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ARTICLE

From grassroots to centralization—the development of local and regional governance in the german energy transition

Gerhard Fuchs · Ulrike Fettke

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Abstract In the process of sustainability and especially electricity transition, the local and regional levels gain a new importance. Both social movements as well as governments from different levels (state, federal) are mobilizing and/or addressing local actors. The way this has been done and the capacities for local actors to have a say in the way transition processes do unfold, however, has changed significantly over the last decades in Germany. The paper will use the example of wind energy projects to analyze how multilevel governance arrangements have changed over time. The main thesis will be that the available repertoires of activities for local actors have become increasingly limited due to increasing policy management activities by state and federal governments. Especially the creation of artificial markets and auctioning devices have severely limited the scope of action for local actors. The article will reconstruct the changes in the multi-level governance structure and assess the effects on the development of wind energy by studying in detail two cases.

Keywords Governance · Electricity transition · Renewable energies · Wind power · Local initiatives

Gerhard Fuchs
Department for Organization and Innovation Studies, University of Stuttgart, Stuttgart, Germany
E-Mail: gerhard.fuchs@sowi.uni-stuttgart.de

✉ Ulrike Fettke
Sociology of Diversity Unit, Technical University of Munich, Munich, Germany
E-Mail: ulrike.fettke@tum.de

Von Grassroots zur Zentralisierung. Die Entwicklung lokaler und regionaler Governance bei der Veränderung des deutschen Energiesystems

Zusammenfassung Im Zuge von Bemühungen um eine möglichst nachhaltige Gestaltung der Gesellschaft, wie insbesondere der Energiewende, kommt der lokalen und regionalen Ebene eine wichtige Bedeutung zu. Sowohl soziale Bewegungen als auch Regierungen auf verschiedenen Ebenen (Land, Bund) mobilisieren und/oder wenden sich an lokale Akteure. Die Art und Weise, wie dies geschieht, und die Möglichkeiten lokaler Akteure, den Übergangsprozess mitzugestalten, haben sich in den letzten Jahrzehnten in Deutschland jedoch stark verändert. Am Beispiel von Windenergieprojekten analysieren wir, wie sich Governance-Arrangements auf mehreren Ebenen im Laufe der Zeit verändert haben. Die Hauptthese ist, dass die Handlungsmöglichkeiten lokaler Akteure durch die zunehmende politische Steuerung durch Bund und Länder zunehmend eingeschränkt werden. Vor allem die Schaffung künstlicher Märkte und Versteigerungen haben den Handlungsspielraum der lokalen Akteure zunehmend begrenzt. Der Artikel rekonstruiert die Veränderungen in der Multi-Level-Governance-Struktur und untersucht die Auswirkungen auf die Entwicklung der Windenergie anhand von zwei Fallbeispielen.

Schlüsselwörter Governance · Veränderung des Stromsystems · Erneuerbare Energien · Windkraft · Lokale Initiativen

1 Introduction

In our research on the development of local electricity transition projects (Fuchs 2017), we repeatedly stumbled over cases, in which there was broad local public support for the building of new installations or the extension of existing projects, but this support was frustrated by outside developments like changing political priorities, new regulatory frameworks etc. on state or national levels. At the same time, the federal government and others repeatedly claimed that the realization of the "Energiewende" (energy transition) goals would be seriously impeded by a lack of public support. How to solve this empirical puzzle?

We suggest that in the field of electricity generation a double transformation has taken place. In a first wave, local experiments and plans were driven forward by groups of active citizens, social movement actors and other civil society actor (Fettke and Fuchs 2017). In a second wave, the initiative was taken over by government actors in an attempt to more actively manage the development of renewable energies (RE). In order to do this, new regulatory principles and frameworks were installed that seriously disadvantaged the activities of civil society actors but privileged other groups interested in the deployment of RE.

This double transformation resulted in a changed social structure of the field (Fligstein and McAdam 2012). A strategic action field is a meso-level social order where actors (who can be individual or collective) interact with knowledge of one another under a set of common understandings about the purposes of the field,

the relationships in the field (including who has power and why), and the field's rules. Property relations are an important indicator for field change. In the first phase, private citizens, energy cooperatives, farmers, and other actors previously not active in the field of electricity generation proper owned a significant part of RE installations. In the second phase, a growing share of installations is owned by investment funds, insurance companies, and even the old utilities, which up to the Energiewende decision of the federal government (2011) were notoriously uninterested in RE (Kungl 2018).

This transformation was supported by changes in regulatory frameworks, which were supposed to be more market oriented, but were accompanied by the setting of strict rules, direct government intervention, and a diminishing room to maneuver for the participating actors. In this sense, the situation has changed from one which was characterized by search efforts and innovation to one characterized by optimization efforts within a rather rigid regulatory framework (Lazonick 2005).

As such, we can also observe important shifts in the architecture of multi-level governance in this field. Dominant actors have reframed their role, positions (and power structures) have changed, and regulatory items have multiplied along with the number of actors involved. In the beginning, we see bottom up activities with little support from state or federal levels. Meanwhile, we are witnessing an elaborated, cumbersome multi-level governance structure, which both empowered the federal level (centralization) as well as disempowered the local level, creating a new set of levels on regional (e.g., regional planning), state (e.g., state regulation on RE installations), and cross-state levels (e.g., meetings of environmental experts from the state governments). In addition, due to the proliferating amount of ambiguous regulations, courts play an increasingly important role.

The present paper will start with a discussion of its conceptual framework. The following part will give a brief sketch of the double transformation of the German electricity system since the early 1990s. The general historical narrative has already been used in other contexts albeit for different purposes, with reference to other empirical cases and using other phase distinctions (e.g. Fuchs and Hinderer 2016.) The actual problems real actors face within this transformation will be discussed by analyzing two cases of wind park conflicts in the South Eastern German state of Bavaria. The paper is based on a structuralist logic, which assumes that structures result from actual activities of real actors (Scharpf 1997; White 2008; Martin 2009). In this respect, an analysis of the context specific activities of actors is necessary to better understand how and why new structures and institutions come into existence or established ones do change.

2 Conceptual framework: multi-level governance

Over the last decades, research on governance has made much progress. We are now better able to understand how markets are working, what mechanisms account for the functioning of industrial sectors and how technological developments come about and influence industrial activities (Ugur 2013). In all these areas, coordination

problems have to be solved in order to allow for a smooth operation of activities (Hall and Soskice 2001; Beckert 2009).

Coordination problems are dealt with by a varying mix of private and public actors in a more or less organized manner. Governance can be defined as all forms and mechanisms used for the coordination of actors, whose activities are interdependent, i.e. they can support each other in achieving specific aims or prevent them from happening (Benz et al. 2007). The reflections on the importance of governance structures are usually informed by institutionalist thinking (Werle 2012) and analyze predominantly specific regulatory structures in a synchronic manner (Mayntz 2004). Research has been concentrated on the more static and structural aspects of governance. Most of the relevant governance literature is thus focusing on the internal operation of governance structures and presupposes that they are working in a more or less self-sufficient manner. At least as important, however, is the challenge to analyze the change of existing governance structures. It has been sufficiently discussed that structures, institutions as well as organizations are characterized by a specific immobility (Scott 2001). Path dependence—among other factors—plays a significant role in making more radical change difficult (see Fuchs and Shapira 2005). Verbong and Loorbach (2012) have established that especially in the field of energy infrastructures "transition" to a new state is hard to come by. This is the effect of the inertia inherent in established governance structures. If we assume that to fight climate change, significant changes in the way our established system of electricity generation works have to be made, it is paramount to ask, whether the existing governance structures are fit for that task or whether we need to look for new forms or structures of governance to ensure a transition towards a more sustainable infrastructure. Studies informed by one or the other strand of evolutionary theory have repeatedly and successfully attempted to show that changes especially of a fundamental nature will be the result of "external" demands (Meyer and Rowan 1977) or major crisis and shocks emanating from the environment (Gould 2002). Fundamental changes furthermore are not driven forward by the incumbent actors in a specific field, sector, organization or policy domain, but by challenger groups.

In addition, it has to be taken under consideration that coordination efforts take place at different levels. Multi-level governance stresses that governance is usually not a single level phenomenon. Analyzing multi-level governance refers on the one hand to the architecture of such arrangements, the relationship between different levels; the other question refers to the dimensions of governance. The architecture (or structure) of governance focuses on the patterns of activities and actors involved in governance and their hierarchical or horizontal relations. The question of instruments refers to the types of intervention applied to the achievement of specific goals or the solving of specific problems.

In spite of the fact that much governance literature interprets governance still as a problem of hierarchies with politicians making decisions that need to be implemented or accepted, the core of the theoretical argument on governance neither accepts this view nor does it necessarily imply that activities of the participants need to be in any way "well" coordinated. It rather stresses the empirical point that what is of interest to study are those forms of interaction in which the relations established are mutually acknowledged relationships that guide social action on the

part of persons. That is why we are interested in how actors are actually going about referring to their specific, interrelated activities. To determine the degree of conflict or cooperation is a matter of empirical investigation. As Mayntz (2007) states, agencies at different territorial levels (e.g., in the field of RE installations) are sometimes only related by the fact that they are directed at the same economic sector, without explicit coordination between them. By the way, a feature continuously criticized by RE actors, which routinely complain about the lack of coordination between the main actors and about permanently shifting priorities.

The article will analyze multi-level forms of governance not only as the result of combinations of (usually government steered) policy instruments, but also as the result of more 'organic' ways of institutional emergence. The usually used trichotomy between governance by government, governance through markets and governance via self-organization is just an analytical distinction. A lot of governance research considers modes of governance to be a choice problem (with the government as the selecting agent), but in fact it is usually a process in which a variety of actors are involved that leads to specific (hybrid) governance configurations.

Summarizing we want to analyze how multi-level forms of governance evolve and change over time as the result of the activities and the established relations by concerned actors.

2.1 Phase one: the genesis of a new system of multi-level governance

We will now look at the overall development of the multi-level governance system, employing something like a bird's eye view, meaning that we are putting actors front stage, but deal with them in an aggregate manner. In order to better highlight the development trajectory, we will distinguish between two phases of development. The main difference between phase one and phase two is that phase one deals with the genesis of a new multi-level governance system, while in phase two we are observing the strengthening of a (new) multi-level governance system (Powell and Padgett 2012). This constitutes what we referred to in the beginning as a double transformation.

A relational approach as used in this article fully incorporates at least two types of actors or agencies occupying different positions within the social space or field and bound together in a relationship of mutual dependence or struggle. In this way, at the beginning of the electricity transition process it can be distinguished between the incumbent actors, dominating the field, and the challengers, at the fringes or even outside of the field, who are eager to disturb the dominant field practices. The roots of the dominant system of electricity generation and distribution in Germany in the 1990s—the starting point—differ from those of the RE movement, which can be considered as the challengers. Insofar there are two processes running parallel for some time. Nevertheless, they have one common reference point: the discussion about nuclear energy. The dominant industrial and political actors for a long time considered nuclear energy to be an important building block of the German electricity system. A social movement against nuclear energy, however, led to a stop of construction plans, and especially after the Chernobyl accident the antinuclear sentiment won broad public support and attempted to delegitimize

nuclear energy. The challengers successfully achieved the attribution of a threat to nuclear energy and later on to climate change. Actors associated with the threat were the big energy companies and parts of the government(s). The anti-nuclear power movement had also demonstrated that mobilizing could be effective and successful. In their efforts to mobilize, RE actors were also developing a collective attribution of opportunity, by developing the idea that RE and a new decentralized system of energy generation and distribution would help in coping with the threats to the environment. The hot cause (Rao 2009) then was nuclear energy and climate change, the cool solution RE.

An important window of opportunity for the challenger groups opened following the rising electoral successes of the Green party (Bündnis 90/Die Grünen) in the 1980s and 1990s, which eagerly picked up the energy issue. In some communities where the green movement was strong, experiments were conducted with local energy solutions, operating with different organizational and technological mixes. There was little direct competition between incumbents and challengers, which were not yet considered relevant. The incumbents, however, did lobby politicians, obstruct RE programs, and used the courts to stop RE development.

Political decision makers at the federal level were concerned with re-organizing the electricity system in the former German Democratic Republic and with preparations for the liberalization of electricity markets, an issue especially advanced by the European Commission. Attitudes towards RE were reluctant and haphazard. Less by persuasion than as a sign of being open to the public mood against nuclear energy, technology-based support programs for small wind turbines were first introduced in the late 1980s (Neukirch 2010). The support programs were later extended to solar energy; both were funded by the German Federal Ministry for Education and Research (as opposed to the German Federal Ministry of Economic Affairs, which was concerned with liberalization, market frameworks, and nuclear energy). The introduction of a first Feed-In Law in 1990 constituted an important milestone; this was the result of a compromise between different political groups ahead of an important federal election.

Now, the independent operators of turbines got the guarantee that utilities not only had to connect their installations to the general grid, but that they were also obliged to pay fixed tariffs for the energy supplied. The Feed-In Law helped the German wind energy market to grow in the early 1990s. In the mid-1990s, however, there was general insecurity about the future stance of the government towards RE. The then Minister of Environmental Affairs, Angela Merkel, proclaimed that it is not conceivable that RE will play any significant part in the future German electricity mix. Nevertheless, the 1990s proved to be a period in which RE actors could experiment with various designs, build up public support for RE, and extend the advocacy coalition.

The years 1998 to 2008 were dominated by the formation of a new federal government and a dynamic development concerning both incumbent actors and challenging niche actors. The main disputes in this phase were concerned with the issue of the legitimacy of the different energy sources (coal, nuclear, RE).

In 1998, a change in government from a conservative one to one controlled by a coalition of the Social Democratic Party (SPD) and the environmentally focused

Green Party took place. Under their leadership important slightly conflicting regulatory decisions were passed. Following an EU market directive aiming at liberalizing the European energy markets, an amendment to the Energy Economy Law (EnWG) was put into effect in 1998. Monopolistic structures were dismantled, and the law now required that electricity suppliers separate their business activities along the supply chain by maintaining separate accounts for their business activities in generation, transmission, and distribution as well as for non-electricity activities.

Furthermore, demarcation agreements between energy suppliers were banned, while at the same time third-party access to their power grids had to be ensured. As a result, the regional monopolies held by the power companies were formally limited to the operation of the electricity grids. Competition was thus introduced as a new element in the field of electricity distribution. This meant that a new market framework had been put in place for the established utilities, new governance units had been created, and the incumbent firms had to adapt and to learn to act in a somewhat competitive market.

With respect to RE, two important regulatory changes were implemented. Eventually, they contributed to far-reaching changes in the balance of power in the field. In 2000, the Renewable Energies Law (EEG) was passed. It provided incentives for investments in RE generation by obliging grid operators to give priority to connecting such facilities. It also guaranteed a consistent minimum payment for the electricity produced for a period of 20 years and thus ensured investment and planning security. In contrast to the Feed-In Law of 1990, the level of financial support was held flexible depending on the maturity of the different technologies. This especially included much higher remuneration for photovoltaic installations, making this technology economically feasible for the first time (Hoppmann et al. 2014). Furthermore, unlike the previous Feed-In Law, the EEG did not directly exclude utilities from receiving benefits. In the end, the EEG helped boost the RE expansion from 6.6% of the electricity generated in 2000 to 14.5% in 2008. For our purposes, it is equally important to note that with the expansion, the specification of the actors who can legitimately produce electricity had changed significantly. Now new types of actors, i.e., ones in addition to the established utilities, were allowed to generate electricity and connect to the grid. Consequently, new types of legitimate social practices evolved beyond certain limited niches.

The passing of the EEG in 2000—which became the most important support mechanism for RE—was only possible due to the broad coalition of actors supporting it via different channels. The federal law was inspired by local feed-in tariffs that had been introduced over the 1990s in cities like Aachen, Freising, or Hammelburg, which provided legitimacy and ammunition for federal policy entrepreneurs like the SPD politician Hermann Scheer (Fuchs and Wassermann 2008). It was additionally supported by the lobbying activities of a broad advocacy coalition—consisting of NGOs like Eurosolar, Solarenergie Förderverein, and Greenpeace, but also industrial associations, and even one incumbent utility (Preussen Elektra)—which intensified pressure on federal policymakers (Jacobsson and Lauber 2006). Besides ecological arguments, this coalition pointed to the economic benefits of RE. They highlighted the first mover advantages of an early adoption of RE and the benefits for the national economy from the growth of the RE industries. As the RE industries grew

in size and professionalization (e.g., photovoltaic module producers, wind-turbine manufacturers) as well as due to the increasing contribution to regional value creation (especially in eastern Germany), there was growing support from previously critical parts of the SPD and the CDU (Lauber and Jacobsson 2016).

In parallel, it was decided to phase out nuclear power plants. Following the *Atomkonsens* (consensus agreement on atomic energy) of 2000, the Atomic Energy Act was amended in 2002. The amendment stipulated an end to the construction of new nuclear power plants and limited the running time of the existing ones. The struggles about nuclear energy again heated up with the end of the red-green coalition in 2005. The incumbents saw a chance of achieving a repeal of the phase-out decision. They began to promote nuclear power as being important for the German energy supply. They stressed the security of nuclear power, and its importance for climate change mitigation as well as for the security of supply. They highlighted the benefits for the national economy and the opportunity to finance the switch to a RE future by utilizing the profits made from nuclear energy.

The actors representing the vision of a decentralized energy supply developed strongly and successfully. Mautz et al. observed that the professionalization, stabilization, and differentiation of decentralized actors and diffusion networks increased and the general "social opening" of the electricity sector proceeded further—although the developments differed for the various types of technology (Mautz et al. 2008). For all the RE technologies, the multiplier function of civil society actors was important. Still, decentralized and less organized actors were driving the activities in the RE sector. The framing that was used to legitimize the initiatives changed. While a previously an ecological argumentation was predominant, meanwhile economic arguments of various sorts began to dominate both the discourse and the efforts of the initiatives to achieve legitimation.

The developments in these years led to the formation of two different fields within electricity generation. On the one hand, there was the liberalized electricity market, dominated by the big four utilities relying on fossil fuels and nuclear energy. The new market environment allowed them to grow significantly by swallowing smaller competitors and realizing benefits of scale. On the other hand, there was the RE sector, which was regulated by different principles and which was populated by different actors. The actors to be found were mainly small entrepreneurs, individual citizens, farmers, and cooperatives, who unlike the actors in the traditional field were not looking to optimize their business strategies, but were struggling to build a new market framework that would allow them to survive.

The learning trajectories of the two actor groups were thus very different. Direct competition between the two groups did not take place. Especially the RE group did not have significant problems from internal competition. The market for RE was developing quickly, and new actors were coming in on a continuous basis. As Lawrence and Phillips (2004) have argued, institutional entrepreneurship in emerging fields is likely to be associated with rapid imitation and relatively little conflict. The immediate effects of institutional entrepreneurship in emerging fields are likely to be highly uncertain and therefore the strategies of institutional entrepreneurs are more likely to be emergent than intended. Unlike in the old field, hierarchies were not present and no single actor was in a position to dominate the fragmented field.

Important regulatory changes were again introduced in the following years. Field development, however, was dominated by global developments external to the field, which eventually led to a significant crisis in the field. The success of RE had enticed many other countries to develop and support national industries. This was especially true in China, which began to produce and export equipment as standardized mass products. The ensuing price competition proved detrimental to many German producers. This, however, affected not only the producers, but also the RE advocacy coalition. As mentioned previously, the actors who had supported RE for economic reasons, based especially on structural policy arguments, began to lose interest, especially since a newly formed federal government (2009) made it clear that it would not support the ailing industry. The big utilities also ran into problems. Competition laws limited internal growth in Germany. The internationalization of their business proved to be largely a failure in the aftermath of the financial crisis. Growth prospects were thus dim. Finally, the Fukushima catastrophe had an important and decisive impact on electricity-related issues. It led to the so called "Energiewende" decision (2011), which put an end to nuclear energy and, for the first time, officially stated that RE should be the backbone of a new electricity system. Old and new actors were now forced into direct competition. Table 1 provides an exemplary categorization of old and new RE actors. We acknowledge that the actual numbers have to be interpreted with caution as the single categories may be not be clearly distinct. Nevertheless, the source provides an unrivaled picture of the dynamics in the field.

With RE leaving their niche, formerly hidden conflicts and parallel developments in a differentiated field became increasingly apparent and obvious once the technology mix began to be shaped more and more strongly by high shares of RE, which especially at peak times increasingly displaced conventional energy sources in the electricity mix. The incumbents thus had to face a direct attack on their market position. This was the end of layering and established business practices.

We are now faced with a curious situation. On the one hand, the movement for RE had finally achieved its aim and the switch to the use of RE formally received the support of all the major parties. The use of the term "transformation" to describe this development thus seems to be justified, even if the transformation was not the result of conscious planning and strategy by one single party but conjoint actions of established and emerging actors. On the other hand, the movement and

Table 1 Ownership structure of RE installations in Germany (2010) in percentage. (Source: Maron et al. 2011)

	Level	Private Citizens	Farmers	Banks + Funds	Project developers	Municipal utilities	Industry	Four major utilities	Others (contractors, internat. utilities)
Technology	**Wind**	51.5	1.8	15.5	21.3	3.4	2.3	2.1	2.2
	Biogas	0.1	71.5	6.2	13.1	3.1	0.1	0.1	5.7
	Biomass	2.0	0	3.0	6.9	24.3	41.5	9.6	12.7
	PV	39.3	21.2	8.1	8.3	2.6	19.2	0.2	1.1

the support coalition for RE began to disintegrate generating a hybrid albeit more rigid governance configuration.

It is quite common to find the year 2011 mentioned in the literature as a watershed year for the development of the energy sector. Some even consider it as the real beginning of the energy transition. For us, the distinctive element is not that there is now a comprehensive government statement, but we stress the strategic reorientation that has turned the electricity transition (as a part of the energy transition) from a movement project into a government project, which now views the old incumbent actors (e.g., the big utilities), which up to then had opposed the turn to renewable energies into preferred partners for realizing the new government aims.

2.2 Phase two: the stabilization of yet another system of multi-level governance

We will deal with phase two in a more dense format. One reason for this being that once the extension of RE has become a political priority, regulations, actor constellations, and governance architectures multiplied and have become much more complex and much more difficult to handle in a concise way. Another reason being that our two cases started in phase one and the changes in phase two operated as constraints and not as enabling regulations as for the wind parks to be newly built in this second phase.

What is new in phase two at any rate is the attempt to more "successfully" steer the growth of RE, which at first meant to stop the dynamic growth of RE by introducing a new set of federal regulations. This was an attempt to strengthen the steering capacities of the federal government and put it in the driver's seat. Insofar it is no wonder that the new priorities soon became to be considered as a threat by the "old" challenger actors. A statement of the Bundesverband Windenergie claiming that the (modest) growth in installations over the last years has not been an effect of the present regulations, but that growth has taken place in spite of the inhibiting regulations gives an impression about the changes between phase one and two. This meant a reversal of the impression shared by the participants during phase one.

Nevertheless, in phase two, the generation of electricity based on RE became the new normal. Having reached a share of almost 25% in 2013, it was no longer a niche phenomenon, but an integral part of the field of electricity generation. In addition, a thoroughgoing trend towards decentralization has made decisions on electricity-related issues urgent matters of public debate (Unnerstall 2017).

An initial aim of the new coalition between the conservative parties (CDU/CSU) and the Social Democrats at the beginning of this phase (2012) was—as we mentioned—to better influence RE deployment. The government's intention to make RE growth more manageable had failed for several years. The government regularly had to upgrade projections because the growth of installations was much quicker than had been anticipated. In phase two, the system for providing support for RE was changed in order to finally stop the quick RE expansion and to save the incumbents. A new regulatory initiative was passed in 2014, which for the first time explicitly mandated upper limits for the expansion of RE. Various new instruments were introduced to achieve this aim, among them most prominently the requirement for an actor to participate at an auction in order to obtain a permit to install wind

Table 2 Ownership structure of RE installations in Germany (2019) in percentage. (Source: trend:research 2021)

	Level	Private Citizens	Farmers	Banks + Funds	Project developers	Municipal utilities	Industry	Three major utilities	Others (contractors, internat. utilities)
Technology	Wind	38.6	2.0	16.1	22.8	11.0	5.2	3.9	0.4
	Biogas	1.0	73.9	4.1	10.0	3.3	3.2	0.3	3.9
	PV	32.1	15.9	11.6	8.5	6.3	24.8	0.2	0.4

turbines (Hook 2018). Besides, new regulations provided guidance at which sites new installations can be built at all. It was thus not any longer a prerogative of a specific community to decide whether they wanted to have an installation or not, but the result of previous political decisions on the federal and state levels. Many local initiatives therefore were faced with a situation that regulators considered their plans illegitimate. This measure was accompanied by various other new regulations, which generally were specifically aimed at making life more difficult for decentralized, less professional initiatives. The German Federal Ministry of Economic Affairs and Energy, which had conceived these measures, had now regained full responsibility for electricity-related issues, sidelining both the German Federal Ministry for Environment, Nature Conservation, Housing, and Reactor Safety and the German Federal Ministry for Research and Education. Access to policy makers now became more limited for RE actors and the German Federal Ministry of Economic Affairs and Energy continued its practice to cooperate mainly with the leading utilities in working out regulations. Besides the changing political priorities, it has to be acknowledged that in contrast to the old incumbents, the actor constellation in the RE field remained rather fragmented (see Table 2). The different types of actors involved and their different organizational and technological set-ups make it difficult to formulate common goals and to mobilize for them. This reflects the inequality in the initial distribution of resources among RE actors. The German Wind Energy Association mainly represents small and medium sized companies, while meanwhile f. ex. the multi-national company Siemens has also become an important player with very different interests.

Both the will of the government(s) to intervene more directly in the RE field as well as the specific regulatory instruments chosen (e.g. auctions) contributed to a changing social structure of the field. The part of installations owned by private citizen, farmers etc. has been reduced to 40%. In 2019, for the first time, private persons were not any longer the biggest group of RE investors. This rank was taken over by banks and investment funds. The number of energy cooperatives had reached a climax in the year 2015 (more than 900) and has since slightly declined. Most probably, the number will further decrease as the running of installations is usually based on a twenty-year cycle and, after that, the installations lose their privileges. Given the changing regulatory framework, many cooperatives will not be able to update or replace the existing equipment. The associations for RE industry presently fight for special regulations for installations, which will not any longer be covered by

the EEG support scheme. The federal government had promised to pass a respective regulation before the end of the present legislative term, but as of yet (October 2022) little has changed. The Bundesgeschäftsstelle Energiegenossenschaften of the German Cooperative and Raiffeisen Confederation assumes that eventually—given present political priorities—all energy cooperatives will cease to play a part in the electricity transition—with respective consequences for public acceptance. Already in 2014, when auctions were introduced, the available evidence had shown that the implementation of auction schemes slows down developments, makes them more expensive and crowds out smaller actors. If we assume that the German Federal Ministry of Economic Affairs and Climate Action acts based on available evidence, it has reached its goals (Grashof 2021).

To sum it up, local and regional governance of RE installations build on time-specific regulations that reflect differing political goals and reactions to ecological events with global impact and are enacted by governance agencies at local, regional and federal political levels. They go along with varying constellations of public and private actors in hybrid forms of governance.

3 Research design

The research design covers two case studies of the emergence of wind turbines in two municipalities in Bavaria, a federal state in the south of Germany. To illustrate the setup of the case studies, we elaborate upon their selection, the methods of data collection and analysis as well as the criteria for case comparison applied.

The two case studies were part of our research about the development of local electricity transition projects (Fuchs 2017). Wind energy was one pillar of research covering electricity production with RE. For studying the local governance arrangements in phase one, we depicted cases with processes of wind turbine emergence dating back to this time. With phase two slowing down RE engagement, we chose to study wind cases in Bavaria meanwhile known as a notorious laggard in terms of wind turbines. Therefore, Bavarian wind cases seem to be extreme cases providing information about the slowing effects of phase two. With community studies documenting a more developed degree of political organization in larger settlements like towns and cities, we opted for small communities, as we were interested in studying the emergence of grassroots initiatives.

For the case studies, we collected data that we compiled into community profiles. On this basis, we selected interviewees in the communities. As we believe the day-to-day life of the community, encompassing all aspects of life, to be relevant to the local happenings, we compiled information about the communities and their histories through a desktop search and a search of local print media, following McAdam and Schaffer Boudet (2012). The case profiles include the community's spatial, social, political, and organizational characteristics. They list the actors known from the press to be involved in the local processes and the reported initial conditions of the community policy discussions.

We chose the problem-centered interview method (Witzel and Reiter 2012) to sample narratives about the local RE history and to ask specific questions about

the issues at hand. We started the interviews with the people listed as initiators of the wind projects. Based on our information about local RE history, we conducted additional interviews with individuals who were knowledgeable about the perspectives and events for which we lacked information. For both cases, the interviews were conducted between December 2014 and June 2015. For the Allgäu case, there were four interviews and for the Palatinate case, there were seven interviews (see Additional material, Table 4 Interview overview).

In the interviews, the respondents reported about their perspectives on local RE history which was certainly not neutral, especially in the case of local conflicts. Like Witzel and Reiter (2012) recommend, the interviews were conducted with a guideline serving as notes to be adjusted to the situations at hand (for the interview guidelines, see Additional material, Table 5 Basic structure of questions). Here, the approach of interviewing several people and creating case profiles proved successful, as it enabled the interviewers to match the sometimes emotionally charged narratives with hard facts such as data, events, and protocols.

In order to present the two cases, we illustrate the regulatory and spatial framework conditions. Our case description starts with the events that triggered the local discussions about wind turbines. To stick to data privacy protection agreements, we present the cases with heteronyms assigned to retain viable information but without references to local journals and official documents.

In the Allgäu case, the first wind turbine was built in 1996, when there was a general insecurity about the future government regulation of RE but a period in which RE actors had room to search for new technological solutions. Further windmills with citizen participation were installed in 1999, 2001 and 2008. In the Palatinate case, wind turbines were erected at the end of the year 2011, which allowed the operating company to benefit from the conditions of the EEG 2009 that provided a remuneration for energy fed into the grid from onshore wind turbines that was even higher than the remuneration of the EEG 2004. Nevertheless, the wind initiators were in a hurry to build the wind turbines since an installation built in the year 2012 would have meant less favorable conditions. Overall, the two cases differ according to the regulatory framework within which they are embedded.

For case comparison, we chose a perspective based on the conceptual framework of local governance (Sect. 2) to study the change of governance arrangements over time and the local actors' options for action. Therefore, we start with the emergence of the initial discussion on RE installations and local responses, continue with the process of construction and installation, and finish with their impacts. Hence, we compare the two cases by the structures of regulation, major events in external fields, and the activities of governmental and private actors, as well as why, how, and with what results they engaged in RE installations.

The case study approach allows for a context-sensitive and in-depth study of the local processes of RE emergence but imposes limitations on our findings. Due to the location in the same federal state and the selection of two wind cases, a generalization beyond this setting is not possible from the analysis presented. Yet it becomes plausible how top-down regulations bring local wind plans to a halt. Overall, we base our considerations on two cases rich in detail allowing for the observations of mechanisms locally at work during the time overserved. With the selection of

extreme cases regarding restrictive settings for RE installation in Germany, we study processes where we are more likely to find hindering factors for RE engagement—although in both cases, the major pathways for the installation of wind turbines had already been paved in phase one with comparably favorable conditions.

4 Case studies

The two cases analyzed describe the emergence of wind turbine installations in Bavarian municipalities. In terms of time, the cases refer to a time span that we called phase one above. In terms of space, the communities studied are far apart and therefore in very different regions of Bavaria, in the Palatinate and in the Allgäu. Both cases provide information about case developments in phase two as well.

Both municipalities are situated in rural areas with favorable wind conditions. Each community is located in a 10 minutes-distance from a medium-sized town. There is a strong dominance of single-family houses. As it is typical for Bavaria, both municipalities have a political tradition of conservative and long-time mayors.

In the two cases, locals who were strongly rooted in the community initiated the installation of the wind turbines. They used their contacts that included the municipal mayors to organize and mobilize for the building of the windmills, which resulted in the municipalities declaring ecological sustainability targets. In both cases, local media considered the wind turbines a success regarding citizen participation and acceptance. Nevertheless, regional authorities more or less successfully hampered the planning process at certain points.

4.1 The Allgäu case

The municipality is situated in the southern alpine part of the state of Bavaria. The municipality and its surrounding area consists of farming communities. Other parts of the district cater more to the tourism business. The community grew to be a forerunner community both with respect to RE development in general as well as with respect to the initially self-developed technology. The activists initially concentrated themselves on wind power.

Developments were kind of set in motion by external events: the oil price crisis in 1973 and the Chernobyl disaster in 1986. These events provided long time reference points for developing strategies of legitimation. A local man, meanwhile the current major of the municipality, became active in the process of the reinstallation of small water turbines, which had been previously decommissioned. His activities were driven by the interest of being independent of fossil fuels and non-local energy suppliers and a growing fascination for renewable technologies.

A second man, a farmer, had initially become interested in bioenergy. The farmer's motives and logic of action in addition was strongly influenced by religious motives like securing the future of god's creation.

Politically both actors were affiliated with the conservative Bavarian party CSU. The very first activities of the two actors took place independent from one another and gained profile once the actors became part of the municipal council in 1984.

In 1990, the mobilization process started. The two actors engaged in offering guided trips to various successful RE localities to the citizens. The trips focused on alternative technical possibilities for heating in Austria. At the beginning, the participants were mainly the organizers' relatives. Only gradually, a larger audience of local politicians, followed by the local farmers and finally the interested public became attracted. Simultaneously, the farmer examined the issue of wind energy. In 1993 and 1994, he joined a supra-regional working group that was part of the German Wind Energy Association and that dealt with the issue of wind energy in the Allgäu district. The association aimed at establishing a regular exchange of know-how.

In 1996, the man who had engaged in building water turbines became the municipality's mayor. He campaigned as a member of the conservative party, but also for a mandate to change the local electricity supply system. His activities received a very positive response among the farming population, which was lured by the idea of energy autonomy as well as new economic prospects.

Later in 1996, the farmer who was part of the regional wind association installed the first wind energy plant. He implemented a wind energy plant of his own based on a special technique (Neckar-Watt-Anlage) in a neighboring municipality. The construction was financed with money coming from his family. No bank at this point was willing to give him a loan for the project. The district looked with great suspicion on the developments. At this time, there already was a regulation for the energy from wind plants fed into the grid. The regulation secured a technologically independent tariff remuneration.

In the same year, the mayor submitted an application for the installation of two windmills in the municipality, followed by an in-depth and controversial discussion in the municipal council. A consensus existed that a nuclear phase out would be a good thing, but there was disagreement about the exact choice and potential of RE. A slight majority independent of any political affiliations voted for the construction of the wind turbines.

In order to increase support, an information campaign addressed at the inhabitants of the village was started. Besides explaining the planned constructions, a participation model in form of an invest-profit-sharing scheme especially reserved for the inhabitants of the municipality was advertised. In 1999, a group established a wind energy company to build two community windmills to produce 3.5 MWh of power. The total investment was 4.4 million Deutsch-marks (DM), composed of 25% equity and about 70% debt and a small grant from the state of Bavaria (200,000 DM—The value of a DM in 1999 was about 0.51 Euros) specifically allocated for testing the two wind turbines.

In 1998, a participative process started. The aim was to create a vision of the future of the municipality. In the first round, the process collected the perspectives of those who worked in public administration. In the second round, the inhabitants of the municipality were questioned. After the questioning and in consultations with the population the municipal council worked out a mission statement thought to secure the further development of the energy plans. The statement became the blueprint for how it aimed to address the demands of its citizens, community projects, and future growth and development. The statement focused on three main themes:

(1) Renewable Energy and Saving Energy; (2) Ecological Construction of Buildings Using Ecological Building Materials (mainly wood-based); (3) Protection of Water and Water Resources (both above and below ground) and Ecological Disposal of Wastewater.

In June 2001, a second company was created which featured 94 investors. Again, two wind turbines were constructed.

In June 2008, a fifth wind turbine was built. More recently, in May 2011, the farmer raised funds for a third company to install two more wind turbines. This investment was only available to the communities' citizens. Overall, investors in the community wind power projects so far have received a minimum of 8–10% return on their investments.

In 2008, the association "Ilka" formed to preserve the "original" landscape of the district. The initiative is mainly directed against the construction of additional RE installations especially in the area of the municipality. Today, the municipality counts as a lighthouse development for its supporters, but its opponents consider it an especially bad example for too many wind installations. The association has few supporters in the municipality itself, but wields considerable influence in the district and supports the new stricter state regulations. The major driving motive for the initiatives' activities is the fear that the region might lose attractiveness for tourists. Other nature conservation groups (e.g. bird protection association) also support the initiative for other reasons.

However, further wind energy plans were constrained by new air traffic control regulations that restrict the construction of new equipment within a certain distance of installations necessary for air traffic control. This regulation faces court challenges, but for the time being, no new wind power installations can be built in the whole district. Currently, it is discussed to re-regulate this issue based on empirical evidence. Another impediment for further growth became the so-called 10H rule in Bavaria, which brought windmill development to a near standstill in all of Bavaria (2014).

4.2 The Palatinate case

The municipality is a small, conservative village with a long-time mayor situated at a high geographical altitude. It consists of several sub-villages.

In 2007, the Bavarian State Forestry Office concluded a contract with wind power investors, which secured them the construction of wind energy plants in the area around the municipality. Due to good wind conditions, a project development company planned seven to nine wind turbines in an area that locals used for recreation purposes. A prerequisite for the realization of wind farms on the part of the Bavarian State Ministry was the consent of the neighboring municipalities. When the company presented its wind plans to the municipality's mayor, the mayor assigned a local contact person to the company.

To survey the acceptance of the local population, the mayor called for a town hall meeting, and informed the population, that either they could vote for the community council to designate zones for the use of wind energy or they could vote for the community council to refrain from a respective planning procedure. If the munici-

pality would not initiate such a planning, the wind energy company could have built on the recreational area from a legal perspective.

In the town hall meeting, one person publicly raised the question of whether the mayor had received payments from the development company for the construction of wind turbines. The mayor ignored the question. At the end of the meeting, the participants voted for the community council to designate zones for the use of wind energy. One day later, the community council voted for the planning procedure to start.

After the town hall meeting, a self-proclaimed counter-initiative was organized around the person who had criticized the mayor. They wanted to prevent the building of wind turbines and criticized the community council's decision. They argued that the wind turbines could be prevented on legal grounds.

Simultaneously, some friends of the contact person of the project development company organized to build wind turbines on their own. They were looking for alternative ways of energy production to replace nuclear energy plants for a better future of their children. They were especially worried about the nuclear plants behind the near Czech border.

In 2009, the two groups organized public meetings, collected signatures and wrote press releases. The wind group continued planning, founded a local company for financing the planned wind turbines, and launched a procedure for selecting a rental property. The situation became tense when there was an exchange of arguments in the local newspaper's letters to the editor and the self-proclaimed counter-initiative threatened the wind group with lawyers to cease making false statements.

In 2010, the counter-initiative questioned its engagement when the community council completed its development planning and designated three zones for the use of wind energy. Meanwhile, the wind group mobilized for wind turbines in a small sub-village of the municipality situated on a hill. They introduced a land lease model to the benefit of all households of the sub-village. The wind group planned to sell the operating company's shares in a process that favored local and regional people and presented its plans to the community council.

In February 2011, the community approved the plans of the wind energy initiative and changed its planning to designate the wind zones that the wind group had been planning with. In March, after the Fukushima disaster, the wind group remarked a significant raise of interest and acceptance regarding the wind plants that they ascribed to the disaster. When the building of the wind turbines began, the district wind plan was published, which conflicted with the planning steps of the municipality. The district's plan classified the area, on which the construction work of the wind group's operating company had begun in the meantime, as unsuitable. Since regional planning has priority over the urban land-use planning of municipalities, the municipal administration feared the thwarting of its own planning and rejected the regional planning. The district replied that the area designated by the municipality was not suitable for wind turbines. Wind power had to be given sufficient space. The local council factions then designated a bigger zone. Two wind turbines were finally built in December 2011.

When other project planning companies repeatedly contacted the municipality, the municipal council revised its planning again to make the adoption of distance

areas legally secure. The district's wind plan was discussed until 2015. The municipality appealed again, against the objections of other public authorities, and the municipality objected once more to the regional plan. In 2015, the regional plan was declared a failure.

The wind group did not want to plan further wind turbines on their own. They blamed the federal RE regulations, district and state politicians by whom they felt let down and their work capacity did not seem sufficient any longer. In 2012, the conditions for wind energy plants got more restrictive. For wind energy, the basic tariff remuneration of the EEG 2009 was granted until 2016. For a more demand-driven integration of RE, consumers were given the option of self-marketing on the stock market. At first, the self-marketing was voluntary but was to be mandatory from 2014 onwards for all plants above a plant size of 100 kilowatts. A management premium was launched to cover the costs incurred by the use of direct marketers. For the wind group, participating in the stock market with subsequent wind projects was no option as they worked on a volunteer basis. What is more, one member, who had organized the daily business of the operating company, died in 2014 leaving the remaining two members with a heavy workload. No further enlargements were envisioned.

5 Case comparison

By comparing cases to gain knowledge about the governance structure of the energy transformation, we focus on structures of regulation, important events in external fields, and activities of state and private actors as well as on their engagement in RE installations.

Concerning structures of regulation, the district level did not support the local plans in the two cases despite of federal tariff remuneration for wind energy fed into the grid. There were top-down regulations that stopped wind turbine expansion in both cases. The district was suspicious of the wind plans in the Allgäu case. In the Palatinate case, the locals reported about a notion of pressure to react to the contracts of the land with wind power investors by building wind turbines of their own. According to federal legislation, wind turbines were to be built with priority in areas that the state government designated suitable for them. In this context, community plans that undermined wind turbines were usually not acknowledged in court what allowed companies with respective plans to build plants. In the Palatinate case, the locals were in a hurry to realize the wind turbines in 2011 to be able to profit from the tariff remuneration and the legislation of the contemporary EEG. They considered the EEG 2012 and participating on the stock market as not feasible for volunteer work. Additionally, there were conflicting district plans against which the community casted its veto and that failed years after the local wind turbines had been erected. This is why the wind initiative in the Palatinate case realized only two wind turbines while there are five turbines in the community of the Allgäu case where the building of plants only stopped when the land decided about new air traffic control regulations conflicting with wind turbines in communities neighboring the local airport. We explain the countervailing district plans with the multi level

structure of German politics, and with the role of Bavaria as a notorious laggard in terms of RE known for regulations that are not favorable for wind turbines in German comparison (keyword 10H). Furthermore, Bavaria did not make its administrative subunits coordinate wind plans that harmonize with community expectations in time. This is also how we reason the top-down regulations that stopped the wind plans in the Allgäu case. The Palatinate case displays frame conditions of a time when the federal level launched RE expansion plans. Nevertheless, the case shows that the expansion ambitions, at least in terms of citizens' perceptions, did not last long.

In the two cases, there were external events situated in different times in the cases' histories and that stimulated RE activities what attests that shocks emanating from the environment stipulate change ambitions. In the Allgäu case, the oil crises and Chernobyl, that had discernible consequences in Bavaria, served as a primary motivation of wind turbines' initiators and locals who supported them. In the Palatinate case, the catastrophe of Fukushima happened at the same time when the wind initiative sold the operating company's shares and made locals participate by buying shares.

In terms of activities, we found that the initiators had formal and informal access to local polity structures and organized against established structures of fossil energy production and, later on, big RE companies. In both cases, those who initiated the wind projects were in a comparable favorable position, especially because of their political positions and relations to local politicians that enabled joint planning on the community level. In the Allgäu case, two locals engaged at first in disparate projects that worked on alternative solutions to the energy production with fossils. Later, they worked together on the basis of their membership in the local council. In the Palatinate case, an initiative of locals organized against the contract of wind energy investors and the Bavarian state government and did its planning in cooperation with the community planning.

In both cases, there was local protest against wind plans but it occurred in different times of the cases' histories. In the time of the Allgäu case, wind turbines were considered an ecological alternative to established structures of fossil energy production while in the time of the Palatinate case, the RE sector had already undergone a professionalization. There even was a public debate about wind turbines involving discussions about economic value, volatility of energy, and harm for nature and human health. In the Allgäu case, there was only protest after five wind turbines had already been built and when the decision about conflicting traffic air regulation undermined further wind turbine expansion. In the Palatinate case, there was an initiative that organized against the wind plans and that emerged simultaneously with the wind initiative.

In terms of participation, only in the Allgäu case, there was a corresponding community decision what may explain the relative lower incidence of conflicts accompanying the wind plans. There was invest-profit-sharing for the inhabitants in the Allgäu case and a community strategy that framed the wind plans. There was a land lease model for those who lived close to wind turbines and a public offer with priority on local and regional people of company's shares in the Palatinate case.

Today, the 10H regulation, in force since 2014, hinders further wind engagement in both cases. According to the regulation, the turbines may only be erected at

a distance of at least ten times their height from residential buildings (cf. STMB 2016). As wind turbines are privileged in outdoor areas according to Section 35 (3) of the German Building Code (BauGB), there are no development plans necessary to secure the erection. The 10 H regulation implies, faced with the high settlement density in Germany, that many areas are not available for wind turbine installation.

In the Allgäu case, the traffic air regulation issue is being discussed on the juridical level for several years now despite ambitious energy plans of the district. In the Palatinate case, there is still no wind plan on the district level. The wind initiative still shies away from further plans. It has taken over patronage of a wind project of another company whose plans have failed due to local resistance.

To sum it up, the two cases display how locally established actors cooperate on the community level to realize RE projects despite of a lack of support from the district and countervailing intentions on the state level. In both cases, there were top-down regulations that brought the local wind plans to a halt. Compared to the RE expansion ambitions that superior levels declared in advance or later on, the interventions in the two cases seem contradictory and invite those who consider themselves in worse positions by top-down RE plans to organize against the plans.

We conclude that there is an urgent need for the coordination of the community level and superior levels in Bavaria to enable RE expansion that has to be accompanied by a federal agreement on RE distribution to avoid discussions about distributional justice. We pledge that the coordination efforts consider those that might engage against RE plans—by publicly announcing the coordination measures at an early stage and including the multiple perspectives in the decision-making process.

6 Conclusion

We started this article by stating an empirical puzzle that results from our fieldwork with actor groups who mobilized for an energy transition, but after impressive initial successes could not continue with their efforts. At the same time, the federal government issued various statements saying that the electricity transition was stalling because of popular resistance. The problem of acceptance was identified and by the way intensively researched. We tried to develop a (theoretical) solution for this empirical puzzle by examining the changing governance structures in the field of electricity generation. We argued that a process that started as a mobilization effort by concerned citizens and other groups, that had hitherto no role in the field of electricity generation, became transformed into a government project after the energy transition decision of the federal government following the Fukushima disaster. In this process, the governance structures were changed radically. At the end (and still today) the government had installed a rather rigid so called market framework, which set out to decide who, under what conditions, and at what places can produce certain amounts of electricity. This has contributed to a dampening of the dynamic development of RE for which Germany served as a model for some years. The current government wants to get the energy transition back on track and is working on a new law to help make it happen. It is too early to judge whether

Table 3 Governance features of multi-level governance over time. (Source: by the authors)

	Temporal Frame	
Governance features	Phase one	Phase two
Goals	Undermining the old regime	Stabilizing the energy transition
Relation of public/private actors	High involvement of civil society actors	Professionalization
Relative importance of levels	Predominance of local level	Predominance of state and federal level
Scope and density of regulation	Low	High
Instruments	Feed-in tariff	Auctions

this will in fact happen and contribute to changes in the governance structure of the field eventually. The structural and regulatory changes outlined above provided the *opportunity* for RE activities to emerge, but they did not create the *necessity* for any one particular form of organization to persist and dominate. Still today, there is not one dominating organizational form in the field of electricity generation and distribution.

We conclude, that the main differences in the multi-level governance architecture over time concern

1. the prevalent purpose, or goals of governance,
2. the prevalent governance instruments,
3. the relative importance of governance agencies at different levels, as well as
4. the prevalence of public, private, or mixed forms of governance.

Table 3 tries to provide a summarizing overview.

One idea of the new government is to strengthen the role of civil society actors decisive in our two cases again. The case studies presented show the mobilizing efforts of local actors in phase one. In the Allgäu case, there was an early interest in RE that came to a halt due to the changing frame conditions in phase two. In particular, the case highlights what we called search efforts characteristic for radical innovations in the beginning. In the case's beginning, no reliable market framework was available. It became only established over time. The Palatinate case started towards the end of the dynamic growth of RE installations in phase one and features a rather sudden end of further enlargement. The case started when in principle the contours of the market were calculable. Thanks to regulatory changes the initial calculus, the local engagement soon proved to be not viable any longer.

We can also see that in both cases, activities organized by the different levels of government on the one hand and professional project planners on the other hand have now replaced the initial mobilization efforts by local actors. Local mobilization for climate issues is surely still to be observed, but it is not oriented towards RE. We derive from the observations that a government interested in civil RE engagement has to revive the interest again and be sensitive for engagement against the plants' installation. If there were conditions more favorable for civil RE engagement like renewed tariff agreements comparable to phase one, the actors involved would still

be faced with a more differentiated regulatory structure and competitors that are more professional.

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