy. The dependent variable measures support for climate policy on a three-point scale (*support_envt*), and results are presented separately for Democrats, Republicans, Independents, as well as for the full sample.

For both Democrats and Republicans, neither exposure to wind nor solar farms has a statistically significant effect on their support for climate policy. For Independents, the estimated coefficient of *windinzip* is statistically significant at the 10% level ($p = 0.078$), suggesting weak evidence of an association between the presence of wind turbines within one's zip code and higher level of support for climate policy. Exposure to solar farms has an insignificant effect on Independents' climate policy attitudes. Moreover, model (4) in table 1, which pools all respondents, finds no significant effect of exposure to wind or solar projects, likely due to the null relationships for strong-partisan subgroups.

In the next set of analyses, we use OLS models to test the effect of exposure to wind or solar energy for Democrats, Republicans, and Independents, with climate policy attitudes measured by three dummy variables (*Support, Notsure*, and *Against)*. Consistent with results of model (1) and (2) in table 1 using a three-point measure of policy support, presence of wind or solar in one's residing zip code is not significantly correlated with Democrats' or Republicans' views of climate policy (appendix tables A3 and A4).

Table 2 presents results of the exposure effect on Independents. It shows that exposure to wind energy infrastructure (*windinzip*) is significantly associated with a decreased likelihood of opposing climate policy by Independents (*Against*, $\beta = -0.0513$, $p < 0.01$). However, *windinzip* does not have a statistically significant effect on supporting climate policy or being unsure about it by Independents. This suggests that while wind energy exposure does not necessarily generate greater enthusiasm for or increase uncertainties about climate policy, it may reduce opposition among Independents. Consistent with results in table 1, the estimated coefficient of *solarinzip* is statistically insignificant in all three models in table 2, suggesting solar energy exposure is not associated with Independents' climate policy attitudinal changes.

Table 2. Effect of exposure to renewable infrastructure on independents' climate policy attitudes.

	(1) DV: Support	(2) DV: Notsure	(3) DV: Against
Windinzip	0.0215	0.0298	-0.0513^{***}
	(0.0310)	(0.0301)	(0.0185)
Solarinzip	0.0122	0.0014	-0.0136
	(0.0142)	(0.0122)	(0.0098)
Age	-0.0014^{***}	0.0003	0.0011^{***}
	(0.0003)	(0.0002)	(0.0002)
Female	-0.0997^{***}	0.1332^{***}	-0.0335^{***}
	(0.0096)	(0.0085)	(0.0062)
Hispanic	0.0053	-0.0326^{**}	0.0274^{***}
	(0.0159)	(0.0134)	(0.0106)
Black (reference—white)	-0.0215	0.0140	0.0075
	(0.0160)	(0.0140)	(0.0095)
Other race (reference—white)	0.0080	-0.0065	-0.0015
	(0.0132)	(0.0119)	(0.0107)
Household income	0.0017^{**}	-0.0028^{***}	0.0011^{**}
	(0.0008)	(0.0007)	(0.0005)
Education	0.0244^{***}	-0.0212^{***}	-0.0032^{**}
	(0.0026)	(0.0025)	(0.0016)
Constant	-3.3733	14.6272	-10.2539
	(21.1378)	(18.9782)	(9.0976)
N	39 091	39 091	39 091
R^2	0.1359	0.1458	0.1219

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Taken together, our results suggest that Independents may be more responsive to local renewable energy developments (particularly large-scale wind energy projects) than partisans, possibly due to weaker pre-existing ideological commitments on climate issues. Specifically, exposure to wind power is not necessarily creating strong supporters, but it is moving Independents along a continuum away from opposition.

4.2. Sensitivity analysis

For sensitivity analysis, we construct a composite exposure variable (*reninzip*) measuring the presence of large-scale wind or solar installations in a respondent's zip code of residence. We first run OLS models using the three-point scale dependent variable (*support_envt*) and the composite exposure variable (*reninzip*). Results of model (2) in appendix table A5 show that the exposure effect for Independents now becomes stronger (*reninzip*, $\beta = 0.0386$, $p < 0.05$) than that in table 1. In addition, we run OLS models using three dummy dependent variables (*Support*, *Notsure*, and *Against)* and the composite exposure variable (*reninzip)*. Results in appendix table A6 are consistent with those in table 2: living near a renewable energy facility reduces Independents' opposition to climate policy. Lastly, we estimate logit regression models using the *Against* binary variable for the Independents subsample. Results remain substantively similar with the findings based on OLS regression (see appendix table A7).

5. Discussion and conclusion

This study integrates the Nationscape survey data with wind and solar project location data in the United States to investigate how personal exposure to large-scale renewable energy infrastructure correlates with public attitudes toward climate policy. Our findings suggest that climate policy attitudes linked to renewable energy exposure are contingent on political identity and are not uniform across the population. Specifically, while proximity to wind turbines does not significantly alter climate policy attitudes among Democrats and Republicans, it does reduce opposition to climate policy among Independents.

At least at the federal level, renewable energy remains a highly politicized issue, with partisan narratives from Democrats and Republicans offering very different perspectives. While direct exposure to renewable energy infrastructure provides individuals with firsthand experience beyond partisan rhetoric, strong partisans—whether Democrat or Republican—tend to remain anchored in their existing ideological frameworks and not easily swayed by their personal experience. In contrast, Independents, who are less constrained by partisan narratives, appear more receptive to adjusting their views based on personal experience. Our findings indicate a significant decline in the '*Against*' category but insignificant impact on both the '*Support*' and '*Not Sure*' categories among Independents, suggesting that exposure to wind turbines may serve as an informational cue that recalibrates prior beliefs and enhances appreciation for renewable energy's role in addressing climate change and environmental challenges. It is likely that exposure leads to reduced perceived threat of wind turbines that shift Independents away from outright opposition, but it does not lead to increased perceived benefits that generate strong support. This nuanced finding is meaningful for understanding how exposure influences attitude formation, showing that reducing opposition may be easier than generating enthusiastic support through direct experience with renewable energy infrastructure.

This research also contributes to the growing literature on NIMBYism. Our findings reveal differences in responses to wind and solar energy projects among Independents: while living near wind turbines is associated with reduced opposition to climate policy, exposure to solar infrastructure does not appear to influence any of the three climate policy attitudes. The null finding regarding solar energy exposure may be due to the fact that solar farms, which compose of ground-mounted and quieter photovoltaic installations, are less visible and intrusive compared to wind turbines. Nearby residents may not notice or perceive them as significant changes to their local environment. As a result, their presence may have limited influence on individuals' climate policy attitudes. These results align with prior research documenting that wind energy often faces stronger local opposition and regulatory scrutiny than solar. For instance, scholars note counties are more likely to enact restrictive ordinances for wind projects, but not solar projects, and Democratic counties are more likely to do so (Ko *et al* 2023). Similarly, studies find that public support for utility-scale solar is generally higher than that for wind energy (Kaldellis *et al* 2013, Sütterlin and Siegrist 2017) and that this support does not vary significantly whether solar development is considered in abstract terms or in reference to the survey respondent's own county (Carlisle *et al* 2015).

In addition, our research is distinct in that it examines public responses after exposure to renewable energy projects, rather than relying on hypothetical attitudes or anticipatory reactions before installation. This temporal dimension allows us to assess how lived experience with renewable energy projects shapes climate policy attitudes. This context has great practical importance. Many policymakers and advocates assume a build -it-and-they-will-come-around approach—that exposure to renewable projects will naturally increase acceptance. Our findings challenge this assumption by showing that strong partisans (both Democrats and Republicans) largely maintain their existing views regardless of exposure. Only Independents show meaningful attitudinal change—specifically reduced opposition rather than increased support. This suggests that the policy scaffolding idea (implementing smaller projects first to build acceptance) needs supportive policy design tailored to the type of renewable infrastructure and the political orientation of local populations. The fact that exposure only affects independents' attitudes also helps explain why partisan divides persist even in areas with extensive renewable development.

This research contributes to the policy feedback literature, which examines how public policies influence mass public opinion and behavior (Pierson 1993, Mettler and Soss 2004). While most empirical studies in this area have focused on welfare and other social policies (Clinton and Sances 2018, Hopkins and Parish 2019, Crabtree and Wehde 2023), there remains limited understanding of feedback effects in the context of energy and climate policy. Renewable energy facilities represent tangible outcomes of previously adopted climate mitigation policies. Our research provides empirical evidence that such policy outcomes can influence public attitudes, consistent with Pierson's (1993) argument that policies can transform people's preferences and the associated politics surrounding an issue (Pierson 1993). Specifically, our results show that real-world encounters with climate policy outcomes—in this case, renewable energy infrastructure—can influence people's climate policy preferences in politically heterogeneous ways.

Practically speaking, the varied results across partisan groups suggest that, rather than relying on a passive approach that lets renewable energy projects 'speak for themselves', more intentional and targeted approaches may be needed to broaden support for climate policies. For example, Tailored messaging that emphasizes local economic benefits, job creation, or energy security may resonate more with certain groups, while the choice of messengers—such as local leaders, business figures, or non-partisan experts—may also influence how the message is received (Ghio *et al* 2021, Golos *et al* 2022). Similarly, effective engagement may depend on the communication channels used (Lee and Kwak 2012, Firmstone and Coleman 2015), whether through local media, community organizations, or social media. Given the differences in how partisans form policy attitudes, understanding effective ways to engage different groups could be crucial for designing strategies that foster broader public acceptance of renewable energy policies.

Despite its theoretical contributions and practical implications, this research is not without limitations. First of all, we acknowledge that recoding the three-category dependent variable into multiple binary outcome variables can raise concerns, including the potential loss of structural information and an increased risk of Type I errors due to multiple testing. Second, because the Nationscape study does not track the same individuals over time, the data we use in our analysis are cross-sectional, hence we are unable to use a causal inference design to examine the within-respondent changes in climate policy attitudes. Even though we have controlled for county and year fixed effects, omitted variable bias concern still exists. There may still be unobserved, time-variant factors that influence both renewable infrastructure siting and public opinion. Moreover, individuals may self-select into or out of zip codes with large-scale renewable infrastructure, which could confound causal interpretations. Our control variables, including individual level demographic characteristics and county level socio-economic and policy factors, help mitigate some of these concerns. Nonetheless, we encourage future research to use longitudinal surveys and causal identification strategies (e.g. difference-in-differences) to investigate the causal effect of renewable infrastructure on climate policy attitudes.

Data availability statement

The data that support the findings of this study are available upon reasonable request from the authors.

Appendix

Table A1. Variable description, data source and summary statistics.

Variable	Description	Source	Mean	S.D.	Min	Max
Support_envt	Three-category variable measuring answers to this question: 'We'd like to know whether you agree or disagree with each of the following policies—Make a large-scale investment in technology to protect the environment' (1: agree; 0: not sure; −1: disagree)	(1)	0.44	0.75	−1.00	1.00
Support	Binary measure of supportive attitude	(1)	0.60	0.49	0.00	1.00
Notsure	Binary measure of uncertain attitude	(1)	0.25	0.43	0.00	1.00
Against	Binary measure of opposing attitude	(1)	0.16	0.36	0.00	1.00
Windinzip	1: if the survey respondent lives in a zipcode with wind turbines	(2)	0.03	0.17	0.00	1.00
Solarinzip	1: if the survey respondent lives in a zipcode with solar farms	(2)	0.13	0.33	0.00	1.00
Age	Survey respondent's age	(1)	44.89	16.46	18.00	99.00
Female	1: if survey respondent is female	(1)	0.56	0.50	0.00	1.00
Hispanic	1: if survey respondent is Hispanic	(1)	0.14	0.35	0.00	1.00
Black	1: if survey respondent is black	(1)	0.12	0.33	0.00	1.00
Other race	1: if survey respondent is other race	(1)	0.13	0.34	0.00	1.00
Democrat	1: if survey respondent is self-identified as democrat	(1)	0.36	0.48	0.00	1.00
Republican	1: if survey respondent is self-identified as republican	(1)	0.30	0.46	0.00	1.00
Household income	Survey respondent's household income	(1)	9.31	7.10	1.00	24.00
Education	Survey respondent's highest level of education	(1)	6.34	2.16	1.00	11.00
County median household income	Median household income of the county	(3)	74 880.88	19 986.99	25 586.17	169 366.69
Total population	County total population	(3)	1097 849	1883 345	395	1.01e + 07
Dem vote share	Percentage of votes for democratic candidate	(4)	49.55	17.33	3.09	92.15
Wind ordinance	Whether there is a wind ordinance in effect in the county that year	(5)	0.06	0.23	0.00	1.00

Note: Data sources: (1) Nationscape Survey (2) Authors' calculation (3) Census Bureau (4) MIT Election Data and Science Lab (5) Ko *et al* (2023); In total, there are 142 412 observations.

Table A2. Pairwise correlation coefficients matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Support_envt	1																		
2. Support	0.9095*	1																	
3. Notsure	−0.3441*	−0.7033*	1																
4. Against	−0.8241*	−0.5140*	−0.2483*	1															
5. Windinzip	−0.0083*	−0.0121*	0.0133*	0.0005	1														
6. Solarinzip	0.0003	−0.0012	0.0033	−0.0023	0.0737*	1													
7. Age	−0.0384*	−0.0276*	−0.0033	0.0416*	0.0047*	0.0060*	1												
8. Female	−0.0317*	−0.0860*	0.1400*	−0.0517*	0.0084*	0.0080*	0.0360*	1											
9. Hispanic	0.0159*	0.0180*	−0.0134*	−0.0084*	0.0049*	0.0128*	−0.2290*	0.0450*	1										
10. Black	0.0090*	0.0035	0.0076*	−0.0139*	−0.0295*	−0.0045*	−0.1354*	0.0047*	−0.0397*	1									
11. Other	0.0356*	0.0308*	−0.0086*	−0.0316*	−0.0067*	0.0148*	−0.1864*	0.0146*	0.3374*	−0.1446*	1								
12. Dem	0.2048*	0.2110*	−0.1263*	−0.1351*	−0.0191*	−0.0085*	−0.0320*	0.0785*	0.0627*	0.2011*	0.0424*	1							
13. Rep	−0.2144*	−0.1818*	0.0440*	0.1947*	0.0051*	−0.0056*	0.1283*	−0.0529*	−0.0813*	−0.1784*	−0.1044*	−0.4895*	1						
14. Household income	0.0376*	0.0720*	−0.0986*	0.0201*	−0.0283*	−0.0071*	0.0799*	−0.0594*	−0.0654*	−0.1249*	−0.0415*	0.0108*	0.1085*	1					
15. Education	0.0713*	0.1122*	−0.1315*	0.0058*	−0.0243*	−0.0183*	0.1543*	−0.0171*	−0.0547*	−0.0762*	−0.0222*	0.0722*	0.0288*	0.4373*	1				
16. County median household income (log)	0.0603*	0.0718*	−0.0590*	−0.0267*	−0.0456*	0.0171*	−0.0118*	−0.0401*	0.0249*	−0.0479*	0.0956*	0.0663*	−0.0561*	0.2376*	0.1648*	1			
17. Total pop (log)	0.0760*	0.0888*	−0.0705*	−0.0359*	−0.1299*	−0.0376*	−0.0743*	−0.0514*	0.1668*	0.0845*	0.1541*	0.1369*	−0.1116*	0.1393*	0.1324*	0.4372*	1		
18. Pctdemvote	0.0965*	0.1086*	−0.0802*	−0.0512*	−0.0905*	−6.0084*	−0.0869*	−0.0560*	0.1349*	0.1576*	0.1404*	0.1892*	−0.1633*	0.1360*	0.1495*	0.3810*	0.7115*	1	
19. Windordinance	0.0011	0.0003	0.0012	−0.0019	0.0565*	0.0711*	−0.0111*	0.0031*	0.0488*	−0.0374*	0.0648*	0	−0.0077*	0.0032*	0.0028	0.1004*	0.1007*	−0.0013	1

Table A3. Effect of exposure to wind or solar energy on democrats' climate policy attitudes.

	(1) Support	(2) Notsure	(3) Against
Windinzip	0.0032	−0.0064	0.0032
	(0.0274)	(0.0229)	(0.0151)
Solarinzip	0.0014	−0.0014	−0.0000
	(0.0122)	(0.0099)	(0.0078)
Age	0.0008***	−0.0001	−0.0007***
	(0.0002)	(0.0002)	(0.0001)
Female	−0.0773***	0.0974***	−0.0201***
	(0.0071)	(0.0061)	(0.0046)
Hispanic	−0.0325***	−0.0036	0.0362***
	(0.0123)	(0.0096)	(0.0077)
Black (reference—white)	−0.0744***	0.0405***	0.0339***
	(0.0095)	(0.0076)	(0.0063)
Other race (reference—white)	−0.0033	0.0143	−0.0110
	(0.0128)	(0.0099)	(0.0077)
Household income	0.0024***	−0.0022***	−0.0002
	(0.0006)	(0.0005)	(0.0004)
Education	0.0204***	−0.0192***	−0.0012
	(0.0023)	(0.0017)	(0.0012)
Constant	17.5633	−19.5314	2.9681
	(12.0198)	(12.5086)	(7.1104)
N	50 512	50 512	50 512
R^2	0.1251	0.1258	0.0865

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Table A4. Effect of exposure to wind or solar energy on republicans' climate policy attitudes.

	(1) Support	(2) Notsure	(3) Against
Windinzip	−0.0386	0.0214	0.0172
	(0.0301)	(0.0307)	(0.0260)
Solarinzip	0.0038	0.0078	−0.0116
	(0.0134)	(0.0124)	(0.0120)
Age	−0.0024***	0.0002	0.0022***
	(0.0003)	(0.0002)	(0.0002)
Female	−0.1185***	0.1423***	−0.0237***
	(0.0090)	(0.0068)	(0.0081)
Hispanic	0.0446***	−0.0723***	0.0277*
	(0.0164)	(0.0136)	(0.0156)
Black (reference—white)	0.0271	−0.0405*	0.0135
	(0.0270)	(0.0212)	(0.0209)
Other race (reference—white)	0.0583***	0.0018	−0.0601***
	(0.0168)	(0.0153)	(0.0138)
Household income	0.0014**	−0.0020***	0.0006
	(0.0006)	(0.0006)	(0.0006)
Education	0.0069***	−0.0137***	0.0068***
	(0.0023)	(0.0019)	(0.0021)
Constant	7.2676	9.2177	−15.4853
	(12.4517)	(11.2892)	(13.6157)
N	42 954	42 954	42 954
R^2	0.1493	0.1489	0.1288

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Table A5. Effect of exposure to renewable infrastructure on climate policy attitudes.

	DV: Support for Climate Policy (*support_envt*)			
	(1) Dem	(2) Ind	(3) Rep	(4) All
Reninzip	−0.0002	0.0386**	0.0007	0.0098
	(0.0170)	(0.0196)	(0.0210)	(0.0110)
Age	0.0015***	−0.0025***	−0.0046***	−0.0019***
	(0.0003)	(0.0004)	(0.0004)	(0.0002)
Female	−0.0573***	−0.0660***	−0.0948***	−0.0455***
	(0.0103)	(0.0138)	(0.0156)	(0.0070)
Hispanic	−0.0687***	−0.0224	0.0170	0.0139
	(0.0182)	(0.0233)	(0.0290)	(0.0107)
Black (reference—white)	−0.1084***	−0.0291	0.0135	0.0548***
	(0.0143)	(0.0223)	(0.0432)	(0.0102)
Other race (reference—white)	0.0078	0.0092	0.1181***	0.0653***
	(0.0187)	(0.0209)	(0.0267)	(0.0106)
Household income	0.0026***	0.0006	0.0008	−0.0003
	(0.0008)	(0.0011)	(0.0011)	(0.0006)
Education	0.0216***	0.0276***	0.0001	0.0236***
	(0.0032)	(0.0036)	(0.0041)	(0.0018)
Constant	14.5997	7.0867	22.7336	−4.1022
	(15.2866)	(26.4718)	(23.5298)	(12.4034)
N	50 512	39 091	42 954	142 238
R^2	0.1098	0.1258	0.1379	0.0660

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; * $p < .10$, ** $p < .05$, *** $p < .01$.

Table A6. Effect of exposure to renewable infrastructure on independents' climate policy attitudes.

	(1) DV: Support	(2) DV: Notsure	(3) DV: Against
Reninzip	0.0184	0.0018	−0.0202**
	(0.0134)	(0.0122)	(0.0093)
Age	−0.0014***	0.0003	0.0011***
	(0.0003)	(0.0002)	(0.0002)
Female	−0.0996***	0.1332***	−0.0336***
	(0.0096)	(0.0085)	(0.0062)
Hispanic	0.0052	−0.0328**	0.0276***
	(0.0158)	(0.0134)	(0.0105)
Black (reference—white)	−0.0215	0.0139	0.0076
	(0.0160)	(0.0140)	(0.0095)
Other race (reference—white)	0.0079	−0.0065	−0.0013
	(0.0132)	(0.0119)	(0.0107)
Household income	0.0017**	−0.0029***	0.0011**
	(0.0008)	(0.0007)	(0.0005)
Education	0.0244***	−0.0212***	−0.0032**
	(0.0026)	(0.0025)	(0.0016)
Constant	−3.3163	14.7193	−10.4030
	(21.1545)	(18.9737)	(9.1031)
N	39 091	39 091	39 091
R^2	0.1359	0.1458	0.1216

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

Table A7. Effect of exposure to renewable infrastructure on independents' climate policy attitudes—logit models.

	DV: Against	
	(1)	(2)
Windinzip	-0.6251^{**}	
	(0.2433)	
Solarinzip	-0.1477	
	(0.1040)	
Reninzip		-0.2148^{**}
		(0.0996)
Age	0.0108^{***}	0.0108^{***}
	(0.0019)	(0.0019)
Female	-0.3471^{***}	-0.3477^{***}
	(0.0646)	(0.0646)
Hispanic	0.2832^{***}	0.2843^{***}
	(0.1032)	(0.1031)
Black	0.0774	0.0793
	(0.0973)	(0.0973)
Other race	-0.0162	-0.0131
	(0.1139)	(0.1139)
Household income	0.0117^{**}	0.0120^{**}
	(0.0051)	(0.0051)
Education	-0.0335^{**}	-0.0337^{**}
	(0.0167)	(0.0167)
Constant	-222.0780	-225.4727
	(164.3915)	(165.0838)
N	35 524	35 524

Note: Robust standard errors in parentheses; county-level controls and county and year fixed effects included but not reported; $^{*}p < .10$, $^{**}p < .05$, $^{***}p < .01$.

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