Household Costs and Resistance to Germany's Energy Transition

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Abstract

Germany is an exemplary case of an energy transition from nuclear energy and fossil fuels toward renewables in the electricity sector, but it also demonstrates repeated, increasingly successful countermobilization by energy incumbents and their allies. The course for Germany's energy transition was largely set with the adoption of a feed-in tariff law in 1990, but since then the energy transition has been altered by a series of policy-making episodes, each of which was shaped by the outcomes of the previous episodes; there has been a combination of reinforcing and reactive sequences. This article uses policy windows and advocacy coalition theory, supplemented by work on resistance to carbon pricing, to analyze the four periods in which opponents of the energy transition had the greatest opportunities to limit or reverse it. It makes three main arguments intended to influence future research on energy transitions: (1) episodes of opposition to the feed-in tariff policy occurred when problem awareness and political commitment converged, (2) the outcomes of those conflicts depended on the balance of mobilization by advocacy and opposing coalitions, and (3) rising household costs due to the renewable energy surcharge drove both problem awareness and the composition of the opposing coalition, which helped lead to a more far-reaching retrenchment of renewable energy policy in 2014 than in earlier periods.

KEY WORDS: advocacy coalitions, energy transitions, environmental politics, Germany, policy windows, renewable energy

德国电力产业从核能和化石燃料向可再生能源过渡的能源转型是一个模范案例，并且德国还证明了由能源在位者及其盟友所发起的反动员，这种反动员进行了多次，且越来越成功。德国的能源转型进程随着*1990*年上网电价补贴法的采纳而基本确定，但自此能源转型被一系列决策场景所改变，每一次决策都受到之前决策结果的影响；一直存在巩固和反应的场景顺序结合。本文使用政策之窗和倡导联盟理论，加上抵制碳定价的相关研究，分析了四个时期，在这四个时期中，能源转型的反对者曾有绝佳的机会对其进行限制或逆转。本文为促进未来能源转型研究提出三个主张：*1)*当问题意识和政治承诺相一致时，抵制上网电价补贴政策的场景便会出现；*2)*这些冲突的结果取决于倡导联盟和反对联盟各自发起动员（之间）的平衡；*3)*由可再生能源附加费引起的不断攀升的家庭支出，推动了问题意识和反对联盟的形成，这帮助导致*2014*年可再生能源政策开支缩减比以往时期更为影响深远。

关键词: 倡导联盟, 能源转型, 环境政治, 德国, 政策之窗, 可再生能源

Alemania es un caso ejemplar de una transición energética desde la energía nuclear y los combustibles fósiles hacia las energías renovables en el sector eléctrico, pero también demuestra una contramovilización repetida y cada vez más exitosa por parte de los titulares de energía y sus aliados. El curso para la transición energética de Alemania se estableció en gran medida con la adopción de una ley de tarifas de alimentación en 1990, pero desde entonces la transición energética ha sido alterada por una serie de episodios de formulación de políticas, cada uno de los cuales fue moldeado por los resultados de episodios anteriores; Ha habido una combinación de secuencias de refuerzo y reactivas. Este artículo utiliza ventanas políticas y la teoría de la coalición de defensa, complementada por el trabajo sobre la resistencia a los precios del carbono, para analizar los cuatro períodos en los que los opositores a la transición energética tuvieron las mayores oportunidades para limitarla o revertirla. Presenta tres argumentos principales destinados a influir en la investigación futura sobre las transiciones de energía: (1) episodios de oposición a la política de tarifas de alimentación ocurrieron cuando la conciencia del problema y el compromiso político convergieron, (2) los resultados de esos conflictos dependieron del equilibrio de la movilización mediante la defensa y coaliciones opuestas, y (3) el aumento de los costos de los hogares debido al recargo de energía renovable impulsó la

conciencia del problema y la composición de la coalición opositora, lo que ayudó a llevar a una reducción de mayor alcance de la política de energía renovable en 2014 que en el anterior períodos.

PALABRAS CLAVE: coaliciones de defensa, transiciones energéticas, política ambiental, Alemania, ventanas políticas, energía renovable

Introduction

Germany's dramatically successful renewable energy policies for electricity have contributed substantially to its greenhouse gas emissions reductions and hence have formed a crucial buttress to its leading role in international climate policy. Compared to other industrialized democracies, Germany's targets for both renewable energy expansion (currently 65% of electricity consumption by 2030) and greenhouse gas reductions (55% over the 1990–2030 period) are ambitious. It has been exceeding its renewable energy targets since they were first set in 2000, leading to an estimated 141 megatons in avoided emissions in 2018 (Agora Energiewende [Agora], 2017, p. 33; Lauber, 2014, p. 5; Umweltbundesamt [UBA], 2019, p. 16). That year, 38% of electricity consumption came from renewable sources, mainly wind, solar, and biomass (UBA, 2019, p. 18). Recognizing that Germany's greenhouse gas trajectory is lagging well behind its reduction target for 2020, the February 2018 coalition agreement included provisions to accelerate the federal government's renewable energy target and add some short-term policy supports.

The German energy transition from nuclear power and fossil fuels to renewable energy has depended on a range of supportive policies, of which generous payments to producers provided through a system of feed-in tariffs have been key. The course for the energy transition was *largely* set with the adoption of that payment system at a critical juncture in 1990, which set in motion positive feedback, or, in the terms of Stefes's (2020) introduction to this special issue, a reinforcing sequence. This positive feedback got another major boost after the 1998 elections, when a coalition of the Social Democratic Party (SPD) and Greens passed the 2000 Renewable Energy Sources Act, which strengthened the feed-in tariff system (Laird & Stefes, 2009, pp. 2622–24; Karapin, 2014, pp. 128–31; Meckling, 2019, pp. 322–25; Stefes, 2010; Sühlsen & Hisschemöller, 2014). The reinforcing sequence included many elements, which were clearly in place by the 2000s. Renewable energy installations grew; the production costs of wind and solar power fell due to technological advances and economies of scale; renewable energy associations became well-established political actors allied with environmental organizations; the electric power utilities experienced a relative decline in their political power (though they remained quite powerful); and renewable energy enjoyed very high, robust public support.

A crucial fact concerning the feed-in tariff system is that its costs are essentially passed on to electricity consumers as a surcharge per kilowatt hour, and households pay a disproportionate share of the surcharge compared to industry; the political visibility of this surcharge contrasts sharply with subsidies for the coal and nuclear industries, which are quietly provided through government budget items (Laaser & Rosenschon, 2018). As renewable energy has grown, the costs of the surcharge for each household have become substantial, averaging 180 Euros in 2013, about 20%

of the retail price of electricity (Boscheck, 2014, p. 260). While costs to industry were also a factor in the debate, this article's main focus on costs will be on household costs.

Although the German energy transition has been marked by a strong degree of path dependence since 1990, the reinforcing sequence initiated at that time did not determine the policy outcomes in later periods. Rather, those outcomes also have been shaped by actors opposed to a rapid expansion of renewable energy, who mobilized in response to that sector's successes. In retrospect, the feed-in tariff law adopted in December 1990 initiated not only a reinforcing sequence, but also a "reactive sequence" of action, reaction, and counter-reaction by forces promoting and opposing renewable energy (Mahoney, 2000, pp. 508–09). Opponents gradually gained influence during a series of conflicts, so that by 2014, the reactive sequence had partially—though far from completely—neutralized the reinforcing sequence.

To show this, I analyze four episodes (subcases) of political opposition to the feed-in tariff system. After the opposition failed in 1997 and had a very small success in the 2010–11 period, it had a larger success in 2012, when rates for solar photovoltaics were sharply cut. Then, in 2014, the opposition had its biggest impact to date, when the parliament altered the feed-in tariff policy in significant ways designed to curb, but not halt, further growth in renewable energy. The 2014 Renewable Energy Act provided for caps on the amount of wind, biomass, and solar power to be supported by government policy and for an auction system for new large facilities rather than legally fixed rates of payment beginning in 2017.

Meadowcroft (2009, p. 337) argues that those trying to guide energy transitions will encounter large-scale political conflicts, and Stefes (2020) reminds us that the outcomes of those conflicts are uncertain and may contribute to the kind of reactive sequence that transforms or even reverses the direction of policy. This article takes the additional step of trying to explain the *timing* of efforts to undermine renewable energy policy (using policy windows theory) and the *outcomes* of those efforts (using the advocacy coalition framework).

In addition, it brings household costs into those two theories: as part of the problem stream that affects the timing of opposition, and as an interest articulated by certain political actors in the coalition opposing renewable energy expansion. I argue that the household costs aspect of the conflict over renewable energy—mediated by the 2013 German federal election and the responses of the political parties—helped to produce a more far-reaching retrenchment than had previous episodes. In terms of the three interrelated paths or dimensions of energy transitions that Stefes (2020) identifies, this article focuses mainly on the political dimension of policy making and implementation, and secondarily on the legitimation dimension in terms of public opinion; for reasons of space, I will not analyze the favorable technological-economic dimension of the energy transition that has also made Germany's energy transition possible.

Theories and Methods Used

Recent research on energy transitions has shown that the politics of renewable energy change as this sector develops. Initial policy adoption is met with little opposition, as opponents in the electric utility and energy-intensive industries underestimate the threat to their interests. This is followed by a period of incremental policy change, technological advances, declining unit costs, and the takeoff of the renewable energy

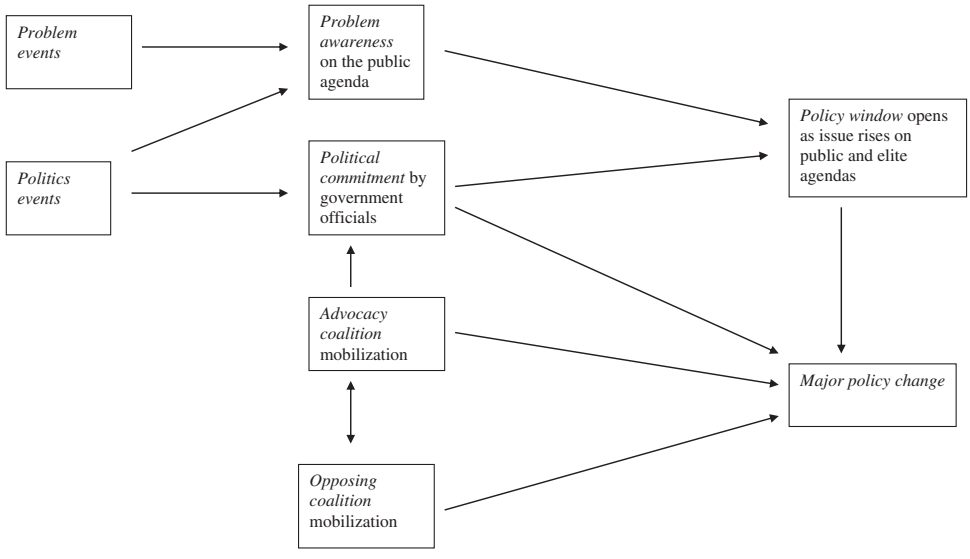

Figure 1. Policy Windows and Advocacy Coalition Theories

sector. However, as supportive policies and renewable energy production grow, so do the overall costs to various actors, which leads to more vigorous opposition and politicization of the issue (Aklin & Urpelainen, 2019, ch. 5; Breetz, Mildenberger, & Stokes, 2018; Stokes & Breetz, 2018). While this longitudinal framework predicts rising opposition as an energy transition proceeds, it does not specify when opposition will mobilize, what influence it will have, or what factors condition the outcomes of conflicts between advocates and opponents.

To address those questions, this article's analysis of four German subcases will be guided by two theoretical perspectives that are often applied to environmental policy making (e.g., Dunn, 2006; Farley et al., 2007; Layzer, 2012; Pralle, 2009; Sabatier & Weible, 2007, p. 189; Stokes, 2015), modified to account for the role of household costs. Figure 1 provides a graphical overview of these two theories. The first is policy windows theory, which is an approach to public policy agenda setting that can help to explain the timing of the most important episodes of opposition to Germany's renewable energy policy. Briefly, when awareness of a problem and political commitment to address it converge, an issue rises on public and elite agendas and a window of opportunity opens, which can be used by policy entrepreneurs to press for policy changes (Kingdon, 2003, pp. 165–90). Problem awareness may be generated by feedback from existing policies, expert reports, or focusing events such as energy price increases (Kingdon, 2003, pp. 90–115). Political commitment may be the result of elections; other changes in government leadership; or mobilization by broad coalitions of interest groups, political parties, or social movements (Kingdon, 2003, pp. 145–54). Although policy windows theory relates larger political and economic forces to the policy-making process, it does not explain the outcomes of that process.

To explain those outcomes, aspects of the advocacy coalition framework (Sabatier, 1988; Sabatier & Weible, 2007) are useful, as Roberts et al. (2018, pp. 305–06) suggest for low-carbon energy transitions. Renewable energy policies are contested by opposing coalitions of advocates and opponents, defined here in terms of actors who

coordinate their activity toward common goals (Sabatier, 1988, pp. 132–33, 139).[1] In this policy area, the advocates tend to include environmental organizations, renewable energy trade associations, officials in environment ministries, and (often) left-of-center party leaders, while the latter tend to include fossil fuel industries; large, privately owned electricity utilities; energy-intensive and export industries; unions representing these industries' workers; officials in economics ministries; and (often) right-of-center party leaders (Stefes, 2017, pp. 9, 10). The policy outcomes of the conflicts between these two coalitions depend largely on the political resources that the two sides can muster (e.g., money, organization, and links to government officials), their degree of unity, the appropriateness of their strategies and tactics, and their ability to win over ambivalent or uncommitted actors, such as swing voters and service sector businesses (Sabatier, 1988, p. 134).

To supplement these two approaches, I also draw on the literature on climate change policies that impose direct costs on consumers. This literature expects such policies to be blocked or severely limited by voters and the politicians accountable to them (Compston & Bailey, 2008, p. 267; Harrison, 2010, p. 512; Rabe, 2010; cf. Karapin, 2020). Although this work has been limited to climate policies that involve carbon pricing, renewable energy policies also can produce relatively high, visible costs for households. Hence, I will include household costs as an event in the problem stream of the policy windows theory and will include actors concerned about household costs in the advocacy coalition framework. I argue that the rising importance of policy-related household energy costs can help to explain why resistance grows in the later stages of an energy transition, and more specifically why opposition erupts when it does, since rapid increases in costs help to create windows of opportunity for opponents. Household costs can also help to explain the composition of the opposition coalition, as this factor may lead politicians and interest groups aiming to mobilize voters on this issue to become more involved, especially if the timing of the policy window overlaps with election campaigns.

After a brief policy history, the bulk of the article will apply these theories to four German policy-making episodes, using case study methods. I first identified four subcases of substantial conflict that occurred after 1990. I then used secondary sources, government documents, public opinion data, and news sources to carry out process tracing; this included a close reading of over 900 news articles that were used for Figure 4 (below). I tried to trace the effects of the key variables and mechanisms (Collier, 2011; George & Bennett, 2005, pp. 21, 131–49) identified by the policy windows and advocacy coalition theories—problem awareness and the events driving it, interest group mobilization, positions taken by elected officials, the state of the public agenda, and the balance of public opinion—on policy decisions and the outcomes of policies. Content analysis of newspapers and public opinion salience data were used to measure the position of the issue on the public agenda, and net public support for renewable energy policy was calculated from opinion polls. Details about the content analysis methods are provided in the endnotes.

Background on Renewable Energy Policy Development in Germany

Although the German federal government supported the development of wind and solar power through research and development funding and demonstration projects

in the 1980s, its renewable energy policy became much stronger and more effective in the 1990s. The core of its policy on renewable source electricity from 1990 to 2017 was the feed-in tariff. The Feed-In Law (*Stromeinspeisungsgesetz*), which went into effect in January 1991, required power utilities to buy electricity generated by renewable energy providers, with wind and solar electricity producers guaranteed 90% of the retail rate (75% for biomass and hydropower). An effort by renewable energy opponents to reduce or eliminate this policy support failed in 1997. While the feed-in tariff rate was too low to encourage much solar development, it did lead to the installation of a noticeable amount of wind power by the late 1990s (see Figure 3 [below]). This system was reformed and expanded by the 2000 Renewable Energy Sources Act, which was adopted by a government of the SPD and the Greens. The 2000 law greatly increased payments for solar photovoltaics, from about 8.5 to 51 cents/kilowatthour (kWh) and guaranteed rates to renewable electricity producers for the first 20 years of a facility's operation (Gründinger, 2015, pp. 230–31). The initial rates under the new law were much higher for photovoltaics than for wind or biomass, reflecting the much higher relative costs of solar electricity production at that time. The guaranteed rates for newly built production facilities declined gradually (called "degression") to reflect production cost decreases due to technological development; the decrease was initially 5% per year for solar photovoltaics, though only 1% per year for biomass and 1.5% per year for wind (Gründinger, 2015, p. 231). The Economics Ministry was to review the degression rates every two years. The 2000 law also addressed the problem of uneven geographic development, which had produced higher costs in the northern *Länder* (states) due to a wind power boom there, using a national fund to redistribute the costs to electricity consumers in all regions (Hoppmann, Huenteler, & Girod, 2014, pp. 1428–29).

Renewable energy policy has also involved ambitious official targets, which several times were exceeded and then strengthened. In 2004, the federal government adopted targets for renewable source electricity: 12.5% of gross final energy consumption by 2010 and 20% by 2020. The former target was exceeded in 2007, and increased targets were adopted in 2008: 35% of electricity consumption by 2020, 50% by 2030, 65% by 2040, and 80% by 2050, as well as 18% of gross final energy consumption across the electricity, heating, and transportation sectors by 2020 (Gründinger, 2015, pp. 245, 263, 264). Finally, with the 2020 electricity target already exceeded, the 2018 coalition agreement specified an increased target of 65% by 2030 (CDU, CSU, & SPD, 2018, p. 71).

But beginning in the early 2010s, three episodes of opposition (in 2010–11, 2012, and 2014) led to a series of policy changes that eventually made renewable energy policy less favorable to the further rapid expansion of the sector. Parliamentary reviews of feed-in tariff rates led to increases in the annual degression rates, initially to 7%–11% per year in 2009, with these rates linked to the amount of renewable capacity installed the previous year, a kind of flexible cap (Hoppmann et al., 2014, p. 1426). Three other laws passed in the 2010–11 period made only modest changes, with the most important being a 13% reduction in feed-in tariff rates for solar photovoltaics adopted in 2010 (Gründinger, 2015, pp. 281, 282; Hoppmann et al., 2014, pp. 1426, 1430). When solar power installations continued to grow rapidly after these payment cuts, the parliament adopted the 2012 Solar Photovoltaics Act, which provided for a more significant, 30% cut in solar rates, with further cuts (through increased degression) if annual capacity additions exceeded 3,500 megawatts. In addition, this act

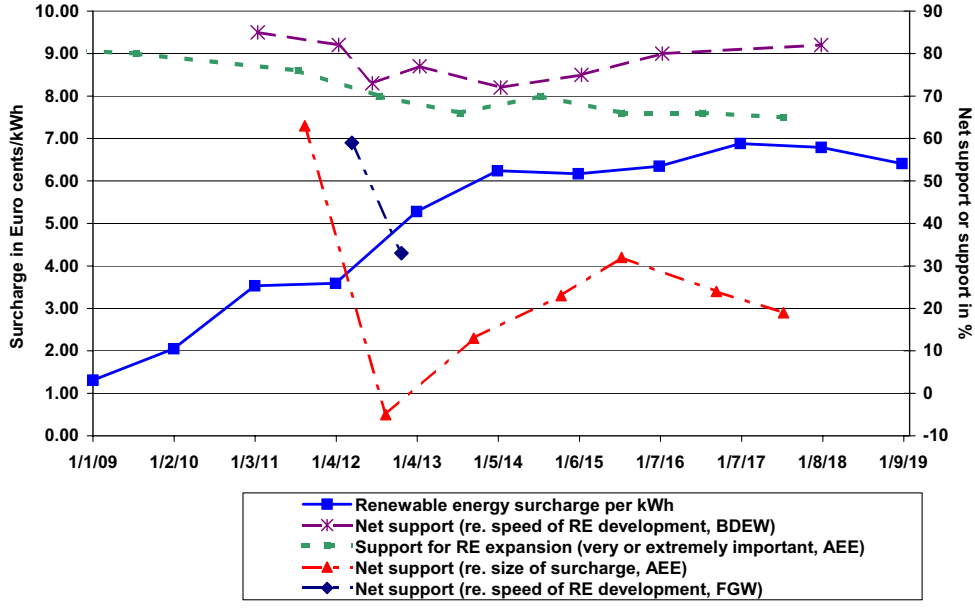

Figure 2. Germany's Renewable Energy Surcharge and Public Support for It, 2009–19. *Sources*: Surcharge data from Bundesverband der Energie- und Wasserwirtschaft (BDEW); public opinion data from Agentur für Erneuerbare Energien (AEE), BDEW, and Forschungsgruppe Wahlen (FGW).

included a hard cap on the total photovoltaic capacity to be supported by government policy, at 52,000 megawatts, which was the official target for solar installations by 2020 (Gründinger, 2015, pp. 295, 309).

More significantly, in 2014, a grand coalition government fundamentally changed the renewable energy law, replacing the feed-in tariff with a system of auctions for new installations, except for small facilities such as household rooftop photovoltaic systems (Brunn & Sprenger, 2014, pp. 30–32). Beginning in 2017, producers of renewable electricity from new large-scale facilities bid for the right to sell their electricity to the utilities at rates proposed by the producers; the government accepts bids until the targeted quantity is reached, with the highest winning bid setting the rate that is guaranteed to all producers in that bidding round.

The auction process also set new caps on the amount of renewable energy supported by government policy. As revised by the 2017 Renewable Energy Act, 2,800–2,900 MW of onshore wind and 600 MW of large-scale solar photovoltaics are to be auctioned per year (Bundesministerium für Wirtschaft und Energie [BWE], 2017, p. 2). For its part, offshore wind is to be limited to certain expansion targets (6,500 MW by 2020, 15,000 MW by 2030) through access to the electricity grid (Brunn & Sprenger, 2014, pp. 33–36).

The feed-in tariff policy has produced costs (as does the new auctioning system) that are borne by electricity consumers through a renewable energy surcharge called the *EEG-Umlage*. Reflecting the changing scale of renewable electricity production, the surcharge remained below 0.5 Euro cents/kWh through 2003 and then rose rapidly to a plateau of 6–7 cents/kWh in the 2014–17 period (see Figure 2). The surcharge is a well-publicized and substantial component of electricity prices, making up 22% of the retail household price in 2013 and about the same share in 2019; because it reflects long-term legal commitments to power producers, the surcharge tends to

ratchet upward and cannot be rapidly reduced without a major financing reform that so far has not occurred.

However, the surcharge overstates the overall economic costs of Germany's renewable energy policy, for two reasons. First, the growth of renewable energy has helped to reduce wholesale electricity prices, which could help to keep down total costs to consumers if the reductions were passed on to them. Second, paradoxically, the decline in wholesale prices (which fell by about 4 cents/kWh from 2008 to 2015) triggers an increase in the surcharge, since it is calculated on the basis of the difference between the cost of renewable source electricity and the current wholesale price (Lauber, 2017, pp. 167, 171). In addition, the surcharge has risen partly because of recently increased industrial exemptions, which concentrate the costs of renewable energy on private households.[2] Hence, according to one estimate, renewable energy promotion was responsible for less than half of the 5.3 cent surcharge in 2013 (Bundesverband Erneuerbare Energie [BEE], 2012, p. 5; Lauber & Jacobsson, 2016, p. 155).

The renewable energy surcharge is not distributed equally across all electricity consumers. A large share of industry—especially energy-intensive industry—is mostly exempt from it, while households pay the full rate. Although this contrast is politically important, the overall distribution of the surcharge is not heavily skewed toward households, because about 40% of industry, as well as all service sector businesses and public sector institutions, also pay it. As a result, in 2013, households paid 35% of the surcharge (8.3 billion Euros) while consuming 26% of the country's electricity (Agora, 2015, p. 31; Arbeitsgemeinschaft Energiebilanzen [AGEB], 2017). Moreover, although residential electricity prices approximately doubled in the 2000–16 period—largely for reasons unrelated to the renewable energy surcharge—the share of household income spent on electricity rose only slightly compared to the 1990s, from about 2% to about 2.5%; however, the percentage for low-income households is about 5% (Agora, 2015, p. 32).

Through 2018, Germany's renewable energy policy supported progress toward its energy transition and climate protection goals. Renewable sources reached 38% of gross electricity consumption in 2018; almost all of this (35% of consumption) came from new sources, mainly wind, solar, and biomass, rather than hydropower (UBA, 2019, p. 18). New renewable sources in all sectors led to the avoidance of an estimated 184 megatons CO_2eq in greenhouse gas emissions (nearly all of this being CO_2) that year, which is about 15% of Germany's 1990 emissions; of these, 141 megatons were in the electricity sector (UBA, 2019, p. 16). Hence, Germany's renewable energy policy has contributed more to greenhouse gas emissions reduction than any other climate policy area—even more than the windfall results of German unification, which were estimated at 113 megatons over the 1990–2010 period (Eichhammer et al., 2001, p. 39; Karapin, 2012, p. 15).

Analysis of the Four Subcases

The 1997 Episode: Failure for the Opponents

Summary and Outcome—A window of opportunity for opponents of Germany's feed-in tariff policy opened in 1996, as the post-1990 growth of wind power led to a backlash; a reactive sequence was beginning, although it had little force at this point. The introduction of an EU policy that would require Germany to liberalize its electricity

sector sparked vigorous efforts by renewable energy opponents to have the feed-in tariff eliminated or reduced through litigation and parliamentary action. But their efforts provoked countermobilization by a broad coalition of renewable energy advocates in 1997. The result was the preservation of the feed-in tariff in legislation passed that year; opponents achieved only a 10% cap on renewable energy purchased by each utility, which was abolished three years later (Stefes, 2016, p. 73).

This proved to be a decisive defeat for the opponents, since the policy window mostly closed in September 1998, when a Social Democratic-Green government took office and passed legislation entrenching and expanding the feed-in tariff in 2000. Opponents did not give up; their efforts continued until the early 2000s, when the European Court of Justice ruled the tariff to be legal (in 2001), the European Commission's Directorate-General for Competition withdrew its objections to it (in 2002), and Economics Minister Clement (SPD) tried and failed to reduce the tariff rates (in 2003) (Michaelowa, 2005, p. 196; Vogelpohl, Ohlhorst, Bechberger, & Hirschl, 2017, p. 4). But 1997 proved to be the turning point in this period of conflict, and hence is the focus here.

Policy Window and Opposition Coalition—The 1997 policy window, which led to the mobilization of opposition but not to policy retrenchment, was created by a convergence of increasing problem awareness and political commitment to address the problems by rolling back the feed-in law. Problem awareness by the private electricity utilities increased sharply compared to 1990, when they did not oppose the Feed-In Law, partly because they were preoccupied with taking over the electricity system of the former East Germany and apparently underestimated the potential impact of the new law (Bruns, Ohlhorst, Wenzel, & Köppel, 2011, p. 58). However, aided by the generous payments guaranteed by the law, wind power grew rapidly in Germany, from 55 megawatts to 2,089 megawatts total installed capacity during the 1990–97 period. Although the wind power share had reached only 0.5% of total electricity generation in 1997 (BMU and AGEB data), before 2000, the increased costs due to the wind power boom were concentrated on the utilities and their customers in the regions where the renewable energy was generated, mainly in the northern *Länder* (Jacobsson & Lauber, 2006, p. 265).

Hence, Germany's four large privately owned utilities, including RWE and Preussen Elektra, became increasingly concerned about the impact of the feed-in tariff on their businesses, which were losing market share to independent power producers and being required to pay premium prices for renewable source electricity (Szarka, 2010, p. 845). Dependent on coal-fired and nuclear generation (even at the end of 2016, they had only about 5% of Germany's renewable energy production capacity), the utilities stood to lose more than they would gain from the expansion of renewable energy (Strunz, Gawel, & Lehmann, 2016, p. 36; Wettengel, 2018).

At about the same time, political commitment to rolling back the feed-in tariff increased for two reasons. First, the Christian Democratic-Liberal federal government formed by the Christian Democratic Union (CDU), Christian Social Union (CSU), and Free Democratic Party (FDP), which was in office until 1998, became increasingly opposed to renewable energy. Although this government had overseen the adoption of relatively ambitious climate change targets and of the Feed-In Law in 1990, it had accepted the latter only under pressure from backbench members of the Bundestag; moreover, the government's interest in environmental policy declined in

the mid-1990s as the economic costs of reunification became clear (Weidner, 2002, pp. 157, 158). The governing parties opposed increases in the feed-in tariff as being uneconomic, while the Social Democrats and Greens advocated generous tariff rates to help create a mass market for solar photovoltaics (Hoppmann et al., 2014, p. 1427).

The second political shift came from the EU level, where the European Commission adopted a directive in 1996 that called for electricity market liberalization (Directive 96/92/EC). Although the directive permitted national programs that prioritized renewable energy, the European Commission, led by its Directorate-General for Competition, soon came to see feed-in tariffs as market distorting and sought to harmonize them across the EU (Vogelpohl et al., 2017, pp. 48, 49). Since Germany had relatively generous feed-in rates, harmonization would have meant reducing the tariff rates in Germany. Moreover, responding to a complaint by the German electric utilities association Verband der Elektrizitätswirtschaft (VDEW), the EU's commissioner for competition van Miert wrote to the German economics minister Rexrodt (FDP), calling for a change to the feed-in tariff system to eliminate the additional electricity costs that it produced. This led to a draft law in 1997, which aimed to cap payments to and reduce tariff rates for the wind power sector (Hustedt, 1998, p. 166).

However, the Commission soon backed away from efforts to reduce feed-in tariff rates; then, after its members resigned en masse in March 1999 due to corruption scandals, the restructured Commission took a more pragmatic approach to renewable energy, and in 2001 it adopted a directive that did not aim to harmonize feed-in tariffs and instead focused on renewable energy target attainment (Vogelpohl et al., 2017, p. 50). Hence, the best time for opponents to strike against renewable energy policy was limited to 1996–98, before the change in Germany's national government and the shift in the European Commission's approach.

The coalition opposed to the feed-in tariff consisted of three main actors at this time: the large utilities; energy-intensive industry; and officials in the Economics Ministry (Bruns et al., 2011, pp. 378, 379). In this episode, they were also supported by the major business associations: the German Federation of Industry (Bundesverband der Deutschen Industrie [BDI]) and the German Chamber of Commerce (Deutscher Industrie- und Handelstag [DIHT]) (Franken, 1997). The opponents pursued three paths of influence, running through German and EU courts, the European Commission, and the German federal government and Bundestag, but failed in all three of them.

In 1995, the Association of German Electric Power Utilities (VDEW) argued that the feed-in tariff law adopted in 1990 did not comply with the principles of Germany's market economy and was unconstitutional. Its lawsuit first went to a district court and the Federal Constitutional Court, but the cartel chamber of the Federal Court of Justice finally ruled against the power companies in 1996 (Bruns et al., 2011, pp. 59, 60; Hirschl, 2007, p. 135). Later, in 1998, the power utilities went to the European Court of Justice, arguing that the feed-in tariff was illegal state aid. But the *Preussen Elektra vs. Schleswag* case was ultimately decided against the utilities in March 2001; the court ruled the feed-in tariff payments to be legal since they were paid by consumers rather than through taxes (Szarka, 2010, p. 845; Vogelpohl et al., 2017, p. 49).

In the meantime, the opponents also asked the European Commission to intervene, with the VDEW making a complaint to the Directorate-General for Competition in 1996, an effort that was supported by the federal Economics Ministry (Jacobsson & Lauber, 2006, pp. 264–65). With the Commission pressing it to drop the feed-in

tariff, the Ministry proposed a reduction in the tariff rates (Vogelpohl et al., 2017, p. 49). The government took the proposal to the Bundestag, which was considering legislation to implement the Commission's directive on market liberalization. But in this venue, renewable energy advocates were able to block the efforts at retrenchment through strong countermobilization.

Advocacy Coalition and Countermobilization—The core of the advocates' coalition consisted of renewable energy associations and environmental organizations, although it became much broader during this conflict episode. Many renewable energy trade associations were formed in the late 1980s and 1990s, and in Summer 1997, the German Wind Energy Association (Bundesverband Windenergie [BWE]) was formed (Jacobsson & Lauber, 2006, p. 266, n. 21; Ohlhorst, 2009, p. 181). The large Mechanical Engineering Industry Association (Verband Deutscher Maschinen- und Anlagenbau [VDMA]) and two renewable energy associations testified at a hearing held by the Bundestag's economic committee (Ohlhorst, 2009, p. 181). Advocates argued that the renewable energy sector was important for jobs, especially in areas with high unemployment; at that time, the sector was already responsible for an estimated 5,000 direct and 5,000 indirect jobs, and it was growing at 80% per year (Michaelowa, 2005, p. 195).

In a crucial move, the BWE initiated the Tailwind Campaign (*Aktion Rückenwind*), which organized a broad-based demonstration in Bonn (the national capital until 1999) that drew four to five thousand people in September 1997. Supporters included wind turbine suppliers and operators, solar energy producers, the German Farmers Association, environmental and religious organizations, the VDMA, and the metal-workers trade union association (Industriegewerkschaft Metall [IG Metall]) (Bruns et al., 2011, p. 370; Hustedt, 1998, p. 167; Michaelowa, 2005, p. 195). The demonstration was held one day before a scheduled Bundestag committee hearing, and around this time, deputies from all the parliamentary parties spoke out in favor of the feed-in tariff (Ohlhorst, 2009, p. 181).

Under pressure from this broad advocacy coalition, Bundestag deputies rebelled against the government's measure to reduce the feed-in tariffs. Two weeks before the Bonn demonstration, the measure lost by an 8–7 margin in a Bundestag economics committee vote. Moreover, up to 20 Christian Democratic deputies were prepared to vote against it on the Bundestag floor; the governing parties had only a 10-vote margin in the lower chamber, so they could afford to lose the support of at most 4 deputies on a floor vote (Jacobsson & Lauber, 2006, p. 265; Koepke, 1997). In the week after the demonstration, the governing parties backed away from their plans to reduce the tariff rates (Hustedt, 1997), although they did not completely give up for several more months. However, in the end, when the Bundestag passed the 1997 Reform of the Energy Sector law, which liberalized the German electricity industry, it included the feed-in law intact (Jacobsson & Lauber, 2006, p. 265).

Six years later, the dynamics of the 1997 conflict were repeated, although in a less intense fashion. After Economics Minister Clement (SPD), supported by the utilities, tried to cut feed-in payments by an immediate 15% and then by 5% per year afterward, the renewable energy industry and IG Metall mobilized a demonstration of five thousand people in Berlin, which helped to block Clement's effort (Michaelowa, 2005, p. 196).

The 2010–11 Episode: Minor Successes for the Opponents

Summary and Outcome—During the 2010–11 period, the newly elected conservative-liberal German federal government tried to make major cuts to feed-in tariff rates and to tighten the flexible cap on solar expansion that had been introduced by the previous, grand coalition government in the 2009 Renewable Energy Sources Act. However, the three laws that were passed by parliament in the 2010–11 period (the 2010 Photovoltaic Act; the 2011 Photovoltaic Interim Act; and the 2012 Renewable Energy Act, which was adopted in July 2011) made changes to the renewable energy support system that were modest relative to the rapidly declining costs of production caused by global technological change in the solar sector. Thus, they represented mostly victories for the proponents of renewable energy and only very minor gains for the opponents; the reactive sequence was still having little impact on the dominant, reinforcing sequence.

The main change was a reduction in the rates for solar photovoltaics, which was accomplished by increasing the degression rates and enacting one-time cuts totaling 13% in 2010. Degression rates now were set to increase if solar photovoltaic installations overshot the government's target. In the 2010 act, the upper bound of the target was set at 3,500 MW per year; while this flexible cap was nearly doubled compared with the 2009 Renewable Energy Sources Act, the degression increases were made steeper than in that prior legislation (Gründinger, 2015, pp. 264, 281).

However, these changes were so modest that solar photovoltaic installations continued to overshoot the government's targets in 2011 and 2012, with 7,900 and 8,200 MW installed, respectively (Figure 3). Moreover, the 2012 Renewable Energy Act mostly reaffirmed the status quo, with no change to the country's renewable energy targets (still 35% of electricity consumption by 2020 and 50% by 2030), little further change for solar photovoltaic rates, and only a small cut for wind power rates that was offset by increased bonus payments for that sector (Gründinger, 2015, pp. 291–93).

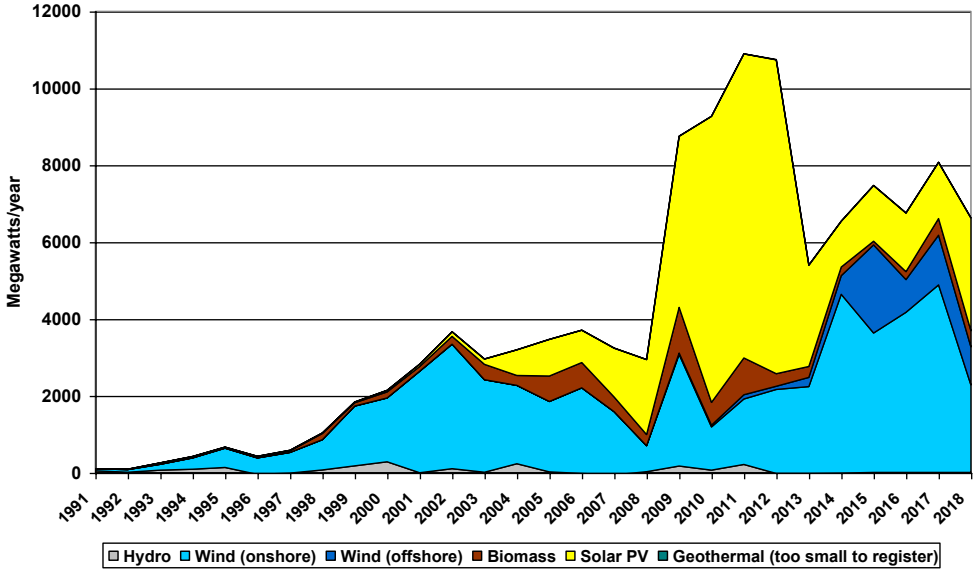

Figure 3. Annual Capacity Additions of Renewable-Source Electricity in Germany, 1991–2018. *Source*: German Environment Ministry (Umweltbundesministerium).

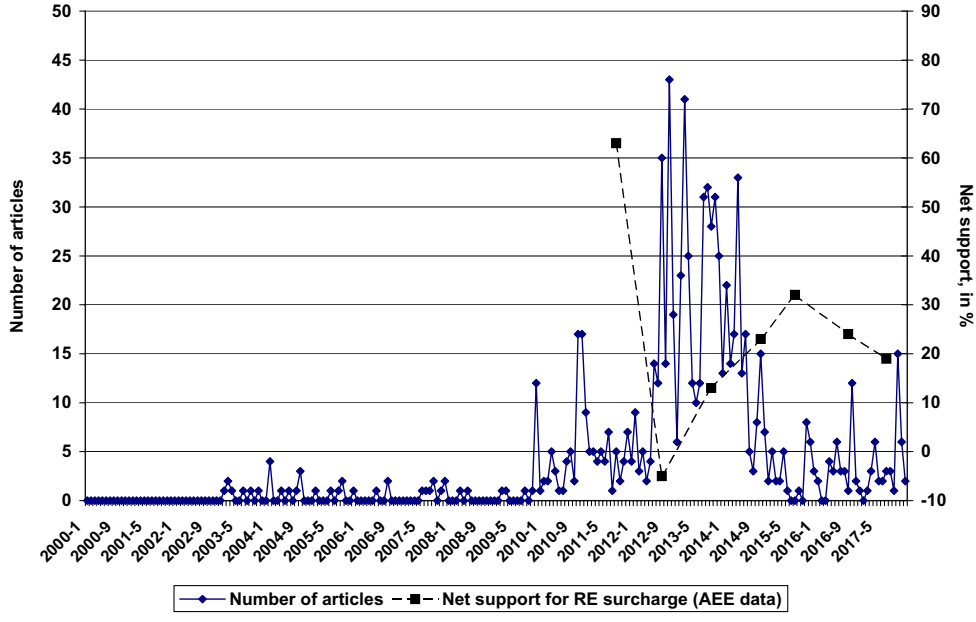

Figure 4. Electricity Prices and Renewable Energy Surcharge on the Public Agenda in Six News Sources and Net Support for the Surcharge, 2000–17. *Sources*: *Berliner Zeitung*, *Frankfurter Rundschau*, *Tagesspiegel*, *tageszeitung*, *Spiegel*, and *Spiegel Online*; public opinion data from Agentur für Erneuerbare Energien (AEE).

Policy Window, Opposition Coalition, and Advocacy Coalition—Although these changes represented only a small retrenchment of renewable energy policy, the policy window for renewable energy opponents initially had been fairly large in the 2010–11 period, due to increases in problem awareness and in political commitment to policy retrenchment. Awareness of the problem of rising costs for renewable energy promotion rose for the first time in the post-2000 period, reaching small peaks in November 2009 and October–December 2010; see Figure 4, which shows news articles that mentioned both the renewable energy surcharge and electricity prices.[3] Attention to the rising costs was driven by several factors. First, the rapid growth of renewable energy (mostly photovoltaics) caused the renewable energy surcharge to increase from 1.3 cents in 2009 to 3.5 cents in 2011. The first two spikes in public attention seen in Figure 4 were due to the announcement of the surcharge increase (made each October for the following year) and ensuing announcements by utilities of electricity price increases, as well as parties' and interest groups' responses to those increases. Germany had added 18,000 MW in renewable energy capacity during 2009 and 2010; of this, 11,900 MW (66%) was due to solar photovoltaics, which benefitted from production costs that were falling more rapidly than were the feed-in tariffs (Hoppmann et al., 2014, p. 1430).

Second, the profits of the solar industry, which had been criticized in a report by the think tank RWI[4] and in the news media already in 2008 (Gründinger, 2015, p. 271), gained renewed attention. The chief of the solar technology manufacturing company Solarworld, Frank Asbeck, who was dubbed the "Sun King," became notorious for his luxury lifestyle and campaign contributions to the SPD and FDP (Beste et al., 2010; Gründinger, 2015, pp. 283, 285). Third, the Federation of German Consumer

Organizations (Verbraucherzentrale Bundesverband, VZBV), though largely favorable to renewable energy, began to push for large cuts to solar photovoltaic rates in August 2009 (Gründinger, 2015, p. 283; "Weniger Geld für Solarstrom," 2009).

At the same time, the September 2009 Bundestag elections increased the political commitment to retrench renewable energy policy. The election resulted in a shift from a grand coalition of Christian Democrats and Social Democrats to a conservative-liberal coalition of Christian Democrats and the neoliberal Free Democratic Party in the federal government. Since the Free Democrats had been longstanding opponents of renewable energy and now gained control of the Economics Ministry, they were able to press for cuts to feed-in tariffs (Monstadt & Scheiner, 2014, p. 387). Among other things, the government proposed lowering the annual cap on new solar photovoltaics to 1,900 MW by 2017 (Lauber & Jacobsson, 2016, p. 152).

However, three ways in which the advocacy coalition responded to the policy window and the occurrence of an external event prevented major policy change at this time. First, the advocacy coalition remained unified in resisting cuts to feed-in tariff rates. The Social Democrats, Greens, renewable energy associations, Federal Environment Agency (UBA), and the Öko-Institut largely defended the feed-in tariff against its critics, while the consumer protection associations displayed ambivalence rather than hostility to renewable energy. Many state governments, which benefited from domestic economic activity in the renewable energy sector, also resisted radical change to the policy, even in those *Länder* governed by Christian Democrats (Lauber & Jacobsson, 2016, p. 153; Monstadt & Scheiner, 2014, p. 387).

Second, public opinion remained strongly favorable through 2011, even in the face of rising costs, as shown by the top two lines in Figure 2. In a Summer 2011 survey, 76% found the expansion of renewable energy to be "very important" or "extremely important"; 75% would prefer to receive renewable source electricity from their supplier; and 60% or 76%, respectively, found a wind or solar energy facility in their neighborhood to be "good." Moreover, a very large share—79%—still viewed the level of the renewable energy surcharge (then 3.5 cents/kWh) as either "appropriate" or "too low," while only 16% saw it as "too high" (Agentur für Erneuerbare Energien [AEE], 2012, pp. 5, 6, 8, 11). Third, the deliberations in parliament allowed Bundestag deputies from the governing parties and Bundesrat members from many *Länder* to resist changes and gain concessions (Gründinger, 2015, p. 287).

Finally, the March 2011 Fukushima nuclear disaster led to a new nuclear phaseout policy and a strengthened commitment to renewable energy by Chancellor Merkel in June (Merkel, 2011). This helped to deter the government and parliament from seeking deeper cuts in renewable energy for about a year (Stefes, 2016, p. 77).

The 2012 and 2014 Episodes: Moderate, Then Major Success for the Opponents

Summary and Outcome—Renewable energy opponents finally had two successes in the 2012–14 period; as negative feedback increased, the reactive sequence finally began to partially neutralize the force of the reinforcing sequence. First, the 2012 Solar Photovoltaics Act (adopted June 2012) cut feed-in tariffs for that sector by 30% and introduced a hard cap of 52,000 MW on the total amount eligible for feed-in tariff payments, which corresponded to the government's existing target for solar photovoltaic capacity in 2020; 34,000 MW had been built by the end of 2012. This was

only a partial success for opponents; it was proposed by Environment Minister Röttgen (CDU), who was an advocate for renewable energy, and it was viewed as insufficient by Economics Minister Rösler (FDP) and other hardliners in the government. However, according to the solar energy association Bundesverband Solarwirtschaft (BSW), the law drove the tariff for solar photovoltaics below system costs for the first time since at least 2006 (Gründinger, 2015, p. 307). Most German solar equipment firms went bankrupt around this time, a process that was also driven by Chinese competition and alleged dumping and that began before the law's passage and continued after it (Tillack, 2015, p. 241). Solar photovoltaic installations dropped sharply, from an average of 7,800 MW per year in the 2010–12 period to 1,900 MW per year in the 2013–18 period.

Second, in a more important reform, the 2014 Renewable Energy Act (adopted in July) made several major structural changes to Germany's system of renewable energy supports. It provided that, beginning in 2017, most new renewable energy installations would be supported through payments determined by an auction system in which the rate is set by the highest winning bidder rather than feed-in tariffs set by the parliament; in a pilot program, auctions were used for ground-mounted photovoltaics in 2015 and 2016. In addition, growth corridors were established for onshore wind (2,500 MW per year upper limit) and biomass (100 MW per year), as well as solar photovoltaics (2,500 MW per year); offshore wind was given caps of 6,500 MW by 2020 and 15,000 MW by 2030.[5] The corridors transformed the targets in the earlier renewable energy acts into caps on the amount that would be eligible for payments (Lauber & Jacobsson, 2016, p. 154), to be enforced initially by degression rate changes and later by the amounts of new capacity set out for auction, except for offshore wind, where this was done by network access commitments (Brunn & Sprenger, 2014, p. 36; BWE, 2017, pp. 6, 7).

Policy Window—These policy changes were made possible by the emergence of a large policy window in 2012–14, the causes of which overlapped somewhat with those of the 2010–11 policy window. Problem awareness, as measured by news coverage of the cost issue, began to rise in June 2012; it reached a new peak in the period from August 2012 to February 2013 that was more than twice as high as the 2010 peak (see Figure 4). This increase in attention was driven by increases in the surcharge and in electricity prices, but also by reported bankruptcies of German solar firms and by the mobilization of politicians and interest groups opposed to renewable energy supports, which they undertook in August 2012, February 2013, and again as part of the Bundestag election campaign in Summer 2013.[6] Public and elite awareness of the cost issue remained high after the election, too, with peaks due to the negotiations for the new coalition government (October 2013) and the introduction of the 2014 Renewable Energy Act (April 2014).

The increase in attention shown by the newspaper data is broadly confirmed by longitudinal data on "important problems" seen by the public, asked in open-ended questions. Mentions of the category "environment/energy transition" spiked to 10%–15% of all respondents seven times in the 2011–14 period, making this the second or third most commonly mentioned issue in April–June 2011 (tied for 2nd), May 2012 (3rd), October–November 2013 (tied for 3rd), and April 2014 (3rd).[7] Although there is no close correspondence between these data and spikes in public attention on the

surcharge issue, this may be due to the fact that the salience data is based on a much broader category that includes other environmental issues.

The surcharge increases seemed to influence public opinion and to spur opponents to mobilize against the renewable energy policy. The surcharge rose from 2.1 cents/kWh in 2010 to 3.6 cents in 2012, 5.3 cents in 2013, and 6.2 cents in 2014; the total increase during the 2010–14 period was 4.1 cents (see Figure 2). During the same period, household electricity prices also rose sharply, by 5.5 cents/kWh, which news reporting attributed mainly to the increases in the surcharge. Those increases, in turn, were widely seen as due to the failure of previous efforts to retrench renewable energy policy, although advocates and opponents differed sharply concerning which parts of the policy most needed to be changed.

From September 2011 to August 2012, net support for the surcharge among the public fell sharply from a positive 63% to a negative 5%, although it immediately rebounded to the positive 10%–30% range beginning in September 2013 (see Figure 2).[8] The sharp drop in public support seems tied to the rise in critical news attention to the surcharge issue in 2012 and might be able to help explain the 2012 Solar Photovoltaics Act (adopted in June 2012); by contrast, any effects that this decline had on the adoption of the 2014 Renewable Energy Act would have been indirect, since they would have occurred with a lag.

Political changes comprised the other set of forces helping to create a policy window at this time, by increasing the political commitment to retrench the policy. First, as in the 2010–11 episode, in 2012 Germany had a CDU/CSU-FDP government that was generally favorable to cutbacks in renewable energy supports. However, Environment Minister Röttgen resisted the retrenchment efforts of Economics Minister Rösler (e.g., Kreutzfeldt, 2011) until Röttgen was fired in May 2012 after leading the CDU to a disastrous election result in the *Land* elections in North Rhine-Westfalia.

However, the composition of the government cannot explain the continuation of the policy window through the 2014 reforms, since the September 2013 Bundestag elections led to the formation once again of a grand coalition between the Christian Democrats and the Social Democrats. That change in government might have led to a decline in the renewable energy cost issue on the public and elite agendas and prevented further cuts to renewable energy supports, except for a second political change in this period: the Social Democrats, led by Gabriel (who became Energy Minister and Vice-Chancellor in December 2013), did an about-face, shifting from supporting the unrestrained growth of renewable energy to opposing it by joining the Christian Democrats in developing the 2014 Renewable Energy Act (Lauber & Jacobsson, 2016, p. 153). This shift will be analyzed in more detail below.

The third political change came from the EU Commission, which pressured the German federal government to change its feed-in tariff to an auction system. The Commission had begun backing away from the EU's renewable energy targets in March 2013, to focus more on limiting short-term costs and promoting market competition (Tews, 2014, p. 4). Then, in December 2013, the Commission opened an investigation of Germany's renewable energy surcharge, including an infringement proceeding concerning the country's generous exemptions for industry, which it viewed as state aid subject to its supervision. The Commission also issued draft guidelines on state aid for renewables, which labeled feed-in tariffs as nonmarket compatible (Tews, 2014, pp. 11, 13; Vogelpohl et al., 2017, p. 52). The German federal

government responded by successfully negotiating for the retention of most of the industry exemptions, while not resisting the Commission's drive for an end to the feed-in tariff.[9] Finally, in April 2014, the Commission formally adopted the new guidelines on state aid for renewable energy, which called for a transition from feed-in tariffs to feed-in premiums, auctioning, or tradable certificates (Boscheck, 2014, p. 258; Tews, 2014, p. 12). The German cabinet timed the adoption of its draft law for radically reforming its renewable energy policy to coincide with the EU Commission's announcement of its finalized guidelines (Vogelpohl et al., 2017, p. 52).

The Commission's change in position on state aid influenced German domestic policy by helping to create a window of opportunity for retrenchment. But it did not dictate the German policy outcome, since the new guidelines included gray areas and had dubious legality under EU law according to several expert analyses. The German government could have resisted the Commission's policy change while challenging it in the European Court of Justice—as it had done with previous EU attempts to limit Germany's feed-in tariff system (Boscheck, 2014, p. 258; Günther et al., 2014, pp. 3, 21, 22; Münchmeyer, Kahles, & Pause, 2014; Vogelpohl et al., 2017, p. 52).[10] But the Commission's new position did allow the German government to act as though it had no choice and hence to rush through the 2014 legislation with little debate, thus giving renewable energy advocates less opportunity to resist in the parliament (Lauber & Jacobsson, 2016, p. 154). Advocates mainly were able to gain a delay in the transition to auctioning, to 2017, and slight increases in the caps for each technology (Hoffmann, 2014; Monstadt & Scheiner, 2014, pp. 388, 389).

Advocacy and Opposing Coalitions—The existence of a policy window does not determine the policy outcome, since that also depends on how advocacy and opposing coalitions mobilize. In the 2012–14 period, the coalition patterns became complex, since there were five major areas of conflict: feed-in tariff rates and caps on solar and wind power; the distribution of feed-in tariff costs (industry exemptions vs. the household share); alternative methods of renewable energy financing (taxes or borrowing as partial substitutes for feed-in tariffs); other ways to relieve burdens on households; and the feed-in tariff vs. market-based alternatives (see Table 1).[11]

In this context, the ways that advocacy and opposing coalitions mobilized helped to produce major policy changes in the 2012–14 period concerning tariff rates, caps on wind and solar power, and a shift from feed-in tariffs to auctions—without leading to major changes in industry exemptions, the use of tax financing, or other ways to compensate households for the rise in electricity prices. First, the solar industry made strategic mistakes in resisting tariff cuts for too long and not negotiating concessions when the 2012 Solar Photovoltaics Act was being debated (Gründinger, 2015, p. 313). Second, partly as a result, the advocacy coalition split to an extent at this time. In a context in which the solar industry's public image had suffered, most environmental organizations backed away from supporting it (Gründinger, 2015, p. 313). Hence, although the advocates organized a demonstration of 11,000 people in Berlin in March 2012, only one environmental group (German Environmental Relief, DUH) joined the solar industry, trade associations, unions, and left-leaning parties (Gründinger, 2015, p. 312). Rather than defend the feed-in tariff rates, environmental organizations and the Green party focused on criticizing industrial exemptions and arguing for other ways to reduce the burden on households (see Table 1).

Table 1. Advocacy and Opposing Coalitions in Germany's Renewable-Source Electricity Policy, with Main Proposals, 2012–14 Episodes

Issue	Advocacy Coalition (Promoting the Rapid Expansion of Renewable Source Electricity)	Positions/Proposals	Opposing Coalition (Opposing the Rapid Expansion of Renewable Source Electricity)	Positions/Proposals
Feed-in tariff rates & caps on solar and wind power	SPD, Green *Länder* in Bundesrat; Renewable energy associations; Environment Minister Röttgen (CDU; until May 2012)	Reduce cuts to feed-in tariffs (2012)	Utilities	Reduce surcharge
			Economics Minister Rösler (FDP); European Energy Commissioner Oettinger; Environment Minister Altmaier (CDU; from May 2012); Economics/Energy Minister Gabriel (SPD)	Reduce feed-in tariff payments (2013)
			Textile firms	Surcharge is unconstitutional
	Greens; SPD (Schleswig-Holstein); Metalworkers union; Eight industry associations; Northern *Länder*, Rhineland-Palatinate *Land* governments	No caps, or delay them	European Energy Commissioner Oettinger; FDP; VZBV; Economics/Energy Minister Gabriel (SPD)	For a cap (or moratorium) on solar power and on the surcharge; Quantity steering
	Public opinion	Surcharge level is appropriate (2014)	Public opinion	Surcharge is too high (2012)
Distribution of feed-in tariff costs: industry exemptions vs. household costs	Newspapers; European Competition Commissioner Almunia; Greens; Left party; CSU (Aigner) Low-income advocacy associations (VdK, PWV); Consumer organizations (VZBV); Environmental organizations (Greenpeace, BUND, DUH, Öko-Institut); SPD (e.g., in Mecklenburg); CDU (incl. Environment Minister Altmaier); Regional court in Duesseldorf; Think tank DIW (Kemfert)	Reduce industry exemptions	CDU-FDP government; Energy- intensive industry; Chemical industry; Steel industry; Business associations (DIHK, BDI); SPD (in North Rhine-Westfalia, and in the 2013 coalition negotiations)	Retain industry exemptions
Alternative methods of financing renewable energy	Consumer organizations (VZBV); Low-income advocacy associations (VdK); CSU (Aigner); SPD (Scheer)	Shift some costs from consumers to tax financing or borrowing	CSU (Seehofer); Greens (Peter)	
	Textile firms	Shift all costs from surcharge to tax financing		

(Continues)

Table 1. Continued

Issue	Advocacy Coalition (Promoting the Rapid Expansion of Renewable Source Electricity)	Positions/Proposals	Opposing Coalition (Opposing the Rapid Expansion of Renewable Source Electricity)	Positions/Proposals
Other ways to relieve burdens on households	Utilities association (BDEW)	Use taxes on the surcharge to finance household energy efficiency		
	Think tank (DIW); Environmental organizations (e.g., BUND); Social welfare associations (e.g., DPW); E.ON utility	Subsidize appliance purchases for low-income households; Increase social assistance, housing subsidies; Reduce electricity taxes		
	Trade union association (DGB)	Cut the value-added tax on the surcharge		
	FDP; SPD (Gabriel); Greens; Left party; Medium-sized business (BVMW)	Cut other electricity taxes		
	Greens	Progressive electricity rate structure		
	Environmental organizations (Greenpeace, Öko-Institut); SPD (Machnig, Steinbrück); Left party	Regulate electricity prices		
Feed-in tariff vs. market-based alternatives	SPD, Greens; Environmental organizations	(Implicitly) retain feed-in tariff system; (Explicitly) make other reforms to reduce household costs	Neoliberal think tanks (INSM, RWI); FDP; BDEW; BDI; European Competition Commissioner Almunia	Quota system, auctions, other market models

Sources: *Berliner Zeitung*, *Frankfurter Rundschau*, *Tagesspiegel*, *tageszeitung*, *Spiegel*, and *Spiegel Online* (see note 3).

Third, in the case of the 2014 retrenchment, the 2013 Bundestag election campaign and results cleared the way for a major overhaul of the renewable energy law. During the campaign, renewable energy was a major issue, and the parties divided sharply into advocates and opponents. The Social Democrats and Greens mostly blamed electricity price increases on industrial exemptions, opposed caps on wind and solar, and called for a shift in the distribution of the renewable energy surcharge from households to industry. On the other side, the CDU and FDP criticized the payments to renewable energy producers as overly generous and called for reductions in feed-in tariff rates and caps on expansion; the FDP went further by pressing for a shift from the feed-in tariff system to a more market-oriented policy (see Table 1).[12] However, late in the campaign, Social Democratic leader Gabriel repeated earlier warnings about the possible deindustrialization of Germany due to rising electricity prices and began to call for curbing the growth of renewable energy by subjecting its producers to market forces (Gabriel, 2013).

The election result did not give a clear victory to either bloc, which might have led the status quo forces favoring the strong promotion of renewable energy to prevail, had the SPD not shifted its position after the election. That was crucial, especially since in the new government the SPD's Gabriel headed the Economics and Energy Ministry (which took over renewable energy from the Environment Ministry). However, the election result probably also limited the extent of the policy retrenchment, since the FDP (for the first time in post-war German history) fell below 5% of the vote and hence did not gain any parliamentary seats. As a result, the FDP's voice in favor of far-reaching neoliberal policy change was absent in the coalition negotiations.

The Household Costs Element of the Opposition Coalition—During the 2012–14 period, the coalition opposed to supportive renewable energy policy gained an element focusing on household costs, which was driven by the large electricity utilities, certain interest groups, and the governing political parties. This element had several components. First, in October 2012 and October 2013, as had occurred almost every fall since 2008, the electricity utilities announced that surcharge increases were forcing them to raise prices for their customers. These announcements led to spikes in news coverage and helped create the impression that the renewable energy policy was the main source of household electricity cost increases during this period.

Second, a variety of interest groups began to argue that the costs to households from the feed-in tariff were becoming excessive. Consumer organizations (led by the VZBV) and social welfare associations (including the Social Association VdK and the Paritätischen Gesamtverband) criticized the rising surcharge for its effects, especially on low-income households (e.g., Schlandt, 2011, 2012). While these organizations remained supportive of the energy transition and made many proposals to distribute its costs more evenly (such as through tax financing of some of the costs), when they raised their voices on the cost issue, it reinforced the impression that renewable energy was becoming too costly for private households. The VZBV, in particular, at times gave clear support to the opposing coalition, by supporting cuts to solar photovoltaic tariff rates beginning in August 2009, calling for a cap on new renewable capacity in January 2013, and sponsoring an August 2013 Forsa survey indicating that half the population favored a cap on payments to renewable energy companies (e.g., Geyer & Schlandt, 2013; "Weniger Geld für Solarstrom," 2009; Wenzel, 2013).

Moreover, a neoliberal interest group, the Initiative for a New Social Market Economy (INSM)—which had been founded by the metal industry employers association (Gesamtmetall) in 2000, with a large annual budget of 7 million Euros (Tillack, 2015, p. 236)—conducted public campaigns against renewable energy in 2012 and 2013. The INSM used the slogan "*EEG stoppen*" ("Stop the Renewable Energy Act") and the image of the "*Strompreisteufel*" (Electricity Price Devil), which many saw as an inverted version of the familiar smiling sun image that had been used by the anti-nuclear energy movement since the 1970s. The first INSM campaign was announced in August 2012 and included a study arguing for the superiority of a quota model, newspaper ads and articles, widely distributed posters, and a Facebook page with a petition ("Zum Teufel mit der Sonne," 2012). According to Tillack (2015, p. 237), the campaign was revived in October 2013, at a crucial time, when the coalition negotiations for the new government were taking place and the latest (large) increase in the renewable energy surcharge was announced.

Third, leaders in the governing parties embraced the household cost issue as a lever for reducing the level of support provided by Germany's renewable energy policy. The FDP, led on this issue by Economics Minister Philip Rösler, strenuously argued that the impact on household electricity prices made radical revisions of the policy necessary (e.g., Doemens, 2012; "SPD kritisiert Gaucks Äußerungen zu Energie," 2012). Rösler even attacked the surcharge for its impact on low-income households, a group that usually does not loom large in the FDP's concerns (Kemfert, 2013, p. 117). For the Christian Democrats, Environment Minister Peter Altmaier also took up the household cost issue in 2012 and again in February 2013, when he called for an "electricity price brake" (*Strompreisbremse*) in order to spare private households (Janzing, 2013). Altmaier's proposal was crucial; its radical nature created major uncertainty concering the CDU-led government's future policy, and it injected the issue into the Bundestag election campaign leading the parties to draw up distinct positions, as already noted.

Fourth, driven by this mobilization by utilities, interest groups, and politicians, news coverage of the household cost issue reached a crescendo in the 2012–14 period; it peaked at over 280 articles in 2013, more than four times the level in 2010 and more than six times the average level in the 2015–17 period (see Figure 4). The largest peaks were in August 2012, October 2012, and February 2013, and coverage was also very high during and immediately after the Bundestag election campaign, from July to October 2013, and in April 2014, during passage of the major reform bill. Finally, all these developments impacted public opinion. While the public remained strongly supportive of renewable energy and the energy transition,[13] support for the surcharge and approval of how rapidly the transition was being implemented dipped sharply in 2012 (see Figure 2). Support for the surcharge recovered into net positive territory by September 2013, but just before the Bundestag elections it remained well below previous levels, at +13%, with 55% finding the surcharge appropriate or too low and 42% saying it was too high. Moreover, the energy transition issue became more salient for the public in this period, as described earlier in this section.

The household costs element of the opposition can help explain the Social Democrats' shift in position immediately after the September 2013 Bundestag elections. Most Social Democratic politicians had supported the feed-in tariff policy during the campaign, but the election result suggested there was little payoff for this

approach;[14] their party received only 26% of the popular vote, which was up only 3% from its disastrous 2009 showing. The SPD's poor result in 2013 also gave it little leverage in coalition negotiations with the Christian Democrats, who had received 42% of the vote, up 8% from the previous election (Lauber, 2014, pp. 21–25).

Furthermore, the Social Democrats had reason to fear that the household cost issue would be used against it in future election campaigns if renewable energy policy were not radically reformed in order to put the brakes on the rising surcharge. After all, the surcharge was growing rapidly (with increases announced in October every year), the Christian Democrats and Free Democrats clearly had been willing to politicize the household cost issue in the 2012–13 period, public opinion had turned against the surcharge in 2012, and the Social Democrats had done poorly in the 2013 elections while largely defending existing renewable energy policy.

However, there was another path of influence on the SPD, running through interest groups, which also helped to produce its about-face. This path had several aspects. First, the four large private electricity utilities were losing market share to renewable energy (which had priority access to the grid) and were facing other, unrelated financial problems, so they mobilized against the renewable energy policy in order to try to gain some breathing space for their fossil fuel plants (Lauber, 2017, pp. 173, 174). Indeed, on the eve of the coalition negotiations, the utility RWE threatened that electricity blackouts would occur if government subsidies for conventional power plants were not forthcoming (Dehmer, 2013). More generally, the coal faction reasserted itself within the SPD; in particular, RWE pressured Social Democratic-governed cities and towns in North Rhine-Westfalia (Lauber, 2017, p. 175). After the 2013 elections, Hannelore Kraft, that state's premier, was chosen to lead the coalition negotiations on energy policy for the Social Democrats, and she quickly made clear that she would seek to protect the interests of the large utilities.

Second, under pressure from the European Commission, industrial firms with exemptions began to fear losing them, and they mobilized against the renewable energy policy around the time of the Bundestag election (Tillack, 2015, p. 238). Third, Social Democratic leaders, especially Gabriel, began to argue that the renewable energy policy threatened to lead to the deindustrialization of Germany. Gabriel had used this argument, which was pressed by the labor union representing coal workers (IG Bergbau, Chemie, Energie), since 2011, and he revived it in the 2013 election campaign, to the dismay of the SPD's prospective coalition partner, the Greens (Beste et al., 2011; Lauber, 2017, p. 172; Sauerbrey, 2013).

Conclusions

Theoretical Contributions

Case studies drawn from one country's experience provide an inherently limited empirical basis for theorizing, and it can be difficult to assess the relative causal weights of multiple factors. Nonetheless, within those limitations, the foregoing case studies support five theoretical conclusions for the study of resistance to energy transitions as well as resistance to other kinds of climate policy such as carbon pricing; these propositions should be tested against evidence from other cases. First, as expected by

policy windows theory, when episodes of opposition to strong renewable energy policies arise, this will likely be due to a convergence of problem awareness and political commitment; rising electricity surcharges costs can play a key role in helping to raise problem awareness. Second, in accordance with advocacy coalition theory, the addition of new actors to the opposing coalition, such as interest groups and politicians speaking on behalf of households, may lead to more extensive policy retrenchment. Third, as a consequence of the first two arguments, the household costs of renewable energy policies should be included as causal factors that may affect the public agenda and the composition of advocacy and opposing coalitions, as has been shown for carbon pricing in the U.S. Congress, California, and British Columbia (Karapin, 2020; Rabe, 2010).

Fourth, analysis of the German energy transition shows that both reinforcing and reactive sequences can be found within an overall pattern of path dependence, and that a combination of external and endogenous factors may be most effective in producing change. The adoption of the Feed-in Tariff Law in December 1990 initiated reinforcing feedback among government policy, technological advances, the growth of the renewable energy sector, the political power of its lobbying organizations, and public and elite support for renewables. The passage of the 2000 Renewable Energy Sources Act, which was driven by an external event (the 1998 election) as well as the growth of the domestic wind-power sector, gave this system further impetus. By contrast, the 1997 and 2010–11 episodes, which led to stalemates between supporters and opponents and to little policy change, were driven mainly by endogenous backlash processes.

In the 2012–14 episodes, the reactive forces included both growing endogenous factors (surcharge increases, politicians' and interest groups' mobilization on it) and strong exogenous ones (the Liberals' elevation into government in 2009, the E.U. Commission's neoliberal offensive). This combination of forces was powerful enough to overcome—to an extent—the momentum of the feed-in tariff system. While these forces did not reverse Germany's set of supportive renewable energy policies, they did transform it, by largely ending the feed-in tariff for new installations in favor of an auction system and by introducing caps on most policy-supported new installations, which effectively converted the government's minimum targets for expansion into maximums.

Fifth, reactive sequences appear to be more open-ended than reinforcing sequences; this claim is part of how the theory is defined, and it seems to be supported by the subcases analyzed here. The 2014 reforms, even given the decision to end feed-in tariff policy, could have reduced the burdens on households in a variety of ways: by reducing the exemptions for industry, cutting the electricity tax for lower and middle income consumers, cutting the value-added tax on the surcharge for those groups, requiring renewable energy producers to contribute to a solidarity fund that would compensate them, or requiring utilities to pass on wholesale price cuts to consumers. These kinds of changes would have been politically popular,[15] relieved the political pressure created by the rising surcharge, and made it possible to set more ambitious corridors for renewable energy expansion—although of course the utilities and industry would have resisted some of those measures.

In the event, the grand coalition government used the household cost issue to scale back the expansion of renewable energy rather than to unburden households.

Nonetheless, the persistence of projected high surcharges into the mid-2020s and of the household cost issue on the public agenda at least through 2017 (albeit at a lower level than in previous years; see Figure 4) created some lasting potential for redistributive reforms in this policy area.

The Role of Household Costs

The 2012–14 episodes brought more success for the opponents than did the 2010–11 episode for a number of reasons, many of them linked to the household cost issue. First, the surcharge on household electricity prices was substantially higher in the later years than in the 2010–11 period, and public opinion on the surcharge turned sharply downward in 2012. Second, the advocacy coalition, which had been unified since 2000, experienced major divisions; most environmental organizations were reluctant to defend the solar industry in 2012, the Social Democrats did an about-face to help produce the 2014 law, and the *Länder* and the Greens accepted that law rather than fighting it in the Bundesrat (Hoffmann, 2014). The Social Democrats' role was crucial, and they probably responded both to the rising pressure from the large utilities with coal-fired plants and to the household cost argument being pressed by consumer organizations, the INSM's campaign, the CDU, and the FDP. Third, by joining the conflict in 2013, the European Commission heightened the issue's position on the agenda and provided cover for the German federal government to push major reforms through the parliament rapidly enough to undercut backbench opposition.

Finally, the 2013 Bundestag election campaign and results made the 2014 reforms possible, but in a way that was complex and mediated by the parties, not just the voters. If the FDP had done well enough to join the post-2013 government, the retrenchment of renewable energy policy probably would have been larger than it turned out to be. But the SPD's poor showing in the election, after largely defending the feed-in tariff policy in the campaign, helped convince that party's leaders to do an about-face right after the election. Public opinion apparently mattered, but with a lag; although the public had swung back to net support for the high electricity surcharge by the time of the election, elites seemed to respond more to the sharp dip in support during 2012 than to the modest increase in support afterward.[16]

Household costs comprised a new element in the debates over renewable energy policy beginning in 2009, but especially in the 2012–14 period. Increases in the surcharge and in electricity prices played a fairly direct role in driving the debate in the recent episodes, although the stabilization of the surcharge led to a decline in the issue's position on the public agenda after 2014. However, the high, fairly stable surcharge (currently about 6.5 cents/kWh, about 20% of the retail price) continues to make household costs something of a political issue. By contrast, gasoline, heating oil, and natural gas prices, although they impact households and were also rising in the early 2010s, did not enter into the debate.

The Outlook for Renewable Energy in Germany

Germany is a case of incumbent resistance in the later stages of an energy transition, in which the large utilities' recent successes have led to reforms that have slowed but not stopped the decarbonization of the country's energy production system. So far,

the reforms have caused renewable energy capacity growth to slow from exponential growth during 2007–12 to linear growth of about 6,800 MW per year in the six years since then, as shown in Figure 3 by the relatively stable annual capacity additions starting in 2013. Although given recent policy changes it is difficult to project far into the future, if the 2013–18 average growth rate continues, Germany will be nearly on course to reach the official target of 65% renewable electricity consumption by 2030.[17] While the switch to an auction model with quotas was expected to slow the growth of onshore wind power (and it did so in 2018 and the first half of 2019), the February 2018 federal grand coalition agreement called for additional auctions of 8,000 MW of wind and solar capacity to be built in 2019 and 2020 (later revised to the 2019–21 period), which, if successfully implemented, would tend to counteract those effects.

For the large utilities, the upshot of the recent retrenchment and the later adjustments to them is that the phaseout of fossil fuel power plants is now expected to occur more slowly and predictably, but to still occur (Lauber, 2017, p. 176). This was affirmed by the 2018 grand coalition agreement, which accelerated the renewable energy target to 65% of electricity consumption by 2030, apparently in an attempt to restore some international credibility in the face of the government's admission that it will fall far short of its 2020 greenhouse gas emissions target of a 40% reduction (CDU et al., 2018, pp. 71, 72, 144). Public opinion and all the established parties favor the expansion of renewable energy, and the current trajectory and new 2030 target are expected to lead to the phaseout of coal-fired generation (Morris, 2018). It should come as no surprise, then, that as of July 2019, the stock prices of Germany's largest utilities have not recovered since the declines that began in 2008,[18] and that some of them have begun to sell coal assets and increase their investments in renewable energy (Frese, 2016; Tillack, 2015, p. 246).

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Notes

1 This is measurable with the news sources used; the presence or absence of common beliefs is not explored.

2 From 2009 to 2014, the annual value of industrial exemptions from the levy rose much faster (575%) than the levy did (376%); data from Freericks and Fiedler (2017, p. 7).

3 Using Nexis Uni, I searched four daily newspapers (*Tagesspiegel*, *Berliner Zeitung*, *Frankfurter Rundschau*, and *tageszeitung*) and the newsmagazines *Spiegel* and *Spiegel Online* for articles that mentioned either renewable energy or solar as well as electricity prices and the renewable energy surcharge; I identified and analyzed 906 such articles in the 2000–17 period.

4 Rheinisch-Westfälisches Institut für Wirtschaftsforschung.

5 The 2017 Renewable Energy Act slightly changed the expansion corridors, raising the cap to 2,800–2,900 MW per year for onshore wind and to 150 to 200 MW per year for biomass (BWE, 2017, p. 2).

6 Each October, the Federal Network Agency (Bundesnetzagentur) announces the renewable energy surcharge for the following year; in most years after 2008, this was followed by electricity utilities'

announcements of their upcoming price increases. A scatterplot of the number of articles mentioning both renewable energy and either the surcharge or electricity price increases in October and November by the size of the surcharge increase during the 2001–18 period showed a strong linear correlation, with an R-squared value of 62%.

7 From Forschungsgruppe Wahlen data, available at http://www.forschungsgruppe.de/Umfragen/Politbarometer/Langzeitentwicklung.

8 Net support is defined as the percentage who said that the surcharge was appropriate or too low minus the percentage who said it was too high, using data from the Agentur für Erneuerbare Energien. The bulk of the public-opinion evidence suggests that support dropped sharply in 2012 and had begun to fall by June (see the top and bottom lines on Figure 2). The dramatic downward trend in net support for the surcharge during 2012 is corroborated by two data points from the Forschungsgruppe Wahlen, in March and October 2012, on the speed of renewable energy development (the short line on Figure 2), and by two other data points from that polling organization on the acceptance of electricity price increases to fund renewable energy investments, also from June and October 2012 (not shown on the figure). The steepness of the decline depends on the 2011 reference point; but while one might expect that the 2011 data point would reflect temporary enthusiasm for renewable energy in the wake of the Fukushima nuclear accident in Japan, a 2011 spike in support for renewable energy is not found in two questions that the AEE asked every year during the 2007–15 period except 2008 (see the second line on Figure 2).

9 From 2014 to 2016, the value of industrial exemptions declined only slightly, by 9.5%, while the size of the renewable energy levy per kWh was stable (rising only 1.8%); data from Freericks and Fiedler (2017, p. 7).

10 The German government did challenge the European Commission's decision that feed-in tariffs under the 2012 Renewable Energy Law are state aid, but it did so only in March 2015, after ending its feed-in tariff policy for large facilities by adopting the 2014 reforms. The government ultimately prevailed in the European Court of Justice in March 2019, in a ruling that protected energy-intensive industries' exemptions from the surcharge (Reuters, 2019).

11 This table was constructed from the news articles gathered for Figure 3, using 481 articles published in 2012–14; see note 3 above. The news sources permit identifying coalitions based on their common, publicly stated goals, which also signal their coordination of activity in pursuit of those goals.

12 See, for example, Schulte (2013), Doemens (2013), Wille (2013), "SPD will Ministerium für Energie" (2013), Artz (2013), and Geyer (2013).

13 Even in August 2012, 94% found the expansion of renewable energy to be "very important" or "important," 73% to 84% found having a wind or solar facility in their neighborhood to be "good" or "very good," and 63% agreed to the construction of new power lines if needed for a complete transition to renewable energy (AEE, 2012, pp. 1, 2). However, Figure 2 shows a decline in the share of the population viewing the expansion of renewable energy to be very or extremely important, from 80% in 2009 to about 65% in 2013 onward.

14 At the same time, the 2013 elections did not necessarily show the electricity surcharge issue to be a winning one for the opponents, since the Liberals lost badly, dropping 10 percentage points to just under 5% of the vote.

15 For example, reducing exemptions for industry would have been supported by large majorities of the population ("Erneuerbare Energien hoch im Kurs," 2012; Wenzel, 2013).

16 The governing parties were well aware of the drop in public support during 2012 (e.g., "Ökostrom-Abgabe steigt auf Rekordniveau", 2012), and a major VZBV poll showing opposition to household costs was widely publicized a month before the 2013 elections (Wenzel, 2013). Indeed, some politicians, such as in the FDP, had been warning as early as 2010 that rising household costs could threaten public support for renewable energy (Schulz, 2010).

17 Calculated from the data used for Figure 3. Assuming stable total electricity consumption (as was the case from 2005 to 2018), continued linear growth of renewable source electricity at the 2013–18 growth rate will lead to a 53% renewable share of consumption in 2025 (exceeding the official target of 40–45%) and to 63% in 2030 (just short of the 65% target).

18 Data from Google Finance, for ENBW, E.ON, and RWE.

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