

Multilevel governance of energy transitions in Europe: Addressing wicked problems of coordination, justice, and power in energy policy

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Abstract Concerns about energy transition and policies to achieve a clean energy Europe are omnipresent in all European discourses. A transformation dynamic has captured all European states, whereby the extent, scope, and direction of this transition vary between different (EU member-) states and political levels (European, national, federal, local). Likewise, governance dynamics and policies vary between the different European governance and regulatory systems. This Special Issue aims to take stock and discuss approaches in governance and policy research to assess, analyse and evaluate this variance from a theoretical, methodological, and empirical perspective. Of particular interest are recourses to investigate concepts describing and analysing the formation of new policy fields. Within the framework of the Special Issue, the role of specific architectures in which the energy transformation in Europe is embedded (e.g., federalism and multi-level structures, institutional constellations of actors, multi-sector networks, etc.) are analysed to explain the energy transition policies and their transformative properties. Linking the empirical results back to basic research concepts and relating the results to the existing approaches in policy and governance research facilitates a better understanding of the energy transition as a classic and/or new transformation policy.

Keywords Multilevel Governance · Energy Transitions · Europe · Policy analysis · Governance research · Federalism

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Multilevel-Governance der Energiewende in Europa: Komplexe Probleme der Koordination, Gerechtigkeit und Machtausübung in der Energiepolitik

Zusammenfassung Fragen zur Energiewende sind in sämtlichen Diskursen in Europa in aller Munde. Die Transformationsdynamik hat alle europäischen Staaten erfasst, wobei Ausmaß und Richtung der Energiewende sowohl zwischen verschiedenen EU-Mitgliedsstaaten als auch zwischen verschiedenen föderalen politischen Ebenen (europäisch, national, regional, lokal) variieren. Ebenso ist die Governance-Dynamik innerhalb des europäischen Mehrebenensystems sehr unterschiedlich ausgeprägt. Das Ziel dieses Sonderheftes ist es, eine Bestandsaufnahme dieser Dynamiken vorzulegen und verschiedene Perspektiven der Governance- und Politikforschung zu diskutieren. Auf dieser Grundlage soll diese Varianz aus theoretischer, methodischer und empirischer Perspektive eingeschätzt, analysiert und bewertet werden. Von besonderem Interesse sind hierbei Rückgriffe auf Forschungskonzepte, welche die Entstehung neuer Politikfelder beschreiben und analysieren. In dieser Hinsicht wird im Rahmen des Sonderheftes erstens die Rolle spezifischer Policy-Architekturen erfasst, in welche die Energiewende in Europa eingebettet ist (z. B. Föderalismus und Mehrebenenstrukturen, institutionelle Akteurskonstellationen, multi-sektorale Netzwerke etc.). Zweitens geht es im Rahmen dieser Analysen darum, die Energiewendepolitik im Hinblick auf ihre transformativen Eigenschaften zu erklären und zu bewerten. Hierbei ist drittens die Verknüpfung empirischer Erkenntnisse mit (theoretischen) Forschungskonzepten unter der Leitfrage, was die Einsichten für bestehende Ansätze der Policy- und Governance-Forschung bedeuten, für ein besseres Verständnis der Energiewende als klassisches (Energie)Politikfeld einerseits und/oder als neu strukturierte Transformationspolitik von erheblicher Bedeutung.

Schlüsselwörter Multilevel Governance · Energietransformation · Europa · Policy-Analyse · Governance-Forschung · Föderalismus

1 Introduction

The contributions of this Special Issue are devoted to questions of policy creation and multilevel governance structures concerning energy transitions in European countries. In doing so, the articles of the Special Issue show the manifold and immense challenges facing an effective and democratic European multilevel energy governance. On the one hand, the contributions address the well-known conflicts between the nation-states regarding different interests and goals of their energy policies (Chowdhury and Wessel 2012; Knill and Liefferink 2013; Ehnert et al. 2018). On the other hand, numerous operational problems in the internal processing and formulation of energy policies become visible, which require a high degree of coordination and harmonization (Jordan et al. 2004; Selianko and Lenschow 2015; Skjærseth 2016, 2021). Thus, the various governance levels are confronted with typical patterns posed by the challenges of federal systems in negotiated democracies (Wurster 2013b; Radtke 2018a; Wenzelburger et al. 2020). Fritz Scharpf

long ago described the challenges when multi-level governance systems attempt to integrate political bodies, public institutions, private companies, civil society representatives, and other actors for creating and implementing harmonized, functioning policies (Scharpf 1991, 2019). However, the demands for coordination can become so overwhelming that costs and resources might paralyze the systems, making them ineffective and convoluted. Therefore, a certain simplicity and clarity of harmonized policies in multilevel governance systems are needed, for instance, through overarching concepts and strategies and meta-governance (Scharpf 2021). However, the closely interconnected systems tend to hamper the active participation of non-governmental actors and communities through complexity, bureaucracy, and lack of input channels (Bauer 2015; Radtke 2016). This problem can be explained by the well-known trade-off between system effectiveness and inclusive participation (Dahl 1994). There are numerous difficulties and pitfalls when designing and implementing participatory arrangements, especially in energy policy. Several contributions to this Special Issue illustrate that energy transitions are significantly influenced by the bottom-up engagement of local initiatives, niche actors, and social movements (Radtke et al. 2020). These activities are generally based on a different logic than the top-down governance strategies and goal-oriented policies created by state institutions and coordinated with organized interests such as associations, unions, and large corporations. The task of creating policies driven by democratic principles is, therefore, to take into account the principles of energy justice and inclusive participation to ensure that diverse preferences are recognized (Jenkins et al. 2016; van Veelen and van der Horst 2018). In this context, it is evident that the different levels and actors between local, regional, and national may conflict with each other and that distribution and power struggles are likely to characterize the energy transitions in all European countries (Radtke and Scherhauser 2022).

The European Union, its institutions, the nation-states, and the associations of European regions, cities, and municipalities are bound to resolve this task jointly through numerous complex coordination processes. The contributions of this Special Issue introduce some examples of successful decision-making processes and policy design, whereby the analyzed cases are not exhaustive and, in each case, also reveal numerous challenges. This points to the specificity of energy transitions, characterized by solid spatial, technological, and community dimensions (Calvert and Simandan 2010; Fuchs and Hinderer 2014; Pfenninger et al. 2014). A governance strategy may be promising for a particular region but not transferable to other regions. The task of overarching levels and policy strategies is, therefore, to create overarching frameworks and concepts, but also mediating institutions, which are suitable on the one hand to provide essential support services for the usually overburdened local and regional units and, on the other hand, to initiate and develop transcending strategies that promise successful policy diffusion and upscaling potential in all governance levels (Radtke and Drewing 2020). In the coming years, the institutions of the European Union and the member states will be called upon to give European energy policy a new face and adopt new governance strategies.

2 “Energiewende” as a classic and/or new transformation policy

Policy fields are constantly subject to change. However, triggered by endogenous and exogenous extreme conditions, “transitional policies” can be identified to produce profound societal and technological transformation (Czada and Radtke 2018). Energy policy is generally considered an “ixothymic” policy field characterized by structural solid conservatism and path dependencies (Wurster 2010). Compared to other policy fields, 20th-century energy policy can be seen as an example of rigid and inflexible confinement and determination of the technical infrastructure and its governance and design. However, triggered by various factors, a transition in electricity generation, in particular, has been initiated in Europe since the end of the previous century, starting with measures and policies supporting the liberalization of the energy markets. Since then, research has provided various case studies and interpretations of the specific character of these transitions. From the perspective of Transition Theory in the context of sustainability (Geels and Schot 2007), the European or global energy transition process appears to be like being copied from a textbook. Triggered by various events such as climate change and nuclear accidents, a shift in trajectory was caused by modifying or breaking down existing structures. These transformations led to the emergence of a new regime supported by the involvement of new actors and the introduction of new governance mechanisms. This interpretation would suggest a classical transformative character. However, indications, such as the persistence of old energy structures and governance mechanisms, may indicate the emergence of either a second or the persistence of an old regime with a new facade. This pertains to whether a decentralized transformation is taking place or if decentralization is again taking on centralist features. Therefore, different assessments can be made regarding whether it is a classical and/or entirely novel transformative policy or a modified form.

The contributions to this Special Issue use several examples to show that path dependencies exist in the energy regimes but that new actors and sociotechnical systems also break into these structures. The results confirm the basic assumption of transition studies that niche actors find it more challenging to achieve their goals. However, external influences may facilitate their success by creating a window of opportunity. Most recently, however, it became apparent that shocks, such as the Russia-Ukraine and the resulting energy crisis, tend to support the old fossil fuel energy system. Moreover, the “new” energy regime with a higher share of renewable energies already demonstrates new path dependencies, which are economically, socially, or technologically unfavorable for promoting further innovative, creative, and ambitious processes. These are needed to find adaptable, flexible, and situationally adapted solutions for new challenges and problems of climate-neutral energy production. Recent examples are renewable heating systems and the transformation of the mobility sector, which contain technical systems that create new politically undesirable dependencies, relocate polluting production facilities, or support the fossil or nuclear energy regime in other parts of the world.

Therefore, the findings of the Special Issue make clear that energy transitions can be understood as a “melting pot” of old and new policies that are permanently reconfigured. Hence, creating new policies from scratch is impossible, despite the

enormously transformative character. However, opening a new field of action based on step-by-step changes offers the opportunity to undertake a re-framing of control and regulation, promotion, and ex-novation. It could lead to a content-related design of technologies and implementation policies compatible with primary economic conditions, social mechanisms and structures, and democratic principles.

3 Energy transition as a new policy field: Formulating new policies

The energy transition has undoubtedly given rise to a new policy field, even though energy, technology, and environmental policies have already been components of international policies (Radtke and Canzler 2019). Some indications can be drawn from previous research on how this new policy field is characterized: both in terms of content and specific forms of formulation, agenda setting, collaboration among actors, mechanisms in the process of democratic decision-making and legislation, as well as in the non-parliamentary realm of civil society, business, and academia. Firstly, the energy transition, similar to environmental policy, is typically a cross-cutting policy comprising a large body of content (Wurster 2010). Secondly, its breadths of topics and the complexity of how they interact is strongly reflected in the problem-solving approaches employed by the actors and their styles: the energy transition is knowledge-intensive, linked to various core beliefs (e.g., climate change), requires close collaboration among politics, (energy) industry, and organized or non-organized civil society, and is a comparatively open project for the future. It has become evident that this is a highly conflict-ridden policy field with complex, wicked problems: this applies to both societal policy discourses and those of political parties and various stakeholders.

The contributions to the Special Issue show that specific fields of action in the energy transition, such as energy generation (especially the expansion of renewable energies) and the management of contaminated sites (coal power plants, mining areas, nuclear waste disposal), already exhibit signs of lock-ins to existing policy schemes. In other fields of action of the energy transition, such as heat and mobility, there are even more open spaces for policy creation but also more challenges to implementing new solutions.

In this situation of change, new constellations of actors are already emerging. The pressure for action on the design of energy policies has risen sharply to counter the problem of excessively high costs and cheap energy production. The economic problems (impending recession, inflation) in Europe and the high costs arising from constructing new infrastructures are a challenge for policymakers because no significant investments have been made for a long time, and the conversion of energy systems is more costly than maintaining the old technology. However, governments are bound to achieve climate targets and, therefore, must continue to pursue the path of energy transformation. The economic conditions and the price problem, however, lead to the fact that either old energy systems are maintained longer (for example, coal energy) or ecologically problematic forms of energy production, such as nuclear power, are declared as “sustainable energy” leading to a continuation of the old energy paths. Based on numerous empirical results, the contributions in this volume

show that a shaping force emanates from numerous actors, communities, and new initiatives that support an ambitious formulation of new policies and include active involvement in the implementation. However, success is not guaranteed.

Under unfavorable socio-economic and political conditions in the form of disputes between political parties and organized interests on the one hand and economic problems on the other, policy regimes, governments, and influential actors have little motivation to test new policy strategies and use new forms of collaborative and participatory governance arrangements. The increase in the challenges and complexity of individual sectors of energy transitions in respective regions leads to a substantial increase in the perception of disadvantages, injustices, and impairments. This, in turn, inhibits the willingness to innovate and the actors' commitment.

In this respect, the contributions of the Special Issues unanimously emphasize the need for sensitive policies that anticipate conflicts and constraints, reflect the responses of various actors, and adapt to changing context conditions. Without a practical policy feedback function regarding the recognition of actors' and regions' preferences, new energy policies will not be very effective concerning the expected outcomes, and there is a risk of blockage and strangulation of beneficial dynamics. In essence, the contributions provide empirical evidence and conceptual insights justifying the conclusion that decision-making policy and governance actors must dare to take the uncertain and challenging path of "open space policies" and to include numerous and recalcitrant actors in order to achieve climate goals, acceptance, and progress in the transformation more quickly (Radtke 2020).

4 New governance arrangements: policy output with a soft shell and a hard core?

Forming (new) governance arrangements and using policy instruments at local, sub-national, national, and supra-national levels are essential and constitutive preconditions for far-reaching energy transitions. The Special Issue offers some indications that the "new" governance of the energy transition relies more on open, flexible, cooperative, and participatory (and thus "soft") policy instruments than on top-down decision-making instruments (Wurster 2013a). This might be caused by a modern understanding of politics and administration when it comes to including the various new actors (reflexive governance, new forms of cooperation, public-private partnership, etc.; Radtke et al. 2018a) in this policy field that offers leeway for change. A crucial question in this regard is whether such new cooperative governance arrangements only exist alongside "harder" (i.e., rigid and inflexible) forms of regulation or whether the "soft" policy instruments are merely grafted onto an essentially inelastic form of governance, for instance, by addressing only policy issues of less importance. In addition to the specific design of traditional policy instruments such as command and control (bans on specific energy technologies, environmental regulations), economic incentives (taxes, energy saving discounts), or structuring (procedural specifications, neo-corporatist concertation; Wurster 2013a), the question arises how new policy instruments, such as preventive interdependence management, market-based incentive instruments such as quasi-markets (European

Emissions Trading System) or the (re-)regulation of liberalized market sectors can contribute to a fundamental transformation of energy systems in Europe. One can argue that using new policy instruments is crucial in influencing energy policies in EU member countries (Wurster 2013a). In addition to traditional regulatory instruments like energy market regulations or energy efficiency standards, market-oriented instruments like Feed-in Tariffs (FiTs) and Renewable Portfolio Standards (RPS), in particular, have gained importance on the EU-, national, and also sub-national level (Wurster and Hagemann 2018, 2020; Wurster and Köhler-Tschirschnitz 2021). It is still unclear whether and to what extent there will be a fundamental change in modifying older policy instruments or a diversified readjustment of governance arrangements for the energy transition.

In this respect, the contributions of the Special Issues show that the actors in the energy transitions are considerably dependent on these instrumental conditions. However, they try to respond individually to these requirements, develop strategies to benefit from advantages, and avoid systematic disadvantages as best as possible. These unintended side effects are sometimes unfavorable for achieving climate goals and innovation, so governments constantly adjust the instruments. Inevitably, they always lag behind the dynamics of unintended changes. In the future, the greatest hope of the European Commission and the member states lies in the effect of CO₂ prices and quotas (carbon taxation), which will continue to rise (prices) or contingencies will be limited (quotas) in the coming years (Domon et al. 2022; Lovcha et al. 2022; Runst and Höhle 2022; Sgarciu et al. 2023). Large energy companies are already trying to adjust and adapt to these changed market conditions ahead of time. How this new “hard core” of energy and climate policy will work remains unclear. However, it seems that avoidance and evasion strategies will be evoked, or reallocation or exemption from costs will be attempted, depending on the level of influence of the respective actor. It is already apparent that “climate-neutral” companies and products are not CO₂-neutral if the bar is not set in an ambitious way. In the European energy sector, a shift of non-sustainable production of large amounts of energy to other world regions is emerging (for example, hydrogen production). This development is unfavorable for the European economy and the idea of decentralized energy transition and thus also activation of local actors. In the future, therefore, it will be a matter of further instruments and governance arrangements that react appropriately to carbon taxation and form a soft shell that is effective in terms of effectiveness and innovativeness, energy justice, and climate neutrality and that promotes the intended goals of the CO₂ principle and contributes to achieving them.

5 Energy communities: A contribution for more energy justice in Europe?

A few years ago, the European Union anchored the principle and vision of creating energy communities in the energy policy packages. At the same time, a transition mechanism to promote fairness was created to provide additional financial assistance to regions particularly affected by the energy transition, such as coal mining

areas. The European administration is thus responding to the requirements of the principles of energy justice and energy democracy. Energy justice is based on the three dimensions of distributive, procedural, and recognition justice (Jenkins et al. 2016, 2017; Sovacool et al. 2017; Carley and Konisky 2020). The distributive dimension is evident in the energy transition at the spatial level, for example, because the expansion of renewable energies is unevenly distributed. There are regions in Europe where wind power and photovoltaics expansion, for example, has been much more significant due to favorable natural conditions than in other places. However, the distribution also affects the gains and losses generated by the energy systems. The other two dimensions of procedural and recognition justice are related: The distribution of gains must benefit the most affected communities, and these regions and communities also need special recognition of their needs, preferences, and identities. In research, place attachments and identities describe these interrelationships and explain the patterns of effects, impacts, and responses in different spaces among different actors and communities (Devine-Wright and Batel 2017; van Veelen and Haggett 2017; Manzo and Devine-Wright 2020).

Several contributions to this Special Issue, in particular the papers by Henner Busch, Jörg Radtke and Mine Islar, Gerhard Fuchs and Ulrike Fettke, Achim Brunnengräber and Lucas Schwarz, Nils Stockmann and Antonia Graf, and Pia Laborgne, describe and emphasize the importance of equity aspects in the energy transition. They show that the shift of the focus of European policy towards aspects of a fair and just transition and the promotion of energy communities is an appropriate response to the bottom-up processes of numerous civic initiatives in European regions, either to shape local energy production, distribution, and consumption in a participatory way, for example in the form of community energy, or to create special promotion and support programs for structurally weak and disadvantaged regions. However, the contributions also show that, on the one hand, the goal of creating Europe-wide energy communities may not be achieved due to particular interests and the failure of diffusion and scaling-up of community-driven and participatory approaches. On the other hand, the conditions of thriving energy communities at the local level are so complex and convoluted that a transfer or policy response seems challenging to implement (Radtke 2014, 2018c, 2023; Radtke and Ohlhorst 2021). Nevertheless, the contributions provide evidence about the effectiveness of conducive conditions. Quite a few communities experience financial support, enjoy societal recognition, and reach prominence, for example, to which they respond positively. It would, therefore, not be correct to assume that policy creation for community-friendly, socially just, and more democratically shaped energy transition strategies would not be possible. Numerous European local and regional initiatives could be activated and newly created through a more far-reaching and effective political action with policy strategies promoting energy communities. The hitherto existing “island problem” of only individual initiatives and best practices of community energy and other community-oriented energy projects could thus be overcome, at least in tendency. Following the emergence of numerous community energy projects in Europe, researchers have recently speculated whether the “community mode” will increasingly be replaced by a “local energy mode” that relies less on the bottom-up involvement of citizens and communities and instead emphasizes the activities of local energy actors such

as municipal utilities (Devine-Wright 2019). This would not be problematic because local energy would grow more strongly in Europe, advancing the decentralized energy transition and offering regional value creation to the regions. The participation of the local population would be even more desirable here, but the two models need not necessarily be mutually exclusive in practice. For example, community energy projects can cooperate with municipal utilities and local energy companies, or the latter can offer participation to local stakeholders or citizens. Research has shown that local communities want to influence decision-making and planning processes (procedural justice), they want to share in profits (distributional justice), and their preferences should be heard and taken into account (recognition justice) (Langer et al. 2017; Schumacher et al. 2018; Azarova et al. 2019; Liebe and Dobers 2019; Suškevičs et al. 2019; Stadelmann-Steffen and Dermont 2021). These justice factors can be achieved through various arrangements, strategies, and instruments. They are indispensable for achieving democratic legitimacy of the energy transition at input, throughput, and output levels (Radtke et al. 2018b; Radtke and Schaal 2018; Sareen 2020). In the future formulation of energy policies, it will therefore be necessary to promote and establish energy communities on a massive scale simultaneously. At the same time, these policies must be anchored on justice principles in the mechanisms and schemes concerning policy outcomes.

6 Policy outcomes of the energy transitions in Europe: Failure or incremental change?

Following the Fukushima incident in 2011, several countries, including Germany, embarked on ambitious energy transition policies to establish sustainable energy systems by replacing fossil fuels and nuclear power with renewable energy sources. However, achieving such transformative changes requires overcoming technical, economic, societal, and political challenges at the national level. As national energy systems are embedded within a complex multilevel energy governance framework, it is also crucial to align national policies with EU-level policies to facilitate a cohesive and comprehensive energy transition across the European Union, considering regulations governing the internal energy market. In this respect, several articles in this Special Issue examine how the interplay between EU and national governance has impacted energy transitions. On the one hand, conflicts arising from the multilevel setting can undermine national energy transitions, with European regulations potentially conflicting with ambitious domestic policies. On the other hand, these conflicts can also strengthen national energy transitions if EU regulations are more ambitious than the country's existing policies. Thus, national energy transition policies are situated within a complex multilevel governance system in Europe, shaped by national interests, the interests of other EU member states, and EU-level institutionalized interests. Several articles in the Special Issue reveal that national energy transition policies have experienced a mix of alignment and divergence with EU-level policies. As a result, national governments have encountered challenges and support from the European level in their transition efforts. One critical question this Special Issue wants to shed more light on is whether and in what way this complex

multi-level situation leads to intended and unintended outcomes when it comes, for instance, to changes in the national energy mix and what role other external factors such as shocks (Fukushima accident, Ukraine conflict, etc.) plays in this. One can argue that there has not yet been complete harmonization since the energy mix in different EU member states still varies greatly. Countries like Germany, Denmark, Spain, and Sweden have made significant progress in increasing the share of renewable energy in their energy mix. At the same time, Poland, the United Kingdom, and Germany are still heavily dependent on fossil fuels, including coal, oil, and natural gas. Natural gas is a relatively cleaner fossil fuel and might serve as a transitional energy source in many EU member states. Countries like the Netherlands, the United Kingdom, and Italy utilize a substantial natural gas infrastructure for power generation and heating, even though the Russia-Ukraine conflict has pressured this. Nuclear power has been a significant component of the energy mix in countries like France, the Czech Republic, and Slovakia. These countries rely on nuclear power to meet a significant portion of their electricity demand. These different results are also due to natural conditions, energy resources, and governance decisions made long ago. Nevertheless, over time, governance decisions today can leave noticeable traces in the national energy mix of a country or region (e.g., the phase-out of nuclear power and coal or the expansion of renewable energies).

The policy outcomes of the energy transition in Europe so far are very mixed. Besides remarkable changes in some fields, one can find patterns of continuity and, in many regards, no signs of a fundamental change. Currently, the European and global energy crisis in the aftermath of the Russia-Ukraine war seems even to work against the willingness of governments and actors to promote the policy outcomes for a clean energy transition more strongly. Future developments regarding the ambitious goals of the European region and the member states regarding climate neutrality with the help of CO₂ pricing cannot yet be assessed. The transformation of energy systems and all related sectors, systems, and communities appears to be much more complex and challenging than the initial euphoria in connection with the successful expansion of renewable energies in many European regions suggested. As the findings of the Special Issue can be interpreted, the European states may have to take new innovative and more ambitious paths in designing energy policies to achieve the climate goals as quickly as possible.

7 The special issue's contributions in detail

The Special Issue combines nine contributions that examine the interactions between institutions, actors, and ideas in the energy sector in Europe and looks at the linkages to policy results on different levels.

The first contribution by Andreas Corcaci deals with the dynamics of multilevel administration. It examines the coordination processes between national, supra- and international administrations in energy policy within Europe. Based on numerous interviews with representatives of the European Commission, Corcaci finds that administrative coordination of energy policies is based on three types, layering of coordination instruments, formal and non-formal interactions through multiple channels

and interactions, and inter-administrative relationships through personal networks and contacts. Thus, it becomes clear that the extent and complexity of European multilevel governance increase significantly in the context of energy transitions. The author assumes a trend toward persuasive coordination in institutional layering driven by endogenous conditions. Thus, coordination patterns seem to change, but it cannot yet be assessed to what extent this has a positive effect on the solution of the various coordination problems of the multilevel administration, which seems to be caught between the numerous levels and institutions to which the administrations understandably react by pragmatic handling predominantly based on legally non-binding instruments and reciprocal interactions and relationships.

The second article by Maria Rosaria Di Nucci and Andrea Prontera examines the Italian energy transition. There is a multilevel governance system that, according to the authors, is situated between reinforcing dynamics and institutional constraints. The authors recognize a development from a centralized, path-dependent institutional and organizational structure to a more fragmented and pluralistic energy system in Italy. In particular, the expansion of renewable energies in Italy has led to a decentralization of energy production. As a result, there has been a multiplication of decision-making arenas and actors. Within the network of actors, the authors identify many different interests, problem understandings, and narratives, making coordination and regulation by the government considerably more difficult. Italy has established a community-based renewable energy policy in line with the European vision of a community-friendly energy transition. Based on decentralized local activities, the acceptance of the energy transition is to be increased. However, the authors recognize barriers to new modes of governance; in particular, they consider creating approaches to improved cooperation to be significant. The challenges of the Italian energy transition are thus reminiscent of the constellations in other European countries such as the United Kingdom, Scandinavia, or Germany. In Italy, similar to the cases of Germany and the United Kingdom, there is a big difference between parts of the country and regions, especially between the north and south. Here, different strategies are required for the southern provinces and Mediterranean islands, for example, and the northern area in the Alpine region. In contrast to other policy areas, Italy does not have a negative attitude toward European energy policy, which is why positive synergy effects—also with neighboring countries—could be the result.

The third contribution by Florian Engels studies the extent to which compliance or non-compliance of French energy policy with the European energy policy can be analyzed. France is not considered a model nation for an energy transition, mainly due to the strong unchecked use of nuclear energy. The author examines intentional and unintentional reasons based on the EU compliance theory. On the one hand, France follows the European energy policy objectives; on the other hand, the nation adheres to the nuclear energy regime. Regarding the CO₂ balance, this energy policy is advantageous for France. In addition, various domestic political reasons and structural constraints inhibit further progress to change the energy system. Thus, France is a special case among the European core states since there are comparatively few ambitious efforts concerning a decentralized energy transformation. There is a close link between the centralized state organization and the highly centralized

nuclear power generation regime. This could be interpreted as an example of specific similarities and parallels between the structure of states (e.g., more federal or centralized) and energy systems. However, other factors and conditions are at work in the context of the energy sector (e.g., economic, spatial, infrastructural, settlement, historical) that influence the design of the energy regime (Paul 2018; Radtke 2018b; Renn and Marshall 2020).

In the fourth contribution of the Special Issue, Henner Busch, Jörg Radtke, and Mine Islar analyze the example of community energy transition in Denmark. The authors find an outstanding strategy based on energy autocracy on Danish islands (Bornholm, Samsø, and Ærø). In recent years, Denmark has been able to switch its energy production entirely to wind energy and is thus a pioneer in the 100% use of renewables. In this context, the authors ask to what extent this achievement of a completely decentralized, renewable, and self-sufficient energy transition also achieves the goals of energy democracy. Their analysis focuses on the unfolding of democratic processes and institutions in connection with the decentralized energy infrastructures on the local level. It has been possible to involve numerous communities in energy projects, to increase acceptance, and to offer the communities a share in the profits from energy production. However, the communities on the islands are very small, so this model is not representative and transferable. It only works because the amount of energy required on these islands is severely limited. However, there is little awareness of this unique role among island residents; they are proud of their achievements and believe this complete energy transition can happen anywhere. While it is true that the potentials of renewable energy use in Europe are far from being exhausted, adopting perspectives between European regions is very important for a mutual understanding and, thus, a shared worldview and European identity. Therefore, it is of considerable relevance that adaptable strategies for local and democratic energy transitions are developed, which can be applied in different contexts and can be regionally linked to existing structures. This reinforces the impression that, beyond the path of expanding renewable energy systems, the European energy transition has not yet found answers to the questions of a more far-reaching transformation of existing unsustainable energy production and the sectors of heat and mobility.

Gerhard Fuchs and Ulrike Fettke argue in the fifth contribution to the Special issue with the title: “From grassroots to centralization—the development of local and regional governance in the German energy transition” that the leeway for local actors attached to the German “Energiewende” has become increasingly limited due to the creation of artificial markets and auctioning devices. By exploring the development of local and regional governance in Germany’s energy transition, the authors highlight a shift from grassroots-based approaches to centralization tendencies when looking at wind energy projects in Germany. The critical argument posits that an initial citizen-led mobilization effort in Germany’s energy policy transformed into a government-led project after the federal government’s decision on the energy transition following the Fukushima disaster. As a result of this, the governance structures experienced radical changes. Ultimately, the government implemented a relatively inflexible market framework, dictating the specific conditions, locations, and authorized entities for electricity production. This framework, which is still in place

in Germany, hinders the authors' argumentation of the dynamic growth of renewable energy in Germany by demonstrating this based on an in-depth evaluation of concrete wind energy projects.

The sixth contribution in the Special Issue underscores the crucial importance of systematically embedded local actors for advancing the energy transition in Germany. In her article with the title: "Local intermediaries in energy transitions: bridging the gap from niche level to changing the regime" Pia Laborgne stresses, based on a case study in Frankfurt/Main, what important role local intermediaries can play in this regard since they have under specific condition the potential to bridge the gap from niche to changing the regime. Defined by their function and position in between other actors, local intermediaries can, on the one hand, catalyze niche experiments while, on the other hand, acting as links between the niche and regime levels. They exhibit both the traits and functions of a niche, facilitating the transformation of inventions into ready-to-implement innovations capable of altering the existing regime. In addition, local intermediaries can also help to overcome lock-in situations and leverage frictions on the local level.

In the seventh contribution to the Special issue entitled: "Diversity of affectedness: Political, spatial, social and temporal scale perspectives on the final disposal of high level waste" Achim Brunnengräber and Lucas Schwarz demonstrate that the site selection process for a repository for high-level nuclear waste in Germany, as a specific aspect of its energy transition, becomes part of a governance strategy characterized by complex relationships between multilevel governance regimes, spatial dynamics, social factors, and temporal considerations. Given the involvement of diverse stakeholders, spaces, and communities, these interconnections pose significant challenges in realizing nuclear waste policy objectives. The authors argue that a comprehensive understanding of affectedness requires a broader perspective encompassing political, spatial, social, and temporal scales. Again, the multi-level character and the role of local circumstances and actor constellations for energy-related issues are stressed.

In an eighth contribution, Viktoria Brendler deals with the question: Who shapes the energy transition? She examines national regulatory styles and societal involvement in European renewable energy policy based on developing national renewable energy policies following the formulation of the European 20-20-20 targets. In four comparative country studies, she analyzes a corporatist setting with new players in Germany, a large-scale public consultation in the shadow of established interests in France, a liberal approach building on agreements in the Netherlands, and repeated consultations with paternalistic decision-making in the United Kingdom. The results show that initially, a persistence of overall regulatory styles and limited additions to involved actors and utilized formats can be stated. Societal involvement in policy-making is inconsequential in most cases. Regarding policy implementation, convergence tendencies, which include both corporate actors and the public, exist but are independent of the persistence of differential regulatory styles. It can be deduced from this that participation, cooperation, and collaboration are not widespread or strongly developed in the member states studied. Although new actors are involved, and numerous public consultations take place, these are to be understood as additional instruments and do not replace the conventional channels of policy making.

European energy policy thus falls short of the expectations of a (more) democratic policy style.

In the ninth and last contribution to the Special Issue titled “Just translation? A socio-ecological justice lens on EU environmental governance and urban mobility transitions” Nils Stockmann and Antonia Graf studies the importance of socioecological justice when evaluating EU environmental governance and urban mobility transitions since policy measures like low-emission zones, road pricing, and driving bans might affect citizens in different ways. In the article, the authors highlight, on the one hand, the relevance of EU environmental policies, such as the Ambient Air Quality Directive 2008/50, amidst the climate crisis and interconnected, sustainable transitions. By combining a translation perspective with an environmental justice lens, the analysis focuses on the other hand on implementation of environmental and mobility policies in different European regions, revealing the contestation of distributive justice claims at the local level and the need for procedural integration of local knowledge to drive just sustainable transformations.

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References

- Azarova, Valeriya, Jed Cohen, Christina Friedl, and Johannes Reichl. 2019. Designing local renewable energy communities to increase social acceptance: Evidence from a choice experiment in Austria, Germany, Italy, and Switzerland. *Energy Policy* 132:1176–1183. <https://doi.org/10.1016/j.enpol.2019.06.067>.
- Bauer, Christian. 2015. Stiftung von Legitimation oder Partizipationsverflechtungsfälle. Welche Folgen hat die Öffentlichkeitsbeteiligung beim Stromnetzausbau? *der moderne staat – Zeitschrift für Public Policy, Recht und Management* 8:273–293. <https://doi.org/10.3224/dms.v8i1.21191>.
- Calvert, Kirby, and Dragos Simandan. 2010. Energy, space, and society: A reassessment of the changing landscape of energy production, distribution, and use. *Journal of Economics and Business Research* 16:13–37.
- Carley, Sanya, and David M. Konisky. 2020. The justice and equity implications of the clean energy transition. *Nature Energy* 5:569–577. <https://doi.org/10.1038/s41560-020-0641-6>.
- Chowdhury, Nupur, and Ramses A. Wessel. 2012. Conceptualising multilevel regulation in the EU: a legal translation of multilevel governance? *European Law Journal* 18:335–357. <https://doi.org/10.1111/j.1468-0386.2012.00603.x>.
- Czada, Roland, and Jörg Radtke. 2018. Governance langfristiger Transformationsprozesse. Der Sonderfall „Energiewende“. In *Energiewende. Politikwissenschaftliche Perspektiven. Schriftenreihe Energietransformation*, ed. Jörg Radtke, Norbert Kersting, 45–75. Wiesbaden: Springer VS.

- Dahl, Robert A. 1994. A democratic dilemma: system effectiveness versus citizen participation. *Political Science Quarterly* 109:23–34. <https://doi.org/10.2307/2151659>.
- Devine-Wright, Patrick. 2019. Community versus local energy in a context of climate emergency. *Nature Energy* 4:894–896. <https://doi.org/10.1038/s41560-019-0459-2>.
- Devine-Wright, P., and S. Batel. 2017. My neighbourhood, my country or my planet? The influence of multiple place attachments and climate change concern on social acceptance of energy infrastructure. *Global Environmental Change* 47:110–120. <https://doi.org/10.1016/j.gloenvcha.2017.08.003>.
- Domon, Shohei, Mayu Hirota, Tatsuhito Kono, Shunsuke Managi, and Yusuke Matsuki. 2022. The long-run effects of congestion tolls, carbon tax, and land use regulations on urban CO2 emissions. *Regional Science and Urban Economics* 92:103750. <https://doi.org/10.1016/j.regsciurbeco.2021.103750>.
- Ehnert, Franziska, Florian Kern, Sara Borgström, Leen Gorissen, Steffen Maschmeyer, and Markus Egermann. 2018. Urban sustainability transitions in a context of multi-level governance: A comparison of four European states. *Environmental Innovation and Societal Transitions* 26:101–116. <https://doi.org/10.1016/j.eist.2017.05.002>.
- Fuchs, Gerhard, and Nele Hinderer. 2014. Situative governance and energy transitions in a spatial context: case studies from Germany. *Energy, Sustainability and Society* 4:16. <https://doi.org/10.1186/s13705-014-0016-6>.
- Geels, Frank W., and Johan Schot. 2007. Typology of sociotechnical transition pathways. *Research Policy* 36(3):399–417. <https://doi.org/10.1016/j.respol.2007.01.003>.
- Jenkins, Kirsten, Darren McCauley, Raphael Heffron, Hannes Stephan, and Robert Rehner. 2016. Energy justice: A conceptual review. *Energy Research & Social Science* 11:174–182. <https://doi.org/10.1016/j.erss.2015.10.004>.
- Jenkins, Kirsten, Darren McCauley, and Alister Forman. 2017. Energy justice: A policy approach. *Energy Policy* 105:631–634. <https://doi.org/10.1016/j.enpol.2017.01.052>.
- Jordan, Andrew, Adriaan Schout, and Anthony R. Zito. 2004. *Coordinating European Union environmental policy: Shifting from passive to active coordination*. CSERGE working paper EDM, Vol. 04–05.
- Knill, Christoph, and Duncan Liefferink. 2013. *Environmental politics in the European Union*. Manchester University Press. <https://doi.org/10.7765/9781847792204>.
- Langer, Katharina, Thomas Decker, and Klaus Menrad. 2017. Public participation in wind energy projects located in Germany: Which form of participation is the key to acceptance? *Renewable Energy* 112:63–73. <https://doi.org/10.1016/j.renene.2017.05.021>.
- Liebe, Ulf, and Gesche M. Dobers. 2019. Decomposing public support for energy policy: What drives acceptance of and intentions to protest against renewable energy expansion in Germany? *Energy Research & Social Science* 47:247–260. <https://doi.org/10.1016/j.erss.2018.09.004>.
- Lovcha, Yuliya, Alejandro Perez-Laborda, and Iryna Sikora. 2022. The determinants of CO2 prices in the EU emission trading system. *Applied Energy* 305:117903. <https://doi.org/10.1016/j.apenergy.2021.117903>.
- Manzo, Lynne C., and Patrick Devine-Wright. 2020. *Place attachment: advances in theory, methods and applications*. Routledge.
- Paul, Franziska Christina. 2018. Deep entanglements: History, space and (energy) struggle in the German Energiewende. *Geoforum* 91:1–9. <https://doi.org/10.1016/j.geoforum.2018.02.017>.
- Pfenninger, Stefan, Adam Hawkes, and James Keirstead. 2014. Energy systems modeling for twenty-first century energy challenges. *Renewable and Sustainable Energy Reviews* 33:74–86. <https://doi.org/10.1016/j.rser.2014.02.003>.
- Radtke, Jörg. 2014. A closer look inside collaborative action: civic engagement and participation in community energy initiatives. *People, Place and Policy Online* 8:235–248. <https://doi.org/10.3351/ppp.0008.0003.0008>.
- Radtke, Jörg. 2016. Energiewende in der Verflechtungsfalle: Chancen und Grenzen von Partizipation und bürgerschaftlichem Engagement in der Energiewende. *Vierteljahrshefte zur Wirtschaftsforschung* 85:75–88. <https://doi.org/10.3790/vjh.85.4.75>.
- Radtke, Jörg. 2018a. Die Mehrebenen-Architektur der Energiewende: Drei Modelle im Vergleich. In *Handbuch Energiewende und Partizipation*, ed. Lars Holstenkamp, Jörg Radtke, 793–814. Wiesbaden: Springer VS.
- Radtke, Jörg. 2018b. Energie. In *Handbuch Staat*, ed. Rüdiger Voigt, 1411–1421. Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-20744-1_127.
- Radtke, Jörg. 2018c. Energiedemokratie durch Bürgerenergie? Die Grenzen finanzieller Bürgerbeteiligung. *GAEA – Ecological Perspectives for Science and Society* 27:284–286. <https://doi.org/10.14512/gaia.27.3.7>.

- Radtke, Jörg. 2020. Das Jahrhundertprojekt der Nachhaltigkeit am Scheideweg: Wie kann die Energiewende in Deutschland breite gesellschaftliche Unterstützung finden? *Zeitschrift für Politikwissenschaft* 30:97–111. <https://doi.org/10.1007/s41358-020-00215-6>.
- Radtke, Jörg. 2023. *Community energy in Germany. A social science perspective*. Wiesbaden: Springer Nature.
- Radtke, Jörg, and Weert Canzler (eds.). 2019. *Energiewende: Eine sozialwissenschaftliche Einführung*. Wiesbaden: Springer VS. <https://doi.org/10.1007/978-3-658-26327-0>.
- Radtke, Jörg, and Emily Drawing. 2020. Technokratie oder Gemeinschaftswerk? Expertengremien und Partizipation in der Energiewende. *TATuP – Zeitschrift für Technikfolgenabschätzung in Theorie und Praxis/Journal for Technology Assessment in Theory and Practice* 29:36–42. <https://doi.org/10.14512/tatup.29.3.36>.
- Radtke, Jörg, and Dörte Ohlhorst. 2021. Community energy in Germany—Bowling alone in elite clubs? *Utilities Policy* 72:101269. <https://doi.org/10.1016/j.jup.2021.101269>.
- Radtke, Jörg, and Gary S. Schaal. 2018. Die Energiewende in Deutschland. Versuch einer demokratietheoretischen Systematisierung. In *Handbuch Energiewende und Partizipation*, ed. Lars Holstenkamp, Jörg Radtke, 143–155. Wiesbaden: Springer VS.
- Radtke, Jörg, and Patrick Scherhauser. 2022. A social science perspective on conflicts in the energy transition: An introduction to the special issue. *Utilities Policy* 78:101396. <https://doi.org/10.1016/j.jup.2022.101396>.
- Radtke, Jörg, Weert Canzler, Miranda Schreurs, and Stefan Wurster. 2018a. Die Energiewende in Deutschland – zwischen Partizipationschancen und Verflechtungsfalle. In *Energiewende. Politikwissenschaftliche Perspektiven*, ed. Jörg Radtke, Norbert Kersting, 17–43. Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-21561-3_2.
- Radtke, Jörg, Lars Holstenkamp, Jake Barnes, and Ortwin Renn. 2018b. Concepts, formats, and methods of participation: theory and practice. In *Handbuch Energiewende und Partizipation*, ed. Lars Holstenkamp, Jörg Radtke, 21–42. Wiesbaden: Springer VS.
- Radtke, Jörg, Emily Drawing, Eva Eichenauer, Lars Holstenkamp, Jan-Hendrik Kamlage, Franziska Mey, Jan Warode, and Jana Wegener. 2020. Chapter 4—Energy transition and civic engagement. In *The role of public participation in energy transitions*, ed. Ortwin Renn, Frank Ulmer, and Anna Deckert, 81–91. Academic Press. <https://doi.org/10.1016/B978-0-12-819515-4.00004-0>.
- Renn, Ortwin, and Jonathan Paul Marshall. 2020. Chapter 2—History of the energy transition in Germany: from the 1950s to 2019. In *The role of public participation in energy transitions*, ed. Ortwin Renn, Frank Ulmer, and Anna Deckert, 9–38. Academic Press. <https://doi.org/10.1016/B978-0-12-819515-4.00002-7>.
- Runst, Petrik, and David Höhle. 2022. The German eco tax and its impact on CO2 emissions. *Energy Policy* 160:112655. <https://doi.org/10.1016/j.enpol.2021.112655>.
- Sareen, Siddharth (ed.). 2020. *Enabling sustainable energy transitions: practices of legitimation and accountable governance*. <https://doi.org/10.1007/978-3-030-26891-6>.
- Scharpf, Fritz W. 1991. Political institutions, decision styles, and policy choices. In *Political choice*. Routledge.
- Scharpf, Fritz W. 2019. Multilevel democracy: a comparative perspective. In *Configurations, dynamics and mechanisms of multilevel governance Comparative territorial politics.*, ed. Nathalie Behnke, Jörg Broschek, and Jared Sonnicksen, 249–271. Cham: Springer. https://doi.org/10.1007/978-3-030-05511-0_14.
- Scharpf, Fritz W. 2021. Forced structural convergence in the Eurozone. In *Growth and welfare in advanced capitalist economies: how have growth regimes evolved?*, 161–200. Oxford University Press. <https://doi.org/10.1093/oso/9780198866176.003.0005>.
- Schumacher, Kira, Felix Krones, Russell Mckenna, and Frank Schultmann. 2018. Public acceptance of renewable energies and energy autonomy: A comparative study in the French, German and Swiss Upper Rhine region. *Energy Policy* 126:315–332. <https://doi.org/10.1016/j.enpol.2018.11.032>.
- Seliano, Iulii, and Andrea Lenschow. 2015. *Energy policy coherence from an intra-institutional perspective: energy security and environmental policy coordination within the European Commission*. SSRN scholarly paper.
- Sgarciu, Smaranda, Daniel Scholz, and Felix Müsgens. 2023. How CO2 prices accelerate decarbonisation—The case of coal-fired generation in Germany. *Energy Policy* 173:113375. <https://doi.org/10.1016/j.enpol.2022.113375>.
- Skjærseth, Jon Birger. 2016. Linking EU climate and energy policies: Policy-making, implementation and reform. *International Environmental Agreements: Politics, Law and Economics* 16:509–523. <https://doi.org/10.1007/s10784-014-9262-5>.

- Skjærseth, Jon Birger. 2021. Towards a European green deal: The evolution of EU climate and energy policy mixes. *International Environmental Agreements: Politics, Law and Economics* 21:25–41. <https://doi.org/10.1007/s10784-021-09529-4>.
- Sovacool, Benjamin K., Matthew Burke, Lucy Baker, Chaitanya Kumar Kotikalapudi, and Holle Wlokas. 2017. New frontiers and conceptual frameworks for energy justice. *Energy Policy* 105:677–691. <https://doi.org/10.1016/j.enpol.2017.03.005>.
- Stadelmann-Steffen, Isabelle, and Clau Dermont. 2021. Acceptance through inclusion? Political and economic participation and the acceptance of local renewable energy projects in Switzerland. *Energy Research & Social Science* 71:101818. <https://doi.org/10.1016/j.erss.2020.101818>.
- Suškevičs, M., S. Eiter, S. Martinat, D. Stober, E. Vollmer, C.L. de Boer, and M. Buchecker. 2019. Regional variation in public acceptance of wind energy development in Europe: What are the roles of planning procedures and participation? *Land Use Policy* 81:311–323. <https://doi.org/10.1016/j.landusepol.2018.10.032>.
- van Veelen, Bregje, and Claire Haggett. 2017. Uncommon ground: the role of different place attachments in explaining community renewable energy projects. *Sociologia Ruralis* 57:533–554. <https://doi.org/10.1111/soru.12128>.
- van Veelen, Bregje, and Dan van der Horst. 2018. What is energy democracy? Connecting social science energy research and political theory. *Energy Research & Social Science* 46:19–28. <https://doi.org/10.1016/j.erss.2018.06.010>.
- Wenzelburger, Georg, Stefan Wurster, and Markus B. Siewert. 2020. Responsive Politikgestaltung in den deutschen Bundesländern? Versuch einer Systematisierung und Konzeption eines Forschungsprogramms. *Zeitschrift für Vergleichende Politikwissenschaft* 14:33–47. <https://doi.org/10.1007/s12286-020-00449-2>.
- Wurster, Stefan. 2010. *Zukunftsvorsorge in Deutschland – Ein Vergleich der Bildungs-, Forschungs-, Umwelt-, und Energiepolitik*. Baden-Baden: Nomos.
- Wurster, Stefan. 2013a. Staatstätigkeit II: neue Formen politischer Steuerung. In *Studienbuch Politikwissenschaft*, ed. Manfred G. Schmidt, Frieder Wolf, and Stefan Wurster, 351–377. Wiesbaden: VS.
- Wurster, Stefan. 2013b. Zielkonflikte in der Energiepolitik. Ein OECD-Ländervergleich. In *Staatstätigkeit, Parteien und Demokratie, Festschrift für Manfred G. Schmidt*, ed. Klaus Armingeon, 353–376. Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-01853-5_21.
- Wurster, Stefan, and Christian Hagemann. 2018. Two ways to success—Expansion of renewable energies in comparison between Germany’s federal states. *Energy Policy* 119:610–619. <https://doi.org/10.1016/j.enpol.2018.04.059>.
- Wurster, Stefan, and Christian Hagemann. 2020. The expansion of renewable energy in federal settings: Austria, Belgium and Germany in comparison. *Journal of Environment and Development* 29:147–168. <https://doi.org/10.1177/10704965198887488>.
- Wurster, Stefan, and Christina Köhler-Tschirschnitz. 2021. Nichts Neues unter Wind und Sonne? Die Energiepolitik der grün-schwarzen Landesregierung in Baden-Württemberg. In *Kiwi im Südwesten – Eine Bilanz der zweiten Landesregierung Kretschmann 2016–2021*, ed. Felix Hörisch, Stefan Wurster, 287–320. Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-34991-2_12.