Sustainable electricity transitions in Germany in a spatial context: between localism and centralism

Gerhard Fuchs* and Nele Hinderer

Institute for Social Sciences, University of Stuttgart, Stuttgart, Germany

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While the traditional form of electricity generation and supply is based on centralized structures with large-scale power plants, the objective of a strongly decentralized form of energy supply is increasingly becoming important. Sustainability-oriented energy transitions are relying on various sorts of renewable energies coupled with energy-efficiency initiatives. In the current existing regulatory and market frameworks in Germany and elsewhere, important technical and institutional innovations for energy transitions were and are being developed, tested, and brought to application on regional and local levels. Regions, cities, and villages experimenting with socio-technical innovations and aiming to implement new concepts have to develop governance structures under high uncertainty. These governance structures mirror space-specific social, political, technological and economic constellations. The present article introduces an analytical approach for studying emergent forms of governance and uses four cases from Germany to apply the approach. Research is based on a comparative case study research design, using primarily expert interviews and document analyses as data sources. The cases demonstrate that sustainable energy transitions are driven forward by a host of different actors with different aims and interests, culminating in the development of space-specific technological mixes and situative governance structures. Sustainable energy transitions neither follow a master plan, nor are they coordinated on a national level. The upper political levels and external events pose severe constraints for the implementation of local transition initiatives. Future research should aim to highlight and analyze the contentious character of energy transitions.

Keywords: sustainable energy transitions; Germany; electricity supply; decentralized initiatives

1. Introduction

While the traditional form of electricity generation and supply is based on centralized structures with large-scale power plants, the objective of a strongly decentralized form of energy supply is increasingly becoming important. In the current existing regulatory and market frameworks in Germany and elsewhere, important technical and institutional innovations for sustainable energy transitions were and are being developed, tested, and brought to application on regional and local levels. Regions, cities and villages experimenting with socio-technical innovations and aiming to implement new concepts have to develop governance structures under high uncertainty.\(^1\) These governance
arrangements mirror space-specific social, political, technological, and economic constellations that have yet to be tested for their persistence and functionality (Joss, 2011).

In this context, the article analyzes the development of decentralized situational governance as a basis for innovation impulses for the sustainable transformation of the electricity system in Germany. Assuming that local, urban, and regional governance structures develop in conflict with the established structures of the field “electricity generation”, the article analyzes a range of German initiatives as “strategic action fields” within which socio-technical innovations are being developed. Based on recent theorizing by Fligstein and McAdam (2011, 2012), the paper stresses the importance of the actions of so-called challenger actors, which eventually might contribute with their activities to a change in the overall system of electricity generation. The article thus treats the city or any local entity not as a given unit, but looks at the actors or coalition of actors who want to change existing structures. They are challenging the established status quo.

Local, urban, and regional initiatives are often interpreted in the literature as small experimental “niches”: constrained, but also enabled, by wider social and political structures and developments (Geels, 2014). Niche innovations may lead nowhere; they may even serve to reinforce the status quo. Equally, however, they can have far wider implications as well, implications which are hard to predict in advance since they are dependent on new cognitive frames, changing economic and political power constellations and innovative measures to become effective. It is of eminent importance insofar as to look at the actors and their resources, their position within the field under investigation for evaluating their actions, and their potential contribution to a transformation of the electricity system towards more sustainability. The article will look more closely at four cases to analyze and ask what actors are present in the fields and what the dominant lines of conflict they are engaged in look like. The study goes beyond treating cities or local communities as research units as such or looking solely at plans for sustainable transition. Energy transitions are concerned with the change of established structures and institutions. Change has to be brought forward by skilled actors, forming coalitions and developing innovative policies, which eventually will bring about new institutions more favorable for the realization of sustainability aims.

The article will proceed as follows. Section 2 looks at the question what actors are driving transition processes and will identify ways to analyze their status. This will be followed by a discussion of some trends of decentralization in the German system of electricity generation (Section 3). Section 4 will present four cases in more detail, before general lines of conflict the local initiatives are engaged in will be discussed.2

2. Transition and its driver
The fact that local and urban governments are increasingly adopting energy-related policies that aim at a transformation of the electricity supply system is widely acknowledged (Hodson & Marvin, 2010). Nevertheless, the relevance of the spatial scale of these initiatives generally remains implicit or underdeveloped in transition approaches (Bulkeley, Broto, Hodson, & Marvin, 2011). This negligence might have two reasons: on the one hand, sociological approaches do have the tendency to underrate the role of spatial proximity because they usually assume that closeness in social space is paramount. On the other hand, a lot of the transition literature is explicitly technology-oriented and takes as its point of departure a specific technology and studies its pathway towards success or failure, being more oriented towards analyzing institutional elements
of technological innovation systems than the actual, process-related conditions of development. Regions and local communities are usually considered more passively as seedbeds, but not as originators of powerful transition-oriented initiatives. This, however, need not be the case. The example of the development of solar technology in Germany has amply shown that the initiative for experimenting with and developing this technology came from certain local and/or regional pockets in opposition to developments on a more central level, be it the federal or state government or the incumbent actors in the field of electricity supply (cp. Fuchs & Wassermann, 2012).

Usually, studies based on the multi-level perspective (e.g. Geels, 2005, 2010; Geels & Verbong, 2007) identify dynamic processes that are characterized by the existence of path dependencies and lock-in phenomena as well as by interdependencies between technical and social change processes (Elzen, Geels, & Green, 2004; Raven & Verbong, 2010; Rip & Kemp, 1998). Trajectories of persistence thereby hinder change and are hence, very interesting for analyzing the reluctant withdrawal from fossil path dependencies. However, there is a lack of actor orientation, as well as a lack of studies on area-focused strategies and innovation resources (Kemp, Rip, & Schot, 2001; Markard & Truffer, 2008). Even though the innovation niches which are in the focus of analytical works were attributed to local characters, the spatial embedding of innovation processes and the dynamics of innovation there, negotiation processes and the “battle of the systems” are neglected (Hodson & Marvin, 2010; Monstadt, 2009).

Looking at the way local initiatives organize bringing about what we will call situative governance forces us to engage with the driving forces aiming to create a new governance structure. We assume that place-specific conditions for innovations in the direction of a sustainable energy system differ according to specific urban initial endowments and existing urban socio-technical energy systems and power constellations. In the process of developing energy innovations, a space-specific specialization and division of labor can be identified. Urban-specific energy and innovation profiles (e.g. solar cities, bioenergy regions and eco-cities) become established.

It is an answer insofar as to look at the “roots of local policy responses to climate change” (Burch, 2011). One line of thinking stresses the role of incumbent actors in initiating transition processes, especially on the local level. Smith, Stirling, and Berkhout (2005) argue that there would be a need to further develop regime-endogenous transition perspectives, where the transition process is conceptualized as the result of incumbent regime actors (local/urban governments) making conscious and planned efforts in response to perceived pressures using regime-internal resources. We take issue with this approach. It is a theoretical as well as an empirical question to identify and categorize the actors responsible for bringing forward initiatives towards transformation or a transition of a regime or the dominating rules within a field. In order to identify who is incumbent and who is challenger, it is first of all necessary to identify the field we are talking about. The field of electricity generation is dominated by the actors responsible for this task and there are rules that regulate who, under what conditions, is allowed to do what, as well as implicit rules concerning what the actors consider to be legitimate actions. So, for example, the big energy providers in Germany, for a long time, did not venture into territory that was supposed to belong to a fellow energy provider, insofar as the four big German energy providers are still regionally concentrated and the market is basically divided up between them.

The theory of strategic action fields (Fligstein & McAdam, 2011, 2012) entices us to look closely at what constitutes a field and the social structure of contested fields. It seems to be able to address some of the critical points mentioned above and looks like
being especially well suited for our purposes since it claims to answer the question how, and under what conditions, relatively powerless actors come to mobilize and (re)organize fields – in our case, electricity supply infrastructures. It helps us to analyze the actions of challenger actors on a local level, which eventually might contribute to a change in the overall system. The theory claims that usually an incumbent–challenger structure can be detected if aims in a field are contested. It further claims that incumbents will usually be interested in defending the status quo, while challengers will try to inflict damage on the incumbents and try to change the status quo. The theory would not make us expect that incumbents are, in fact, in a position to significantly change the structures of the field or that they would, in fact, be the drivers for creating a sustainable urban regime adjustment.

In my mind, in most cases, the question what role incumbents play in transition processes needs to be more precisely formulated. In many case studies, the role of mayors or city councils in developing plans for sustainability and energy transitions is being stressed. Observers consider them to be the incumbents, because they possess, at a specific moment, a politically powerful position. But in most cases, state actors or political actors are not competing in the field under investigation, e.g. electricity supply. They are on the outside trying to regulate the field. The field of electricity supply is populated by the actors responsible for providing energy. Political decision-makers then and there concern themselves with energy questions but are not routinely involved in the business. If the system of energy provision changes due to new political decisions, this is the result of bargaining, mainly between politicians and, very often, changing majorities. In communities that we have analyzed, everything can be observed, from a conflict over energy questions which led to changing majorities in a city council, up to the attempt to use the energy question to keep one’s position as sitting mayor. If the mayor or city council wants to change the energy system, she has to engage with the incumbent actors in the field who will usually try to resist changes that result in a change of their status. This differentiation is useful to make because it sheds light on the different games actors play (Scharpf, 2000) and the different logics that drive the activities of actors. Mobilizing a community and generating electricity at market prices are two different things that can influence each other but are following different logics.

The attempts by local communities to take over electricity networks aim to change the social structure of the field. Changes initiated by local actors can take different forms. A new network operator can be selected that is more attuned to the ideas of the sitting majority or the city council can decide to take over electricity generation by itself, turning it into a public task. In the latter case, the local administration now would be an actor in the field because it has become responsible for providing energy and is dealing with other entities responsible for the supply of electricity.

Quitzau, Jensen, Elle, and Hoffmann (2013) claim that an “… endogenous perspective suggests a need for more institutionally entrenched transition typologies.” (Quitzau et al., 2013, pp. 140–141). This argument is well taken, but there seems to be no need to take the supposedly transforming actions of incumbent actors as the starting point for further developing transition-oriented typologies. Regimes in this context need not be considered as something being solely restrictive. Regimes also have an enabling role. Without regimes and the security for decision-making they offer to both private and public actors, a lot of activities would not be happening or would be frustrated due to a lack of perspective. For example, the development of renewable energies in Germany could only take off once there was something like a regime that made it possible for the relevant actors to make decisions reaching into the future.
This implies that regimes, without any doubt, are characterized by a certain stability (dominant actors, rules, cognitive frames and legitimate actions), but that does not mean that only uniform behavior can be observed. Regime actors are, of course, constantly adapting to new circumstances – they are trying to keep their position even when faced with a turbulent or threatening environment. Thus, slight changes in the strategies of incumbent actors are quite a normal incidence. They are not threatening the regime, but strengthening it.

The claim that transition theory underrates

... the potential of incumbent regime actors as orchestrators of transitional change. By means of their skills in situated interpretations and creativity, such actors may also use regime rules to consciously modify traditional patterns of associations among flows of socio-technical systems. (Quitzau et al., 2013, p. 141)

has to be seen in this light, both as a theoretical claim, for which we see no justification, as well as an empirical claim, which, of course, can be verified or falsified.

Hargreaves, Hielscher, Seyfab, and Smith (2013) recently have highlighted the role of intermediaries for local and regional projects. In fact, organizing and organizational support is crucial for a project to be successful and if an on-going project aims to have a broader impact, delocalized forms of organization have also to be found. Hargreaves et al., in fact, stress that with the growing maturity of local innovation projects, the role of intermediaries increases, which is sensible given that local initiatives develop knowledge and successful projects will have to take into account available knowledge. On the other hand, many projects are embedded in programs, support schemes, etc. and many do not have only a local or regional aim but intend to have a larger impact on the whole system of electricity generation or even how the architecture of the society as a whole should look like. It seems more than reasonable insofar as to suggest that new professionalized knowledge gradually develops with its own set of specialists and more general ideas about how things are best done.

The authors stress, furthermore, the specifics of local innovation projects (in contrast to market-oriented projects). In our mind, however, the difference should not be seen in the local character of the initiatives as such, but in the uncertainties surrounding their activities as they are challenging the incumbents. The authors (a) rightly stress that local initiatives show an amazing breadth of distinct organizational forms. A broad range of organizational types encompassing cooperatives, voluntary associations, informal community groups, etc. can be found. It has to be added, however, that local initiatives might also create companies and entrepreneurial people are also wary about the organizational form that best suits their ambitions; (b) furthermore, there are different resource bases: voluntary labor, grant funding, etc. This can also be claimed for new firm foundations in the electricity sector, which especially in the founding phase, very often depend on grants, personal or family resources and have a hard time making ends meet. On the other hand, both local initiatives as well as companies, in the end, have to generate some kind of income; (c) there are important divergent contextual situations, which is equally true for firm foundations as well as local initiatives. In addition, the authors claim that (d) there are alternative driving motivations: meeting social needs, pursuing ideological commitments. An entrepreneur in the field of electricity generation is often driven by the same motives. Again, we can see this when looking at the development of the renewables industry in Germany, where political and social motives were decisive for the development of the industry (Cp. Fuchs & Wassermann, 2012). On the other
hand, local initiatives can also be driven by the motive to generate profits, as many of the German examples we have studied demonstrate.

Hargreaves et al. thus underestimate the common problems private as well as public actors face when they are in a situation of challenging the status quo: (a) both are unsure about the contours of the future regulatory development. Some of the reform proposals discussed in Germany by the outgoing government (2013) constitute doomsday scenarios for many local initiatives as well as companies aligned with them; (b) local initiatives as well as new companies that are working with technologies or technology mixes intend to offer services linked to specific technological developments, the viability of which, on the long run, still needs to be proven. New technology developments (e.g. in the field of energy storage technologies) or regulatory developments may delegitimize various plans; (c) just like firms, local initiatives have to be organized, structured and made to work. Finally, (d) local initiatives, just like companies, have to do something useful and legitimate in the eyes of their (potential) clients.

Let us sum up by saying that we claim that the theory of strategic action fields is an interesting analytical approach to analyze transitions. It directs our attention to the social structure of contested fields. It is not a theory about local initiatives and their specific characteristics but a valuable instrument to study local initiatives as well – initiatives that are aiming at a transformation of the system of electricity supply.

3. Electricity transitions in Germany

It should be clear that we see an important line of conflict related to the future electricity system insofar as to what extent it has a decentralized architecture. This is not a purely technological problem. Renewable energies could also be harvested and run in a more centralized manner by using big solar farms and huge (offshore) wind parks, administered, for example, by the established big energy providers. This could also be called sustainable. But most actors on the local level are driven by the idea that electricity generation should be dramatically decentralized in both technological as well as organizational forms. And this is not only a German discussion.

Many urban and local governments worldwide are working on reconfigurations of local energy systems. The REN-21 2013 report, for example, lists many examples of locations with starkly varying aims (2013, p. 119). It concludes that

Thousands of cities and towns around the world have active plans and policies to advance renewable energy. Despite the slowdown at a national level in 2012, policy momentum continued to accelerate at the local level as city governments took actions to generate employment, plan for rising energy demand, cut carbon emissions and make cities more liveable.

In the US, more than 900 US cities have signed up (by 2009) to the Climate Protection Agreement (2005), launched by the US Council of Mayors, which requires signatories to meet US–Kyoto targets (7% reduction by 2012 on 1990 levels) within their own boundaries. In 2005, global megacities (e.g. Berlin, Hong Kong, Jakarta, Johannesburg, Los Angeles, London, New York City and Tokyo) created the C40 Cities Climate Leadership Group (2005), which aims to reduce GHG emissions and adapt to climate change. In Europe, there are various dedicated urban initiatives (e.g. Copenhagen’s Climate Plan to be carbon-neutral by 2025) and eco-cities (e.g. Freiburg and Graz). In addition, there are many other national and international groups like Energie-Cités or
ICLEI. Germany, without any doubt, is among the countries with an especially wide variety of relevant initiatives. This might appear surprising at first. The Germany electricity system used to be characterized by strong local and regional monopolies, but after the liberalization of energy markets in the late 1990s, these supposedly inefficient structures were to be replaced by an oligopolistic system run by four big energy providers (ENBW, EON, Vattenfall and RWE), which had divided the market among themselves along regional lines. In the process of liberalization, there was a clearly stated political will by actors from the state and national levels to create powerful and supposedly competitive big actors. The four energy providers, therefore, were gulping up smaller competitors by various means and supported by political will. The big energy providers built their strength on the provision of standardized good “electricity” that is mainly produced in big power stations owned by them and relying on fossil fuels or nuclear power. The developments in the 1990s and in the early years of the new millennium seemed to be characterized by a process of concentration and centralization.

However, somewhat independent from these developments, individual-concerned scientists and citizens and, later on, local governments, were developing alternatives to the dominant centralized structures. They were relying especially (but not exclusively) on renewable energies and were bypassing the “official” system. In the beginning, small individual sites, in the case of PV, for example, individual homes were transformed into sites of electricity generation. These new decentralized forms of electricity generation were heavily opposed by the incumbent energy providers. Nevertheless, small local and increasingly urban initiatives were growing. Energy providers initially were not attacking these small initiatives, because they were considered to be too small and unimportant, but they heavily opposed the promotion of renewable energy schemes on the political level and the development of a market framework that would enable the growth of these technologies.

A change in the composition of the federal government in the late 1990s nevertheless enabled new regulatory initiatives for renewables, which immediately had a tremendous effect (Fuchs & Wassermann, 2012). Ambitious plans for the development of renewable energies in general and a contract for the gradual phase out of nuclear energy followed. In the years 2005–2008, the early movers were joined by a huge wave of local initiatives which were animated by the successes of renewables energies and their economic and social impact.

After another change in the composition of the German federal government (2009), the framework within which the renewables were dynamically growing deteriorated and the initial planned phase out of nuclear power was postponed. Only after the Fukushima catastrophe (2011), the phase out decision was again revoked and political priorities now moved forward to an even quicker nuclear phase out. The German “Energiewende” decision of 2011, however, somewhat happened in isolation. It was not accompanied by plans on how and whether the electricity system should, in fact, be transformed. The local, regional and state governments engaged in planning changes to the electricity system felt strengthened, but the federal government and the incumbent energy providers actually tried to stem the wave of decentralization.

In order to understand the impact of these partially contradictory developments, one has to take a closer look at what specific actors actually aim to achieve with their initiatives and against what and whom and for what and whom they organize. To collect all these varying attempts under the umbrella of “sustainability transition” does not do justice to the complexity of the developments and the varying lines of conflict between
different actors. At least the following forms of decentralized initiatives can be distinguished.

At first, there were the aforementioned attempts by individuals or small groups of people experimenting with new forms of electricity generation and distribution. This movement went mainstream once, in the late 1990s, a regulatory framework for the development of renewable energies and the feed-in of energy into the grid generated in a decentralized way was enacted. The renaissance of this movement with different aims came about when official energy prices soared and prices for self-generated energy declined. Now it became economically interesting not to feed in self-generated electricity into the grid but use it locally (and thus also bypassing the regulatory mess into which the law on regenerative energies meanwhile had degenerated).

Secondly, there are movements by especially small communities to become 100% energy self-sufficient. This movement originally was also driven by challenger groups, but meanwhile, has attracted “official” recognition and federal as well as state programs for some years were supporting the development of respective energy plans.

Thirdly, the renegotiation of network concessions on a local and regional level has to be mentioned. At the moment, in most cases, local and regional networks are run by the incumbent network operators. In order to be able to do this, they had been granted concessions by the respective local authorities. In the wake of the discussion about energy transitions, the process of granting concessions has been repoliticized. Against heavy opposition from the incumbent energy providers, some authorities try to give concessions to new partners. Between 2007 and 2012, about 190 ownership changes in electricity networks had been recorded and 170 concessions for electricity and gas supply were not given to private companies, but were granted to local authorities and local public companies. In Berlin, the city government tries to buy back the urban network (forestalling a public initiative with even more far-reaching aims) and in Hamburg, a citizen initiative forced the city government to negotiate a buyout of the incumbent energy provider against its will.

Fourthly, one of the partners getting a concession might actually be an old partner. In the wake of market liberalization, the old urban and local energy providers, with some notable exceptions, had lost their importance. Now, some of them are being revitalized (e.g. by competing for new concessions) or are newly founded. Since 2007, at least 60 new foundations of urban energy providers (a process that has, by the way, a strong regional flavour, especially in Baden-Württemberg) and 600 foundations of new energy cooperatives were observed. These developments create an interesting – sometimes confusing – organizational mix. We can find totally public as well as totally private energy providers. Between these two poles is a mix of public-private partnerships with a varying mix of minority-majority shareholders. Gerstlberger (2009) distinguishes three types of new urban energy providers with partnership constellations emerging in this phase: local privatizations with a participation of national or regional energy providers, international privatizations with a participation of an international energy provider and privatizations with the participation of an investor that does not belong to the energy field proper. This mixture of organizational forms and the differentiation of actors render it difficult to detect an overall line of development with respect to, for example, sustainability aims. However, this mixture is a clear indicator for a field in emergence in which stable rules and best practices need yet to be established.

These developments should not only to be seen in the context that various actors for different reasons become interested in energy issues, but also in the context of a
rollback of the so-called “New Public Management” movement. It is not only in the field of energy that a revitalization of the role of local governments can be observed. After disappointing experiences with privatizations, many entities are reconceptualising the role of local activities (Libbe, 2013). This refers to both sourcing back activities that had been previously outsourced to private actors as well as generally a new legitimation for a revitalization of economic activities by local governments. Energy questions in this respect are newly discovered as a legitimate and potentially economically profitable field of activities for local governments.

4. Cases of 100% bioregions

Given the scope and space limits of this article, we will not be able to analyze all the different types of localized initiatives. We will, instead, focus on one clearly delineable subgroup, the so-called 100% bioregions. These initiatives have as a common characteristic – they want to become independent from energy generated outside the respective region and intend to use only renewable energies for electricity generation. First ideas were developed in the 1990s and one decade later, federal, state and European money became available for the development of respective plans. The task of identifying 100% regions is made easier with the help of available directories and organizations representing these initiatives. Nevertheless, it is difficult to give a precise number of operating initiatives that have gone beyond setting up a plan and are implementing real changes. We know for certain that there are spatial concentrations of these initiatives. One is in the northeastern state of Mecklenburg-Vorpommern. In this economically peripheral area, the availability of public seed money for setting up plans was decisive. Another concentration is in the southwestern state of Baden-Württemberg. In this economically prospering region, the strong influence of an environmentally minded civil society and engaged citizens was decisive. Our empirical analysis concentrates on initiatives in the south of Germany. The south of Germany can be characterized by economic prosperity, low unemployment and firmly established institutions. Out of the available set of operating initiatives, we selected four cases for a detailed analysis which exhibited a variance along two categories of special importance for our research. Based on an analysis of the aims stated by the organizers of the initiatives, we distinguished between aims that are oriented mainly towards inward energy production and those that are aiming at exporting generated energy. All initiatives need to have a viable business plan. But they differ in the extent to which a profit orientation is prominent. This is also reflected in the type of organization that is being set up to implement the 100% bioenergy aims (profit versus non-profit organization). Secondly, we considered it important to distinguish between initiatives which have been initiated and developed mainly by locals, and initiatives in which outside actors play a dominant role.

With the focus on actor constellations, the phenomena of emerging fields thus was studied with the help of four case studies (small-N analyses). The procedure of case selection in a formalized way was based on two observations. One refers to the definition of the population, the other to the selection of cases. The population of possible cases can be characterized as representative regions which embody the new paradigm of the energy transition (100% renewable energy regions). This means that the regions represent a specific set of special conditions and social phenomena (Bradshaw & Wallace, 1991) by the construction of specific governance structures underlying the goal to achieve an energy supply based on 100% renewable energy. The second argument provides the basis for the construction of a functional model. As it can be seen below, the
model consists of four cases (regional fields) based on differences in the composition of change, assuming that specific structural and organizational designs will be influenced by the type of actors to be found. The model aims to sample the maximum of variation and heterogeneity to understand how the phenomena can be seen with respect to different change agents. Let us take a brief look at the four cases.

Case 1: Region Hegau Bodensee, private actor: In this region, the goal of the energy transition has been driven forward by the Solarcomplex AG. The company works as an alternative municipal utility and aims to supply the Bodensee region with 100% renewable energy by the year 2030. The Solarcomplex AG invests, in particular, in solar energy and bioenergy villages. It acts as a driving force and can be seen as a pioneer for developing business cases in the field of renewable energies.

Case 2: Region Neumarkt i.d. Oberpfalz, public-private actor: The regional management of the development concept for achieving a 100% renewable energy supply is coordinated by the regional innovation agency Regina. It is run and supported by a host of actors from within and outside the region (e.g. Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie, Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten, Bayerisches Staatsministerium für Umwelt und Gesundheit, Europäische Union, Sparkasse Neumarkt i.d.OPf., and Raiffeisenbank Neumarkt i.d.OPf.). The region follows the vision of sustainable regional development, including the supply of 100% renewable energy.

Case 3: Region Hohenlohe-Odenwald-Tauber, Verband Abfallwirtschaftsgesellschaft des Neckar-Odenwald-Kreises mbH (AWN): The Bioenergy Region Hohenlohe-Odenwald-Tauber is driven forward by an association called Abfallwirtschaftsgesellschaft (AWN). It is a profit-oriented company with 100% ownership by regional public bodies. The region aims to become a zero-emission Region by supporting the generation of renewable energies.

Case 4: Region Südschwarzwald, Südschwarzwald e.V.: The key actor of the campaign Bioenergieregion Südschwarzwald plus is the association Südschwarzwald e.V. It has been set up by five counties. The campaign will push the expansion of bioenergy in the region with the objective of supporting municipalities and villages on the way towards becoming biomunicipalities and biovillages. It stresses the use of available biomass which is supposed to bring in line available natural resources and social structures, as well as climate and environmental goals.

As mentioned, the cases are aligned along two dimensions (see Table 1), the first one being: who was the driving actor in the development of the local initiative? We distinguish between an endogenous development in which the driving forces mainly come

| Table 1. Cases and actor constellations. |
|------------------------------------------|
| **Profit orientation** | **Public interest** |
| Solarcomplex AG | Regionale Innovationsagentur “Regina” GmbH |
| Abfallwirtschaftsgesellschaft des Neckar-Odenwald-Kreises mbH (AWN) | Südschwarzwald e.V. |
from inside the community, and an exogenous development, in which the development was driven by actors from outside the community. Solarcomplex AG is an example of a private actor who actively addresses local communities and tries to convince them that to go renewable is a socially desirable as well as an economically feasible goal. Solarcomplex AG was initially founded by social movement actors without profit motives but convinced about the social desirability of their aims. In spite of the fact that the company meanwhile puts the economic viability of its projects center stage, it accepts and takes over substantial economic risks in the process of persuading local communities.

A second example for exogenous actors becoming relevant is related to support programs which existed both on the federal and on some state levels with occasional additional support from the European Community. In these cases, various forms of support were promised to communities which were aiming at developing plans to reorganize the local energy supply. This was an option that was especially taken up by communities in economically deprived areas, lured by the promise of money, jobs and new economic activities.

The pioneer local communities have usually been driven forward by endogenous actors. A typical case is a community with a newly elected mayor with “green” credentials, who had good personal connections to experts in the field of renewables. In our case, a bioenergy pioneer, who later on founded a related company, was living in the same community as the mayor. The two of them convinced the local council, and later on, a majority of the population, that the community should go “bio.” Initially, this could be done without much external interference or help.

A second line of distinction separates cases in which the economic motive is dominating from those in which the profit orientation is secondary or ruled out by the organizational form chosen by the community to reorganize energy supply (e.g. registered association). The economic viability of all projects with a financial contribution of local budgets has to be guaranteed, nevertheless. Otherwise, upper-level control units could derail the projects easily. It is a decisive distinction, however, whether the community looks upon the projects as a means to provide new profits, especially by exporting not needed energy to other communities or the grid, or not.

External actors usually have a more or less clear idea about how activities among the main actors involved in the initiatives shall be coordinated. Solarcomplex AG, as well as ministries, has a blueprint that is adapted to local conditions, and therefore, is still very idiosyncratic, but nevertheless, clearly recognizable and “stable”. Initiatives advanced by endogenous actors show a greater variance in their governance set up and might change over time. The aforementioned example of the green mayor is linked with a story from an initial concentration on bioenergy, which was replaced by a failed attempt to switch to wind power and finally a massive installation of solar-panels with differing coalitions and organizations being established to pursue the green goals. This last example also shows that the choice of technologies and the development of technology mixes are dependent on local conditions and contingent power constellations.

5. Lines of conflict

So far, we have been mainly concerned with the internal set up of the local initiatives. For a continuous development of their plans, they are dependent on favorable outside conditions and cleverness in their struggles with incumbent actors. Section 5 is devoted to looking at the dominant lines of conflict.
Electricity networks, constituting something like a natural monopoly on the local and regional level, are run by energy providers that have been granted concessions by the responsible public authority. These providers eventually may also own the physical network infrastructure. If local authorities want to buy back the concessions, cancel the concessions, or revoke them, they usually face heavy resistance from the incumbent actors. They are offering sticks (courts, high prices and costs, refusal to hand over data, etc.) and also some carrots (higher fees, more participation, etc.). The network operators, very often, are linked to specific political actors in the community, which immediately politicizes the conflict. In many cases, especially in the geographical area dominated by the big energy provider RWE, cross-ownership problems play an important role. Local communities can be among the “owners” of the big energy providers. They should have an interest in their wellbeing since the energy providers (at least in the golden days of the past) provided a steady flow of income to the local communities. In addition, since the system of electricity supply is highly politicized, many (former) politicians are employees or even managers of the incumbent energy providers. It is no wonder, then, that one important line of conflict always centers around the relationship between local communities and the big energy providers.

In our bioenergy case, the new local network operator was forced to sell its business back to the dominant network operator. Due to the growing local electricity production, increasing interconnection problems and steadily increasing regulatory requirements, it could not any longer fulfill its role, and the fastest and easiest way out was to sell back. The energy provider promised not to unravel the local energy system which did get various prizes for being outstanding, but the initial contacts also demonstrated clearly that it is in this business for different reasons than the local community.

In an expertise for the German parliament, the strategies used by the incumbent energy providers to prevent local communities from looking for new partners have been listed. In spite of the fact that there are regulations that fix the prices that have to be paid for regaining control over the network infrastructure, the energy providers routinely demand too high prices. Smaller communities lack the expertise necessary to counter these evaluations and are avoiding lengthy and potentially costly juristic struggles. Another method is to prolong the bargaining. Regulations at the moment say that if no compromise can be found within a year after the concession has been cancelled, the old network operator can operate the network without having to pay a concession fee. Furthermore, the incumbent network operators can try to avoid communicating data that are necessary for running the network and/or establishing its actual worth. There have also been cases were manipulated data have been handed over. Threatening court action, withdrawal of sponsorships for sports and cultural activities, and firing personnel from the community are some other methods used by incumbents.

The relationship between communities and energy providers also has an infrastructure component reaching beyond the limits of the community. Neither at the beginning of the transition nor later on will local communities be able to do without a connection to the general grid. The justification may be the dominance of volatile energy sources (wind, solar) or the necessity to have a backup if local or regional energy resources do not work according to plan. The “Smart Region Pellworm”, for example, produces three times the amount of electricity it needs by itself. Nevertheless, at the moment, it is dependent on a continuous electricity supply from its connection to the overall grid. The reason, in this case, is that due to the lack of affordable energy storage technologies, the electricity generated cannot be used at the time when it is most needed, but only at the time when it is produced. This might change medium- to long-term due to
technological developments, but it constitutes a significant problem for many local communities. Furthermore, at the moment, plans are discussed by the government and propagated by the energy providers to charge the connection to the grid instead of the amount of electricity actually used. This would disadvantage local communities and make their efforts more costly.

Inner conflicts are to be found as well. In many communities, there are conflicts between different interest groups. In the case of the bioenergy village, resistance from farmers had to be overcome on a regular basis. They effectively opposed plans for a solar farm because they feared that land use for non-agricultural purposes would increase the rent for the land that they use for agricultural purposes. The installation of wind power initially in this community, and in many others as well, was opposed not only by farmers, but also by citizens, claiming that it would damage the environment (devaluation of the community for tourists, health risks attributed to installations, ecological problems, etc.) and their personal property (devaluation of the prize of property next to energy-related installations). Some communities totally opted out of energy plans citing aims like they wanted to develop a landscape devoted to leisure activities (tourism) and would not want to develop an industrial landscape.

6. Conclusion

The paper started with the assumption that cities, local, and regional communities are at the forefront of efforts to change the electricity supply system (Morlet & Keirstead, 2013, p. 852). We were furthermore making the assumption that spatial, context-specific factors are important for understanding the development and eventual shape of these decentralized perspectives. We have claimed that initiatives are advanced by a heterogeneous group of actors with varying aims, which take under consideration local power constellations, spatial conditions, and the existing set of technological options insofar as spatial elements (of a social as well as ecological nature), political conditions, economic structures, settlement profiles, available material resources (wind, sun, wood, and biomass) matter. In energy transitions, we will presumably be able to observe a kind of division of labor in the sense of a space-specific specialization of innovation profiles (e.g. solar cities, bio energy regions, energy services region, etc.), if trends towards decentralization continue.

We suggested that with a possibility to avoid the concentration of the analysis on one or only a few cases, the theory of strategic action fields could be of benefit. It directs our attention to the social structure of fields, the dominant actors, strategies, and forms of organization chosen, as well as the dominant lines of conflict. Given the diversity of actors involved, strategies developed, and organizational forms established we can definitely talk about an emergent field that is not yet stabilized. It is also very difficult to say at the moment which of these initiatives at the end will survive, and what influence they will have on the overall transition of the energy system and the specific sustainability pathway. It is obvious, however, that local initiatives have and still play a pioneering role for the energy transition in Germany.

Notes

1. In what follows, we will make no distinction between local, urban, and regional attempts towards developing plans for energy transitions. The decentralized character of these initiatives, which puts them into opposition to the dominating centralized architecture, is the most important common element for the purposes of this study.
2. The article is based on preliminary empirical results from two ongoing projects. One is financed by the Helmholtz Association and the state government of Baden-Württemberg; the second one is funded by the German Federal Ministry for Research and Education (FONA program).

3. The argument that regime actors might deliberately weaken the regime in which they are the incumbent actors begs the question as to why they should do this.

4. For a comprehensive overview and evaluation cp. Berlo and Wagner (2013).

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