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The Politics of Market Change towards Sustainability: Revisiting Germany's Policy Support Framework for Renewables

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Abstract: Legislative efforts for renewables-based energy decarbonisation hinge upon the support and commitment from different stakeholders holding often conflicting positions regarding disruptive processes of socio-technical transformation. However, the evolving acceptance of market actors on the policy-driven promotion of renewables over time remains under-scrutinised. Simultaneously, despite growing attention to power and politics in sustainability transitions, limited efforts remain invested for elucidating the political-economic nature of the market-based selection environments they are operationalised through, highlighting the need for a more systematic comprehension of the "politics of selection". To address these shortcomings, this paper provides a more refined understanding of the role of policy-driven markets and its participating agents in facilitating/hindering innovation diffusion and broader (system-wide) sustainability transitions. To do so, it showcases a longitudinal case study of the politics underlying Germany's evolving feed-in policy support framework for orchestrating a market-mediated diffusion of renewables (1980s–2020). Based on policy analysis and semi-structured interviews, the study traces the changing acceptance and ensuing strategic (re)actions of market actors to the emergence and evolution of Germany's market for electricity from renewable energy sources. Results show how different market participants effectively shape the selection environments they operate in by proactively contesting/deluding the design features of the support policies organising their economised relations (e.g., market entry conditions, exchange rules, remuneration levels, pricing schemes, etc.). Such efforts are undertaken through legal means and market framing strategies targeting the affordability of policy support costs, coupled with the strategic use of policy instrumentation as a vehicle to further expand/retain their market shares to the detriment of competing actors.

Keywords: market politics; policy acceptance; market-shaping; renewable energy; energy transition; actor diversity; selection environment

Citation: Pons-Seres de Brauwer, C. The Politics of Market Change towards Sustainability: Revisiting Germany's Policy Support Framework for Renewables. *Energies* **2022**, *15*, 3898. https://doi.org/10.3390/en15113898

Academic Editor: David Mares

Received: 6 May 2022
Accepted: 23 May 2022
Published: 25 May 2022

1. Introduction

Policymaking efforts for decarbonising national energy systems will require the sustained support, commitment, and ensuing participation (i.e., acceptance) from a wide range of actors holding disparate—and, more often than not, conflicting—positions with respect to disruptive processes of socio-technical system transformation [1–3]. This is particularly the case given the projected increase in renewable power capacity required to realise increasingly ambitious climate and energy targets [4,5]. A key driver of renewables-based energy decarbonisation has revolved around the deployment of policy support frameworks for incentivising a greater uptake of renewable energy investments and, in doing so, institute a market for electricity generated from renewable energy sources (RES-E market) [6].

Within a European context, Germany is exemplary of how "substantial support policies have effectively been pushing RES into the electricity market" [7] (p. 150). Its experience is illustrative of how the development and growth of a country's RES-E market is tied to

that of the policies and instruments that it relies upon for its formation and steering [8]. However, the success of the country's feed-in policies for promoting renewables has triggered increasing opposition from electricity market incumbents (i.e., conventional energy utilities) against their continued use while advocating for policy alternatives better aligned with their corporate interests and market positions [9–12]. Their changing attitudes and ensuing responses towards different RES support policies highlights how policy acceptance is an irreducibly political endeavour, with shifts in the relative acceptance of different market actor groups empirically instantiating the evolving contestations, disputes, and conflicts underlying the legitimacy of the policy-driven yet market-mediated promotion of renewables.

Yet despite growing attention to power and politics in sustainability-oriented socio-technical transitions [13,14], limited efforts remain invested to elucidate the inherent political-economic nature of the market-based processes they are operationalised through [15]. In this respect, the sustainability transitions literature has yet to challenge its apolitical and value-free treatment of markets, contributing instead a more systematic understanding of the "politics of selection" [16,17]. This requires a more thorough evaluation of what (and why) different policy support mechanisms work and others do not [18], which consecutively demands a more elaborate appreciation of the various strategies pursued by market participants to challenge, alter, and/or disrupt (i.e., shape) the policy-driven (re)configuration of the selection environments they operate in for orchestrating change in structures of energy production and supply [19,20]. A greater scrutiny of these contentious market-shaping practices would in turn contribute a response to recent calls for examining the role of markets and their participating agents in facilitating, expediting, and/or hindering policy-driven energy system transformation towards sustainability [21].

Against this backdrop, this paper revisits Germany's transition towards a renewables-based electricity system to examine—by means of a longitudinal case study—the politics of policy-driven market reconfiguration processes purposively enacted to realise sustainability objectives. To do so, a review of recent market-shaping literature with political analyses of markets is first conducted to then outline an analytical framework—foregrounded on a sociological perspective of markets—for tracing changes in the "acceptance positions" (e.g., opposition, concern, reluctance, indifference, dismissal, consent, support, etc.) of market actors in relation to the country's evolving feed-in policy support framework for orchestrating a market-mediated diffusion of renewables. This calls for an explicit focus on RES policy support instrumentation "insofar as the increase in [renewable power] capacity and investments has been driven by active policies to this end" [22] (p. 121). Such seems to be the case in Germany, whose RES-E market emerged and developed due to the prolonged use of feed-in policy instruments for supporting the market diffusion of what once were functionally promising yet commercially vulnerable (i.e., market immature) socio-technical innovations such as wind and solar power [23–27]. Therefore, elucidating the politics underlying the emergence and evolution of Germany's RES-E market inevitably entails a necessary examination of the changes undergone by the very same feed-in policies that enabled its constitution, organised its configuration, and steered its development in the first place.

To this aim, this study addresses the question of how have different market actors contested and influenced the evolution of Germany's feed-in policy support framework for RES-E generation: to what extent have their vested interests been reflected in the (re)formulation of feed-in policy support instrumentation, and how have such market-shaping efforts affected different market participants' capabilities to partake in the RES-E market? The analysis uncovers how different market actors effectively shape the selection environments they operate in by legally contesting, framing, and misusing the very same policies organising their economised relations and, by extension, steering the actor's configuration of the RES-E market. It shows how such efforts are undertaken through legal disputes against specific policy design features, coupled with the use of discursive strategies elevating their cost-effectiveness and challenging their affordability while downplaying

their socio-ecological benefits. Ultimately, the prevailing use of market-shaping practices, if left unchecked or unaccounted for in the design of RES policy support frameworks, might eventually skew RES-E market participation in favour of a reduced number of large market players with greater financial and operational endowments to operate in selection environments with the overriding concern of economic efficiency. Policymaking efforts for renewables-based energy decarbonisation should therefore assess the net socio-ecological welfare outcome resulting from the relative benefits of economic efficiency along with the environmental effectiveness and distributive impacts of RES policy support instrumentation, reflecting a more balanced application of efficiency, pace, and quality considerations in a policy-driven yet market-mediated energy transition.

Following this introduction, Section 2 reviews the market-shaping and -politics literature informing a policy-centric analytical framework for examining the politics of sustainability-oriented market change. Section 3 describes the methodological approach adopted. Section 4 analyses a longitudinal case study of Germany's RES-E market, consisting of a stage-wise chronological account of the changes undergone by its feed-in policy support framework from the 1980s to 2020. Building on the identified changes in policy support instrumentation, Section 5 discusses a number of insights cutting across market politics, sustainability transitions, and policy acceptance. Section 6 concludes, outlining limitations and suggestions for future research.

2. Politics of Market Change towards Sustainability

2.1. Market-Shaping: A Process of Changing Economised Relations across Value Networks

A sociological perspective of markets departs from simplistic notions of "the market" as one single, naturally given structure of efficient resource allocation dis-embedded from society [28,29]. Instead, it elaborates a more empirically sophisticated appreciation of "markets" as malleable socio-technical configurations organising economised relations across networks of value creation and exchange [30–32]. Such relations are established between a heterogeneity of market agents with different interests and resources across the value network. They include market participants like producers, suppliers, traders, retailers, and consumers, yet also comprise other actor groups holding a stake in the market (i.e. concerned with the correct functioning of its institutional and functional architecture, its performance, its outcomes, etc.) such as policymakers and regulators, industrial lobbyists, consumer associations, financiers, etc.

Appraising markets as socio-technical configurations embraces the co-existence of market actors alongside different material "actants" such as technologies, discourses, policies, etc. [33]. In light of actors' respective attempts to orchestrate market interaction, these material actants or "market devices" are articulated and deployed in order to perform certain market-shaping functions towards specific objectives [34]. As such, rather than being (mis)understood simply as reactive entities adapting to changes in a selection environment that they cannot influence or modify, firms and other market actors are instead conceived as proactive agents shaping multiple selection features of market environments in order to (re)organise patterns of economised relations that advance their interests [17,35–37].

"Market-shaping" is thus understood as purposively-enacted strategies through which economised relations for value creation and exchange are organised, contested and subverted, and reorchestrated in light of differing—and potentially conflicting—interests. In that respect, a more granular attention to the reiterative re-composition of market-shaping devices provides the opportunity to empirically explore purposive change of socio-technical market configurations towards sustainability [38,39]. Understanding such a process therefore stands as a prerequisite to assess the relative performance of market-shaping efforts to induce socio-technical change towards more sustainable value networks of economised relations—or markets in transition.

2.2. "Market-Shaping" Policy Devices

A sociological perspective of markets in transition directs the analytical enquiry to the articulation of strategic interests into market-shaping devices deployed in order to induce or steer economised relations (i.e., market interactions) that fulfil specific sustainability objectives [39,40]. These do not usually emerge naturally from incumbent market practices, but instead tend to be articulated by policy instruments from other market shapers (i.e., policymakers, regulatory agencies) in order to induce societally desirable market interactions that would otherwise not occur without their introduction [17,32,41,42]. Sustainability-oriented markets therefore tend to be policy-driven markets: markets purposefully designed and steered by state authorities to realise sustainability goals such as renewables-based energy decarbonisation [39,40,43–45].

Policy-driven markets for sustainability have been articulated through multiple different market-shaping policy devices such as "production quotas" for more sustainable fisheries management in Norway [46], "certification schemes" for organically-grown coffee in Uganda [39], "carbon credits" traded across global greenhouse gas (GHG) offset markets [47,48], or "environmental standards" for sustainable biofuel production in the European Union (EU) [49]. Approaching Germany's evolving feed-in policy support framework for renewables as a chain of changing market-shaping policy devices therefore provides a resourceful means to scrutinise the process by which sustainability-oriented economic policy/legislation (e.g., StrEG, EEG) is articulated by concrete support instrumentation (e.g., feed-in-tariffs, market premia, auctions) aimed at shaping market (inter)actions (e.g., increased RES investments) towards the realisation of societally desirable climate and environmental goals (e.g., GHG emission reductions).

Scrutinising this process of articulation requires an empirically rich description of markets to elucidate *how* the combination of institutional arrangements and discursive frames are assembled into market-shaping policy devices to orchestrate sustainability-oriented market change, as well as *who* partakes in such assemblage [50]. Highlighting the "how" and "who" brings issues of power and politics in the (re)configuration process of market-based selection environments to the forefront of the empirical enquiry [35,51]: who is capable or allowed to participate in or influence the assemblage of the market-shaping policy device and who is not; and therefore, whose interests are better reflected in the (re)configuration of the market and whose are not?

2.3. Market Politics

Policy-driven markets for sustainability are not exempt from political contestations [52]. Typically, these are brought forward by those market participants whose dominant position is threatened by the reconfiguration of current market arrangements [42,45]. Incumbents therefore have a strong incentive to politically mobilise to maintain the legal-regulatory framework upholding the established market configuration and impede its replacement with less favourable alternatives [51,53]. Market incumbency thus contributes to locked-in and path-dependant socio-technical configurations displaying a certain market inertia that is difficult to overcome [54–57].

Yet the same can be expected from other market participants (e.g., newcomers) who operate in unfavourable selection environments, as they may have an equally strong motivation to collectively influence policymaking efforts to replace the current legal-regulatory framework with the objective to unlock the market's incumbent-dominated configurational set up [42,51,58,59]. A political analysis of markets thus moves past the legally sanctioned practices of market participants (e.g., cost-reductions through scale economies, creative marketing campaigns, product diversification strategies, etc.) to uncover the contentiousness of market-based selection environments instantiated across different market-shaping actions.

Examples are plentiful and include, for instance, wholesale market traders benefitting a few large grain producers by setting minimum "production quotas" too high for small farmers to meet and access government procurement schemes in India (*market gatekeeping*) [60]; Japanese firms overtaking incumbent consumer electronics manufacturers in the

UK through strategic greenfield investments exploiting government "investment subsidies" for industrial development (*market usurpation*) [61]; auction participants colluding to secure themselves winning bids (and exclude competing bidders failing to cooperate) from telecommunication "auctions" in Europe, (*market co-optation*) [62]; European and US coalitions of solar PV panel manufacturers lobbying policymakers to impose "anti-dumping tariffs" on panel imports from Chinese competitors (i.e., *market protection*) [63,64]; or incumbent electric utilities shaping public opinion against a nuclear power "phase out scheme" in order to align Swiss voters' policy preferences with their corporate interests (*market framing*) [65].

Such instances shed light on the pervasiveness of contentious market-shaping practices exercised by market participants in their respective attempts to secure control over market opportunities and advantages claimed by competitors [51,66], a process that [67] defined as *social closure*. As such, they reflect the inherently political nature of selection environments as spaces of controversy, dispute, and conflict populated by market actors purposively steering the market's legal-regulatory framework in their attempts to extract and retain *influence rents*: the capture of unearned marginal value by re-designing and/or perverting the "rules of the game" to one's favour and the detriment of others [51,68].

To this end, these practices illustrate the strategic (mis)use of market-shaping policy devices as a means to enable/constrain the capacities of other actors to partake in economised relations and, by extension, re-configure the constellation of market participants. In doing so, market-shaping policy devices originally assembled for the market-mediated realisation of politically determined sustainability objectives (e.g., decarbonised energy supply) are effectively repurposed to operate as *tools of inclusion/exclusion* determining the ability of different actors to participate in the market. Success in undertaking such efforts leads to the reproduction of asymmetric power relations between market participants with unequal material, financial, and operational endowments to shape the selection environments they operate in [51,69].

Given the inherently political nature of market selection environments, and in the context of policy-driven market change for sustainability, a political appraisal of the emergence and evolution of Germany's RES-E market directs the analytical exercise towards (a) the contentious market-shaping practices of gatekeeping, usurpation, co-optation, protection, framing, etc., undertaken by different market actors operationalised through (b) the strategic contestation, (mis)use and re-configuration of the feed-in policy support framework's various design features (e.g., eligibility criteria, allocation mechanism, valuation method, remuneration levels, pricing scheme, duration, degression rates, etc.) with the objective to (c) include/exclude competitors from RES-E market participation (closure) and retain influence rents (e.g., market shares).

3. Methodology

3.1. Research Design

The emergence and evolution of Germany's RES-E market is appraised from the situational perspective of the feed-in policy support framework itself. Doing so enables to reposition the analytical standpoint from an "outsider" onlooker to an "insider" observer [70,71], affording a singular positional view from where to trace market actors' changing "acceptance positions" as reflected in their market-shaping practices with respect to the policy-driven (re)configuration of market selection environments. From this singular standpoint, an in-depth case study is carried out of Germany's changing feed-in policy support framework for orchestrating a market-mediated diffusion of renewable energy technologies (RETs). The analysis encompasses the period between the late 1980s until 2020.

The research reported herein therefore consists of a longitudinal case study, a recurrently employed research design in the sustainability transitions literature, yet less extended across its market-shaping and acceptance counterparts [72–74]. This has prompted recent calls for conducting multilevel, longitudinal accounts within both groups of literature [75–77]. A longitudinal research design seems a suitable candidate for this case in point, as it allows

to qualitatively unravel and sequence complex phenomena unfolding over time within a given context [78–80]. As such, it offers a particularly supportive means to elaborate the process character of sustainability-oriented market evolution, as it favours empirically rich illustrations of policy-driven market-change dynamics unfolding across different stages along a chronological process [73,81]. Adopting a processual perspective on market change therefore facilitates the identification of long-term market-shaping processes while helping to recognise the evolutionary character of markets as both complex and dynamic socio-political constructs [73,82,83].

3.2. Case Selection

Germany has been repeatedly depicted as representative of Europe's governance approach for addressing its grand societal challenges such as the Eurozone crisis, EU-Ukraine-Russia relations, or the climate crisis [84]. On the latter, Germany has often been catalogued as a "frontrunner" and a "leader" in its efforts to mitigate climate change [85–87]. Germany's "transition" efforts in decarbonising its energy system based on the mass-scale diffusion of renewables therefore lends itself as a suitable case with generalisable potential informing other parliamentary democracies with a market-based economy and robust industrial base in need of drastic decarbonisation measures. This is particularly the case for those 26 countries with which it shares a common climate and energy governance structure overseen by the European Commission (EC).

The choice for examining the German experience thus follows an "information-oriented" selection logic of a "typical" case study, where the aim is to maximise the utility of information from a single case of strategic relevance in its representability of the phenomena under scrutiny [88,89]. Given the process-character of the longitudinal research design, the selection logic is further driven by the choice of a "pathway" case study useful for elucidating causal chains when tracing empirical processes over time [88].

3.3. Data Collection and Analysis

Multiple data sources were drawn upon to build the richness of data required for elaborating a detailed descriptive account of the case under examination [90]. Data collection started with the retrieval of secondary data sources. These consisted of, first, a number of historical studies on the various legislative developments unfolding across differing time periods. These studies consisted of academic literature as well as policy reports. They were identified through a keyword search in journal databases, followed by a snowball sampling procedure whereby relevant references in the consulted texts were taken for further review [91]. Additional secondary material was collected in the form of legal documentation (e.g., EU directives, national laws, parliamentary proceedings), white papers and roadmaps, market reports, and industry position papers, as well as quantitative data on various variables (e.g., investment flows, ownership structures, subsidy volumes, electricity prices, installed capacities, etc.). Data retrieval was conducted via online legal archives, EU/national statistical databases, and media and corporate repositories. With this, the various legislative developments, events, diffusion trends and milestones, as well as the market-shaping actors involved, were chronologically mapped and arranged into a linear progression of delineated timelines unfolding in parallel.

Secondary sources were complemented with primary data obtained from 19 semi-structured interviews with different energy industry associations, policymakers and regulatory agencies, electricity market participants, and expert market analysists/consultants (Table 1). The first round of interviews was conducted between March-December 2020 followed by a second round in March 2022. Interviews lasted about one hour. They were all conducted online, audio-recorded, and transcribed. The transcription exercise enabled an initial analysis of the interview data, which was then further organised according to the delineated timelines previously constructed, and further catalogued according to the contentious market-shaping practices identified in the literature review. The ensuing analysis enabled to deepen some of the most salient policy events, conditions, and measures

identified during the initial longitudinal appraisal. The collection and analysis of the interview data therefore served to corroborate, contest, nuance, expand, and/or discard the empirical material previously obtained, which deepened the exploratory character of the analytical exercise.

Table 1. Categorisation list of informants interviewed for the study, along with the number of interviews conducted for each category.

Informant *	Category	No Interviews
Renewable energy association	RES Association	2
Energy industry association	E-Association	1
Citizen energy association	C-Association	2
Policymaker, regulatory body, public agency	Government	4
Energy utility company	Utility	2
RES operator/developer	Independent power producer (IPP)	3
Energy cooperative	Cooperative	2
Energy market analyst/consultant	Consultant	3

* Interviews are cited using the category of informant and a number (e.g., Government 1).

From this, a detailed historical plotline was elaborated in chronological order. Analytical attention was invested in richly describing key RES policy support scheme developments and exploring their coupling with the various market-shaping actions undertaken by market participants with a vested interest in their assemblage and steering, enabling a context-bound examination of evolving market ↔ policy ↔ society interactions.

4. Longitudinal Case Study

4.1. Market Gatekeeping through "Voluntary" Compensation Schemes as Tools of Market Exclusion—Pre-1990

Before 1990, Germany lacked a nationwide (i.e., federal) regulation of RES-E compensation. Market access for renewables was not high up in the political agenda. Rather, privately negotiated arrangements were considered a sufficient means to organise the relationship between RES-E generation and grid access within the prevailing monopolistic organisation of the electricity market. RES-E could only be fed into the grid via "Voluntary Association Agreements" (VAAs), non-binding compensation frameworks subscribed on a voluntary basis between RES producers and energy utilities—in their role as grid operators [92]. Since the utilities owned both the electricity grid and the large nuclear/coal power units under vertically-integrated regional monopolies, they held a dominant position in the negotiation of the compensation regime for RES-E, enabling them to control entry to the electricity market (RES Association 1). Market gatekeeping was therefore the predominant closure strategy to retain influence rents from the prevailing monopolistic organisation of the electricity market. This was reflected in the method used to remunerate RES-E, which was based solely on the utilities' avoided generation costs [93].

The "avoided cost" principle for RES-E valuation resulted in very low payment rates insufficient for full cost recovery. For instance, the VAA between the Association of Bavarian Hydropower Plants and the regional grid operator established a remuneration of about EUR 0.4 ct/kWh for electricity generated by small and medium-sized hydropower plants, "less than what the electricity companies had to spend on their own electricity" [94] (para. 4). Similarly, the remuneration offered by a large utility company for a citizen's wind turbine consisted of no more than EUR 0.1 ct/kWh, while simultaneously charging EUR 0.14 ct/kWh for grid access [95]. Since VAAs were not strictly binding for either stakeholder, but just a recommendation, energy utilities could arbitrarily obstruct or entirely refuse RES-E fed into the grid by independent competitors (Consultant 1) [96]. Market incumbents therefore employed VAAs as tools for market exclusion to prevent newcomers from partaking in the electricity market. "The utilities were free to accept or not to accept, and this became a burden to upcoming renewable energy producers" (RES Association 1).

Inevitably, RES operators—mostly consisting of farmers and individual citizens—were effectively displaced towards the margins of an electricity market locked into the incumbency of a fossil/nuclear energy monopoly.

VAAs thus codified a patchwork of discriminatory relationships between electricity market incumbents (energy utilities) and newcomers (RES operators), with the latter facing significant risks due to unreliable investment conditions (i.e., undercompensation, non-guaranteed and overcharged grid access) and limited regulatory oversight. Not surprisingly, RES-E was rarely fed into the grid but mostly used for private consumption (Consultant 1). Its contribution to the electricity generation mix remained marginal throughout the 1980s. By 1990, it accounted for just 3.4% of gross electricity generation (Figure 1), with the majority (92%) coming from large hydropower plants owned by the utility companies [96,97]. Given the limited prospects of change stemming from such a stagnant market configuration, the introduction of a support scheme to promote renewables "seemed next to impossible" [98] (p. 10).

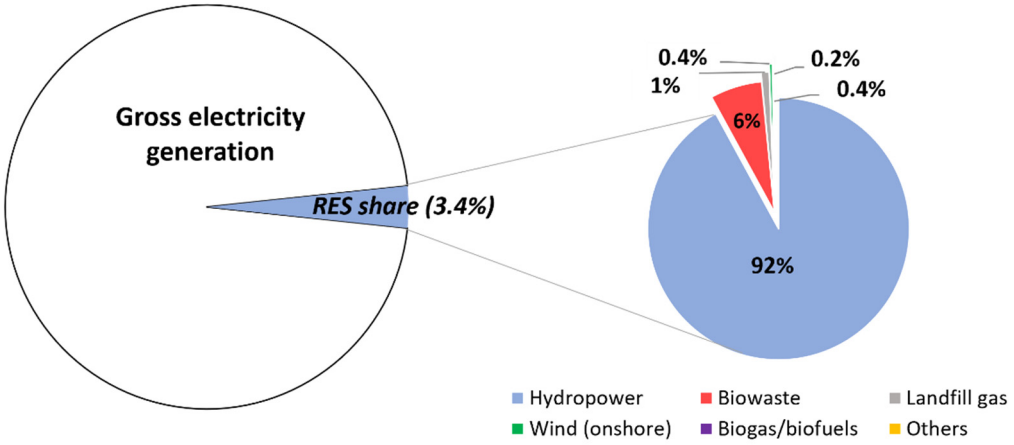

Figure 1. Shares of renewable power sources in gross electricity generation, 1990. Source: Own elaboration. Data from [97].

However, in 1989 the Ministry of Research launched a 15-year Research and Development programme to deploy 250 WM of wind power capacity [99]. To do so, it simulated a price-based remuneration scheme consisting of a supplement of EUR 4.10 ct/kWh added onto the negotiated tariff rate of EUR 4.4 ct/kWh, yielding a final remuneration of EUR 8.5 ct/kWh for wind-based electricity granted for 10 years [100]. Besides its core objective of monitoring the technical viability of wind power technology, the programme performed a perhaps less salient, yet crucial role as a "testing device" for assessing the performance of FiTs in orchestrating market interaction around RES-E. Their use "was legitimised by the need to gain practical experience with different [support] approaches under real-life conditions" [24] (p. 106), laying the groundwork for later-stage renewables' support schemes.

4.2. Inception of Renewables' Support in a Nascent RES-E Market—1990 to 1999

The Feed-in Act of 1991 (*Stromeinspeisungsgesetz*—StrEG) constituted Germany's first legally-binding regulatory framework to support renewables. The law framed RES support as a response to increasingly salient climate and energy concerns held across the German public [101]. "The main trigger for political action was definitely a societal push. There was a very strong anti-nuclear movement in Germany at that time due to the Chernobyl nuclear disaster [of 1986]" (RES Association 1). RES policy support was therefore built upon an increasingly concerned population for environmental and climate issues [24,27,102], rather than exclusively stemming from any demands by market newcomers (RES operators).

The EC initially accepted the law due to its small financial endowment and limited impact on electricity prices [103]. Its position was paired with the utilities' dismissal of a support scheme "likely to average less than 0.1% of [their annual] revenues" [104] (p. 4)

(Consultant 2), enabling them to retain the influence rents of a monopolistic energy system. The market incumbents thus echoed their parliamentary counterparts in downplaying the law as "a treat for the ecologically motivated" [94] (para. 8), claiming that renewables would never supply more than 4–6% of Germany's electricity demand and wind energy would be less than 1% (Government 1, RES Association 1, Consultant 2) [105,106].

Building on the "250 MW Wind" programme, the StrEG's support framework combined compulsory grid connection with preferential dispatch for RES-E. In doing so, it undermined the incumbents' closure strategy of market gatekeeping, as it effectively forced energy utilities to allow market entry for new participants (Consultant 1). Yet their efforts to limit market entry for newcomers remained relatively uninterrupted throughout the 1990s and 2000s, as they continued to deny grid access to independent RES operators on the basis of grid capacity constraints and ensuing blackout risks (Cooperative 1) [107].

The support framework further obliged utilities to remunerate RES operators for the electricity fed into their grid area at a fixed percentage of the annual average electricity price (e.g., 90% for wind/solar—Figure 2). Tariff rates were therefore pegged to the electricity price, and thus, indirectly linked to the utilities' avoided generation costs (Consultant 1) [108]. Importantly however, avoided external costs of EUR 3–5 ct/kWh from coal power were accounted for when setting the remuneration level [109]. Due to this monetary endowment, the compensation scheme restricted RES operators' exposure to the arbitrariness of energy utilities in the negotiation of a cost-recovering remuneration scheme for RES-E, and thus counterbalanced (yet did not overthrow) their dominant position in their economised relations with renewables' producers (IPP 1-2). By setting avoided external costs as the benchmark for calibrating remuneration levels, FiTs levelled the playing field between RES-E and conventional electricity producers, itself a declared objective of the StrEG [101].

The provisions on guaranteed grid access and purchase obligations effectively created a steady and (to a lesser extent) predictable demand for RES-E (IPP 1-2). Importantly, in accounting for the avoided external costs of conventional energy generation, the support framework established a differentiated market space that, thanks to an environmentally-reflective remuneration and preferential treatment for RES-E, organised market exchanges upon the basis of criteria differing from the prevailing economic ordering of the electricity market. Its emergence was furthered by explicitly restricting incumbents from partaking in it, as the eligibility criteria was purposefully articulated to exclude energy utilities from remuneration [101].

The combined performance of these design features triggered a notable increase in wind power capacity undertaken by a growing number of new market participants. These consisted mostly of community-based models of wind turbine ownership (Government 1, RES Association 1): in 1989, citizen-owned wind turbines numbered 221 across Germany, and by 2001, they had increased to 9359 [110,111]. Neither solar PV nor biomass experienced significant growth due to prohibitively high technology costs and remuneration levels too low to ensure cost-recovery despite "auxiliary" support such as the "1000 Rooftops" programme for solar PV) (Government 1). Virtually none of the wind power capacity installed during that decade was owned by the incumbent utilities [96].

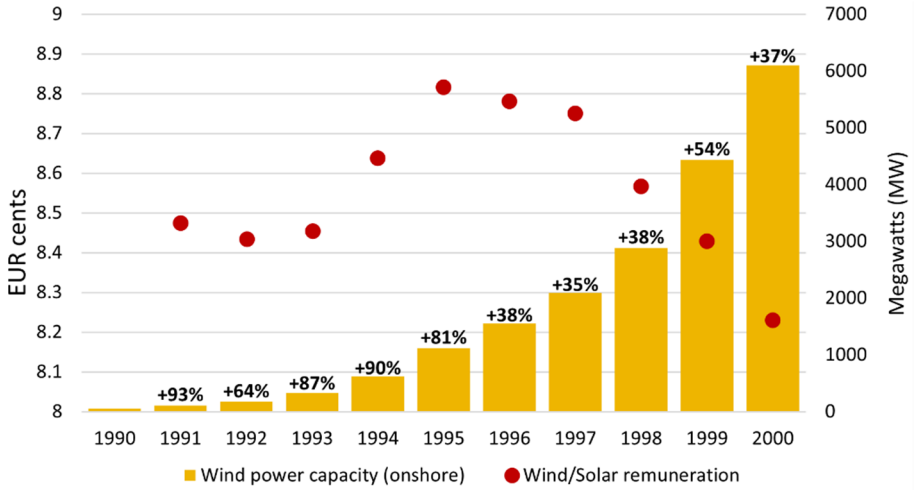

Figure 2. StrEG remuneration levels for wind and solar power (set at 90% of the average electricity price) along with the annual growth rate for onshore wind power capacity. Source: Own elaboration. Data from [24,97,112].

Yet the policy-driven diffusion of renewables did not unfold without the contestation of some market incumbents who saw their position potentially at risk by an increasingly actor-diverse market configuration (Government 1, RES Association 2). "From the utilities' point of view, this notion of independent power producers was a threat because that meant more players in the marketplace, and the utilities just didn't want their monopoly threatened" (RES Association 1). Their closure strategy of market gatekeeping progressively expanded to include legal contestation. Exemplary of such efforts was their judiciary actions taken at national and EU levels, based on the StrEG's discriminatory nature for lacking a burden-sharing mechanism to distribute remuneration costs equally across all end-users. Utilities operating grid areas with a higher RES-E penetration than others would have to accrue higher costs than their competing suppliers, resulting in a competition-impairing outcome incompatible with the EU Internal Electricity Market [113]. The core dispute targeted "the calculation of the minimum purchase price for electricity generated from wind" [114] (p. 6), which allegedly "inflated" the avoidable costs of conventional electricity generation by EUR 4.3 ct/kWh—the same cost value used in the "250 MW Wind" programme and within the value range employed in the StrEG to account for the external environmental costs of coal power. Arguably, if the remuneration level for wind energy remained unchanged—that is, if external environmental costs remained accounted for—there would be "a risk of overcompensation with the ensuing detrimental effects on competition" [114] (p. 6). The outcome of the incumbents' closure strategy by legal means yielded mixed results: the demands to lower the 90% purchase price for wind were side-lined by the government, who instead capped at 10% the amount RES-E utilities had to feed into the grid—effectively limiting the future growth of a nascent RES-E market.

Furthermore, the liberalisation of Germany's electricity market in 1998—while beneficial for new participants due to the opening up of a market monopoly to competition—meant that electricity prices were now determined in a competition-driven marketplace, which resulted in price reductions thereafter (Figure 2) (C-Association 1). Since tariff rates were pegged to retail electricity prices, the remuneration obtained by RES-E producers dropped along with the certainty of their revenues (Consultant 1) [115]. These were further eroded by the impossibility of confidently foreseeing RES-E demand, as the StrEG did not specify a duration of support but instead granted it on a yearly basis.

4.3. Emergence and Consolidation of a Competition-Exempt RES-E Market: Market Usurpation through FiTs as Tools of Market Inclusion—2000 to 2010

The StrEG's faulty design to address liberalisation-induced market changes and the energy utilities' closure strategy by legal means combined to undermine the emergence

of a still unstable RES-E market (mostly driven by wind power) now at risk of losing momentum. "A lot of wind investment feared bankruptcy or insolvency. So, we had big demonstrations demanding higher compensation" (Government 1). The government thus "had to act fast to restore a secure climate for investment [. . .] as more and more renewable energy investment projects were being shelved" [116] (p. 3). This regulatory uncertainty found its resolution in the Renewable Energy Sources Act of 2000 (*Erneuerbare Energien Gesetz*—EEG).

The EEG reflected the political resolve of a pro-renewables Red/Green government coalition rather than the sole outcome of a cohesive associative action from market newcomers to secure effective (i.e., sufficient) and sustained (i.e., predictable) remuneration (RES Association 1). Like their 1990 predecessors, policymakers leveraged widespread public support for climate action to orchestrate a pro-RE alliance backing FiT-based renewables' support (RES Association 1). "The basic motivation came from a societal demand, not from renewable businesses. [They] only begged for better wind power compensation, nothing else. They did not beg for photovoltaics, hydropower, or biogas. We had to organise it. We had to force companies to support FiTs for all technologies" (Government 1). Without actively pursuing it, market newcomers found in their legislative counterparts a cohort to avail themselves participation in a utility-dominant electricity marketplace.

The law encoded an ambitious remuneration scheme based on the full cost-range of RETs. It substituted the "avoided external costs" valuation benchmark and instead calibrated remuneration levels based on the specific cost structures of each technology. From 2000 onwards, RES-E valuation was performed via fixed FiTs operating independently from demand-driven electricity price developments, effectively shielding RES operators from the increased price volatility of a liberalised electricity market. Their use represented a paradigm shift in the operationalisation of Germany's support framework: FiTs guaranteed payment for every kWh of RES-E fed into the grid regardless of its actual market need (i.e., demand) for a total duration of 20 years (Utility 1, Government 2). The combined performance of these design features did not necessarily align Germany's RES-E market with a competition-based model of economised relations, but rather, bypassed it to enhance revenue certainty for RES operators, and in doing so, ensure the investability of renewables as a means to operationalise ambitious climate and environment goals demanding at least a 12.5% market share by decade's end (Utility 1, Government 2, IPP 1) [116].

Additional provisions were articulated to redress the faulty design features of discriminatory market access and cost-defective market exchange previously exposed by the incumbents' legal contestations against the StrEG. First, the eligibility criteria penalising energy utilities was replaced with an "actor neutral" scheme guaranteeing support for any RES operator. This provision equipped FiTs to perform as tools of market inclusion, since utility companies were now eligible for FiT-based remuneration. Since they were no longer excluded from the RES-E market, the incumbents lost one key point of contention in their closure strategy to delegitimise the support scheme upholding its emergence. As argued by Government 1, "when we exclude the big old utilities from receiving support, we have them every time as an enemy. We must allow them to make their business case with this law".

Second, to enhance positive market spillover (e.g., cost reductions through technological innovation), and later, to contain detrimental ones (e.g., windfall profits from overcompensation), the remuneration scheme incorporated scheduled tariff degressions (Consultant 1). This was complemented by a novel "equalisation scheme" distributing support costs equally across all electricity end-users through a levy on their electricity consumption. However, exemptions for energy-intensive industrial consumers were granted to maintain their competitiveness, a provision that would yield important spillover and trigger cost-containment efforts later on (Government 1–3, RES Association 1). By introducing a burden-sharing mechanism for "equitable" support costs distribution, the EEG rendered obsolete the 10% cap imposed on RES-E fed into the grid. Energy utilities burdened with higher RES-E shares were no longer disadvantaged with respect to their

competing suppliers, a second element which further weakened their legal manoeuvres against a "competition-impairing" allocation of support costs. Despite their opposition to FiT-based support due to its "exorbitant costs" [115], their closure strategy was ultimately derailed with a favourable court ruling on the legality of Germany's feed-in policy support framework [117]. Shortly afterwards, the EC dropped its objections against the EEG, assessing later that "FiT regimes are generally the most efficient and effective support schemes for promoting renewable electricity" [118] (p. 3). Market incumbents thus lost an important political lever for their closure efforts, as the EC's position with respect to RES policy support had traditionally favoured a tradeable renewable certificates scheme for orchestrating renewables' support [6].

This however did not undermine the incumbents' stronghold on the electricity market, as their remaining role in grid operation allowed them to maintain their market gatekeeping efforts to slow down the market diffusion of RETs. As explained by Cooperative 1, exemplary of such efforts were:

> *"Some utility companies [who] denied grid access for many high-capacity PV installations. Even though the [EEG] law says they must grant them access, they just didn't. They said 'yeah, file a lawsuit', and when they did the utilities won almost every case. Plus, many solar PV owners didn't have the time or money to pay for this, so instead they just built smaller installations. This aggressive behaviour tells you a lot about how they act, to bully out the small participants from the market".*

At the same time, larger utilities consolidated their market power by leveraging liberalisation reforms to buy out competitors and absorb their supply areas. Their market expansion strategy of fast and profitable "growth by acquisition" led to an actor consolidation resulting in an oligopolistic market configuration dominated by four large power companies—RWE, E.ON, EnBW and Vattenfall [9]. By 2004, the "Big 4" owned 82% of Germany's electrical power capacity, controlled the entire transmission infrastructure, and almost all distribution networks [92,119]. In 2009, they still accounted for 80% of Germany's total electrical capacity and generated 82% of the country's electricity [120]. On the other hand, between 2004–2010 they accounted for just 18% of the growth in biomass capacity, 2.7% in onshore wind, and 0% in solar PV and biogas [121]. By decade's end, they operated just 6.5% of the country's renewable power portfolio, mostly from large hydropower plants [121].

"The utility companies did not invest [in renewables] because of one thing: FiTs enabled annual returns of about 5–7%, and they had a thinking of 20% returns. It was too small a profit" (Government 1) [122]. Market incumbents thus forewent their participation in the RES-E market, giving it away to an increasing number of new market actors who seized the opportunity provided by long-term, fixed FiTs to secure a footing in RES-E generation (Figure 3) (Government 2, Consultant 1). In doing so, they began a process of market usurpation of an incumbent-dominated electricity generation base.

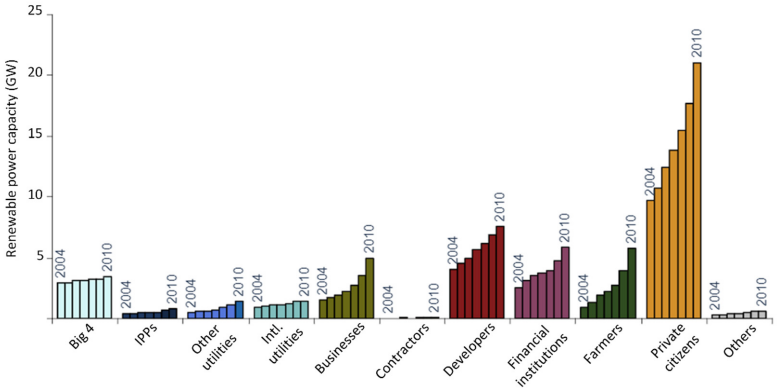

Figure 3. Evolution of the ownership structure of renewable power capacity in Germany between 2004–2010. Source: Adapted with permission from Ref. [121]. 2011, trend: research.

Between 2000–2010, wind power quadrupled its production, biomass electricity generation increased by a factor of 13, biogas by a factor of 35, and solar PV by a breath-taking factor of 195 [97]. The 2010 target of 12.5% market share was amply surpassed by 2007, reaching a 17% share by decade's end [97]. The prolonged use of FiTs throughout the 2000s therefore drove the emergence of an actor-diverse RES-E market configuration, itself spearheaded by a drastic increase in citizen-led developments via cooperative associations (Figure 4) (RES Association 2, C-Association 2) [123]. Germany's RES-E market became characterised by diversity in the generation base—both in terms of power capacity and actor configuration—and by concentration in its supply and distribution segments (RES Association 2).

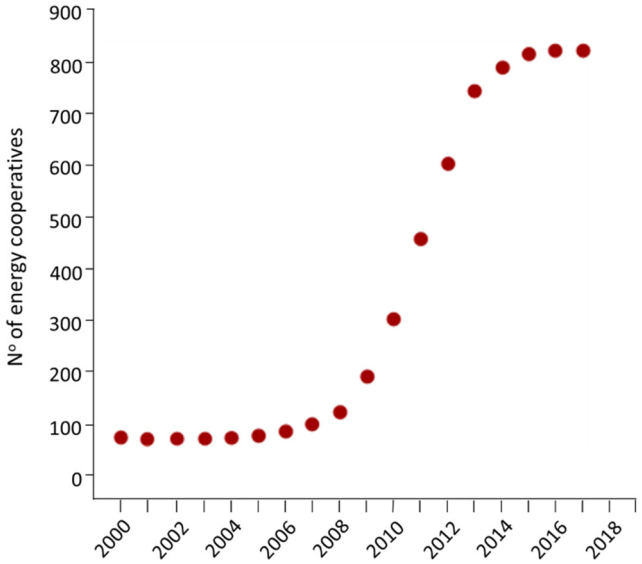

Figure 4. Evolution of the number of energy cooperatives in Germany between 2000–2017. Source: Adapted from [124].

Yet the emergence of a policy-dependent RES-E market did not occur without its challenges. By decade's end, climate action progressively ceased to play a dominant role in framing RES promotion while rising support costs became an increasingly salient concern dominating public and political debates over Germany's FiT-based support framework (Government 4) [125,126]. In effect, the expansion of renewables throughout the 2000s had been accompanied by a steady increase in the EEG levy for end-use electricity consumers—from EUR 0.2 ct/kWh in 2000 to EUR 3.5 ct/kWh in 2011 [127]. Simultaneously, RETs had undergone steady cost reductions during the same time period, rendering RES-E generation increasingly competitive in a competition-exempt RES-E market (Utility 1) [128].

Rapidly declining costs fuelled political concerns over windfall profits from overcompensation as well as from rising household electricity prices (Government 4) [129,130]. "At some point the government was over-subsidising RES installations with this feed-in regime" (Utility 1). "To some degree this is true because FiTs were quite high until 2012, so you could get easy returns. So yeah of course there was a profit-seeking motivation" (Cooperative 2). Market newcomers' early-day environmental idealism progressively gave way to rent-seeking pragmatism: instead of reacting to contain these detrimental market spillovers, they opted to retain their influence rents by demanding better remuneration conditions (IPP 1). Yet some of them adopted a more strategic stance and argued for tariff reductions for fear of legitimacy losses from rapidly increasing support costs [115]. As reflected by IPP 1:

> *"Around 2008–2009 there were a lot of claims to reduce FiTs. So many renewable energy associations, companies and so on came along asking politicians to not reduce them, but to increase them. Most of that to be honest was avarice. They just wanted even bigger*

> *margins, so they asked for higher and higher FiTs. What should have been implemented initially is a serious reduction of FiTs. Here is the one key mistake the renewable energy players made".*

4.4. Market Framing and Co-Optation: The Politicised Use of Support Costs and Auctions as Tools of Market Exclusion—2011 to 2020

Throughout the 2000s, the electricity regime had initiated a socio-technical reconfiguration process underpinned by (a) the emergence of a decentralised means for renewable electricity production, driven by (b) a diversified constellation of non-utility actors, and supported by (c) an actor-neutral remuneration scheme of long-term fixed FiTs that "had gained broad social acceptance as it included a wide range of actors—from single households to corporations" [25] (p. 37). By 2012, the distributed generation base of the RES-E market comprised 1.3 million generators, with 47% of RES capacity owned by citizens, 41.5% by small and medium-sized (SME) developers/operators and financial institutions, and 12.5% by utility companies [131,132]. "We had already over 20% renewables. This means the big utilities, their business on electricity production, was reduced by 20%" (Government 1). The market diffusion of RETs became a threat not only to their traditional business model but also to an increasingly obsolete paradigm of centralised electricity supply, a reality they both underestimated and were late to fully recognise (Government 1, IPP 2) [133–135]. Utility companies—who had traditionally held a dominant position in the electricity market—were being relegated to a position of market latecomers in the RES-E market. As noted by [136] (p. 20), "incumbents were about 10 years late [. . .] in substantially reacting to the government promotion of renewable energies".

At this stage, their closure strategy shifted once again, this time to slow down the pace of expansion of a rapidly growing RES-E market, secure greater control over the business opportunities stemming from it, and in doing so, counteract the market usurpation that RES operators were undertaking in their generation base (Incumbents' responses to Germany's *Energiewende* encompassed a wide range of actions including, e.g., disinvestments in energy supply/distribution, subsidy demands for conventional power units, litigation against nuclear phase-out policies, etc. These and other responses are outside the scope of this study, as they do not directly concern the generation base of the RES-E market nor the feed-in policy support framework upholding its diffusion. See [125,136] for a wider range of incumbent adaptive/reactive strategies beyond those concerning renewables). Although the establishment of renewables subsidiaries/divisions gave them an entry into the RES-E market, their large corporate structures were ill-conceived to profitably operate smaller scale, more modular and decentralised generation units (IPP 1). RWE's 2013 internal reports are exemplary of their operational challenges: "in a low-interest environment, it will not be possible to generate sufficient returns within this subsidised industry. Our cost of capital will not be competitive against funding from private and institutional equity investors" [137] (para. 3–4). Furthering this assessment, IPP 1 noted:

> *"Many large companies and utilities had too high fixed costs in their structures, they were not able to adapt to a small and medium sized, very dynamic market. So they needed to slow down the growth rate of renewables. Because under a pure FiT system only SMEs were being active and successful in the market. But they are larger, so they knew if they wanted to get into the market they needed a system where their size makes a difference, where they could make use of their assets, which are mainly scale and money. They wanted a system where the smaller companies were not able to compete, so many of them promoted a volume regulation".*

To do so, they collectively orchestrated a market framing strategy to steer the public and political debates towards the exorbitant costs of the current FiT-based model for renewables' support. Among other actions, "they paid for this initiative that made huge advertisements in each main station of the public transport system saying that the EEG levy is disastrous" (Figure 5) (Consultant 1). The campaign targeted prohibitive household energy costs to highlight the tension between energy affordability and a competition-exempt,

over-subsidised, and cost-deficient RES-E market (Government 1, RES Association 1, Consultant 1) [138]. In effect, the continued increase in the EEG levy for financing renewables' support costs was paired with a 72% rise in household electricity prices between 2000–2011 [139,140]. Failing to pacify this dichotomy could potentially trigger societal opposition against further RES expansion should the public perceive it as occurring at the expense of increasing energy costs (Consultant 1, E-Association 1). This was taken on as a key point of contention by the market incumbents to argue for the substitution of FiTs with a more market-oriented scheme to support renewables efficiently and within acceptable costs for the German population and the export-oriented industrial base (Government 1, E-Association 1). Both RES auctioning and tradeable renewable certificates were framed as the most competition-enabling, and therefore, the least market distortive policy devices (Utility 1, E-Association 1) [107,141–143].

The market framing strategy proved sufficiently salient for policymakers to reformulate what it characterised as an outdated feed-in policy support framework failing to upkeep with the dynamic growth of a competition-exempt RES-E market (IPP 2, Government 3) [141]. "The government felt huge pressure to change the [support] scheme because of this huge campaign from conventional power producers who saw their business model threatened" (Cooperative 2).

Figure 5. "With subsidies, the energy transformation will drown" (**left**) and "Put an end to the horror of electricity prices" (**right**). These print advertisements against over-subsidised renewables triggering rising electricity prices werepart of the 2012 public campaign, "Stop the EEG now!" Source: Reprinted with permission from Ref. [144]. 2012, Initiative Neue Soziale Marktwirtschaft (INSM).

Concurrently, the government started pursuing the market integration of RES-E through demand-driven generation and a market-guiding sales mechanism [145]. This became legally encoded in the 2012 and 2014 EEG amendments, which progressively substituted FiTs for a market-oriented model of renewables' support consisting of direct marketing and sliding feed-in premiums (FiPs) [146,147]. In doing so, the government expanded the end goal of the feed-in policy support framework from securing the investability of renewables as a means to operationalise climate and energy targets, to ensuring their marketability to operationalise increased cost-effectiveness—that is, sufficiently in-

centivising their market responsiveness to demand-based price signals so as to increase operating efficiency and, in doing so, induce cost reductions in RES support (Government 2, IPP 1, Consultant 1) [148]. This served as the first step towards the market integration of RES-E generation—from policy-driven to demand-driven renewables' diffusion (IPP 2).

Premium-based remuneration was shortly followed by the introduction of competitive tendering for allocating RES support. Auctions were first piloted for ground-mounted solar PV during 2015–2016 prior to their full-scale deployment for all RETs in 2017 [149,150]. Their use represented a (second) paradigm shift in the way renewables support had been operationalised thus far (RES Association 2, C-Association 2, Government 3). For the first time since the enactment of Germany's feed-in policy support framework for renewables in 1991, RES-E generation no longer had guaranteed—but conditional—remuneration contingent upon the relative cost-performance of RES developers/operators, who were now impelled to compete for the right to market their RES-E under a premium-based model of support. Auctioning was thus framed as the best-suited policy device to increase the cost-effectiveness of RES support: by repurposing remuneration as the object of competition, cost-reductions would be induced, and with it, a more efficient support allocation (Utility 1, Consultant 3) [151]—assuming there were sufficient "competitors" to enact such cost-reductions (IPP 2). Building upon this assumption, the government further characterised auctions as a policy device conceived to facilitate an actor-diverse participation by large RES operators alongside SMEs, energy cooperatives, and locally-embedded RES developers—ensuring strong social acceptance for RES expansion [151].

Contrary to such characterisation, the use of auctions favoured larger developers with stronger operational and financial means (i.e., larger project portfolios to spread risk) to place more cost-competitive bids (Consultant 3, IPP 1) [152–154]. On the downside, smaller players with more socially-innovative but risk-exposed business models—such as those instantiated by citizen-driven formats for RES-E generation—became increasingly penalised against the risks associated with having to compete for securing support (C-Association 2, Government 4, Consultant 3) [152,154]. In the first six pilot auctions for solar PV between 2015–2016, only 0.8% of bids were won by energy cooperatives, representing 0.2% of the installed capacity auctioned [155–160].

In light of such bleak outcomes, the 2017 EEG amendment introduced a differentiated set of design features to favour community energy initiatives partaking in onshore wind energy auctions. These included a 24-month extension for project realisation (from 30 to 54 months), halving the bid bond from EUR 30/kW to EUR 15/kW, no prior approval pursuant to the Federal Immission Control Act, and obtaining the highest winning bid [150]. However, a loosely formulated definition of "citizen energy companies" (CECs) enabled professional developers to easily qualify as CECs when in fact their operational structure and financial capital were not reflective of such a legal form (IPP 3, Utility 2, RES Association 2, Government 4) [161,162]. Some of them took advantage of this situation and placed predatory bids knowing that they would not cover their project realisation costs (IPP 2, Utility 2) [163]. This was not so much due to a miscalibration of development costs, but rather strategically pursued to crowd out competitors and retain influence rents. In doing so, they perverted the end-goal of auctions—from a cost-reducing policy device to a tool of market exclusion—to prevent competitors from their continued participation in the RES-E market. As explained by IPP 2:

> *"These special rules [for CECs] were a joke. All the costs that you would typically have before the auction, those related with the permits to build your installation, they were gone because you didn't have to show you were approved to participate. Basically, these rules allowed you to pay EUR 15/kW to participate in an auction of 1000 MW, so for just EUR 15 million a big player could come in and buy the entire German onshore wind power market. And this is actually what happened. Some companies took advantage of these conditions and placed unrealistically low bids of like EUR 3–4 ct/kWh to outcompete all others, and so they captured almost all the auctioned capacity. So at first sight it looks like an excellent result, you have many of these citizen initiatives participating in*

the auction and with record-low bid prices. But when you look into it you actually see that many of these citizen initiatives are in fact administered by only a few companies who won almost everything. They abused these special rules to outbid everyone, they basically bought themselves exclusive access to the market and kicked out everyone else. It is obvious that those who were successful in these first rounds [of 2017], they were not bidding to maximise their revenues, they were clearly bidding to maximise their market shares".

In response to this misuse, in 2018 the government abolished the special provisions for CECs and re-introduced stricter rules for all auction participation. This was followed by a progressive increase in support costs due to insufficient competition (i.e., undersubscribed auctions). "There was not enough people to compete, so everyone who participated in the auction got their remuneration guaranteed" (Government 4). "It was basically like a FiT. The goal of cost-efficiency was completely missed, plus all these citizen initiatives are now out of the market" (IPP 2). In effect, insufficient competition was coupled with a drastic drop in CEC participation (Figure 6) (Government 4) [164].

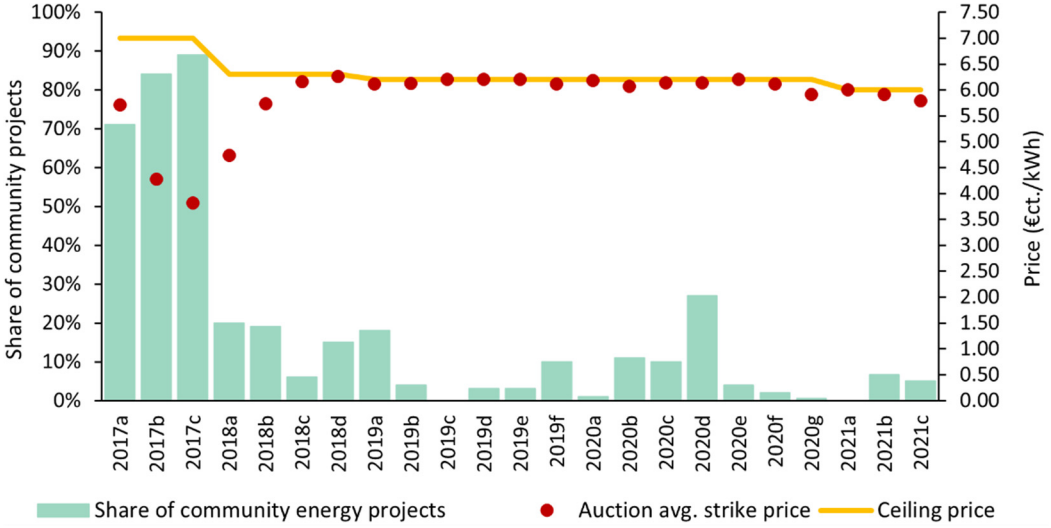

Figure 6. Share of capacity volumes submitted by community energy projects (green bars—%) compared with the evolution of average auction strike prices (red dots—EUR ct/kWh) and maximum allowed bidding (ceiling) prices (yellow line—EUR ct/kWh) for all completed onshore wind energy auction rounds conducted in Germany between 2017–2021. Source: Own elaboration. Data from [165].

Ironically, like the days prior to the StrEG's enactment, citizen-led RES developments—previously the main driving actor behind Germany's market diffusion of RETs—are yet again becoming displaced towards the margins of a RES-E market this time locked-into the imperatives of allocative efficiency and cost-effectiveness. With the continued use of auctions as the core policy device for allocating RES support, the configurational nature of Germany's RES-E market will likely further reduce its actor diversity, yielding fewer but larger players driving the market diffusion of RETs (IPP 3). As concluded by IPP 1:

"When renewables first took off in the early 2000s, we had hundreds of players, hundreds of developer companies. Then you see a consolidation process because smaller companies were no longer able to take the regulatory risk. This is just the wrong way around. Usually regulation should reduce risk. Instead we have regulation which increases risk and leads to an actor consolidation which is not healthy".

5. Discussion

Taking the German experience as a reference, the case study above illustrates that the emergence and evolution of a country's RES-E market is a highly contested process undertaken by market participants who perceive their dominant position in the marketplace

at risk of being usurped by competing participants. Given the policy-driven character of the country's market-mediated diffusion of RETs, such contestation has inevitably revolved around the legitimacy of the feed-in policy support framework for renewables.

First, the case analysis uncovers how the closure strategy of electricity market incumbents has recurrently targeted the "affordability" of the support framework, both through legal means and market framing actions. In both instances, the analysis shows how market incumbents have made a politicised use of support costs to dispute the economic efficiency of FiTs and accentuate their detrimental distributive impacts penalising household electricity consumers via prohibitively expensive electricity prices. The German case thus exemplifies how affordability and costs (along with their distribution) are predominantly viewed as the most influential drivers shaping policy acceptance in an energy transition context [166]. Importantly, the analysis reveals how such drivers are strategically leveraged through the targeted use of public discursive strategies to discredit certain market-shaping policy devices while justifying the need for alternatives [10,65]. This appears as a critical undertaking with potential market-shaping implications, since a core political driver for sustainability-oriented policy formulation revolves around the public's acceptance of its intended purpose and, most importantly, of its distributional impacts across the electoral voting base [167–169]. Steering the socio-political debate through discursive frames that (de)legitimise the value logic of different market-shaping policy devices (e.g., cost-deficient FiTs vs. cost-effective auctions) has therefore been a resourceful means for influencing their assemblage in the context of Germany's policy-driven RES-E market, where socio-economic concerns over policy-induced electricity price increases and energy use affordability have gained increasing relevance as key challenges undermining the political acceptance of FiT-based support [115,167,170,171].

Second, Germany's feed-in policy support framework has not only been the target of market participants' political contestations, but also the vehicle through which they have strategically steered the RES-E market configuration in the pursuit of their respective closure strategies and influence rent-seeking efforts. For instance, early VAAs empowered market incumbents (energy utilities) with a privileged role as market gatekeepers, who strategically repurposed the scheme as a tool for market exclusion to arbitrate market entry for non-utility participants. Consecutively, market newcomers (independent RES operators) found in FiTs the necessary vehicle to secure themselves market entry and initiate a market usurpation process for an incumbent-dominated electricity generation base, which they attempted to consolidate by demanding better support conditions via higher remuneration. Yet in a clear lack of strategic foresight, their influence rent-seeking efforts were pursued at a critical juncture overwhelmingly dominated by rising support costs and electricity prices, fuelling existing political concerns over the affordability of a FiT-based renewables' support framework. This was in turn strategically leveraged by market incumbents through the abovementioned market framing strategy, which contributed to the substitution of administratively-set FiTs for auction-allocated FiPs. It is in this latter shift, with the introduction of competitive tendering via auctioning, where the case analysis elucidates the clearest instantiation of a market co-optation strategy, where a market-shaping policy device originally assembled to increase cost-efficacy in support allocation is strategically repurposed as a tool for market exclusion by a small number of auction participants to grant themselves almost exclusive access to market opportunities derived from FiPs while undermining the ability of competing actors to further partake in the RES-E market.

In sum, Germany's electricity market transition illustrates how the strategic framing of a policy's affordability along with the perversion of its originally-intended purpose become powerful market-shaping resources to drive policy acceptance and influence market change in certain directions. The resulting transition pathways are therefore not neutral but deeply political, in the sense that they tend to benefit traditionally well-organised market actor groups with ample political bargaining power (e.g., utilities, large professional developers/IPPs, energy-intensive industrial consumers) while penalising those

ill-organised and with reduced political clout (e.g., citizen energy cooperatives, residential electricity consumers) [8,16,172]. As such, they reproduce (but can also disrupt) asymmetric power relations between market participants unequally endowed to shape the selection environments they operate in [51,69].

On this final note, the present paper attempts to contribute a reflection with respect to the relative endowments of market-shaping policy devices for determining different market actor capabilities to partake in economised relations that would otherwise not unfold naturally without their necessary introduction. The present case study shows how Germany's feed-in policy support framework for renewables has undergone a steady evolution from an environmentally effective policy device elevating the desirability of a RES-E market space in light of its socio-ecological superiority and actor diverse configuration; progressively giving way to a policy device with the overriding concern of competition inducing cost-effectiveness and allocative efficiency. Yet this should not entail a negative cognition of competition as a disruptive market dynamic as long as it effectively contributes to accelerating a socio-technical transition expeditiously enough so as to avoid the detrimental consequences of irreversible climate change. Net socio-ecological welfare outcomes must therefore reflect competition-inducing economic efficiency gains vis-à-vis foregone opportunity costs reflecting the *pace* and *quality* of a market-mediated energy transition, namely:

- Temporal scarcity (pace): pursuing economic efficiency is desirable insofar as it expedites the realisation of climate and energy objectives within an increasingly limited temporal horizon. As such, it must be addressed alongside temporal scarcity if policymakers are to make climate-smart decisions on the most environmentally effective policies to transition national energy systems towards carbon neutrality by mid-century [173,174]. What is the net socio-ecological welfare outcome of delivering a wind-generated kWh at EUR 4 ct if by doing so we forego the deployment of an additional 8 MW of renewable power capacity?
- Distributive impacts (quality): if the use of competition-inducing policies to efficiently allocate RES support is captured by a reduced number of larger market actors at the expense of a broader and more diverse number of smaller competitors, then the pre-condition of actor diversity necessary for the possibility of competition in the marketplace is foregone [175]. As a consequence, the intended economic benefits of competition-inducing efficiency are off-traded by RES support concentration and actor consolidation outcomes. Furthermore, if those market actors endowed with a comparatively stronger social capital (i.e., high community acceptance amongst local residents) [176–178] are also the most penalised by competition-inducing RES support allocation, then the policy objective of social acceptance delegated to auctioning is foregone, and the intended economic distributive effect of an actor-diverse RES-E marketplace is deluded.

In closing, this study calls upon increased reflexivity on: the relative weight that different market-shaping policy devices impose on the quality and pace of market-mediated sustainability transitions; how these are strategically steered by different market participants in their respective attempts to orchestrate certain market (inter)actions furthering their vested interests; and their ensuing impact on the ability of different market actors to participate in a policy-driven yet market-mediated transition towards a more sustainable socio-technical system of energy generation, supply, and use.

6. Conclusions

This study re-visits Germany's transition towards a renewables-based electricity system in order to examine—by means of a longitudinal case study—the politics of policy-driven market reconfiguration processes purposively enacted to realise sustainability objectives. The analytical framework outlined beforehand serves to guide the tracing of the market actors' changing "acceptance positions" (e.g., opposition, concern, reluctance, indifference, dismissal, consent, support, etc.) in relation to the country's evolving feed-in

policy support framework for orchestrating a market-mediated diffusion of RETs. This is particularly relevant for the German case, whose RES-E market emerged and developed due to the prolonged use of feed-in policy instrumentation, including FiTs, market premia and, more recently, auctioning.

The analysis uncovers how different market actors effectively shape the selection environments they operate in by legally contesting, framing, and misusing the very same policies organising their economised relations and, by extension, steering the actor's configuration of the RES-E market in line with their vested interests. It shows how such efforts are undertaken through legal disputes against specific policy design features, including remuneration levels, eligibility criteria, and pricing schemes. This is coupled with the use of discursive strategies elevating the cost-effectiveness of feed-in policies and challenging their affordability while downplaying their socio-ecological benefits, including social acceptance via citizen participation and climate mitigation via renewables-based energy decarbonisation.

Ultimately, the prevailing use of market-shaping practices, if left unchecked or unaccounted for in the design of RES policy support frameworks, might eventually skew RES-E market participation in favour of a reduced number of large market players with greater financial and operational endowments to operate in selection environments with an overriding concern for economic efficiency. Policymaking efforts should therefore assess the net socio-ecological welfare outcome resulting from the relative benefits of economic efficiency along with the environmental effectiveness and distributive impacts of RES policy support instrumentation, reflecting a more balanced application of efficiency, pace, and quality considerations for securing social acceptance for a policy-driven yet market-mediated energy transition.

This study has limitations that pave the way for future research. This is particularly the case with respect to the single case study approach adopted for this analytical exercise. While Germany stands as a representative national experience informing the ensuing policy choices of other EU Member States, its experience can only be extrapolated to other national jurisdictions to a certain extent, particularly with regards to non-EU countries, such as the United Kingdom, Norway, or Switzerland. The generalisability of the reported findings is therefore limited in scope and reach. In this respect, future research on the politics of market change towards sustainability could adopt a cross-country, comparative case study research design. This would enable the identification of similarities/differences in the pervasiveness and diversity of market-shaping practices beyond national jurisdictions, along with the extent by which international firms operating in different RES-E markets replicate/expand market-shaping strategies across national borders. This would in turn enable an assessment of the degree of institutionalisation of such contentious strategies in the corporate cultures of different RES-E market participants, as well as support more generalizable findings substantiating a broader and more diverse set of policy implications.

Funding: This research is funded by the European Union's Horizon 2020 Research and Innovation Programme for funding the project MISTRAL under the Marie Skłodowska-Curie Actions [Grant agreement N°. 813837]. The views and opinions expressed in this publication are the sole responsibility of the author and do not necessarily reflect the views of the European Commission. Research design, data collection and analysis remain within the sole responsibility of the author. All remaining errors are the author's own.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Relevant data informing this study can be obtained via the following resources. Legal documentation and parliamentary proceedings concerning European legislation/regulation can be found at the EU's online legal archive (https://eur-lex.europa.eu/homepage.html, accessed on 17 March 2020) and concerning German legislation/regulation and parliamentary proceedings at the German Federal Gazette's online legal repository (https://www.bgbl.de/xaver/bgbl/start.xav, accessed on 20 March 2020). Data concerning statistical datasets on

support costs, electricity prices, and consumption profiles can be accessed on Eurostat's energy-related database (https://ec.europa.eu/eurostat/web/main/data/database, accessed on 2 February 2020) as well as on BMWi's information portal for renewable energies (https://www.erneuerbare-energien.de/EE/Navigation/DE/Home/home.html, accessed on 2 February 2020), the German Federal Network Agency's website (https://www.bundesnetzagentur.de/, accessed on 5 February 2020), and on the information platform of the four German transmission system operators (https://www.netztransparenz.de/, accessed on 3 February 2020). Concerning the number and structure of Germany's electricity market, data can be retrieved from the German energy market data register online portal (MaStR—https://www.marktstammdatenregister.de/MaStR, accessed on 11 April 2020) and from the German Federal Network Agency's information platform for the German electricity market (SMARD—https://www.smard.de/, accessed on 11 April 2020).

Acknowledgments: The author would like to thank the constructive comments provided by IMES colleagues Hannes Sonnsjö, Jamil Kahn, and Alexandra Nikoleris, who jointly contributed to improve and strengthen the original manuscript. The author is also grateful for the valuable feedback provided by two anonymous reviewers during the formal review process.

Conflicts of Interest: The author declares no conflict of interest. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

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