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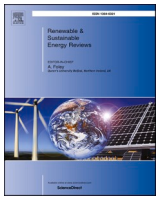

Wind energy acceptability across five major economies: A comparative analysis

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A B S T R A C T

Wind power is a cornerstone of global efforts to decarbonize energy systems, yet its expansion is often hindered by local opposition. Previous studies suggest that perceptions of distributive injustice and perceived lack of community benefits are common sources of contention. Compensation schemes have therefore been proposed to enhance public acceptance, but little is known about their effectiveness across diverse national contexts. To address this gap, this article assesses public support for wind energy, with and without compensation, using original survey data from five democratic countries spanning five continents: Brazil, Germany, India, South Africa, and the United States. The findings show consistently high levels of support for wind energy, with stronger acceptance observed in emerging economies compared to Germany and the United States. Left-leaning ideology and climate concern are associated with stronger support for wind energy across all countries, yet the results are otherwise context-dependent. While this study finds that compensation to residents living near wind turbines tends to increase support among individuals initially negative to wind power, the effects are modest. In contrast, supportive individuals may become more skeptical when monetary incentives are introduced, suggesting that such measures may undermine altruistic or pro-environmental motivations. In the United States, right-leaning individuals who are typically more skeptical of wind energy respond more favorably to compensation, while the opposite effect is observed in India and South Africa. By providing a cross-continental comparison, this study offers a more globally inclusive perspective on the social factors shaping public acceptance of wind energy.

1. Introduction

Wind energy has grown to become a key global source of energy. The electricity generated from onshore and offshore increased sixfold from around 350 TWh in 2010 to more than 2100 TWh in 2022 [1]. The reasons for the rapid expansion are primarily the benefits of supporting policies and falling turbine prices. Between 2010 and 2022, the global weighted average cost of electricity from onshore wind fell by 69 % [2]. Together with the development of solar photovoltaics, this expansion encouraged 198 parties at the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (COP28) in Dubai 2023 to deliver the so-called UAE Consensus, agreeing to triple the global renewable energy capacity by 2030 [3]

While the global expansion of wind energy has been impressive, it still falls short of the pace needed to meet the targets set at COP28. In 2023, only one-third of the annual average capacity needed for onshore wind energy was installed [4]. Additionally, wind power development remains uneven across continents. In 2023, three countries — China, the United States, and Germany — accounted for more than two-thirds of the installed capacity [5]. Only one percent of global wind power capacity is installed in Africa, a continent home to one-sixth of the world's population [6].

According to the International Energy Agency (IEA), the scale gap can be attributed to a lack of financing, slow permitting processes, barriers to grid integration, and challenges related to community acceptance [7]. Even though wind energy is generally popular in many countries [8], projects often encounter resistance from nearby communities during the implementation process [9–11]. People living near wind power sitings tend to express more negative attitudes due to property price devaluation [12], visual and auditory disturbance [13], or socio-cultural place attachment [14].

Moreover, research demonstrates that perceptions of an unjust distribution of the profits of wind power investments negatively influence public acceptance [15,16]. Communities living in proximity to wind farms often do not receive any economic benefits during operation, and investments may therefore be seen as an exploitation of their landscape [17,18]. To overcome such acceptance barriers, wind power developers and governments have been advised to implement compensatory policies [19,20]. There is evidence suggesting that community benefits can enhance wind power acceptance [21–23], however, uncertainties remain regarding the level of compensation needed and the effect of different types of benefits. There are also studies demonstrating that

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negative attitudes can be related to undemocratic planning processes [24–26] and that attitudes towards wind power are influenced by value-based factors, such as trust, ideology, and environmental concern [27–29].

However, research on public acceptance of wind power has predominantly focused on Europe and North America, while only a few studies have been conducted in Latin America, Asia, and Africa. In recent years, investments in wind power has picked up in several countries in Asia and Latin America. Alongside China, India, and Brazil are among the ten countries with the largest installed wind power capacity. Even though wind power is underdeveloped in Africa, the continent has massive wind resource potential [30], and these resources are increasingly being developed in countries such as South Africa and Morocco, contributing to the fight against energy poverty.

Due to a lack of research attention, it is unclear whether these continents face similar acceptance barriers as those observed in Europe and North America. It is also uncertain how effective different policy solutions aimed at enhancing community acceptance are in various country contexts, such as financial compensation. To bridge this empirical and geographical research gap, this article presents original survey data from five major economies across five continents. We surveyed wind power attitudes in five democratic countries: Brazil, Germany, India, South Africa, and the United States. By comparing the acceptability of wind energy with and without compensation in these countries, we present new insights and contextualize previous research. The study is guided by the following three research questions:

(1) What is the level of acceptability of national and regional wind power deployments across different countries?
(2) To what extent does the acceptability of wind power change if compensation is distributed to communities living in the vicinity of wind power turbines?
(3) What individual-level factors explain wind power acceptability across different countries?

The study represents the first analysis of wind power acceptability and the effects of compensation across large economies on several continents.

2. Literature review

The social dimensions of the energy transition have gained increasing research attention in recent years, partly because issues related to community acceptance of wind power have been shown to be essential for successful wind power development [31–36]. Although wind energy often enjoys broad public support, several studies demonstrate how investments may face local resistance during construction [37,38]. The rejection rate of submitted planning applications is high in many countries, impeding wind energy expansion [39–41].

The disparity of attitudes towards wind power in general, and towards turbines near people's places of living, has been referred to as the 'Not in My Backyard' (NIMBY) phenomenon [42–45]. There are several studies demonstrating that the level of acceptance is lower among individuals who are exposed to wind power than those who are non-exposed [46–48].

To this end, wind power acceptance could be explored both in terms of the opinions of the general population and the attitudes of affected communities, recognizing that there exists a "social gap" between these dimensions [49]. Wüstenhagen et al. [50] identify three different dimensions of acceptance: socio-political, market, and community acceptance. As research on social acceptance has expanded, critical perspectives have also emerged. Several scholars have suggested that acceptability, acceptance, and support should be conceptualized as different reactions, although in the literature they often overlap [51]. Huijts et al. [52] define acceptability as an attitudinal response, while acceptance is a behavioral response. Kyselá et al. [53] distinguish acceptability, representing a reaction to a hypothetical proposal, from acceptance and support, which represent a passive or active consent of implemented policies. Batel et al. [54] and Fast [55] have also contested the concept of social acceptance for not capturing the nuances between support and opposition. Wind power development might in these regards be accepted by a quiet majority, as argued by Fleming et al. [56], but opposed by a vocal and enraged minority.

Numerous studies have examined attitudinal responses to wind power developments located near people's homes, also demonstrating that rural residents, who are more likely to be exposed to wind farms, are more skeptical than urban residents [57]. Research shows that people may react negatively to the physical disturbances of wind turbines and changes to the landscape, especially from the noise of turbine blades and navigation lights flashing at night [58–64]. Noise annoyance has also been associated with self-reported health effects [65] and reduced quality of life [66,67]. Perceived changes to the landscape, local environment, biodiversity, and birdlife can also influence public attitudes [68,69]. Moreover, the number and height of the turbines can play a role in shaping public attitudes [70–72].

Additionally, research suggests that opposition to wind power can be rooted in people's sense of place or their sociocultural attachment to the area in which they live, making resistance a form of "place-protective action" [73,74]. Individuals with strong ties to their communities and surroundings tend to be especially sensitive to such changes. Moreover, worries about potential declines in property values [75–79] and tourism-related impacts can contribute to local opposition [80,81].

However, recent findings suggest that community acceptance should be understood as a complex social and psychological response, often stemming from institutional factors [82–85] or perceptions of distributional or procedural unfairness [86–90]. Communities that benefit from wind power through job creation, local economic development, or financial contributions are generally more positively inclined [91–97].

A key challenge in this regard is that wind farms typically generate limited local economic benefits beyond short-term employment opportunities during the construction phase [98]. When profits from energy production are directed to a limited number of landowners, government budgets, or business corporations, affected residents may associate wind power investments with an unfair exploitation of the local environment [99–102]. This underscores the need for governments and wind power developers to ensure community benefits, investments in local infrastructure, financial compensation, or co-ownership opportunities [103].

Studies suggest that perceived local socioeconomic effects for host regions or nearby communities, through various types of financial participation schemes or community benefits, can positively influence public acceptance of wind power projects [104–106]. However, the impact of economic benefits depends on factors such as the amount or type of compensation or benefits, proximity to residents, scale, and number of turbines [107–109]. While financial benefits can enhance general acceptance, some studies show that their impact on individuals with negative attitudes to wind power is marginal [110,111]. Moreover, the potential of different financial participation schemes to affect opinions depends on whether the benefits are distributed directly to individuals or communities living near wind farms or collectively to the affected region, for instance, through municipal taxes or similar mechanisms [112–115].

Moreover, the effect of compensation on the willingness to accept differs between individuals depending on their general attitude towards wind power [116] and the distance they live from the wind power installation [117,118]. Some studies suggest that negative attitudes may recede over time, partly due to changes in perceptions and the influence of economic benefits, although empirical evidence on this issue remains uncertain [119–122]. On the other hand, some findings suggest that financial compensation can have counterproductive effects if it is perceived as a bribe or based on agreements that are seen to be illegitimate or unfair [123–125]. It has accordingly been argued that formal regulations and transparency are relevant for generating legitimacy

[126].

Local opposition can also arise from feelings of exclusion or a notion that community voices are not being heard, and in this sense, community acceptance can be seen as a matter of procedural justice [127–132]. An inclusive planning and decision-making process may generate acceptance [133] and influence the effectiveness of financial compensation [134-137]. Mills et al. [138] suggest in this regard that while economic benefits can shape public attitudes, their impact depends on how fair and inclusive the compensation decisions are perceived to be.

Trust also tends to be of relevance, and several studies show that individuals who express low trust in political and governmental institutions [139,140] or in the developer as such [141–143] are more skeptical. People are generally less inclined to accept projects from foreign firms, showing a preference for those operated by national or local energy companies [144,145]. In this connection, there are several studies suggesting that local or co-ownership arrangements of wind power, such as energy communities, can enhance support for wind power investments [146,147].

Besides aspects that relate to the evaluation of actual wind power investments, other types of value-based factors are also relevant for explaining acceptance of wind power, such as worldviews and ideological orientations. Individuals with a high level of climate concern [148,149] or who express positive attitudes towards the energy transition [150,151] are more supportive of wind power. Moreover, social norms shaped by the attitudes of neighbours may affect the level of community acceptance [152]. Wind power attitudes can also be affected by political discourses and energy policy debates. Attitudes towards different energy options can, in this sense, be influenced by political cues and the ideological polarization in individual countries [153]. People with right-leaning political orientations tend to be more skeptical of wind power [154–156], which indicates that political narratives shape opinions. Media narratives and disinformation about different energy solutions, spread by vested interests, political actors, or protest groups, have also been shown to have an impact on public attitudes [157–162]. Finally, sociodemographic factors may be of relevance to explain acceptance, and there are studies suggesting that young people, women, and individuals with higher education are more likely to express positive attitudes towards wind power [163], although systematic reviews of the literature show that sociodemographic factors generally have a modest effect on wind power acceptance [164].

2.1. Country-specific differences

Research on public acceptance of wind power has predominantly focused on Europe and North America. [165],* Only a few studies have explored this topic in Latin America [166], Asia [167–170], and Africa [171–174]. It is difficult to draw any conclusions about the differences between country contexts, as the research evidence is limited and methodological approaches of the available studies differ. Country-comparative studies on the topic are also rare, with a few exceptions focusing on different European or high-income countries such as Australia and the United States [175–180]. Similar determinants behind wind power opinions have been found in Europe and North America, yet it is unknown if these factors can also be found in developing countries. Differences in public attitudes across countries are nevertheless expected, given the significant variation in wind power development, also shown among the countries included in this study. Germany has one of the highest shares of wind power, while the development has also increased rapidly in the United States and Brazil. By contrast, India and South Africa still have a modest share of wind power in their energy mix.

The differences between the countries can be linked to factors such as adopted climate and energy policies, energy mix, pricing, permitting, and access to finance. The historical characteristics of the energy balance, together with political and economic circumstances, can moreover influence the preferences for specific energy solutions. However, it is also likely that public perceptions of various energy options play a role (see Table 1).

It is challenging to provide a comprehensive overview of the wind power policies in the countries included in this study, as they comprise a wide range of laws and regulations that often vary between national and regional levels. As shown in Table 2, these frameworks create diverse investment incentives and barriers [181]. When it comes to compensation to local communities, only Germany and South Africa have adopted mandatory requirements at the national level, besides the local property taxes operators typically pay. In many cases, voluntary agreements are reached with local communities [182,183].

Moreover, the motivations behind renewable energy development differ between these countries. German energy policies have been motivated by environmental considerations, notably the national program “Energiewende” and EU policies such as the Renewable Energy Directive [184]. Within the United States, energy policies differ between states [185], yet besides policy drivers such as tax credits and renewable/clean energy standards [186], the development of wind power is to a great extent motivated by economic and market interests. While some studies suggest that there are no obvious connections between the energy policies of individual states, the share of wind power, and state-level tax incentives for renewable energy [187] there is also evidence for policies to act as barriers for development [188]. It is also difficult to assess to what extent energy policies are driving wind power expansion in developing countries such as India, Brazil, and South Africa. Key policy instruments in these countries are, as demonstrated in Table 2, public auctions with Power Purchase Agreements, tax incentives and exceptions, public credits [189–193], and, in the case of India, energy certificates [194]. In India and South Africa, where a fairly large share of the population lacks sufficient access to energy, while an even greater share lives in energy poverty, policies are prioritizing the public needs for energy, rather than transitioning away from fossil fuels [195,196]. It can be expected that these differences influence attitudes toward renewable energy investments.

3. Methods and materials

3.1. Sample and data collection

The study’s findings are based on an online survey conducted by YouGov from January 17 to February 2, 2023, across five countries: Brazil, Germany, India, South Africa, and the United States (See Table 3). The countries were selected as they are democracies and the largest economies on each continent, with a substantial rate of wind power in the national energy mix. To the best of our knowledge, the timing of the survey did not coincide with any major electoral event that might have biased responses in any of the countries.

The survey was part of a broader research project that included questions on policies related to energy, environment, climate, food

Table 1
Country-level wind power development.

	Wind power generation GWh	Percentage of electricity mix
Brazil	107 654	14,3 %
Germany	138 914	27,2 %
India	93 465	4,7 %
South Africa	11 586	5,1 %
United States	458 511	10,0 %

IEA, 2025 (https://www.iea.org/countries).

* A Scopus search on (TITLE-ABS-KEY (wind AND power) AND TITLE-ABS-KEY (acceptance)) AND (LIMIT-TO (SUBJAREA, “SOCI”)), resulted in 185 publication, out of which 32 were dealing with cases outside of Europe, USA and Canada.

Table 2
Overview of key wind power policies.

Country	Key wind power policies	Compensation policy	Sources
Brazil	Public auctions with long-term Power Purchase Agreements (PPAs). Tax exception for renewable energy and public low-interest credits (Brazil Development Bank)	No mandatory compensation, except for local property taxes.	(Santa Catarina 2022; Werner and Lazaro 2023; Lucena and Lucena 2019).
Germany	Public auctions with a remuneration price. Low-interest credits and grants (German Development Bank).	Developers are obliged to make financial contributions to host municipalities. Regional regulation on compensation and local property taxes.	(Croonenbroeck and Hennecke 2020).
India	Auction system with Power Purchase Agreements (PPAs). Tax incentives, low-interest credits (Indian Renewable Energy Development Agency), and Energy Certificates that the entities are obliged to purchase.	No mandatory compensation, except for local property taxes.	(IEA, 2021; Chaurasiya, Warudkar, and Ahmed 2019)
South Africa	Auction system with Power Purchase Agreements (PPAs), tax incentives, and the possibility to generate carbon credits.	Developers are obliged to allocate a percentage of revenues to benefit local communities and pay local property taxes.	WEF, 2024, (Schultze and Robinsson, 2024)
United States	Production and investment tax credits (extended through the Inflation Reduction Act). State-level low-interest credits and tax exceptions, grant programs, renewable/clean energy standards (demanding utilities to purchase clean energy).	No mandatory compensation, except for local property taxes.	(Gilmore and St. Clair, 2025, IEA, 2024b).

Table 3
Sample size.

Country	Sample size
Brazil	1697
Germany	1818
India	1647
The United States	1738
South Africa	1754
Total	8654

consumption, and transportation, and also included Sweden. While the survey data were used in two previous publications focusing on food policies [197,198], no prior publications have addressed wind power.

The sample was weighted based on sociodemographic factors, including gender, region, and age, using census data from each country. Respondents who provided straight-line responses were excluded to ensure data quality. Participation was restricted to individuals aged 18 and older, and YouGov ensured that informed consent was obtained. The sampling software selected panellists according to a predefined quota framework, ensuring that the study sample reflected the demographic distribution of the respective national populations.

3.2. Variables

As highlighted in the literature review, the concept of acceptance has been debated, and its usage has been inconsistent in previous studies. Acknowledging the vagueness of the concept, we adopt the definition established by Kyselá et al. [199], defining acceptance as reactions to a hypothetical proposal for wind power development in the respondents' country or region of residence. To respond to the first research question and to capture the level of acceptance, we asked the respondents to evaluate the following proposals: *establish more wind turbines in your country and establish more wind turbines in your region*. The respondents were asked to evaluate the proposals on a scale of 1–5, where 1 represents "strongly against", and 5 is "strongly in favour". We thereafter asked the respondents to evaluate the following proposal: *establish more wind turbines in your region and let some of the generated revenue compensate those living in the vicinity of the turbines*. To address our second research question, we intend to use this question as the independent variable, exploring if compensation affects baseline acceptance of wind power. The statistics are described below (Table 4).

Our third research question pertains to the individual-level factors that can explain general wind power acceptability. As described in the literature review, at least three value-based factors have been shown to influence attitudes to wind power: trust, ideology, and environmental or climate concern. We have therefore chosen to focus on these three aspects.

To capture the level of trust, we created an index based on the responses to the following questions: "On a scale of 0 (do not trust at all) to 10 (trust completely), how much do you personally trust each of these institutions? (1) political parties, (2) government, and (3) parliament?".

Ideology was captured in the responses to the following three statements: "(1) Reduce income differences in society, (2) Increase taxes on high incomes, (3) Government should increase taxes and spend more on services". Responses were captured on a five-step scale, ranging from "Strongly Disagree, Somewhat Disagree, Neither Agree nor Disagree, Somewhat Agree, and Strongly Agree". A mean of responses below 3 indicates right-leaning, while a higher mean represents left-leaning.

The internal consistency for the scales was tested, with fairly high levels for political trust (Cronbach's alpha: 0.90) and lower for ideology (Cronbach's alpha: 0.57), for the whole sample. In the statistical models, we standardize the response values to allow for comparison.

Finally, we measured climate concern with the response to the question: "How worried are you about climate change?" from 1 (very worried) to 4 (not at all worried). This variable was recoded so that higher values correspond with higher concern.

We also include control variables for gender (male = 0, female = 1), income (low, middle, high), education level (low, middle, high), age group (18–34, 35–54, 55+), and residential area (urban, suburban, rural) (see Table 5).

3.3. Methods

To address the first research question, we begin by conducting cross-country comparisons of the mean levels and standard deviations of wind

Table 4
Descriptive statistics – Main variables.

Variable	Mean	Std. dev.	Min	Max	N
Country	3.95	1.26	1	5	8654
Region	3.82	1.29	1	5	8654
Region + compensation	3.67	1.29	1	5	8654

Table 5
Descriptive statistics – Independent and control variables.

Independent variables	Mean	Std. dev.	Min	Max	N
Political trust	3.82	2.85	0	10	8654
Ideology	3.34	0.94	1	5	8654
Climate concern	3.16	0.88	1	4	8654
Gender (dummy)	0.51	0.50	0	1	8654
Income (categorical)	1.66	0.67	1	3	7686
Education (cat.)	2.27	0.66	1	3	8654
Age (cat.)	1.87	0.79	1	3	8654
Residential area (cat.)	1.66	0.77	1	3	8628

power acceptance, examining both national and regional levels of support within and between countries. T-tests were conducted to assess the differences between the deployment alternatives, within and across countries, and z-tests of proportions, to explore shifts in support from national to regional deployment.

We then assess potential shifts in attitudes toward regional wind power development when compensation is introduced. This is done by comparing respondent groups based on the magnitude of change in their responses from the baseline regional proposal to the proposal that includes local compensation. This allows us to determine whether compensation leads to increased support among initially skeptical respondents, particularly whether attitudes shift from below to above the neutral threshold (value 3), indicating a move from opposition to support.

To answer the third research question, we estimate ordered logit regression models with robust standard errors for each country subsample. The dependent variables are the three baseline measures of wind power acceptability: support for wind power development at the national level, at the regional level, and at the regional level with compensation to nearby residents.

Moreover, we investigate the effects of compensation and the factors that predict changes in attitudes. For this analysis, we construct categorical (dummy) variables reflecting these attitude shifts (positive, negative, unchanged) and perform logistic regression analyses, including the three key independent variables (ideology, political trust, and climate concern), along with relevant control variables. This approach enables us to identify the individual-level factors associated with responsiveness to compensation across different country samples.

4. Results

As illustrated in Fig. 1, wind power enjoys broad support across all countries included in the study. A majority of respondents are somewhat or strongly in favour of wind energy development both nationally and within their own region. However, support tends to be lower for deployment in the respondents' regions, compared to national deployment, suggesting that proximity influences public attitudes in all contexts (see Appendix for t-tests and tests of proportions).

Levels of acceptance also vary by country. In Brazil, 82 % of respondents support national deployment and 78 % support regional deployment. In contrast, only 56 % of respondents in the United States support wind power development at the national level, and 53 % at the regional level.

However, for wind power development, the absence of a vocal opposing minority is often more important than the general acceptance rate. It is therefore of relevance to explore the size of the opposition and to what extent negative opinions can be affected by compensatory measures. As shown in Table 6, more than a fifth of the respondents in Germany, the United States, and India are strongly or somewhat against wind power in their regions, while very few Brazilian and South African respondents express such opinions.

When examining the specific effect of compensation on attitudes toward wind power, the impact is modest (see Table 7). While a majority of respondents in each country remain somewhat or strongly supportive of wind energy deployment, the inclusion of compensation is, on average, associated with a decline in support for regional deployment. This pattern is evident across all countries in the study and particularly pronounced in Germany.

When we examine shifts in attitudes relative to the baseline, we find that respondents who were initially opposed to regional wind energy deployment tend to become somewhat less negative when compensation is introduced. Conversely, those who initially expressed support for the baseline proposal become significantly less supportive when compensation is included, as illustrated in Fig. 2.

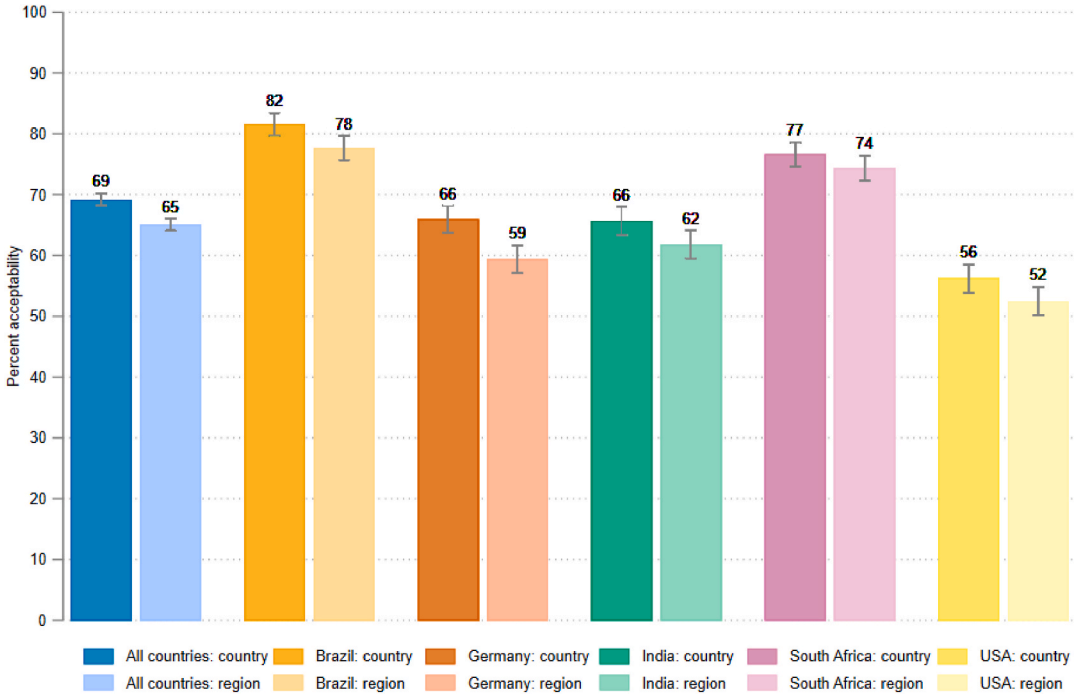

Fig. 1. Acceptance level of wind power at the national level and in the respondents' region, across five countries.

Table 6
Frequency of responses for each response category for question concerning more wind turbines in your region (percent).

	Strongly against	Somewhat against	Neither in favour nor against	Somewhat in favour	Strongly in favour	Balance
Brazil	3	6	13	18	60	+69
Germany	13	8	20	22	37	+38
India	7	12	19	26	36	+43
South Africa	4	8	14	25	49	+62
USA	14	11	22	23	30	+28
All countries	8	9	18	23	42	+48

Table 7
Frequency of responses for each response category for the question concerning more wind turbines in your region, and let some of the generated revenue compensate those living in the vicinity of the turbines (percent).

	Strongly against	Somewhat against	Neither in favour nor against	Somewhat in favour	Strongly in favour	Balance
Brazil	4	6	17	24	49	+63
Germany	15	10	26	28	21	+24
India	9	11	20	27	33	+40
South Africa	5	7	15	29	44	+61
USA	13	12	23	25	27	+27
All countries	10	9	20	27	34	+42

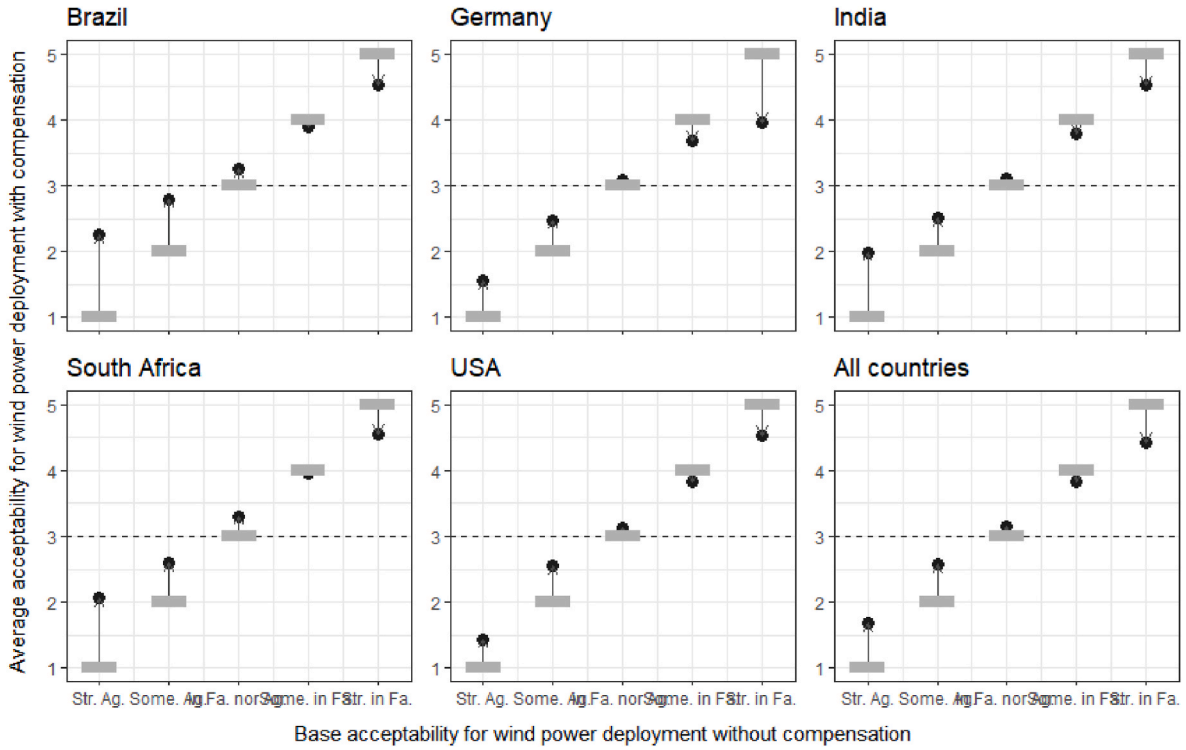

Fig. 2. Shifts of attitudes towards wind power with and without compensation, within all response groups
For each country, the boxes indicate average wind power acceptability in regions, while arrows demonstrate how attitudes shift within the response groups when compensation is included. A black dotted line at 3 indicates the "neither for nor against".

Table 8
Differences of means without and with compensation.

	Strongly against	Somewhat against	Neither in favour nor against	Somewhat in favour	Strongly in favour
All countries	+0.68	+0.57	+0.16	−0.17	−0.57
Brazil	+1.26	+0.80	+0.25	−0.11	−0.47
Germany	+0.55	+0.48	+0.09	−0.31	−1.04
India	+0.99	+0.51	+0.11	−0.21	−0.48
South Africa	+1.06	+0.59	+0.30	−0.05	−0.44
USA	+0.44	+0.55	+0.13	−0.17	−0.47

Focusing on individual countries, we find that compensation has a more pronounced effect among respondents who were initially negative toward baseline proposals in the emerging economies: Brazil, South Africa, and India. In contrast, compensation appears to have less influence on negative respondents in Germany and the United States (Table 8). While compensation can mitigate opposition to some extent, the overall effect remains limited, with mean attitude scores are not rising above 3 on the response scale in any of the explored countries.

4.1. Factors explaining supportive or negative attitudes

To address the third research question, we conducted ordered logit regression models with robust standard errors for each country subsample. These models examine the social mechanisms underlying acceptance of wind power at the national level, in respondents' regions, and when compensation was introduced. The explanatory power of the models, as indicated by the Pseudo-R^2 values, is relatively weak in the US and German samples and modest in the other countries, ranging from 0.05 to 0.06 in the full sample (see Appendix). While some patterns are consistent across countries, notable differences also emerge.

The results suggest that individuals' level of political trust is modestly but significantly associated with wind power acceptability at the national level, the respondents' region, and with compensation, in the full sample as well as in the subsamples from Brazil, India, and South Africa. In these cases, the association is negative, suggesting that higher political trust is linked to slightly lower support for wind energy deployment. In contrast, political trust shows a moderately positive and significant relationship with acceptability in the German sample, both with and without compensation. In the United States, the results are not statistically significant at $p < 0.001$, while low-trusting individuals tend to turn more negative to wind power with compensation, yet only significant at $p < 0.01$, with a coefficient of -0.183.

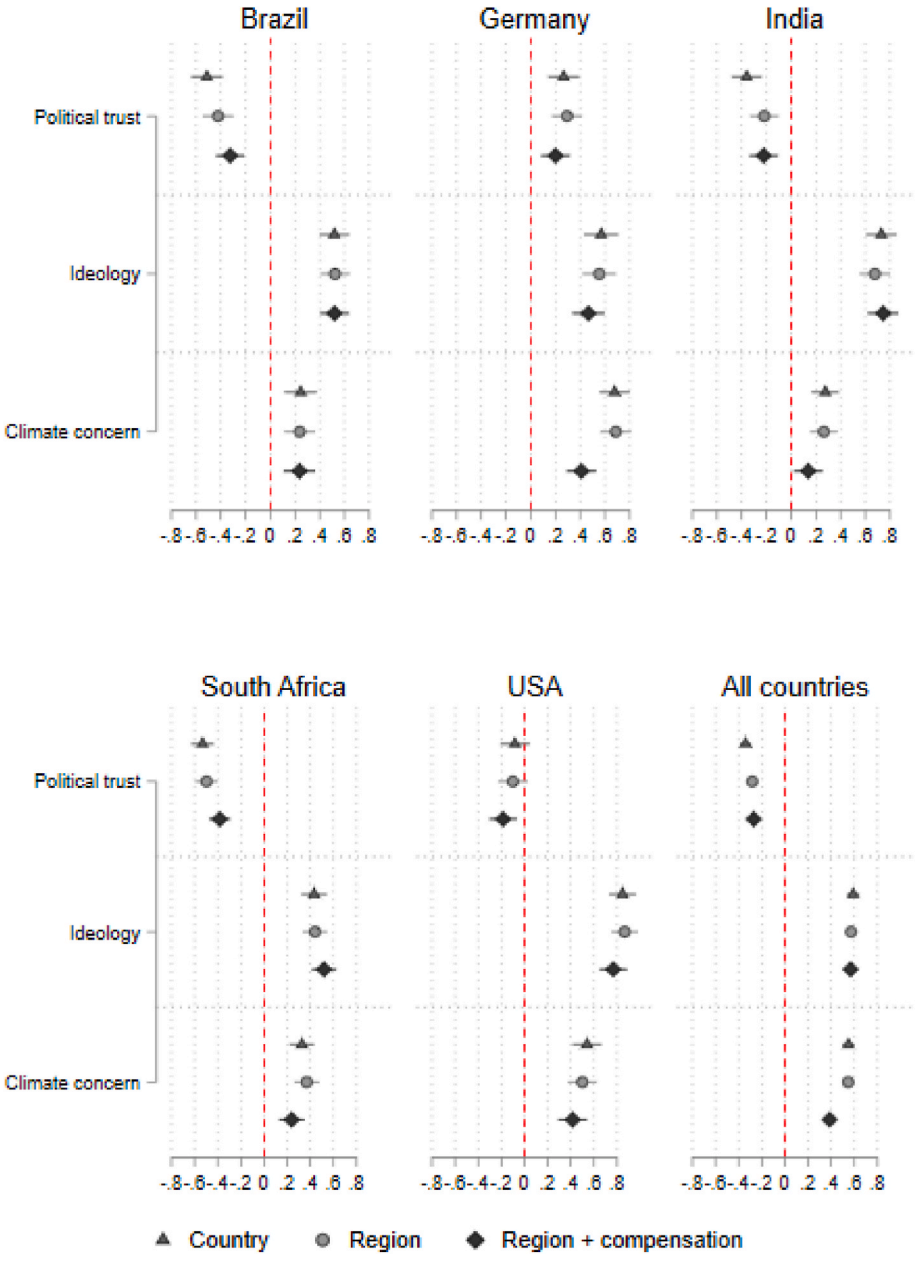

Fig. 3. Variables explaining wind power acceptance at the country-level, in regions, and with compensation, in each sub-sample and total sample
Coefficient levels at the horizontal line of the three independent variables. The results of the controls (gender, personal income, level of education, age, residential area) are presented in the Appendix.

Ideological orientation also plays a significant role in shaping public attitudes toward wind power deployment. Respondents who identify as more left-leaning are consistently and significantly more supportive of all deployment options across the full sample as well as in each individual country. Ideology emerges as a particularly strong predictor of wind power acceptance in India and the United States, with coefficients of 0.847 and 0.866 for national and regional deployment in the United States, and 0.729 and 0.677 in India, respectively.

Likewise, respondents' climate concern is positively associated with acceptability in all countries. However, while this factor is one of the strongest determinants in the United States and Germany, the associations are somewhat weaker in the other three countries (see Fig. 3).

In the overall sample, rural residents are significantly more negative toward wind power at the national level, yet this association is weaker when wind power is deployed in the respondents' region. The effects of control variables across all countries are otherwise heterogeneous and often not statistically significant, limiting the ability to draw any conclusions about the influence of socioeconomic and demographic factors (see Appendix).

When examining the determinants of attitude shifts, we find that the association between climate concern and wind power acceptance weakens notably when compensation is introduced, particularly in the full sample. This effect is most pronounced in Germany and the United States, where the influence of ideological orientation also diminishes under compensation scenarios. These findings suggest that the introduction of compensation may activate distinct evaluative dimensions, altering the weight of climate concern and ideology.

To look deeper into these mechanisms, we constructed a categorical (dummy) variable, reflecting the attitude shifts in both directions, and performed logistic regression analyses, including the three key independent variables (ideology, political trust, and climate concern). In this model, the Pseudo-R^2 is low (0.01–0.03) for the full sample and each sub-sample. Nevertheless, the analysis produced rather heterogeneous results, with many factors pointing in different directions, often without significant statistical power (see Table 9 and for individual countries in Appendix).

Table 9
Logistic regression analyses of differences in attitude shifts in the total sample.

	More negative (1)	No change (2)	More positive (3)
Political trust (0–10)	0.159***	−0.224***	0.170***
	(0.028)	(0.025)	(0.032)
Ideology (1–5)	−0.113***	0.128***	−0.074*
	(0.029)	(0.025)	(0.032)
Climate concern (1–4)	0.161***	0.038	−0.257***
	(0.029)	(0.025)	(0.032)
Female	0.018	−0.046	0.057
	(0.027)	(0.024)	(0.031)
1.Pers. inc. (low)	[Ref. cat.]	[Ref. cat.]	[Ref. cat.]
2.Pers. inc. (med)	0.048	−0.039	0.005
	(0.030)	(0.026)	(0.034)
3.Pers. inc. (high)	0.024	−0.021	0.005
	(0.030)	(0.026)	(0.034)
1.Education (low)	[Ref. cat.]	[Ref. cat.]	[Ref. cat.]
2.Education (med)	−0.065	0.088*	−0.056
	(0.044)	(0.039)	(0.050)
3.Education (high)	−0.095*	0.101*	−0.038
	(0.045)	(0.040)	(0.051)
1.Age (18–34 years)	[Ref. cat.]	[Ref. cat.]	[Ref. cat.]
2.Age (35–54 years)	−0.052	0.088***	−0.080*
	(0.030)	(0.026)	(0.034)
3.Age (55+ years)	0.078*	0.035	−0.170***
	(0.030)	(0.027)	(0.037)
1.Urban	[Ref. cat.]	[Ref. cat.]	[Ref. cat.]
2.Suburban	0.032	0.021	−0.080*
	(0.028)	(0.025)	(0.034)
3.Rural	0.053	−0.086***	0.070*
	(0.029)	(0.026)	(0.032)
Constant	−1.108***	0.299***	−1.589***
	(0.027)	(0.024)	(0.032)
N	7668	7668	7668
Pseudo-R^2	0.01	0.01	0.02

Robust standard errors in parentheses, *p < 0.05, **p < 0.01, ***p < 0.001.

The results suggest that in South Africa, Brazil, and India, right-leaning individuals tend to become less supportive of wind power when compensation is introduced, while in the United States, right-leaning individuals shift towards a more positive attitude when revenues are redistributed to compensate people living in the vicinity of the turbines. The effect is significant only at p-value below 0.01 in Brazil, India, and the United States, and should accordingly be interpreted with caution. German respondents who expressed high levels of climate concern tend likewise to become significantly more negative toward wind power development with compensation. A similar pattern emerges in the US sample (on a p-value below 0.01), while in India and South Africa, low climate concern is significantly associated with shifts towards positive attitudes when compensation was introduced.

5. Discussion

This article demonstrates that wind power enjoys broad support across the five major economies, all located on different continents. Consistent with the literature [200,201], our findings indicate that acceptance is slightly higher for national-level deployment compared to investments in regions where the respondents live, suggesting the presence of a proximity effect in all examined countries. Rural residents express more skepticism toward wind power, which is also in line with previous research [202]. However, in the full sample, this opposition is somewhat less pronounced for regional wind power deployment, an effect particularly evident in Brazil. This may indicate that some rural residents perceive potential personal benefits from local wind power investments.

Moreover, our results suggest that there is a divide in attitudes between industrialized and emerging economies. Support is strongest in Brazil and South Africa, where very few respondents express strong opposition to regional wind power deployment, while it is weakest in Germany and the United States. It is plausible that wind power is to a higher degree assessed for its merits in combating energy poverty and generating economic prosperity in Brazil and South Africa, while in high-income countries, climate concern emerges as a significantly stronger predictor of support for wind power. India is an exception, where respondents display somewhat less supportive attitudes. One speculative explanation for the relatively lower level of support in India is the high population density, which could influence public sensitivity to local development impacts.

Moreover, attitudes toward wind power appear to be shaped by ideological orientation across all countries, with a clear left–right divide. This divide is particularly pronounced in the United States and India. While this finding aligns with previous research [203], one might have expected less political polarization in countries with relatively low levels of wind power development, such as India and South Africa, where renewable energy investments could be perceived as politically neutral and primarily aimed at addressing energy needs.

Another somewhat counterintuitive finding concerns the role of political trust, which differs notably between industrialized and emerging economies. In Brazil, India, and South Africa, individuals with lower levels of political trust tend to be more supportive of wind power. This may reflect the perception of wind energy as a more localized and decentralized solution, relatively disconnected from centralized national energy strategies. Conversely, in industrial economies, wind power can sometimes be depicted as an energy source promoted by elites based on its environmental merits, which might explain why individuals with low political trust are less supportive of wind power.

In addressing the second research question, our findings suggest that financial compensation is not a particularly effective strategy for mitigating opposition to wind power. While compensation can lead to modest shifts in attitudes among individuals who initially expressed

negative views, the overall effect remains limited. The impact of compensation is somewhat more pronounced in Brazil, India, and South Africa compared to Germany and the United States, pointing to potential differences in how such measures are perceived in emerging versus industrialized economies.

However, while the study shows that compensatory measures can have a modest positive effect on individuals initially opposed to wind power, it also demonstrates that those who are generally supportive could turn more skeptical when compensation is introduced. This pattern might partly be attributed to ceiling effects, as those already strongly in favour have limited room to express greater support. However, the observed negative shifts cannot be fully explained by regression to the mean, as they are statistically significant and become more pronounced among those with the highest baseline support.

Moreover, this effect was particularly evident among individuals with strong concern about climate change and was especially pronounced among German respondents. This suggests that compensation may activate different evaluative frames. It is likely that monetary incentives undermine climate-driven support by crowding out the collective and altruistic motivations that often underpin pro-environmental attitudes, as highlighted in previous research [204,205]. Compensation could also be perceived as a form of bribery or as an attempt to buy the approval of local communities, which could deflate value-driven arguments [206,207].

It is also possible that the influence of climate concern is moderated by other social mechanisms when compensation is introduced. The predictive strength of ideology also tends to shift when compensation is introduced, but in different directions. In the United States, right-leaning individuals with initially negative attitudes toward wind power tend to view such investments more favorably when compensation is offered, while in India and South Africa, right-leaning orientation leads to the opposite effects. Similarly, individuals with low political trust became more positive in the US sample, but we were unable to find this effect in any of the other countries. This suggests that certain groups in some political contexts can be receptive to financial incentives, while such measures may have negative or no effects in others.

6. Concluding remarks

This paper reveals that while wind power is a generally popular energy source across these five countries, evident differences are found when it comes to the strength of support and the drivers behind positive and negative attitudes. Certain determinants of public acceptance of wind power are consistent across countries, such as the association with left-leaning ideology and climate concern, yet important differences are also evident. Although wind power enjoys strong overall support, respondents in emerging economies such as South Africa and Brazil express substantially more favorable attitudes than respondents in high-income countries. Furthermore, the effect of compensation on acceptance varies. Right-leaning individuals in the United States, who are typically more skeptical of wind energy, respond more positively to compensation, whereas the opposite effect is observed in India and South Africa. These findings suggest that perceptions of wind power differ across national settings, and energy policies intended to enhance wind power acceptance should accordingly be adjusted depending on the country context and the groups affected.

However, the results of this study should be interpreted with caution, as the survey was conducted across diverse national contexts. Variations in how questions were understood, along with country-specific factors, may have influenced the responses and affected the relevance of the independent variables. The results were notably heterogeneous, and no consistent conclusions can be drawn regarding the influence of socio-economic or demographic factors such as education and income.

Since most respondents in this survey have not experienced wind power development near their homes, the findings should not be interpreted as a definitive assessment of compensation's effectiveness in enhancing community acceptance. The impact of compensation on wind power acceptance and the social mechanisms behind different reactions to this measure cannot fully be captured by the survey data available for this study, but require further exploration with a different methodological approach. A more accurate evaluation would require targeted studies involving individuals with direct experience of local wind power projects.

CRediT authorship contribution statement

Daniel Lindvall: Conceptualization, Methodology and writing original draft, review and editing. Erik Elwing: Methodology and formal analysis, review and editing, survey design. Milla Marzelius: Review and editing, Niklas Harring, review and editing, survey design.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.rser.2025.116564.

Data availability

We have provided the following link to the data used in the paper: https://doi.org/10.7910/DVN/I18RYA.

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