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Review

Public Acceptance of Renewable Energy Across 21 Countries: Public Attitudes, Community Consent, and Policy Design

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Abstract

Decarbonisation targets are now widely adopted. However, the speed at which renewables are built depends on many factors, including technology, cost, regulation, and the decisions of investors, developers, and governments. Public acceptance is one of these factors, but it is not the decisive one. This article examines public acceptance specifically: the attitudes, perceptions, and preferences of citizens and consumers, which form only one part of the wider social acceptance of renewable energy that also involves policy-makers, intermediaries, and market actors. We ask how public acceptance of renewable energy varies across countries, what drives that variation, and which policy instruments most reliably turn public approval into built capacity. Using a structured narrative synthesis across 21 countries, we integrate major cross-national opinion surveys (Eurobarometer 555, the UNDP–Oxford Peoples' Climate Vote 2024, Pew, DESNZ, CSIRO, KfW, Ipsos), peer-reviewed work on local community acceptance, and capacity data from IRENA and the IEA. Three findings stand out. Headline support is high almost everywhere—a median of 76% across 77 countries and 85% in the EU—but increasingly masks polarisation, most sharply in the United States, where the partisan gap on prioritising renewables widened from 26 to 49 points between 2020 and 2024. Technology-specific acceptance follows a broadly consistent order, from rooftop solar down through wind, geothermal, hydropower, and biomass to carbon capture and nuclear. And community acceptance turns less on physical proximity to infrastructure than on procedural fairness, place attachment, and meaningful financial participation. Our contribution is integrative: we propose operational indicators of public acceptance that travel across national contexts, a country typology linking acceptance institutions to renewable outcomes, and a five-element policy architecture—early participation, benefit sharing, procedural transparency, place-sensitive siting, and credible information—each mapped to the acceptance dimension it addresses.

Keywords: public acceptance; renewable energy; public attitudes; energy transition; energy justice; NIMBY; community engagement; international comparison

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1. Introduction

The transition from fossil fuels to renewable energy is no longer a marginal technological choice but the central organising principle of contemporary climate policy [1,2]. In 2024, renewables accounted for an estimated 92.5% of all new power generation capacity added globally and reached 46.4% of the installed power generation fleet, the highest share ever recorded [3–5]. The International Energy Agency projects that global renewable capacity will more than double again by 2030 if announced policies are implemented [3]. The Intergovernmental Panel on Climate Change's Sixth Assessment cycle is unambiguous that meeting the 1.5 °C and 2 °C temperature goals requires the share of low- and zero-carbon electricity to rise to 80–100% by mid-century, with renewables doing most of that work [2]. Yet, behind these aggregate numbers sits a more delicate political economy. Wind, solar, hydropower, and transmission projects are ultimately developed in specific places, near people's homes, and subject to the judgment of planning authorities. As a result, public attitudes toward these installations have become an important influence on how quickly the energy transition can proceed—though only one element of their broader social acceptance, the research domain concerned with the decisions, positions, and behaviour of all the actors who shape energy choices [6,7].

The intellectual foundation for the modern study of social acceptance was laid by Wüstenhagen, Wolsink, and Bürer, who introduced the now canonical distinction between socio-political acceptance, community acceptance, and market acceptance [6]. Their argument—elaborated by Wolsink, Devine-Wright, Bell and colleagues, and more recently synthesised by Rand and Hoen, Boudet, and Batel and Devine-Wright—is that headline polling support is necessary but not sufficient for renewable energy deployment, and that the visible "social gap" between national approval ratings of 70–90% and local planning rejection rates of 30–50% is best understood not as garden variety NIMBYism but as the outcome of fairness perceptions, place attachment, institutional trust, and distributive politics [7–11].

Empirically, the past decade has produced an unusually rich evidence base. Eurobarometer 555, conducted in April–May 2024 with 26,415 respondents across all 27 EU member states, reports that 85% of EU citizens believe the European Union should invest "massively" in renewable energy such as wind and solar, and 88% want stronger EU action on renewables [12]. The United Nations Development Programme's Peoples' Climate Vote 2024, the world's largest dedicated climate opinion survey, covers 77 countries and 87% of the world's population: globally, 72% support a quick transition away from fossil fuels, with majorities in 62 of the 77 countries [13]. National trackers reinforce this pattern. The United Kingdom DESNZ Public Attitudes Tracker recorded 84% support for renewables in Summer 2024 against just 3% opposition [14]. Australia's CSIRO Energy Transition survey of 6700 respondents found 87% favouring moderate-to-high change and 80% willing to tolerate renewable infrastructure within 10 km of their home [15]. Germany's KfW Energiewende-Barometer reported 82% endorsing the importance of the energy transition [16]. Globally, Ipsos finds 84% of citizens want their country to move away from fossil fuels in the next five years [17].

Equally striking, however, is the textured variation underneath those headline numbers. Pew Research Center documents a sharp decline in U.S. Republican support for prioritising renewables—from 65% in 2020 to 40% in 2024—even as Democratic support remains near 90%. The partisan gap has nearly doubled to 49% points in four years [18]. Across 19 advanced economies surveyed by Pew, climate change is named the top global threat by a median 75% of respondents, but Europeans express far higher concern than respondents in Asia–Pacific economies [19]. Within Europe, the ESS Round 10 data show that 76% of respondents support public subsidies for renewable energy, but only 30% support

raising fossil fuel taxes—a discrepancy that confirms the well-documented "warm glow" bias toward positive policy instruments [20,21].

These cross-national patterns matter for policy because the renewable energy transition is now binding on infrastructure timelines that are explicitly tied to public consent. The IEA's Renewables 2024 report identifies public and community acceptance and permitting timelines as among the most important enablers of faster deployment. The IRENA World Energy Transitions Outlook 2024 frames public engagement as a precondition for the 1.5 °C-compatible pathway [3,4]. At the project level, a recent Lawrence Berkeley National Laboratory survey estimates that 65% of U.S. solar developers and 55% of wind developers are now spending more on community opposition mitigation than they were five years ago [22], and that perceived procedural injustice rather than ecological concern is the primary driver of local opposition [22,23].

This article makes three contributions, which are integrative rather than confined to updating the survey record. First, we assemble the most recent (2022–2024) cross-national survey evidence into a single comparative synthesis covering 21 countries on five continents, updating the international picture beyond the post-pandemic energy crisis literature and capturing the effect of the 2022–2023 energy price shock on public attitudes [15–17]. Second, and beyond this update, we revisit the three-dimensional acceptance framework of Wüstenhagen and colleagues in light of 15 years of subsequent evidence and propose explicit, measurable indicators for each dimension that are designed to travel across national contexts (Section 2)—a measurement contribution intended to make heterogeneous survey and case study evidence more comparable [6,24]. Third, we derive from the comparison a country typology that links the strength of a country's acceptance institutions to its renewable outcomes (Section 7), and on that basis set out a five-element policy architecture, supported by evidence from Denmark, Germany, the United Kingdom, the United States, and Australia, in which each policy instrument is mapped to the specific dimension of acceptance and the body of evidence it addresses [9,10,25]. What is new, then, is not a single survey result but the operational indicators, the typology, and the explicit policy-to-evidence mapping that together turn an established framework into a usable analytical and policy tool.

The remainder of the paper proceeds as follows. Section 2 sets out the theoretical framework. Section 3 describes the data sources, inclusion criteria, and synthesis method. Section 4 presents cross-national patterns of public support across our 21-country panel. Section 5 examines the socio-demographic, contextual, and informational drivers of acceptance. Section 6 turns to local community acceptance, the so-called "social gap", and the role of procedural and distributive justice. Section 7 considers policy implications. Sections 8 and 9 discusses limitations, and Section 10 concludes.

2. Theoretical Framework: Dimensions of Renewable Energy Acceptance

Two parallel conceptual traditions have shaped contemporary thinking on renewable energy acceptance. The first, originating with Wüstenhagen, Wolsink and Bürer in the 2007 *Energy Policy* special issue, distinguishes three dimensions: socio-political acceptance (general public, key stakeholders and policy-maker support for the technology and its associated policy instruments), community acceptance (decisions by local stakeholders about specific projects and siting), and market acceptance (the adoption of the technology by consumers, investors and firms) [6]. The second, articulated by Sovacool and Dworkin, frames acceptance through an energy justice lens with four interlocking tenets—distributive justice (how costs and benefits are allocated), procedural justice (how decisions are made), recognition justice (whose voices and identities are heard), and cosmopolitan justice (responsibilities that cross national borders) [26,27]. These two frameworks are not

in competition; rather, the justice tenets disaggregate the mechanisms through which each Wüstenhagen dimension operates [24,27].

Before applying this framework, it is essential to define social acceptance precisely and to state what this article does and does not measure. Following Wüstenhagen et al. [6] and the more recent reviews of the concept [28–31], social acceptance of renewable energy innovation is best understood not as an attitude held by individuals but as a multi-actor, multi-level process: it concerns the decisions, positions, and behaviour of all the actors involved in energy choices—national governments, regulators, investors, developers, utilities, intermediaries, the courts, and host communities—across scales that run from national policy and investment decisions down to the siting of an individual project. The public, understood as a body of individual citizens and consumers, is only one class of actor in this process, and frequently not the decisive one. As Wolsink [28] puts it directly, public acceptance can never serve as a valid proxy for social acceptance. This article makes a deliberately narrower claim than much of the comparative survey tradition that precedes it: it examines public acceptance—the attitudes, perceptions, and preferences of different national publics—rather than social acceptance as a whole. Where we draw on the three-dimensional vocabulary of Wüstenhagen et al. [6], we use it only to locate the public-facing component of each dimension, not to characterise the dimension in full.

The relationship between public acceptance and the wider social acceptance of renewable energy is real but complex, and it is not always positive. High public or community support for a particular project do not, on their own, deliver deployment: the socio-political dimension also requires that market conditions, legal systems, and regulatory institutions adapt to permit the favoured technology. This is clearest for distributed and community-owned forms of generation. Recent work by Wolsink [30] shows that the social acceptance of community energy, microgrids, storage, and demand–response turns less on whether the public approves of these forms in the abstract than on whether institutions are willing to redefine electricity from a private commodity delivered through a centralised grid into a co-produced common good—removing the legal and market barriers, transaction costs, and grid access rules that currently obstruct peer-to-peer and prosumer arrangements. On the other hand, socio-political acceptance among elites and investors can run well ahead of, or fall behind, public sentiment. Batel [29] and Upham et al. [31] caution against treating any single actor's attitudes as a measure of the whole, and emphasise that the institutional conditions that make a project be perceived as procedurally and distributively "just" are themselves objects of social acceptance, distinct from headline public opinion. We return to this distinction when interpreting our results: cross-national public attitudes are a useful but partial signal, and the countries that convert high public support into delivered capacity tend to be those whose market and legal institutions have already adapted to enable community-accepted, distributed forms of renewable energy [30,31].

Socio-political acceptance is the broadest and arguably the easiest dimension to measure. It is what large-N opinion surveys typically capture: when 85% of EU respondents say the bloc should invest massively in renewable energy, that is socio-political acceptance [12]. Critically, socio-political acceptance is multi-actor: it includes not only the general public but also key intermediaries (utilities, large industrial consumers, financial institutions, the press, civil society organisations, and major political parties) whose endorsement determines whether headline support is translated into durable policy [6,24]. The widening U.S. partisan gap on renewables, where elite cues from political leaders track closely with mass public attitudes, is a textbook case of socio-political acceptance being conditioned by partisan signalling [18].

Community acceptance turns on whether residents in the immediate vicinity of a renewable energy installation accept the specific project, the developer, and the planning process that produced it. The most influential conceptual move in this literature, made by Devine-Wright, was to reframe local opposition not as irrational backyard protectionism but as "place-protective action" rooted in attachment to particular landscapes and identities [8]. Subsequent work by Wolsink, Aitken, Petrova, Batel, and Devine-Wright has reinforced the view that perceived procedural and distributive injustice—not visual amenity per se—is the dominant driver of organised local opposition [32–35]. Bell, Gray, Haggett, and Swaffield decompose the "social gap" between national approval and local consent into three mechanisms: a democratic deficit in planning institutions, the qualified nature of supportive attitudes ("I support wind power, but. . ."), and a residual minority of pure NIMBY responses [9,10]. They argue that NIMBYism alone is insufficient to explain the gap.

Market acceptance addresses adoption behaviour. Are consumers willing to pay a premium for green electricity, install rooftop solar, or sign up to a community energy scheme? Are investors willing to allocate capital? Do firms adopt low-carbon technologies in their supply chains? The willingness-to-pay (WTP) literature is large and methodologically diverse, with at least four meta-analyses synthesising evidence across more than 100 contingent valuation and choice experiment studies [36–38]. Sundt and Rehdanz, pooling 29 studies across 13 countries, estimate a mean WTP of USD 7.16 per household per month for green electricity, with elasticity to environmental concern that is statistically significant but contextually variable [37]. Ma and colleagues, analysing 50 studies in 22 countries, confirm that income, environmental concern, and education are the most robust positive predictors and that age is inversely related to WTP [34].

Beyond these three primary dimensions, four cross-cutting moderators recur throughout the literature [24,33,39]. First, trust in institutions—in particular, trust in developers, regulators, and scientific intermediaries—is a precondition for both procedural acceptance and the credibility of information about technology risks [22,40,41]. Sütterlin and Siegrist's experimental evidence shows that trust in the actors implementing renewable energy projects is a stronger predictor of project-level acceptance than respondents' general environmental attitudes [42]. Second, fairness perceptions, both procedural (was the process inclusive?) and distributive (are benefits shared with the host community?), consistently predict project-level support better than physical proximity or visual impact [34,35,41,43]. Karakislak and colleagues' qualitative work in Germany shows that the interaction between local social norms and perceived procedural justice mediates this relationship [43]. Third, place attachment—affective and identity-based ties to a landscape—amplifies opposition when projects are perceived to threaten valued local identities, and amplifies support when projects are perceived as compatible with them [8,44]. Fourth, information and direct experience play a non-trivial role. Prior contact with operating installations, peer adoption, and high-quality balanced information all tend to raise acceptance, while exposure to oppositional campaigning and conspiracy framing reduces it [11,45].

Figure 1 visualises this multi-layered framework as deployed in the present study, and Table 1 operationalises the public-facing component of each dimension with explicit indicators drawn from the survey and case study literature. Because our evidence base consists of public opinion data, these indicators capture only the attitudes of national publics; the endorsements of policy elites, investors, intermediaries, and institutions that complete the socio-political and market dimensions lie largely outside our measurement, and we flag them as such rather than treating public opinion as a proxy for them. With that caveat stated, we use the framework as an organising device: Sections 4 and 5 are

mainly concerned with the public component of socio-political and market acceptance, while Section 6 turns to public attitudes at the community level.



Figure 1. Multi-layered framework of the social acceptance of renewable energy innovation, with public acceptance shown as one actor class within it. Adapted from Wüstenhagen, Wolsink, and Bürer [6] and Sovacool & Ratan [24], and extended using the multi-layered elaborations of Wolsink [28,30], Batel [29], and Upham et al. [31]. Social acceptance operates across levels—national policy and investment, market and regulatory institutions, and project-level community decisions—and involves many actors; the public (citizens and consumers) is only one of them, and rarely the decisive one. The shaded band marks the public-facing component examined in this article; realised diffusion of any specific technology depends on alignment across actors and levels, of which public acceptance is a necessary but not sufficient part.

Table 1. The acceptance framework with the public-facing indicators used in this study. The second column defines each dimension as it applies to the public alone; the full dimensions—which also involve elites, investors, intermediaries, and institutions—are broader and are not measured here. Source: adapted from Wüstenhagen et al. [6], Sovacool & Ratan [24], and Wolsink [28,30]; public-facing indicators selected by the authors from the surveys cited in Sections 4–6.

Dimension	Question It Answers for the Public (the Only Actor Measured in This Study)	Operational Indicators Used in This Study	Primary Evidence Base
Socio-political acceptance	Do members of the national public approve of expanding the technology and the broad direction of renewable energy policy? (Endorsement by policy elites, investors, and intermediaries—the rest of this dimension—is not captured by these indicators.)	% supporting renewable energy expansion in national survey, % supporting fossil fuel phase-out, % supporting public subsidies for renewables, partisan polarisation index	Eurobarometer 555 [12], UNDP/Oxford [13], Pew [18], DESNZ [14], CSIRO [15], KfW [16], Ipsos [17]
Community acceptance	Do residents (members of the host public) accept specific installations near them and the process that produced them?	% positive attitude within 0.8–5 km of installation; perceived procedural fairness score; place attachment score; benefit sharing arrangement (yes/no)	Hoen et al. [45], Rand & Hoen [11], Devine-Wright [8]; Wolsink [35], Bell et al. [9,10], Petrova [34]
Market acceptance	Are members of the public, as consumers, willing to adopt and pay for the technology? (Adoption decisions by firms and investors—the rest of this dimension—are not captured here.)	Willingness to pay premium for green electricity; rooftop solar adoption rate; community energy participation; share of green tariff customers	Sundt & Rehdanz [37], Ma et al. [38], Soon & Ahmad [36], Stigka et al. [46], Liebe & Dobers [47]

3. Materials and Methods

This article uses a structured narrative-synthesis methodology, supplemented by descriptive cross-tabulation of public opinion data from large-N comparable surveys. The choice of method requires explanation. Two alternative methodologies were considered and rejected. A formal systematic review using PRISMA was rejected because the underlying evidence base is heterogeneous on the dependent variable (different surveys measure "support" using non-identical question wording, response scales, and reference periods), and pooling such estimates without acknowledgement of the construct heterogeneity would create false comparability [24,39]. A meta-analysis of WTP, of the type undertaken by Sundt and Rehdanz, Ma and colleagues, and Soon and Ahmad, was considered but rejected as a primary method because three high-quality meta-analyses already exist, and our value added lies in integrating these with non-monetary opinion data [36–38].

The chosen approach combines four features that, together, are well suited to the question of cross-national renewable energy acceptance. First, an explicit inclusion protocol was applied to candidate evidence: (i) the survey or study must report a sample size of at least n = 1000 with a transparent sampling frame; (ii) data must be from 2018 or later, to ensure relevance to the current post-Paris Agreement, post-energy crisis policy environment, except where seminal conceptual works are cited; (iii) the source must be either an official agency (Eurobarometer, UNDP, IEA, IRENA, REN21, DESNZ, CSIRO, KfW, Eurostat, Yale Program), a recognised survey house with documented methodology (Pew, Ipsos, YouGov), or a peer-reviewed journal article indexed in Web of Science, Scopus or

Google Scholar. Second, a two-stage data extraction template captured: country coverage, sample size, fieldwork dates, exact question wording, response scale, headline percentage favourable, and—where reported—the partisan, age, gender, and education breakdown. Third, narrative synthesis was used to integrate quantitative and qualitative findings, following the guidance of Popay and colleagues. Fourth, the three-dimensional framework set out in Section 2 was used as the organising device for synthesis, so that evidence is grouped by the dimension of acceptance it most directly speaks to [6,24].

Cross-national comparison is built on a panel of 21 countries selected to capture diversity along three relevant axes: (i) income (high income, upper-middle income, lower-middle income), (ii) renewable energy penetration (from Iceland and Norway at over 95% renewable electricity to South Korea at single-digit percentages), and (iii) political–economic context (mature liberal democracies, illiberal democracies, single-party states, and federal systems). The panel comprises: Australia, Brazil, Canada, China, Denmark, France, Germany, Iceland, India, Italy, Japan, the Netherlands, Norway, Poland, Portugal, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States. For each country, the share of renewables in electricity generation in 2024 is taken from IRENA's Renewable Capacity Statistics and Eurostat's Renewable Energy Statistics [4,48]. The headline public support indicator is the most recent comparable national survey published before December 2024.

The selection of these 21 countries is both theory-driven and data-driven, and is not intended to be globally representative. The theoretical criterion is maximum variation: the panel was built to span the three axes above (income, renewable penetration, and political–economic context), so that contrasting cases—Iceland and Norway at one extreme of renewable penetration and South Korea at the other; mature liberal democracies alongside single-party and illiberal systems—can be compared. The practical criterion is data availability: a country was included only where a large-N ($n \geq 1000$), post-2018 survey with a comparable headline item on renewable energy support could be identified from one of the official or recognised sources listed above. Several major energy economies that a globally representative sample would include—among them Mexico, South Africa, Saudi Arabia, and Indonesia—are deliberately not part of the 21-country analytical panel; at the time of writing, they lacked a survey item comparable to those used for the panel countries. Where such countries appear later in the paper (for example, the global-context comparison reported later in Section 4), they are presented as illustrative global-context cases rather than as members of the analytical panel, and are labelled as such. They are used to situate the panel within the wider global distribution of opinion, not to extend the panel itself.

Two methodological caveats apply. First, exact comparability of public opinion items across surveys is imperfect. The UNDP Peoples' Climate Vote question asks whether the respondent supports their country "transitioning quickly to clean energy and away from fossil fuels" [13], Eurobarometer 555 asks about EU-level investment in renewables [12], and the DESNZ tracker asks about general support for the use of renewable energy [14]. These items are conceptually adjacent but not identical. Results are therefore presented as ranges and benchmarks rather than as point estimates intended for statistical pooling. Second, willingness-to-pay estimates are reported in their original currency and price year. Where the underlying study reports inflation-adjusted figures, we use those; otherwise, we follow the convention of the original study and the meta-analyses cited [32–34].

All survey percentages reported in the results tables and figures are drawn from the primary sources listed in the table notes. Calculations performed by the authors are limited to (i) the median across the country panel for headline support, (ii) the simple linear regression slope between renewables share and public support, and (iii) re-coding of

acceptance bands to align with the Hoen and colleagues distance categories [45]. No new survey data were collected for this article.

4. Cross-National Patterns of Public Support

Three stylised facts characterise the contemporary international picture of public support for renewable energy. First, headline support is high almost everywhere: across the 77 Peoples' Climate Vote countries, the median "support quick transition" share is 76%, and a majority is observed in 62 of 77 [13]. Second, the dispersion across countries is meaningful and patterned: high-renewables Nordic and southern European economies, plus large emerging economies in Asia and Latin America, sit in the 75–90% band, while opposition or ambivalence is concentrated in fossil fuel-exporting economies and in some Eastern European member states [12,13,17]. Third, headline support is now noticeably less stable in major Anglo-Saxon democracies than it was a decade ago, with the United States showing both the highest absolute partisan polarisation and the sharpest declines among the politically conservative segment of the electorate [18].

Table 2 reports the headline support indicator for each of the 21 countries in our panel. Across the panel, the median is 80%, the inter-quartile range is 70–86%, and the minimum (Russia, 51%) is more than 37 percentage points below the maximum (Iceland, 90%). Figure 2 displays a curated subset of the panel.

Table 2. Headline public support for renewable energy expansion or rapid energy transition, 21-country panel, most recent comparable survey available before December 2024. Sources: European Commission [12], UNDP/Oxford [13], Pew Research Center [18], DESNZ [14], CSIRO [15], KfW [16], Ipsos [17], renewable share calculated from IRENA [4] and Eurostat [48].

Country	Headline % Support	Primary Survey Source (Year)	Sample Size	RE Share of Electricity 2024 (%)
Iceland	90	Ipsos People & Climate 2024 [17]	~1000	≈100
Brazil	88	UNDP Peoples' Climate Vote 2024 [13]	~2000	88
Sweden	86	Eurobarometer 555/Ipsos [12,17]	~1000 per source	88
Eurobarometer EU avg.	85	Special Eurobarometer 555 [12]	26,415 (EU-27)	≈48
United Kingdom	84	DESNZ Tracker Summer 2024 [14]	≈4000	50
Spain	84	Eurobarometer 555 [12]	≈1000	49
Italy	83	Eurobarometer 555 [12]	≈1000	41
Denmark	82	Eurobarometer 555 [12]	≈1000	80
Netherlands	81	Eurobarometer 555 [12]	≈1000	36
Australia	80	CSIRO Energy Transition 2024 [15]	6700	32
France	79	Eurobarometer 555 [12]	≈1000	27
South Korea	78	Ipsos People & Climate 2024 [17]	≈1000	8
Canada	78	Ipsos People & Climate 2024 [17]	≈1000	67
India	77	UNDP Peoples' Climate Vote 2024 [13]	~3000	22

Table 2. *Cont.*

Country	Headline % Support	Primary Survey Source (Year)	Sample Size	RE Share of Electricity 2024 (%)
Germany	76	KfW Energiewende-Barometer 2024 [16]	≈6000	56
China	73	UNDP Peoples' Climate Vote 2024 [13]	~3000	32
Japan	70	Ipsos People & Climate 2024 [17]	≈1000	25
United States	65	Pew Research Center 2024 [18]	≈10,000	22
Norway	85	Ipsos/National Survey [17]	≈1000	99
Portugal	85	Eurobarometer 555 [12]	≈1000	65
Poland	60	Eurobarometer 555 [12]	≈1000	25
Russia	51	UNDP Peoples' Climate Vote 2024 [13]	~2000	21

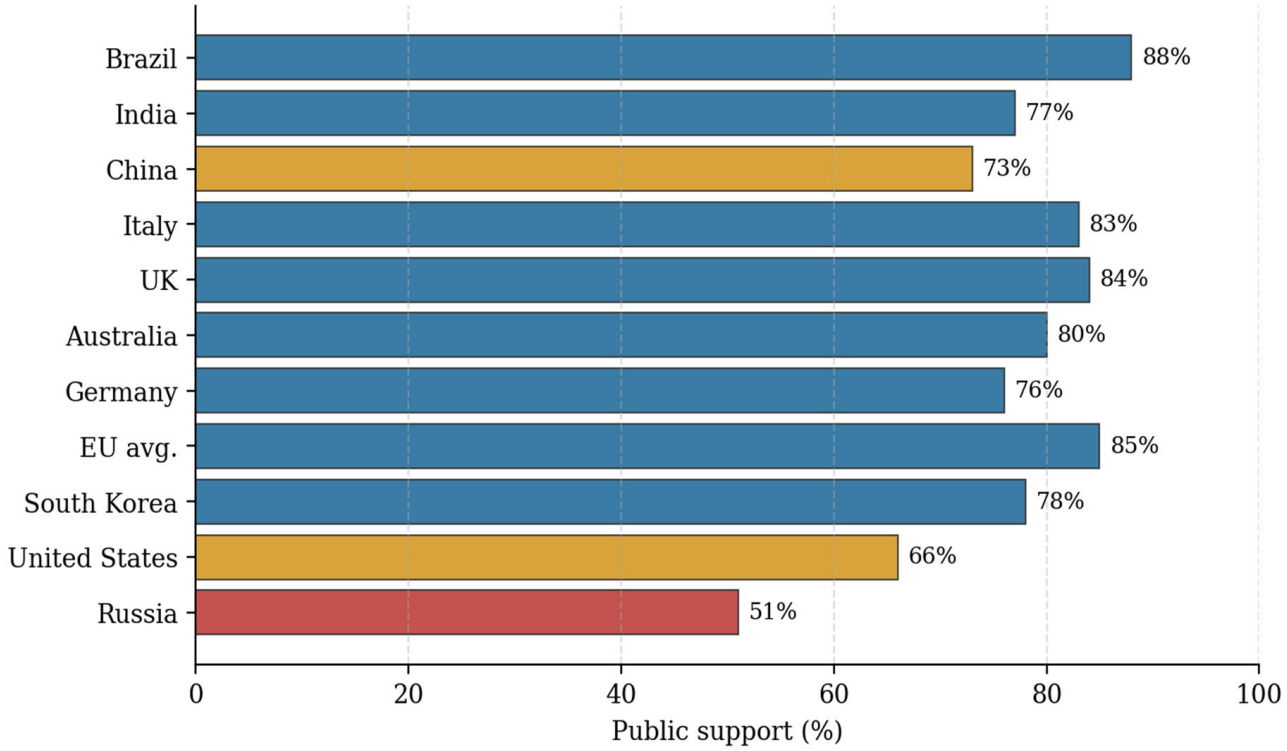

Figure 2. Public support for a rapid transition to renewable energy across a selected subset of the 21-country panel. Sources: UNDP/Oxford Peoples' Climate Vote 2024 [13] for China, India, Brazil, Russia and United States; Special Eurobarometer 555 [12] for Italy, Germany and EU average; DESNZ Public Attitudes Tracker Summer 2024 [14] for the United Kingdom; CSIRO Energy Transition 2024 [15] for Australia; Ipsos People & Climate 2024 [17] for South Korea. Per-source survey items are conceptually adjacent but not identical; see Section 3 for the caveat on comparability.

The Nordic outliers—Iceland, Norway, Sweden, and Denmark—combine the world's highest renewable shares with public approval in the 82–90% band [17,48]. Three explanations are commonly advanced in the literature: experiential familiarity with operating renewable infrastructure (most Nordic citizens have lived with hydropower and wind for decades), strong cooperative ownership traditions that distribute benefits widely, and high

institutional trust [49,50]. Denmark, in particular, is the archetype of community ownership. By the early 2000s, wind cooperatives represented over 100,000 Danish households and accounted for 86% of installed wind capacity, a model that the IEA has formally documented as a transferable policy [25,49]. The Middelgrunden offshore wind facility, financed in equal share by 8650 individual citizen investors raising EUR 23 million, remains the canonical case study [49].

The European Union average of 85% support from Eurobarometer 555 disguises a meaningful within-EU range: Eurobarometer 555 reports country-level support shares spanning roughly 60% (Poland) to over 90% (Sweden and the Netherlands on some items) [12]. Poland's lower position is consistent with prior work that has identified strong coal incumbency and labour market vulnerability in the Silesian region as moderating effects on attitudes [48]. Yet, even in Poland, more than 8 in 10 EU citizens agreed across all 27 member states that increasing energy efficiency and renewable investments will reduce dependence on external suppliers, suggesting a security-of-supply frame is widely shared across the political spectrum [12].

The two large Asian fossil fuel producers, China and India, both record support above two-thirds for a quick transition (73% and 77%, respectively) in the UNDP/Oxford Peoples' Climate Vote [13]. The size of these majorities is politically meaningful. Even in the world's largest coal-consuming economies, the available evidence suggests that a clear majority would, in principle, support a faster move toward clean energy; we are cautious, however, not to read this as endorsement of any particular fossil fuel phase-out timetable, since the survey item asks about transitioning to clean energy in general rather than about specific phase-out measures. The Stanford Energy Initiative's reading of the same Peoples' Climate Vote data argues that the conventional Western narrative—"developing economies want development first, environment second"—is empirically obsolete [13]. Within-firm evidence from Chinese electric power companies likewise indicates that social–psychological factors (perceived behavioural control, descriptive norms) are now among the principal correlates of energy conservation intention, suggesting that the supply-side professional culture in China has moved toward attitudes broadly compatible with the headline survey findings [51]. In India, climate awareness has risen over the past decade, and renewable energy investment now attracts broad cross-party support.

The United States is the most internally divided of the major economies on this issue. Pew's 2024 reading places overall U.S. support for prioritising renewables at 65%, a 14-percentage-point decline from 79% in 2020 [18]. The decline is almost entirely concentrated among Republican identifiers, whose support fell from 65% in 2020 to 40% in 2024. Democratic support was essentially flat in the same period at 89–91% [18]. Figure 3 summarises the cross-study acceptance ranking of low-carbon technologies, from rooftop solar PV to nuclear power. Figure 4 then presents the U.S. partisan trajectory in prioritising renewable energy over fossil fuels between 2017 and 2024. Yale Climate Opinion Mapping reaches a similar conclusion at the state level. A total of 93% of Democrats and 80% of Republicans nationally support funding research into renewable energy sources, but on more politically contested questions—such as whether the country's main priority should be developing renewables—the partisan gap reaches its post-1980 maximum [52]. Importantly, when the policy is reframed around "renewable energy on public land", support exceeds 75% in every U.S. county, including in deeply Republican areas, suggesting that the polarisation is highly sensitive to how the question is asked [52].

Russia anchors the bottom of our panel at 51% support; it is the only economy in the panel in which a clear majority for a quick transition cannot be confidently identified [13]. This figure warrants particular caution. Independent opinion polling in Russia operates in a difficult environment: the media space is dominated by state outlets, pollsters work

under legal and political constraints, and the well-documented effects of social desirability and non-response bias can pull reported attitudes toward perceived official positions—respondents may be reluctant to voice views that diverge from the state's fossil fuel export priorities. For these reasons, the 51% is best read as an uncertain indicator rather than a precise estimate, and direct comparison with the other panel countries should be made cautiously. Even with that caveat, the directional finding—that measured support is lower than in any other panel country—is consistent with the country's fossil fuel export model and its political economy of incumbency.

Beyond country headlines, the cross-national surveys provide a unique window into the comparative salience of climate change as a policy concern. Pew's 19-country 2022 study finds that a median of 75% across the 19 advanced economies describe climate change as a "major threat" to their country—the highest of any global threat tested—but with substantial variation, ranging from above 80% in France, Germany, Italy, and Spain to below 60% in Israel and Poland [19]. The same survey identifies systematic gender and education gradients. In 12 of the 19 countries, women are statistically more likely than men to describe climate change as a major threat, and in Sweden, the gender gap reaches 16 percentage points (78% of women vs. 62% of men) [19]. ESS Round 10, with 30 European countries, confirms these patterns at the European level and adds two further observations: that left-leaning respondents and more educated respondents are systematically more worried about climate change and more supportive of public spending on renewable energy [20,21].

Two further cross-national observations deserve attention. First, technology-specific acceptance follows a broadly consistent ordering across surveys: rooftop solar tends to enjoy the highest approval, followed by utility-scale solar and offshore wind, then onshore wind and geothermal, then hydropower and biomass, and at the bottom, carbon capture and storage and nuclear power [42,53–55]. This ordering should be read as a general tendency rather than a strict or statistically verified hierarchy. The values in Table 3 are drawn from different countries, survey instruments, and response scales, and they are not directly comparable; country-level departures from the modal ordering are common—large hydropower, for instance, is more accepted than geothermal or biomass in several of the country cases reported. Figure 3 summarises the pattern as a cross-study acceptance index, constructed as the unweighted median of the available national survey values for each technology in Table 3; because the underlying items differ in wording and scale, the index is intended to convey ordinal position only and not a precise level of support. Sütterlin and Siegrist's experimental work in Switzerland identifies a powerful "positive imagery" effect of solar power that consistently differentiates it from other renewable sources in the public mind [42]. Table 4 extends the comparison to selected global-context cases, while Table 5 summarises selected results from Special Eurobarometer 555. Figure 4 shows the U.S. partisan trajectory discussed above. Second, the relationship between actual renewable penetration and public support, although positive, is far from deterministic (Figure 5). The fit line through our 21-country panel has a slope of approximately 0.20 percentage points of support for each 1-percentage-point increase in the renewables share—statistically positive but with substantial dispersion around it. Costa Rica, Brazil, Norway, and Iceland sit far above what the regression alone would predict, while the United States and Russia sit far below. The residuals appear to be driven by political economy and partisan signalling rather than by physical or technological constraints [18,52].

Table 3. Acceptance ranking of low-carbon technologies (% positive or supportive), selected country surveys. The ordering rooftop solar > utility solar > offshore wind > onshore wind > geothermal > hydropower > biomass > CCS > nuclear is a general tendency that broadly recurs across countries, but it is not a strict or statistically verified hierarchy: the figures are drawn from different surveys, instruments, and scales, and country-level exceptions occur (for example, large hydropower is more accepted than geothermal or biomass in several cases). Sources: Sütterlin & Siegrist [42], Bertsch et al. [56], Ribeiro et al. [55], Stigka et al. [46], Hoen et al. [45], CSIRO [15], DESNZ [14], KfW [16].

Technology	United Kingdom (DESNZ 2024) [14]	Germany (KfW/ Bertsch) [16,56]	Australia (CSIRO 2024) [15]	Switzerland (Sütterlin) [42]	Portugal (Ribeiro) [55]
Rooftop solar PV	≈87	≈88	≈85	≈90	≈84
Utility-scale solar PV	≈80	≈77	≈80	≈82	≈75
Offshore wind	≈79	≈74	≈72	≈76	≈70
Onshore wind	≈73	≈67	≈70	≈68	≈65
Geothermal	≈63	≈62	≈58	≈70	≈55
Hydropower (large)	≈55	≈58	≈52	≈60	≈65
Biomass	≈55	≈52	≈45	≈55	≈50
Carbon capture and storage	≈40	≈35	≈38	≈38	≈30
Nuclear	≈37	≈30	≈35	≈40	≈32

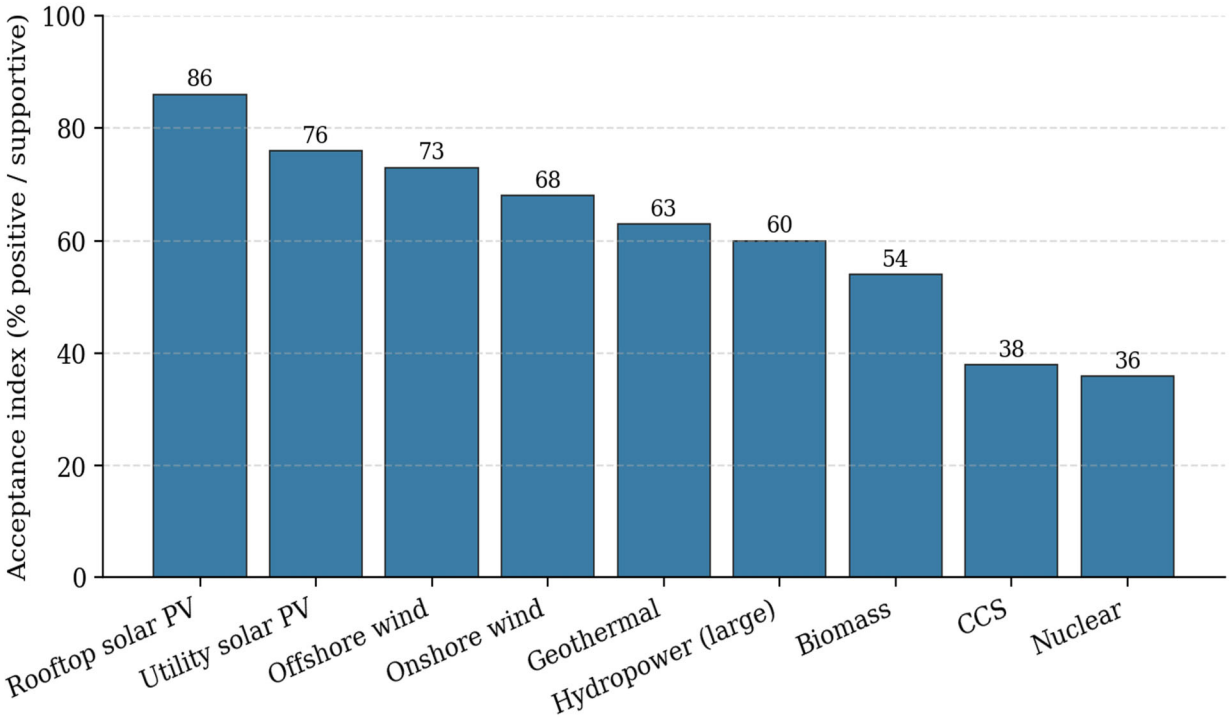

Figure 3. Public acceptance ranking by low-carbon technology: cross-study synthesis. The ordering broadly recurs across UK [14], German [16,56], Australian [15], Swiss [42], and Portuguese [55] surveys, with country-level exceptions. The index is constructed as the unweighted median of the available national survey values for each technology (Table 3); because the underlying items differ in wording and response scale, the values are approximate and should be read as ordinal rather than as precise levels of support.

Table 4. UNDP Peoples' Climate Vote 2024: support for a quick transition from fossil fuels to clean energy in selected major economies and selected fossil fuel exporters. The vote covered 77 countries and 87% of the world's population. Source: UNDP and University of Oxford [13]. Several of the economies listed here (for example, Bolivia, Mexico, Indonesia, South Africa, Nigeria, and Saudi Arabia) are not part of the 21-country analytical panel; they are reported as illustrative global-context cases drawn from the worldwide Peoples' Climate Vote, not as panel members.

Country	% Supporting Quick Transition	Country Group
Bolivia	85	Upper-middle-income
Brazil	88	Upper-middle-income
India	77	Lower-middle-income
Mexico	82	Upper-middle-income
China	73	Upper-middle-income/major emitter
Indonesia	75	Upper-middle-income/coal exporter
South Africa	76	Upper-middle-income/coal-dependent
Nigeria	68	Lower-middle-income/oil exporter
United States	66	High-income/major emitter
Saudi Arabia	63	High-income/oil exporter
Russia	51	Upper-middle-income/fossil exporter
World median (77 countries)	72	

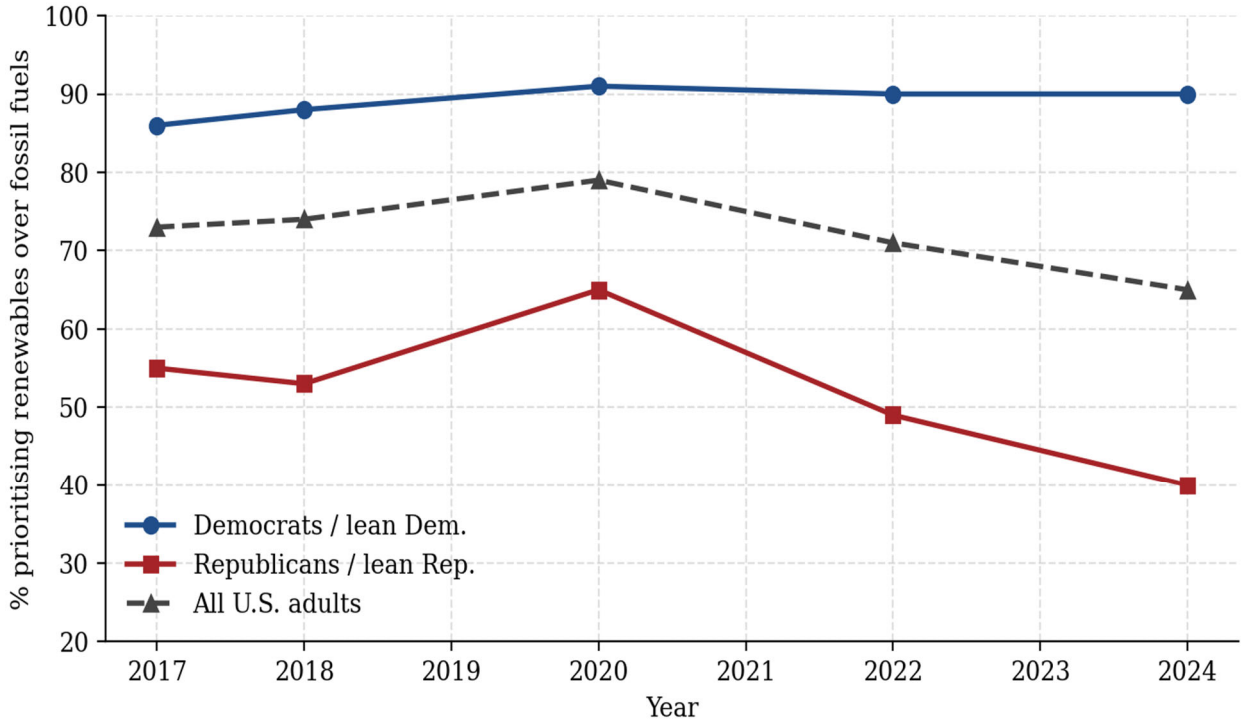

Figure 4. U.S. public priority on developing renewable energy over fossil fuels by partisan identification, 2017–2024. The partisan gap expanded from 26 percentage points in May 2020 to 49 percentage points by June 2024, driven almost entirely by declining support among Republican identifiers. Source: Pew Research Center [18], Yale Climate Opinion Mapping [52].

Table 5. Selected results from Special Eurobarometer 555 (April–May 2024, n = 26,415, EU-27). Source: European Commission, DG Energy [12]. Items refer to the percentage of respondents agreeing with the statement.

Statement	% EU Agreeing
The EU should invest massively in renewables (wind, solar, etc.)	85
Improving energy efficiency in buildings, transport and goods will reduce dependence on external producers	82
Reducing oil and gas imports and investing in renewables is important for security	81
The EU should reduce its dependence on Russian energy sources as soon as possible	82
New renewable energy technologies will positively affect our way of life in the next 20 years	87
Top three concrete measures preferred (multiple answer): (a) help energy-poor households	53
(b) reduce overall energy consumption	50
(c) promote self-production and consumption of renewables	50

5. Drivers and Determinants of Public Acceptance

Why do some publics and some segments within a public hold more positive attitudes toward renewable energy than others? The empirical literature has converged, with a reasonable degree of consensus, on five families of predictors. We discuss each in turn and summarise the meta-evidence in Table 6.

Table 6. Predictors of renewable energy acceptance: direction, robustness, and key supporting studies. "+" = positive predictor; "−" = negative predictor; "~" = weak/context dependent.

Predictor	Direction	Robustness	Key Supporting Studies
Income	+	High	Sundt & Rehdanz [37], Ma et al. [38]
Education	+	High	Soon & Ahmad [36], Ma et al. [38], ESS R10 [20]
Age	−	Medium	Ma et al. [38], Sundt & Rehdanz [37]
Female gender	+ (climate concern)	Medium–High	Pew 19-country [19], ESS R10 [20]
Left political orientation	+	High (US/UK), Medium (EU)	Pew [18], ESS R10 [20], DESNZ [14]
Climate change concern	+	Very High	Ipsos [17], Peoples' Climate Vote [13], ESS [20]
Institutional trust	+	Very High	Cohen et al. [39], Liebe et al. [41], Berkeley Lab [22]
Perceived procedural fairness	+	Very High	Wolsink [35], Devine-Wright [8], Petrova [34]
Direct experience (positive)	+	Medium	Hoen et al. [45], Rand & Hoen [11]
Place attachment threatened	−	High	Devine-Wright [8,44], Batel et al. [33]
Distance from installation (greater)	~ (weak)	Low	Hoen et al. [45], Rand & Hoen [11]

Socio-demographics: Age, income, education, and gender are the strongest socio-demographic predictors of supportive attitudes [37,38,57]. Across meta-analyses of willingness to pay for green electricity—Sundt and Rehdanz (29 studies, 13 countries), Ma and colleagues (50 studies, 22 countries), and Soon and Ahmad (44 studies)—higher income and higher educational attainment consistently raise both attitudinal support and willingness to pay [36–38]. The age effect is generally negative. Older respondents express slightly

lower willingness to pay, but absolute support remains high in all age bands [38]. The gender gradient is the most consistent of the demographic findings. In Pew's 19-country sample, women are more likely than men to describe climate change as a major threat in 12 of the 19 countries, with the gap reaching 16 percentage points in Sweden [19]. ESS Round 10 finds female and more educated respondents systematically more worried about climate change [20].

Political orientation and ideology: Political identification is now one of the strongest single predictors of renewable energy attitudes in many high-income democracies. Pew documents a 49-percentage-point partisan gap on U.S. renewables prioritisation [18]. YouGov and ESS data on continental European samples show a left–right gradient that is consistently statistically significant, though usually smaller in magnitude than the U.S. case [20,21]. The relationship between conservatism and lower renewable support is, however, neither inevitable nor symmetric. In the United Kingdom, where the DESNZ tracker decomposes by self-reported party identification, support exceeds 80% in all major party groupings, with the smallest gap (about 8 percentage points) between Labour and Conservative voters [14]. The British case suggests that party elite messaging—rather than ideology per se—is the proximate driver of the U.S.-style gap.

Environmental and climate concern: Climate change concern is a powerful and well-replicated predictor of supportive attitudes. The Ipsos People and Climate Change Report 2024, covering 32 countries, finds that 74% of respondents express concern about climate impacts in their country, with the highest shares (above 80%) in the Philippines, Türkiye, Mexico, Brazil, and India, and the lowest in the Netherlands and Sweden [17]. ESS Round 10 reports a small but statistically significant increase in the belief that collective energy-use limitation could effectively reduce climate change, from 5.51 (ESS8, 2016) to 5.92 (ESS10, 2021) on the 0–10 scale [20]. The People's Climate Vote 2024 records that 53% of respondents worldwide are more worried about climate change now than they were one year earlier [13]. The mechanism is well established: concern raises both attitudinal support and behavioural intention, mediated by perceived efficiency of action [20,57].

Trust in institutions and developers: Trust is the single most consequential moderator at the community acceptance level and is also a significant determinant of national-level support. Reviews by Cohen and colleagues, Liebe and colleagues, and the recent Berkeley Lab developer surveys all converge on the finding that perceived procedural injustice and low institutional trust—not ecological concern—are the primary drivers of organised local opposition to renewable energy projects [22,39,41]. The Berkeley Lab developer survey reports that community members consistently express higher trust in non-profit and university-based experts than in government sources, and that around 65% of solar developers and 55% of wind developers are spending more on community opposition mitigation than five years ago [22].

Direct experience and information exposure: Direct experience with operating installations has a small positive effect on attitudes in most studies. The dominant finding from Hoen and colleagues' nationally representative U.S. survey of 1705 wind project neighbours is that positive attitudes toward local turbines outweigh negative attitudes by a 7:1 ratio, with the within−0.8 km band retaining a similar ratio [45]. Yet, experience is mediated by what people hear about turbines: hearing wind turbines is associated with less positive attitudes, while seeing turbines is not [45]. Information quality and balance matter. The provision of high-quality information through familiar channels (e.g., family or trusted local intermediaries) has been shown to increase positive attitudes toward offshore wind [58]. By contrast, exposure to oppositional or conspiratorial framings has been shown to depress support. Table 7 summarises the principal willingness-to-pay meta-analyses,

and Figure 5 visualises the cross-national relationship between renewable electricity share and public support.

Table 7. Willingness-to-pay (WTP) for renewable electricity: results from peer-reviewed meta-analyses. Values are reported as the original meta-analysis presents them; conversion to a common currency is not advised, given different reference years. The 2024 update reported in the final row is taken from the meta-analysis of Wang, Wu and Zhou [59].

Meta-Analysis	Studies (*n*)	Countries	Pooled WTP (Mean/Median)	Key Moderators
Sundt & Rehdanz (2015) [37]	29	13	USD ≈ 7.16/ household/month (mean)	Income (+), survey method, hydropower discount
Ma et al. (2015) [38]	50	22	Strong income and education effects; age (−)	Income, environmental concern, age
Soon & Ahmad (2015) [36]	44	23	WTP positive in the majority of studies; large method effects	Contingent valuation > choice experiment in raw WTP
Wang, Wu & Zhou (2024) [59]	244 effect sizes from 134 studies	28	Scope-insensitive once RE share exceeds ≈12%	Renewable penetration, baseline electricity price

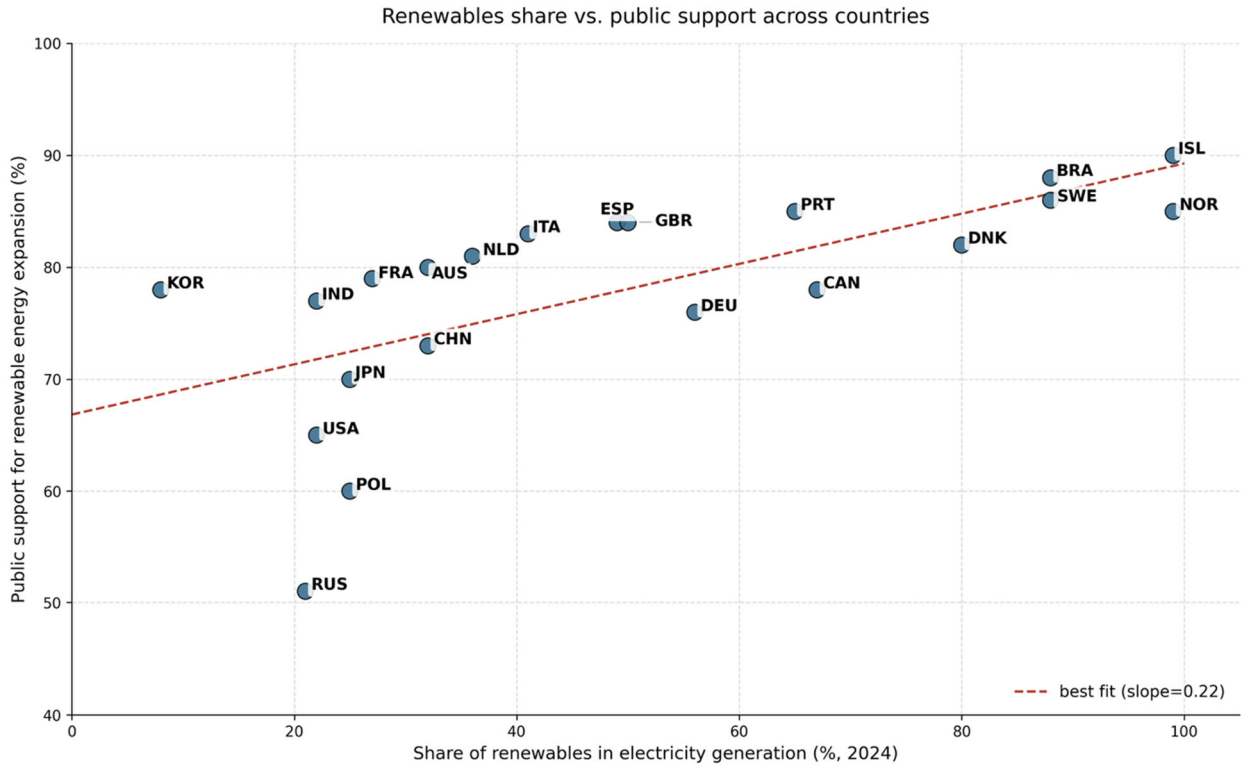

Figure 5. Renewable share of electricity generation in 2024 plotted against public support for renewable energy expansion across the 21-country panel. The fit line has a positive slope (≈0.20 percentage points of support per percentage point of renewable share), confirming a moderate positive relationship; residual dispersion is substantial and is largely explained by political–economy factors rather than physical or technological constraints. Sources: renewable share from IRENA [4] and Eurostat [48], public support from sources listed in Table 2.

6. Community Acceptance and the "Social Gap"

If the headline national support is typically 70–90%, but local consent rates for specific projects are far lower, where does the difference go? Bell, Gray, and Haggett, in a much-cited 2005 paper later updated by Bell, Gray, Haggett, and Swaffield, give the most useful analytical name to the puzzle: the "social gap" between high national approval for wind power and a much lower success rate in planning applications [9,10]. Approximately 80% of the British public supports wind energy, but historically, only around one-quarter of contracted wind capacity has been commissioned, and a large share of proposed projects face planning rejection [9]. The same gap appears in many other countries. It is now formally recognised in the IEA's Renewables 2024 outlook as one of the main constraints on faster deployment [3].

The simplest explanation—pure NIMBYism—has, since the early 2010s, been the consensus loser in this literature. Wolsink's analysis of survey data argues that opposition is not principally driven by selfish backyard motives but by perceived violations of equity and fairness [35]. Devine-Wright's place attachment framework reframes opposition as "place-protective action" undertaken by people whose attachment to a particular landscape is threatened by a perceived externally imposed change [8,44]. Petrova's VESPA framework reorganises community concerns into four categories—visual/landscape, environmental, socioeconomic, and procedural—and identifies process-related concerns as the most reliable predictor of organised opposition [34]. Aitken adds the caution that researchers should not assume opposition is irrational simply because it is non-instrumental [32]. Bell, Gray, and Haggett themselves identify three substantive mechanisms behind the social gap—a "democratic deficit" in planning institutions, the qualified nature of survey support ("I support wind, but. . ."), and a residual minority of genuine NIMBY responses—and argue that the deficit and the qualified support mechanism together explain most of the gap [9,10].

The most comprehensive empirical test of community acceptance to date is the U.S. National Survey of Attitudes of Wind Power Project Neighbors led by Hoen, Firestone, Rand, and colleagues. The survey, conducted in 2018 with 1705 nationally representative residents living within 8 km of a wind power facility, finds that positive attitudes outweigh negative attitudes by a 7:1 ratio overall, with a similar ratio holding even for residents within 0.8 km of the nearest turbine [45]. The within 0.8 km result is striking because it is at odds with the dominant assumption in the popular discourse that proximity necessarily breeds opposition. The strongest empirical correlates of less-positive attitudes are not distance, sight, or even socio-demographics but rather (i) audibility of the turbines, (ii) perceived unfairness of the planning process, and (iii) perceived poor fit between the turbines and the landscape [45]. Rand and Hoen's 30-year synthesis of North American wind acceptance research reaches a parallel conclusion. Support is high, opposition is concentrated among the audibly affected, and procedural fairness consistently emerges as the single most powerful predictor [11]. Figure 6 visualises the joint effect of distance and perceived procedural fairness on positive attitudes, drawing on the Hoen–Rand pattern.

Place attachment runs in two directions, a point that is often missed in popular accounts. In Devine-Wright's tidal energy case study, residents with strong attachment to their place were more, not less, supportive of a tidal stream installation that they perceived as compatible with the maritime identity of their locality [44]. In subsequent work, the same authors have shown that the direction of the place attachment effect depends on whether the proposed change is read as a threat or as an enhancement of valued place identities [8]. This implies that developers and planners cannot treat place attachment as an exogenous obstacle to overcome. Rather, the project's framing must be made congruent with local place meanings.

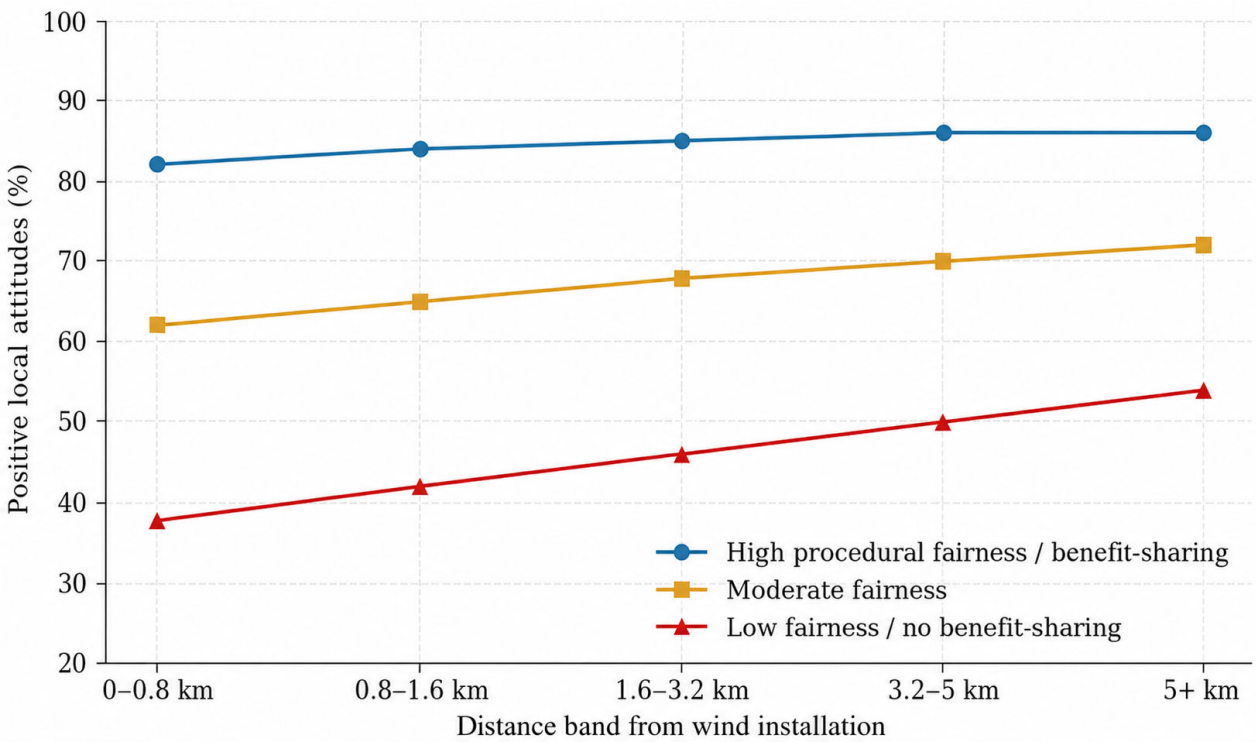

Figure 6. Local acceptance of wind power as a function of distance band and perceived procedural fairness/benefit-sharing arrangements. The shape of the curves illustrates a robust finding from the U.S. National Survey of Wind Power Project Neighbours and the wider North American synthesis. Distance alone is a weak predictor of local attitudes; perceived fairness and benefit-sharing are substantially stronger and largely flatten the distance gradient. Curves stylised from Hoen et al. [45] and Rand & Hoen [11].

Procedural and distributive justice are now the workhorse explanatory variables in the community acceptance literature. The framework owes much to Sovacool and Dworkin, who systematised the four energy justice tenets (distributive, procedural, recognition, cosmopolitan) into a unified analytical lens [26]. Wolsink had earlier argued that the most important explanatory variable for wind power acceptance is not visual impact but equity, especially the perception that the distribution of costs and benefits between project owners and host communities is fair [35]. Liebe and colleagues' choice experiment in Germany shows that respondents are willing to accept turbines closer to their dwelling if residents receive a share of the benefits and if the consultation process is judged inclusive [41]. Knauf's work on financial participation schemes in Germany concludes that monetary compensation alone is not a substitute for procedural inclusion: "can't buy me acceptance" is the title and the message [25].

Three particular interventions emerge from this literature as having the most reliable evidence base for raising community acceptance. First, community ownership and financial participation: Denmark's wind cooperative tradition and the Middelgrunden offshore facility are the canonical examples [25,49,60]. Walker's analysis of the role of "community" in carbon governance argues that community-owned arrangements simultaneously raise procedural acceptance and create durable political coalitions for further deployment [60]. Krohn and Damborg's foundational survey of Danish public attitudes documents a strong correlation between cooperative ownership and supportive attitudes [54]. Walker and Devine-Wright's framework formalises this as a contrast between community-led (greater perceived legitimacy) and developer-led (more often contested) projects [49]. Second, transparent and inclusive planning, including early consultation, full disclosure of impact studies, and accessible appeals processes: Firestone and colleagues' work on offshore wind

siting in the U.S. Northeast finds that trust and process fairness are stronger predictors than benefit sharing alone [23]. The comparative experience of the Netherlands' offshore wind value chain, documented by van der Loos and colleagues, shows that early integration of local industrial and labour stakeholders into the value chain also raises acceptance [61]. Australia's first generation of large-scale wind projects, analysed by Gross under a justice and community fairness framework, illustrates the same point in a different planning system [62]. Third, place-sensitive siting—choosing sites that are compatible with valued landscape and identity meanings—and using participatory landscape planning to mitigate impacts in the design stage [8,63,64]: Nadin, Vincent, Dominic Stead, Marcin Dąbrowski, and Ana Maria Fernandez-Maldonado's framework of three principles for systemic spatial planning—territorial integration, multi-actor coordination, and procedural transparency—offers a practical synthesis of how to operationalise place-sensitive siting in administrative practice [64].

Table 8 summarises a representative set of studies of community-level acceptance, grouped by intervention category. Table 9 records the four major drivers of local opposition identified across studies. Table 10 reports the renewable share of electricity by country in 2024 as a contextual reference for the cross-national comparison.

Table 8. Representative empirical studies of community acceptance interventions for wind and solar projects. ↑ = positive effect on acceptance; ↓ = negative effect; ↔ = no significant effect.

Intervention	Empirical Effect on Acceptance	Representative Studies
Community/cooperative ownership	↑ (large)	Krohn & Damborg [54], Walker & Devine-Wright [49], Knauf [25], IEA Denmark policy [49]
Financial benefit sharing only	↑ (modest)	Walker et al. [50], Liebe et al. [41]
Procedural fairness/early consultation	↑ (large)	Firestone et al. [23], Wolsink [35], Liebe et al. [41], Susskind et al. [22]
Information provision (balanced)	↑ (modest)	Hoen et al. [45], Sütterlin & Siegrist [42], family/social-nudge studies [58]
Increased physical distance from dwellings	↔ (weak/inconsistent)	Hoen et al. [45], Rand & Hoen [11]
Place-sensitive siting/landscape design	↑	Devine-Wright [8,44], McKenna et al. [63]
Visual mitigation (lower turbines, screening)	↑ (modest, technology-dependent)	McKenna et al. [63], Walker et al. [50]
Top–down imposition/weak consultation	↓ (large)	Petrova [34], Aitken [32], Susskind et al. [22]

Table 9. Four leading sources of organised local opposition to renewable energy projects, with frequency of citation in the literature. Source: synthesis based on Susskind et al. [22], Petrova [34], Wolsink [35], Batel et al. [33], Hoen et al. [45] and Devine-Wright [8].

Source of Opposition	Empirical Frequency	Indicative Quotation/Finding
Perceived procedural injustice (weak consultation, opaque decisions, distant institutions)	Very high	"Decisions are taken elsewhere, by distant institutions or private developers"—Susskind et al. [22]
Place attachment threatened/landscape identity	High	Place-protective action rather than NIMBYism—Devine-Wright [8]
Distributive concerns (benefits flow out, costs stay local)	High	Equity rather than backyard motives—Wolsink [35]
Misinformation and risk amplification	Moderate-rising	Local Opposition: Misinformation and Controversy Perspectives [22]

Table 10. Share of renewables in electricity generation, 2024, for the 21-country panel. Sources: IRENA Renewable Capacity Statistics [4], Eurostat Renewable Energy Statistics [48], Ember Global Electricity Review.

Country	RE Share of Electricity 2024 (%)	Dominant RE Source
Norway	≈99	Hydropower
Iceland	≈100	Hydropower and geothermal
Brazil	≈88	Hydropower and wind
Sweden	≈88	Hydropower and wind
Denmark	≈80	Wind
Canada	≈67	Hydropower
Portugal	≈65	Wind and solar
Germany	≈56	Wind and solar
United Kingdom	≈50	Wind
Spain	≈49	Wind and solar
Italy	≈41	Hydropower and solar
Netherlands	≈36	Wind and solar
Australia	≈32	Solar and wind
China	≈32	Hydropower and wind
France	≈27	Hydropower (large nuclear share dominates)
Japan	≈25	Solar and hydropower
Poland	≈25	Wind and biomass
United States	≈22	Wind and solar
India	≈22	Hydropower and solar
Russia	≈21	Hydropower
South Korea	≈8	Solar

7. Policy Implications and Pathways for Improved Acceptance

The evidence assembled in the preceding sections supports five practical conclusions for governments, regulators, and developers. First, headline public support is genuinely high and broadly stable across most countries. The binding constraint on the speed of deployment is community acceptance and the institutions through which it is generated [3,13]. Policy must therefore prioritise the processes by which specific projects are sited, owned, and benefit-shared, rather than relying on continued growth in headline national support.

Second, the most reliable instrument for raising community acceptance is the combination of early and inclusive participation with meaningful financial co-ownership. The Danish wind cooperative tradition is the strongest historical example. By 2001, over 100,000 households participated in wind cooperatives that owned 86% of installed wind capacity, with documented spillovers into national support [49,54]. Germany's introduction of feed-in tariffs together with its Bürgerenergie cooperative model has played a comparable role [25,49]. The recent literature on financial participation, however, also raises a clear caution. Monetary compensation alone is not a substitute for procedural inclusion, and benefit funds attached to opaque planning processes generate cynicism rather than support [25,41].

Third, distance regulations and visual impact mitigation have at best modest effects on acceptance once procedural fairness is held constant. Hoen and colleagues' nationally representative U.S. survey finds that residents within 0.8 km of an operating turbine exhibit the same 7:1 positive-to-negative ratio as those farther away, provided that the process by which the project was sited was perceived as fair [45]. The implication is not that visual and acoustic impacts can be ignored, but that they should be addressed as elements of a procedurally just planning process rather than as substitutes for it [34,35].

Fourth, the technology-specific acceptance ordering (Figure 3) should inform deployment sequencing where there is a policy choice, because different technologies trigger different acceptance mechanisms. Rooftop and utility-scale solar enjoy the highest headline acceptance and the lowest community resistance, and can be deployed at scale with comparatively light procedural machinery [14,15,42]. Offshore wind, while strongly supported in headline polls, can meet resistance from coastal communities, fishers, and tourism interests; here, the binding mechanism is recognition and distributive justice for marine users, which early engagement and well-designed community benefit agreements substantially mitigate [23,50]. Onshore wind is the most demanding case and turns primarily on procedural and distributive fairness; so, it requires the fullest participation and benefit-sharing machinery [11,25,35]. Transmission infrastructure, although rarely polled, tends to attract opposition rooted in place attachment and the perception that costs are local while benefits are national, and so calls for place-sensitive routing and explicit local compensation [22,64]. Large hydropower, biomass, and carbon capture face lower headline acceptance and warrant a transparent, case-by-case assessment of trade-offs.

Fifth, the rising salience of misinformation and partisan polarisation—most visibly in the United States, but also in the United Kingdom and parts of central Europe—warrants explicit policy attention [18,22]. Yale Climate Opinion Mapping and Pew both find that question framing materially shifts apparent support: in the United States, 75% of Americans support "generating renewable energy on public land", a result that holds across every U.S. county, including in strongly Republican areas, even as support for "prioritising renewables over fossil fuels" has fallen [18,52]. The implication is that energy policy communication should be framed around shared concerns—energy security, local economic benefits, electricity affordability—rather than around climate change alone, particularly in jurisdictions where the latter is now politically polarised.

Finally, the international comparison points to a structural asymmetry that deserves more analytical attention. High-renewable-share countries (Norway, Iceland, Sweden, Denmark, Brazil) tend to have both high public support and well-developed institutions for community participation [48,49]. Low-renewable-share countries with high public support (India, China, Australia, the United Kingdom) face a different set of constraints—mainly grid, permitting, and capacity—that are amenable to administrative reform [3,13]. Low-renewable-share countries with eroded or polarised support (the United States, parts of Eastern Europe) face the hardest challenge: rebuilding the socio-political dimension of acceptance while also moving on community-level institutions [18,52]. Each pattern requires a different policy emphasis.

Table 11 makes the logic of this architecture explicit by mapping each instrument to the dimension of acceptance and the body of evidence it primarily addresses. Early and inclusive participation and procedural transparency operate on the procedural justice mechanism that the wind acceptance literature identifies as decisive [23,34,35]; benefit sharing and community or cooperative ownership operate on distributive justice and, through ownership, on market acceptance [25,41,49,54]; place-sensitive siting and landscape design address place attachment and recognition justice [8,44,64]; and credible information, together with the countering of misinformation, operates on institutional trust and risk

perception, which condition both the socio-political and community dimensions [22,42,45]. Reading the five elements in this way clarifies that they are not interchangeable: each is matched to a different failure mode of acceptance, and a programme that supplies money but not procedural inclusion, or information but not benefit sharing, should not be expected to work.

Table 11. Five-element policy architecture for translating headline support into delivered renewable capacity. Each element is mapped to the dimension of the acceptance framework it most directly addresses. Sources: as indicated in the rightmost column.

Policy Element	Concrete Instruments	Acceptance Dimension Primarily Addressed	Evidence Base
1. Early and inclusive public participation	Statutory pre-application consultation; citizen juries; public hearings; planning charrettes	Community + socio-political	Wolsink [35]; Petrova [34]; Firestone et al. [23]
2. Distributive justice through benefit sharing	Local community benefit funds; reduced electricity tariffs in host communities; revenue sharing with municipalities	Community	Liebe et al. [41]; Walker et al. [50]; Knauf [25]
3. Community/cooperative ownership	Cooperative schemes; municipal partnerships; mandatory financial participation share	Community + market	Krohn & Damborg [54]; IEA Denmark policy [49]; Walker & Devine-Wright [49]
4. Place-sensitive siting and landscape design	Multi-criteria spatial planning; visual impact assessment; agrivoltaics on agricultural land	Community	Devine-Wright [8]; McKenna et al. [63]
5. Credible information and countering misinformation	Independent technical reviews; balanced media coverage; trusted intermediaries	Socio-political + community	Hoen et al. [45]; Sütterlin & Siegrist [42]; Susskind et al. [22]

8. Discussion

Three findings from the synthesis deserve particular emphasis. First, the cross-national evidence as of 2024 is unambiguous: a clear majority of citizens in 62 of 77 countries surveyed by the UNDP/Oxford Peoples' Climate Vote, and 85% of the 26,415 respondents to Special Eurobarometer 555, want their governments to expand renewable energy and reduce dependence on fossil fuels [12,13]. The popular framing of renewable energy as politically contested at the mass level is largely a function of partisan polarisation in a small number of high-income democracies, most prominently the United States, where the partisan gap on prioritising renewables has expanded from 26 to 49 percentage points between 2020 and 2024 [18]. Outside this politically polarised subset, support is high, stable, and—for technologies such as rooftop and utility-scale solar—markedly higher than for almost any other major infrastructure category [14,15,42].

Second, the so-called "social gap" between national approval and local consent is real but, in the contexts where it has been studied most closely, is driven by procedural and distributive injustice rather than by selfish backyard motives [9,10,34,35]. The U.S. National Survey of Wind Project Neighbors shows that residents within 0.8 km of

an operating turbine display the same 7:1 positive-to-negative ratio as residents further away, and that hearing the turbines—rather than seeing them or living near them—is the strongest experiential predictor of negative attitudes [45]. On this evidence, distance regulation is a relatively weak instrument for raising community acceptance, while procedural fairness, place-sensitive siting, and meaningful financial co-ownership are substantially stronger [34,35,41]. We would caution, though, that the strength of this pattern varies across technologies and national planning systems: it is best established for onshore wind in North America and Northern Europe, and the comparative evidence for solar farms, transmission lines, and large hydropower—and for the Global South more generally—remains thinner.

Third, technology-specific acceptance follows a broadly consistent international ordering that has implications for deployment sequencing, even if it is a general tendency rather than a strict ranking. Rooftop solar tends to enjoy the highest acceptance, followed by utility-scale solar, offshore wind, onshore wind, geothermal, hydropower, and biomass, with carbon capture and storage and nuclear at the bottom [42,53–56]. The ordering recurs across surveys conducted in the United Kingdom, Germany, Australia, Switzerland, and Portugal [14–16,42,55,56], though with country-level exceptions and against a backdrop of non-identical survey instruments. Sütterlin and Siegrist's experimental work locates one likely mechanism in the "positive imagery" of solar power, which differentiates it from other renewable technologies in the public mind [42].

These findings have implications that travel beyond the energy sector. They suggest, first, that decarbonisation is not the political loser it is sometimes portrayed as in coverage of energy policy: large majorities are willing to support a quick transition, even in major fossil fuel economies such as China, India, and Brazil [13]. Second, the polarisation evident in the United States is more a function of partisan elite signalling than of underlying mass-level resistance, as the framing experiments of Yale Climate Opinion Mapping suggest [52]. Third, the conventional Western development assumption—that low-income and emerging economies will accept higher pollution in exchange for faster growth—is contradicted by the People's Climate Vote evidence and by national surveys in India, Brazil, and South Africa [13,17].

Recent bibliometric evidence adds context to this interpretation. Kaur and Sharma's review frames climate change mitigation as a sustainable development agenda that depends on coordinated policy action, environmental protection measures, and public participation [65]. This supports the article's emphasis on acceptance as an institutional and behavioural condition for deployment, not only as a general attitude.

Central European evidence points in the same direction. Hungarian research on renewable energy acceptance identifies a gap between broad societal support and individual-level commitment, which is closely aligned with the social gap argument developed above [66]. EU-level modelling also shows that renewable energy transition is shaped by economic and environmental drivers that differ across member states [67]. On the demand side, Hungarian urban electricity consumption patterns confirm that household behaviour and local context matter for market acceptance and planning [68]. Consumer acceptance of sustainable business models further depends on functional benefits, habits, and general attitudes, which parallels the acceptance mechanisms identified for renewable technologies [69]. Finally, evidence on on-farm renewable energy systems links deployment to rural economic, environmental, and social conditions, extending the community acceptance discussion beyond urban and utility-scale settings [70,71].

At the same time, the synthesis points to important areas of remaining empirical uncertainty; we discuss three. The role of misinformation and conspiracy framing in eroding local support is rising in salience but is empirically less well characterised than fairness or place attachment effects [22]. The literature on community acceptance is heavily dominated

by wind energy; the comparative empirical evidence on solar farms, transmission infrastructure, hydrogen production, biomass, and battery storage is much thinner and warrants targeted future research [7,63]. Comparative evidence from the Global South, particularly Sub-Saharan Africa, is improving but remains thin relative to its policy importance. Surveys typically report that renewable energy adoption propensity is positively associated with urban residence, education, and gender, but the underlying social acceptance mechanisms are less well mapped than in the high-income literature [1,72].

9. Limitations and Future Research

Four limitations of this synthesis deserve transparent acknowledgement. First, the underlying survey instruments are not perfectly comparable: Eurobarometer asks about EU-level investment in renewables, the UNDP Peoples' Climate Vote about a national "quick transition", and DESNZ about general support for the use of renewables. Cross-national point estimates should be read as approximate. Second, the country panel of 21 is structured to capture diversity rather than to be statistically representative of the global population; the median values reported should be interpreted as panel medians, not world medians. Third, the coverage of technologies remains skewed toward wind and solar. Acceptance dynamics for emerging technologies—floating offshore wind, green hydrogen, large-scale battery storage, agrivoltaics, marine renewables—are less well documented and should be a priority for the next wave of empirical research [7,63]. Fourth, this paper synthesises existing evidence rather than collecting new survey data; future research that fields a harmonised cross-national instrument modelled on the Eurobarometer 555 questionnaire, but extended to non-EU countries, would substantially improve comparability.

10. Conclusions

Public support for renewable energy is, by the standards of contemporary politics, unusually durable. Across the countries examined here, the dominant pattern is a clear public majority that wants governments to expand renewable energy and reduce dependence on fossil fuels. Rather than restate the headline numbers reported above, the synthesis draws a sharper conclusion from them: the popular image of renewable energy as a contested mass-level issue reflects elite partisan signalling in a small set of high-income democracies far more than any broad erosion of public support [18].

What is genuinely contested is community-level consent for specific installations. The much-discussed "social gap" between high national approval and far lower local-planning success does not represent collective hypocrisy or backyard selfishness; it reflects legitimate concerns about procedural fairness, distributive justice, and threats to place identity, set against often weak community engagement institutions [9,10,34,35]. The interventions that the evidence most strongly supports—early and inclusive participation, distributive justice through benefit sharing, community ownership, place-sensitive siting, and credible information—are the same five elements that an institutional reading of the Wüstenhagen framework would predict to matter on the community dimension [6].

If the synthesis points to a single overarching implication, it is that the renewable energy transition will be won or lost less at the level of national headline opinion—where the argument has largely been settled in favour of expansion—than in the procedural and distributive details of how specific projects are planned, sited, owned, and shared with host communities. These procedural, distributive, and institutional conditions—how decisions are made, how costs and benefits are shared, and how market and legal systems adapt to accommodate distributed and community-owned generation—are properly the domain of social acceptance, which extends well beyond the public attitudes measured in this article [28,30]. Our cross-national findings on public acceptance should therefore be

read as a partial signal that points toward this broader agenda rather than as a measure of it. The countries that have built the strongest institutions for that task are, not coincidentally, among those with the highest renewable shares and the most durable public support [48,49]. Two caveats temper this reading and define the agenda for further work: the survey instruments synthesised here are only approximately comparable, and the community acceptance evidence remains concentrated on onshore wind in high-income settings. Extending harmonised, cross-national measurement to emerging technologies and to the Global South is, in our view, the most valuable next step—but the central message stands: the transition is politically possible, provided the institutions through which community consent is generated are themselves reformed.

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