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Two ways to success

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Expansion of renewable energies in a comparison between Germany's federal states

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Abstract: Expansion of renewable energies is a central pillar of the German energy transition initiative toward a non-nuclear renewable system. The expansion rate is co-determined to a significant degree at the level of the federal states, and varies considerably from state to state. Which factors influence significantly development at the state level? Apart from the existence of natural energy resources and general economic conditions, do party-political factors also play an important role? We consider potentially influential factors in a fuzzy-set QCA focusing on the expansion of renewable electricity production in all 16 federal German states from 2004 to 2014. As a result, two promising avenues for accelerated expansion of renewable electricity production at the state level can be identified. On one hand, a group of economically less developed states succeeded in promoting expansion and using it as part of an economic innovation strategy. Within the economically more developed states, however, the party-political composition of the respective state governments (Green party's involvement) played a role.

Keywords: Renewable energies, varying expansion rate, electricity sector, comparison of federal states, party effects, economic determinants, expansion potentials, fuzzy-set QCA

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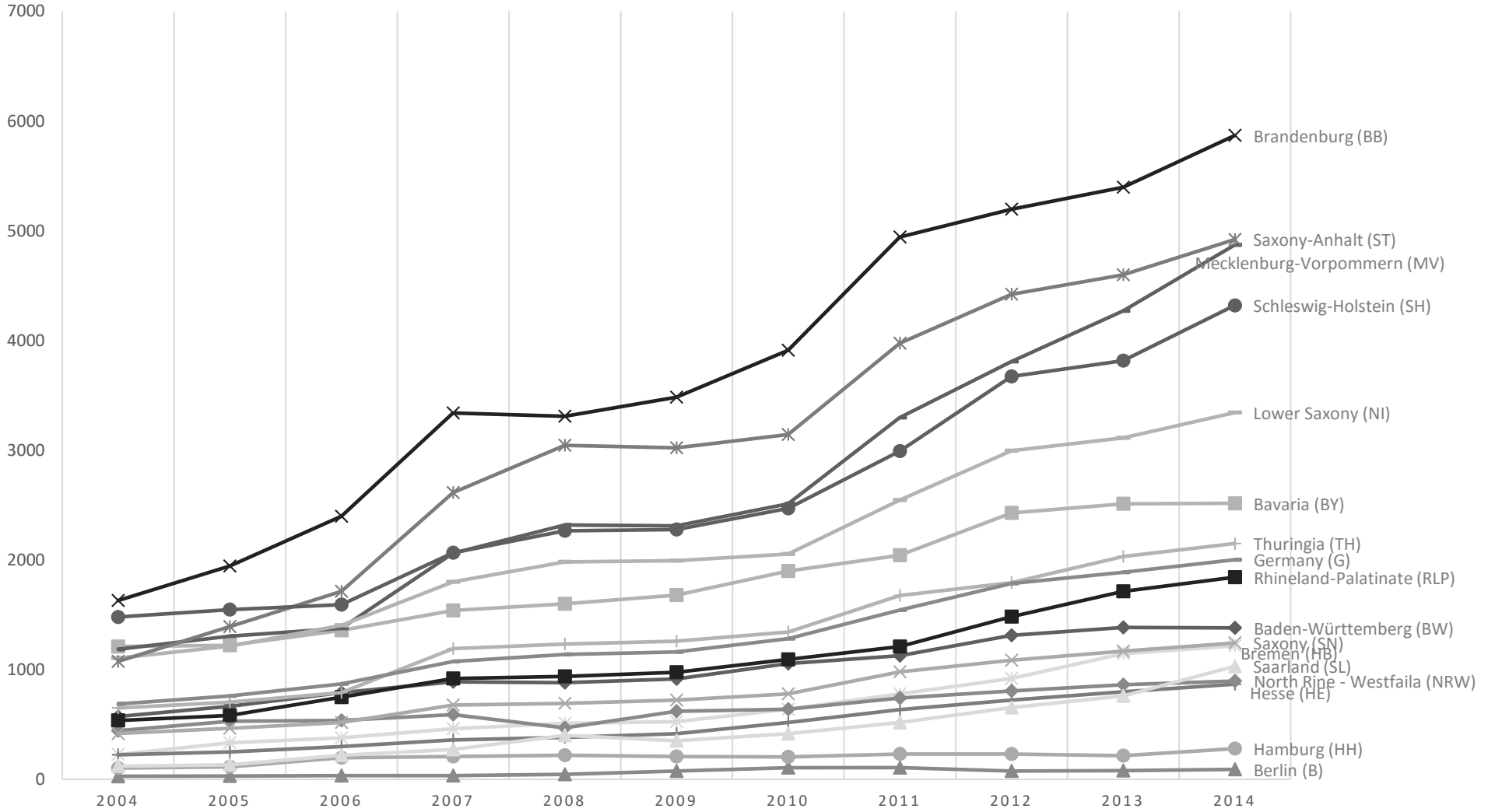
1. Introduction

The aim to significantly increase the share of renewable energy in the total energy mix[3] is one of the central pillars of the German energy transition toward a "non-nuclear renewable system" (Eichelbrönner & Henssen 1997, P. 468). This undertaking entails high conversion costs (temporary subsidies for renewable energy sources) as well as significant measures for adaptation (extension of electricity networks) (Wurster & Köhler 2016, P. 285). Although Germany has already advanced relatively far along this path in an international comparison (Cox & Dekanozishvili 2015, P. 167), significant regional disparities are evident between individual federal states. Accordingly, there are notable variations in dynamics between the federal states with regard to per capita expansion of electricity production from renewable energy sources for the period from 2004 to 2014 (see Figure 1). In addition to the differences between the federal states, Figure 1 also draws attention to temporal variations in the dynamics of expansion within individual states. The outcome is not only differences between the federal states' present statuses of electricity production from renewable energy sources. Also evident are significant shifts in the federal states' individual rankings over time (and accordingly over periods of governance in the states). Whereas states such as Brandenburg, Mecklenburg-Vorpommern and Lower Saxony were able to improve their position over time, others like Bavaria had to concede a relative decline.

[3] Up to the year 2025, about 40 to 45 percent of the electricity consumed in Germany is to be produced from renewable energy sources; up to the year 2035, this share is to reach 55 to 60 percent (Federal Ministry for Economic Affairs and Energy 2016b. https://www.bmwi.de/DE/Themen/Energie/Erneuerbare-Energien/erneuerbare-energien-auf-einen-blick.html. Accessed: 06.12.2016).

Figure 1: Expansion of per capita electricity generation from renewable energy sources in a comparison between federal states (in kWh)



These divergent trends require an explanation, especially because they indicate that, in addition to state-specific, time-invariant determinants (general economic and geographical conditions), time-variant effects over different periods of governance might also be responsible for developments in renewable electricity supply in the individual federal states. Our article therefore concentrates on the following research questions, the answers to which seem especially relevant for an understanding of the German energy transition towards more renewable energies:

1. Which factors significantly influence developments in electricity production from renewable energy sources at the state level?
2. Do (party-) political factors play a role in addition to the existence of natural energy resources and general economic conditions?
3. Can different configurations of factors be identified for dynamic/non-dynamic developments?

The answers to these questions appear not only important from a theoretical perspective (supplements to the growing comparative policy analysis literature at the level of the federal states, Schneider & Wehling 2006; Hildebrandt & Wolf 2008, 2016; Wagschal & Wenzelburger 2009; Bräuninger & Debus 2012, Hörisch & Wurster 2017), but also relevant from a practical perspective for advancement of the energy transition in Germany.

To answer these research questions, the following chapter is dedicated first to the specific structures and developments in the energy sectors of Germany's federal states. Chapter 3 identifies the special challenges associated with the German energy transition. In addition, possible determinants of the expansion dynamics of renewable energies in the electricity sector at the state level derived from policy analysis theories focusing on the characteristics of the energy sector, economic components and (party-) political factors are presented and bundled in research hypotheses. This is followed in Chapter 4 by a detailed description of the methodological approach and operationalization of the conditions used. Chapter 5 then analyzes various configurations of success in a *fuzzy-set Qualitative Comparative Analysis* (fsQCA) which considers the expansion dynamics of renewable electricity production in all 16 federal states in the period from 2004 to 2014. A conclusion (Chapter 6) summarizes the essential results, and points out further research perspectives.

2. Electricity sectors in the federal German states

As an "exceptional economic area" (Jochum & Pfaffenberger 2006, P. 21) the energy sector is characterized by natural monopolies, a line-bound infrastructure and high hurdles for storage of material requiring transport (Wurster & Köhler 2016, P. 284 f.). In Germany, the electricity sector was long characterized by significant market restrictions (this changed only after liberalizing EU policies were introduced starting in the late 1990s), high institutional stability (interwoven division of responsibilities between the federal, state and municipal governments) and continuity of key actors (dominance of semi-public, supra-regional, affiliated energy companies and municipal utilities). In addition, the sector proved very stable and saw mainly incremental changes in the energy mixture generated from different sources. The post-war dominance of domestic coal was superseded successively by oil and natural gas from abroad, while electricity produced from nuclear power also gained importance from the 1970s onwards (Wurster 2010, P. 275 et seq.). Whereas the diversification strategy, initiated in the 1980s in the wake of the oil price shocks in the 1970s, clearly lost momentum, the electricity feed-in law (StrEG) adopted at the beginning of the 1990s served as the first important legal basis for promoting renewable energies at the federal level. The ensuing, rapid expansion of renewable energies, was intended to fundamentally change Germany's electricity sector (increase in decentralized production, emergence of new electricity providers) and thus constituted a real structural breakaway, also in an international comparison.

Already at an early stage, it became clear that, besides the central government, the federal states also play an important role in promoting renewable electricity generation. Accordingly, it was at first individual federal states which had encouraged expansion of renewable energy through their own programmes still years before adoption of the electricity feed-in law.[4] In addition to the possibility of influencing federal legislation via the upper house of German parliament[5], the federal states possess independent regulatory competencies and instruments to influence the development of renewable energy in their respective territories.[6] Their importance to the development of renewable energies in Germany can be established accordingly by the fact that they provide about one-third of total state research funding in this area (Federal

[4] In 1987, North Rhine-Westphalia took the initiative with its "programme for rational use of energy and inexhaustible energy sources", which included broad-based promotion of energy efficiency, energy saving and use of renewable energy sources, and served as orientation for further state programmes in subsequent years (Mez, et al. 2007, P. 99).

[5] This results from the competing legislative responsibilities between the federal and state governments in this policy field (Wurster & Köhler 2016). In negotiations, the federal states thus repeatedly succeeded in enforcing their own interests via the upper house. As an example, see the amendments to the Renewable Energy Sources Act (EEG; Dagger 2009, P. 189-205 and 289 f.).

[6] Accordingly, the federal states are able to adopt state-specific energy laws and employ numerous instruments of implementing energy policy (laws concerning planning, regional development, approvals etc.).

Ministry for Economic Affairs and Energy 2016a). The success story of renewable energy expansion in Germany from the beginning of the 1990s is remarkable also in an international perspective, and resulted not only from federal efforts[7] but also benefited from the commitment at the level of the federal states. For example, all federal states have now committed themselves to promote the expansion of renewable energy for electricity generation in their respective territories (Mez et al. 2007, P. 129-135). However, there are differences between the federal states, both in terms of the general ambition to expand, as well as priorities regarding individual energy sources. Accordingly, the targets defined for achieving shares of renewable energy with respect to total energy consumption vary considerably between 20% (Saarland until 2020) and over 300% (Schleswig-Holstein by 2025) (Renewable Energies Agency 2015). While expansion of wind energy is of central importance to states such as Mecklenburg-Vorpommern, Lower Saxony and Rhineland-Palatinate, promotion of biomass and photovoltaics plays an important role for states such as Baden-Württemberg and Bavaria (Wurster & Köhler 2016, P. 292 et seq.).

3. Explanatory conditions at the level of the federal states

The state level thus plays a key role in implementing the energy transition and the expansion of renewable energies in Germany. At the same time, the dynamics of expansion vary considerably between the federal states and over the periods of governance.

Systematic expansion of renewable energies and associated, fundamental restructuring of Germany's energy system constitute an extremely complex undertaking which initially gives rise to high costs and uncertainties. The direct expansion of renewable generation capacity from solar, wind, water and biogas goes hand-in-hand with investment risks and produces no only winners, but also numerous losers.[8] The transition to a "non-nuclear renewable system" also poses completely new challenges to an energy infrastructure now aimed at decentralization (expansion of regional and supra-regional energy networks). In addition to avoiding supply bottlenecks and grid instabilities, it is necessary to overcome significant organizational and technical problems that initially require high financial investments. However, these (short-term)

[7] Principal milestones include the "100- and 250-megawatt wind programme" for promoting wind energy, the electricity feed-in law (StrEG) which was passed in 1991 (Becher, et al. 1997, P. 252) and which triggered a veritable wind energy boom in the 1990s (Ohlhorst 2006, P. 107f), the "100,000-roofs photovoltaic programme" launched in 1999 and replaced in 2004 by the preliminary photovoltaic law, and in particular, the Renewable Energy Sources Act (EEG) from 2000. No later than the EEG which arranged long-term feed-in tariffs for renewable energy sources decoupled from market prices, Germany rose to a pioneer nation in promoting renewable energies.

[8] These include existing operators of conventional power plants. However, residents can also be negatively affected, depending on the renewable energy source (shadow flicker and landscape spoiling by wind turbines, etc.).

disadvantages and challenges are also confronted by potential (long-term) benefits and gains which can extend to environmental aspects as well as tangible economic profit. For example, expansion of renewable energy sources in a federal state allows medium-term and long-term reduction in dependence on external energy sources, lowering of energy costs, development of a modern industrial infrastructure and establishment of new energy branches (*first-mover advantage*). In this process, it is also possible to generate local value chains and obtain profits from energy exports.

The energy transition poses a great political, social and economic challenge whose success is linked to certain conditions and requirements at the state level. Several different factors are potentially relevant to account for the success of renewable energy expansion. The functionalist, actor-oriented "Heidelberg school" of policy analysis (Schmidt 1993; Schmidt & Ostheim 2007; Zohlnhöfer 2008) considers explanatory factors from the functionalist approach, socio-economic school, power-resource approach and party difference (Schmidt & Ostheim 2007).[9] In this sense, we generally assume that neither a single factor, nor necessarily a single combination of factors, is crucial for the expansion dynamics of renewable energy at the state level. Rather, different equifinal combinations of factors or conditions might explain the success of expansion. Methodologically, the discussed explanatory factors therefore usually involve INUS conditions, which are neither individually necessary nor sufficient, but instead act as an essential part of a combination of conditions (Mahoney & Goertz 2006, P. 24-25). Based on theoretical considerations, it is possible to formulate four hypotheses whose empirical content is to be examined subsequently with the help of a fsQCA.

For the expansion of renewable energies, the technical potential available in a federal state for generating electricity from renewable sources (wind, solar, hydroelectric power and biogas) should play a central role as a fundamental factor specific to the policy sector. As no federal state has yet fully exhausted its potential in renewable energy sources (except for hydroelectric power in some cases), it plays an important role in two respects for the expansion: First, availability of potential allows certain energy paths to be taken, while sometimes even completely excluding others. Furthermore, a large expansion potential is likely to increase the financial and economic incentives for rapid expansion, due to the resultant achievement in

[9] Not considered are theoretical approaches which deal in greater measure with influential factors of an international, political and institutional nature, and aspects of political heritage or political path dependence. This can be explained from the specifics of the still relatively young "renewable energy" policy field and the focus of this analysis on the state level (similar general institutional conditions at the national and European levels, *most similar system design*).

economies of scale.[10] From the functionalist perspective, successful expansion can thus be expected whenever there are especially high expansion potentials in a federal state. At the same time, one can even presume that no significant expansion is possible without appropriate potential.

> *H1*: A large overall potential to produce electricity from renewable sources is an INUS, or perhaps even a necessary condition for the significant expansion of renewable energies in a federal state.

In view of the enormous economic importance of a low-cost, dependable energy supply for the domestic economies of the individual federal states, socio-economic explanatory factors are also likely to play an important role in the expansion of renewable energy. Of decisive importance here is economic structure, in particular, the proportions of the primary, secondary and tertiary sectors in the overall economy. Other things being equal, an economic structure with a heavy share of industry should firstly tend to result in higher energy consumption and, thus, greater demand for stable, low-cost energy (presence of many energy-intensive sectors) compared with a developed service economy which is likely to require fewer energy resources (de-materialization).[11] Moreover, states with developed industries have generally undergone an establishment of long-term, integrative structures between the production sector and energy suppliers, typically based on large-scale industrial (fossil or nuclear) power-plant infrastructure. These established industrial conglomerates constitute a significant hurdle for a transition to decentralized energy supply from renewable energy sources. Namely, the economic actors involved in this structure and profiting from it are likely to use their significant financial, social and political power resources (for different power resources, see for example Ostheim & Schmidt 2007) to try to delay a transformation to renewable energy which they associate with uncertainties and high costs. Even though existing industrial capacities make it in principle easier to produce and utilize new energy technologies, a consolidated industrial structure (based

[10] Despite the undoubtedly great importance of natural occurrences, political decisions on actual utilization of existing energy resources are controversial. This is accordingly made clearly evident by the decline in coal mining in Germany, this being due not to a lack national coal reserves - which are still abundant - but to excessively high mining costs and requirements for greater environmental and climate protection. Though the purely technically available or exploitable potential for generating electricity from wind energy, hydroelectric power, photovoltaics and biogas is therefore an important factor, it should be noted that not all potentials are economically usable just like that, and also that conflicting objectives including such as those concerning protection of the environment, animals and landscapes can result in weighty, politically induced restrictions.

[11] Of late, however, energy-intensive sectors (metal-processing industry, chemical industry etc.) have appeared to make great efforts to reduce, as far as possible, energy consumption which constitutes a particularly large cost factor for them.

on fossil and nuclear energy sources) can thus also hinder an emergence and establishment of new industries in the renewable energy sector.

> *H2*: A low share of industry in economic structure is an INUS condition for significant expansion of renewable energies in a federal state.

In addition to economic structure, the financial strength and associated economic prosperity of a federal state are also likely to influence expansion. Two arguments in favour of a mainly beneficial effect of high prosperity can be mentioned. First, a federal state possessing high financial strength is likely more capable of supporting the expansion of renewable energy through various funding initiatives, be it in the form of research funding or direct subsidies for developing production capacities and energy infrastructure. Furthermore, businesses and citizens in a rich federal state should also possess sufficient private capital for promoting expansion.[12]

> *H3*: High financial strength and associated economic prosperity are an INUS condition for significant expansion of renewable energies in a federal state.

Finally, the development of renewable energy in a federal state is also likely to be influenced by (party-) political determinants in addition to economic ones. The party difference hypothesis assumes that the colours of political parties significantly influence their policy decisions, and that incumbent political parties can make a significant difference to policy outcomes (Hibbs 1977; Rose 1984; Budge & Keman 1990, P. 132). Corresponding party effects can be demonstrated in numerous studies, also controlling for further potentially influential factors (Wenzelburger & Zohlnhöfer 2015). As regards energy policy, the literature on party differences suggests that Green parties should be particularly interested in an expansion of renewable energies. Traditionally, issues such as nuclear phase-out, climate protection and development of renewable energy have been among Green parties' core topics (high *issue* salience). According to the political cleavage model (Lipset & Rokkan 1967, P. 1-64) which differentiates between socio-economic and socio-cultural dimensions (Niedermayer 2013, P. 265-288), a Green party can basically be localized as part of the left spectrum while representing

[12] Accordingly, the proportion of citizens possessing photovoltaic facilities (or a share in them) in the rich states of Baden-Württemberg and Bavaria in 2011 was twice above the national average, while the proportion in the poor states of Saxony-Anhalt and Mecklenburg-Vorpommern reached only one third of the national average (Renewable Energies Agency 2017. http://foederal-erneuerbar.de/uebersicht/bundeslaender. Accessed: 26.04.2017).

progressive policy with regard to the socio-cultural and ecological dimension (Hough 2011). This assumption is upheld by a comparison of Green-party programs with regard to energy policy at the state level (Wurster & Köhler 2016, Wurster 2016). This suggests that Green parties are likely to support an expansion of renewable energies at least programmatically. However, renewable energies were greatly expanded at the state level in recent years in general, although the Greens were only part of the minority of cabinets. This indicates that, in addition to direct party effects (Green party in the state government, ideally with control over the energy portfolio), an important role might be played by further factors, in particular, specific interests pursued for "reasons of state" regardless of the state government's party-political colouring (refer to "new territorialism", Turner 2011, P. 49).

> *H4*: Greens party control of a state's energy policy is an INUS condition for significant expansion of renewable energies in a federal state.

In addition to these four influential factors, social acceptance as well as political and institutional factors are also potentially relevant to the success of expansion, but are not considered here separately. Social acceptance of renewable energies in Germany is exceptionally high, both generally and in one's "own backyard": While over 92 percent of German citizens generally supported expansion in 2012, 67 percent even approved of expansion in their immediate vicinity (Renewable Energies Agency 2017). Interestingly, there is hardly any variance between federal states in this regard, so that separate consideration as an explanatory factor does not appear necessary.[13] Just like social acceptance, political and institutional factors at the state level, such as the system of government, can be considered largely identical and thus "controlled". At the federal level, the Renewable Energy Sources Act (EEG) is equally important for all states and therefore constitutes a scope condition for the results of this investigation, but needs not be included separately in the empirical analysis. On the other hand, a use of promotional instruments at the state level, which can vary considerably as shown, is influenced decisively by party-political power play and the composition of the state government.

[13] While expansion is approved by at least 87% nationwide, acceptance in one's neighbourhood varies between 61% in Brandenburg and 75% in Bavaria (Renewable Energies Agency 2016. https://www.foederal-erneuerbar.de/uebersicht/bundeslaender/BW|BY|B|BB|HB|HH|HE|MV|NI|NRW|RLP|SL|SN|ST|SH|TH|D/kategorie/akzeptanz/auswahl/394-befuerwortung_des_au/#goto_394. Accessed: 06.12.2016).

4. Method and operationalization

The following analysis accounts for the differing developments in renewable energy production in Germany's federal states. Several reasons suggest using QCA for this endeavour. Firstly, QCA is especially suitable for dealing with a medium number or cases which is too complex for analysis with other qualitative comparison methods, yet offers too few cases for statistical research. Furthermore, the set theoretic logic of QCA is highly compatible with the theoretically formulated expectations: The individual explanatory factors probably act in combination, and are alone not sufficient for the outcome (Schneider & Wagemann 2012, P. 12). At the same time, it is conceivable for different combinations to lead to the same outcome, i.e. instances of equifinality (Ragin 2008, P. 63). Both expectations can be tested empirically in a QCA.[14]

Because there is only room for a brief summary here, the research design is discussed at length in an online appendix, with a detailed explanation of the operationalization and calibration decisions. Units of analysis for comparison are not the federal states, but cabinets of the state governments, to be able to also account for variances in their party-political composition. Each cabinet holding office for more than one year and based on a new parliamentary majority or consisting of new coalition partners is considered as a new case. This results in a total of 51 cases for the investigated period from 2004-2014.[15]

Average annual per capita increases in renewable electricity production during a cabinet's term are used as the outcome. Full members in the set "Significant expansion of renewable electricity generation" exhibit a growth of at least 160 kWh.[16]

Because the outcome investigates changes in installed renewable energy capacity for electricity generation, states' potential must be taken into account correspondingly in the form of expansion possibilities in this area. Potential is therefore considered as the general technical possibility of electricity generation (independent of the year) in kWh per capita in the areas of wind energy (*onshore*), hydroelectric power, photovoltaics and biogas. In 2014, these four energy sources accounted for approximately 86% of electricity supply from renewable energies,

[14] The method searches for combinations of causal conditions linked systematically to an outcome. It allows for combinations of multiple conditions as an explanation for an outcome (*conjunctural causation*), as well as the possibility that multiple combinations can lead to the same outcome (*multiple conjunctural causation*). QCA is therefore very suitable for identifying possible paths leading to expansion of renewable energies. Here it is also possible to differentiate between necessary and sufficient conditions for expansion.

[15] We expect a government's influence to extend beyond the actual term of office, because decisions already made continue to have an effect, and a new cabinet needs time to plan its own measures. To take this offset into account, the influence of the cases has been considered with a slight time shift: During calculations of case conditions, the year in which a government takes office is still fully attributed to the previous government.

[16] All cases exhibiting an average per capita expansion of more than 150 KWh (but less than 160 KWh) are still partially members of the set "Significant expansion of renewable electricity generation" (0.67). All cases exhibiting more than 50 kWh, i.e. over the next relatively clear threshold are still partially non-members of the set, while all states exhibiting even lower expansion are fully non-members of the set.

i.e. these are by far the most relevant potentials for electricity generation through renewables.[17] Among the states with high potential are the sparsely populated and/or coastal states of Brandenburg, Mecklenburg-Vorpommern, Schleswig-Holstein and Lower Saxony, in addition to Bavaria with its high potential in terms of biogas, hydroelectric power and, in particular, photovoltaics. Clear non-members are the city states which exhibit a relatively low potential for renewable energy per capita, especially due to their high population density.

A federal state's prosperity is registered on the basis of the transfer payments received as part of the "Länderfinanzausgleich", the federal system of transfer payments between states. Because transfer claims are derived from the miscellaneous tax revenues of the federal states, these are also an indicator of their affluence. Even if the federal states' finances are greatly balanced by transfers, there are still notable differences here, thus likely making it significantly easier for some rich federal states, especially their economies and private individuals, to invest in renewable energy compared with poorer federal states. Data from the Federal Ministry of Finance for the period from 2004-2014 shows marked differences between the states. Taken into account here are value-added tax compensation, financial equalization for states and federal supplementary allocations as a "balance of the federal transfer system" (Hildebrandt 2016). All net contributors as well as minor net recipients during the investigation period count as members of the set "Rich federal states", while significant net recipients count as non-members. The federal states' economic structure was determined on the basis of the manufacturing sector's share of gross added value during a particular cabinet's term. Generally used for the strength of a state's industry, this indicator varies on average between 10.5% in Berlin and 31.96% in Baden-Württemberg during the period under investigation. Here, the EU average of 20% for heavily industrialized member states serves as the threshold for membership in "Low share of industry".[18]

Finally, party effects are measured in terms of expansion of renewable energies on the basis of "Green-party involvement in governance" (Wurster 2013), which should have a greater effect if Green-party ministers are directly responsible for energy (1.00), and still be relevant if they are at least part of the cabinet (0.67). The direct method of calibration was used for all sets except the party effects.

[17] The only energy source not taken into account here and comprising the next most important proportion is the use of solid biogenic fuels for generating electricity, which accounted for seven percent of electricity supply from renewables in 2014.

[18] The set was calibrated inversely so that the theoretical expectation for all sets positively influences outcome in the case of membership.

5. Fuzzy-set QCA: Ways to success

The first step in every QCA is the analysis of necessary conditions. Every condition and its complement (i.e. its negation) are tested for possible necessity for the outcome. No consistent results were obtained for successful expansion of renewable electricity production: The highest consistency values are found for "High potential" (0.78) and, interestingly, for the absence of "Green-party involvement in governance" (0.82). Still, both are clearly below the usually applied threshold of 0.9. The threshold is exceeded only during analysis of the conditions necessary for absence of an outcome: Here, absence of “high potential” reaches a very high value of 0.902, and is therefore almost a necessary condition for absence of successful expansion (see the appendix for details).

The next step is the analysis of sufficiency. To test for sufficient combinations, the data matrix created for analysis is calibrated and converted into a *truth table*. In contrast to the data matrix, the number of rows in the truth table is not determined by the number of cases of *N*, but by the number of conditions *k* considered in the analysis. Every truth table has 2^k rows, corresponding to the number of logically possible combinations of conditions. In this respect, the truth table's number of rows covered by existing cases is much more important than the general number of cases. In this investigation, there are 2^4=16 possible combinations for the four conditions. The truth table (Table 1) shows that 14 of these logically possible combinations are covered by the 51 cases considered in this investigation. Only two rows therefore remain without cases (*logical remainder*s), but also these can still be considered in further analysis.

Sufficient combinations of conditions for further reduction are selected on the basis of consistency values. High values appear in five of the 16 rows. Above the dashed line in Table 1, all combinations reach values of 0.885 or more, while covering only one case which is a non-member in the outcome (TH2). Accordingly, the clear majority (17) of successful cases of interest here are members of consistent combinations, and only four of these cases (NI1, NI2, BY2, SL4) cannot be taken into account in the analysis due to low consistency. Furthermore, the consistency of combinations for the outcome is underpinned by high PRI values indicating that the combinations are not *false positives* generated by irrelevant cases (Schneider & Wagemann 2012). The relatively low value of 0.776 in the fifth row does not pose a major problem either, because a comparison of the combination with the *truth table* for absence of an outcome shows that the row is not simultaneously also sufficient for this (see the appendix).

Table 1: Truth table with four conditions for the outcome "successful expansion of renewable electricity generation"

G	I	P	R	OUT	*N*	Consistency	PRI	Cases
1	1	1	1	1	2	1	1	**SH1,SH4**
1	0	1	1	1	2	0.962	0.915	**NI3,RLP3**
0	1	1	1	1	2	0.947	0.881	**SH2,SH3**
0	1	1	0	1	8	0.939	0.918	**BB1,BB2,BB3,MV1,MV2,MV3,ST1,ST2**
0	0	1	0	1	4	0.885	0.776	**ST3,TH1**,*TH2*,**TH3**
1	1	0	0	0	1	0.680	0.212	*HB2*
0	0	0	0	0	4	0.645	0.413	*HB1,SL1,SL2*,**SL4**
1	0	0	0	0	2	0.633	0.208	*HB3,SL3*
0	0	1	1	0	7	0.628	0.336	*BY1*,**BY2**,*BY3*,**NI1,NI2**,*RLP1,RLP2*
0	1	0	0	0	6	0.459	0.232	*B1,B2,B3,SN1,SN2,SN3*
1	0	0	1	0	4	0.447	0.177	*BW3,NRW1,NRW3,NRW4*
1	1	0	1	0	1	0.439	0.178	*HH3*
0	0	0	1	0	3	0.410	0.094	*BW1,BW2,NRW2*
0	1	0	1	0	5	0.325	0.088	*HE1,HE2,HH1,HH2,HH4*
1	0	1	0	?	0	-	-	-
1	1	1	0	?	0	-	-	-

Note: The letters are abbreviations for the sets "Rich federal state" (R), "Strong Green-party influence" (G), "Weak industry" (I) and "High potential" (P). Cases in italics are non-members in the outcome.

The combinations of conditions identified as consistent can now be reduced further, to achieve the maximum minimization of paths to the outcome. All parts of the analysis were conducted using the R-packages "QCA" (Dusa 2007) and "Set methods" (Medzihorsky et al. 2017), the results are summarized in Table 2. Three different kinds of results are normally produced in a QCA: The *complex solution* is produced by minimizing the *truth table's* rows which are covered with empirical cases. The *intermediate solution* can also consider combinations not covered by cases, by using theoretical expectations as a basis for deciding whether they lead to the outcome (*easy counterfactuals*). Finally, the *parsimonious solution* considers these combinations, but the decision concerning their membership in the outcome is made solely with regard to the combinations' minimization potential. The results in Table 2 show the *intermediate solution* with a total of three sufficient paths to the outcome. The results are represented according to the notation of Ragin & Fiss (2008) and Fiss (2011), which uses black dots ("●") to indicate presence of a condition, and crossed dots ("⊗") to indicate absence, while empty cells indicate redundancy of a condition in a path. Due to the small number of *remainders*, the result of the *parsimonious solution* is identical to that of the *intermediate solution.*

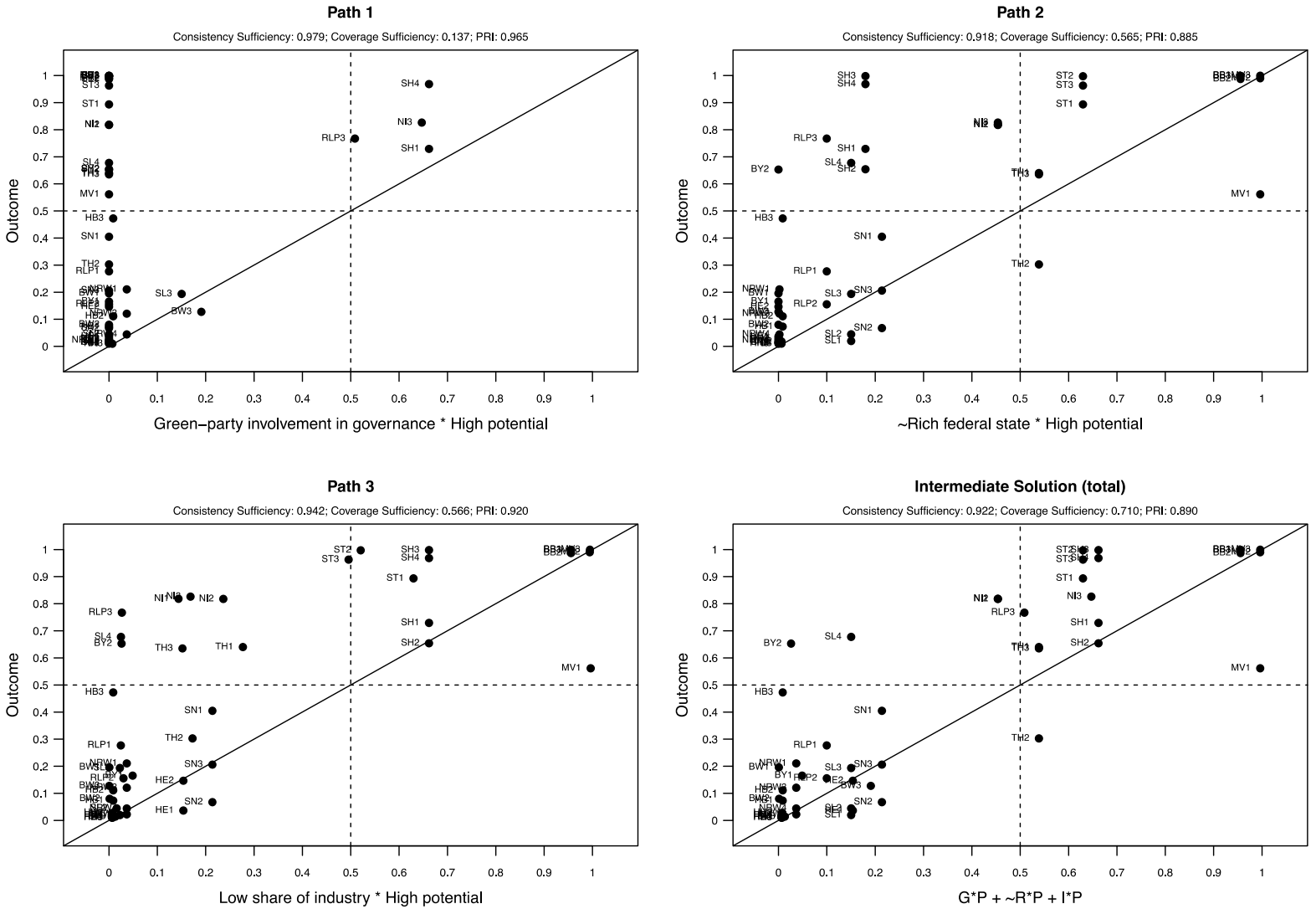
The first path corresponds in great measure to theoretical expectations, revealing a combination of Green-party involvement in governance and high potential as sufficient for successful expansion. This path covers two Red-Green cabinets from Schleswig-Holstein, and one each from Lower Saxony and Rhineland-Palatinate. The second path consists of non-membership in "Rich federal state" and membership in "High potential", and unites all cases from Mecklenburg-Vorpommern, Brandenburg, Saxony-Anhalt and Thuringia. Even though these states experienced no Green-party involvement in governance at any point during the period under investigation, the states nonetheless present some of the most successful cabinets. Interestingly, "Rich federal state" works in contrary to the theoretical expectation here: In these cases, a wealth is not a condition for investment in renewable energies; rather, non-membership in "Rich federal state" is an INUS condition for expansion. Despite the contradictory membership of TH2 in the combination (no member in the outcome), its consistency remains very high (0.918). Finally, the third path corresponds again in greater measure to theoretical expectations, and brings together "Low share of industry" and "High potential". However, this path overlaps to a high degree with path two, also explaining all cases from Mecklenburg-Vorpommern, Brandenburg and the first two cabinets from Saxony-Anhalt. In addition, all cases from Schleswig-Holstein are members here. In general, it is interesting to note that potential, though not a necessary condition for successful expansion, is nonetheless an INUS condition in all three combinations of the *solution term*. The consistencies of the individual combinations are visualized in plots in Figure 2. How empirically sound are these combinations, and which conclusions can be drawn from them?

Table 2: Sufficient combinations for successful expansion of renewable electricity generation

	Sufficient combinations		
	Path 1	Path 2	Path 3
Green-party involvement in governance	●		
Rich federal state		⊗	
Low share of industry			●
High potential	●	●	●
Consistency	0.979	0.918	0.942
PRI	0.965	0.885	0.920
Raw coverage	0.137	0.565	0.566
Unique coverage	0.034	0.087	0.060
Cases/unique members	SH1	MV1	MV1
	SH4	MV2	MV2
	NI3	MV3	MV3
	RLP3	BB1	BB1
		BB2	BB2
		BB3	BB3
		ST1	ST1
		ST2	ST2
		ST3	SH1
		TH1	**SH2**
		TH2	**SH3**
		TH3	SH4
Total consistency		0.921	
Total PRI		0.889	
Total coverage		0.706	

Note: The combinations show the intermediate solution. Black circles indicate presence of a condition, crossed circles indicate its absence. Intermediate solutions and parsimonious solutions are identical in this analysis. Cases in bold type are *uniquely covered*, those in italics are contradictions.

Figure 2: Plots for sufficient combinations of conditions (intermediate solution)



Overall, the analysis reveals two central patterns: The first shows a theoretically expected "green" path leading to successful expansion and based on party-political determinants. The combination of Green-party involvement in governance and potential explains four of 21 successful cases, although only two are exclusive members (NI3, RLP3). The role of Green parties in utilizing expansion potential at the state level is thus empirically present, but requires a differentiated consideration. Interestingly, absence of a state government with Green-party involvement is also assigned a very high value (0.82) as a necessary condition for successful expansion. Can Green-party involvement in governance therefore also be detrimental to renewable electricity production under certain circumstances? The high value for necessity results mainly from the weak role of the Greens in the eastern federal states, which, at the same time possess especially great expansion potential and also utilize it. However, it is implausible to assume that absence of the Greens contributes in these states to expansion, besides the more important observation that their complete absence from east German state governments (and often even from state parliaments) during the investigated period simply provides no case for minimizing this condition, which is also why it is not dropped as an INUS condition until the *intermediate solution*. To make a relevant statement on the role of Green parties, it is therefore more important to consider more closely the cases where they were involved in governance and where potential simultaneously existed. Did the Green parties make the decisive difference in favour of greater expansion in these cases? In Lower Saxony, they appear to be the least relevant: Though NI3 is explained by path 3, the *truth table* shows that the other cases in Lower Saxony without Green-party involvement in governance were equally successful. Green-party involvement in governance in Lower Saxony has therefore made no difference. Similarly, in Schleswig-Holstein, existing potential is exploited by state governments of all colours, and cases SH1 and SH4 are explained not only by the "green" path 1, but also path 3. In contrast to Lower Saxony, however, in Schleswig-Holstein a state government with Green-party involvement (SH1) has at least initiated greater expansion, thus introducing a path dependence in favour of renewable electricity generation. A central role in trend reversal towards greater expansion is played by the Greens in Rhineland-Palatinate: Here, the Red-Green state government differed clearly from its social-liberal and social democrat predecessors. During the term of the Green party's Eveline Lemke as Minister for Economics, Climate Protection, Energy and Regional Planning, the state decided and implemented much more ambitious

expansion goals for renewable energy compared to the preceding governments[19].[20] This made it possible to nearly double electricity production from renewable energies during one legislative period.

In sum, party-political factors in the context of Green-party influence play a role in the expansion of renewable electricity production, but tend to be moderate as a whole. This is derived in particular from the fact that Green parties were hardly ever involved in governments in federal states with a high potential for expansion, and if they were, the preceding governments already had begun to exploit this potential except in one case.[21]

The second and third paths to greater expansion of renewable energies combine high potential with "Low share of industry" or the status of net recipient from federal transfer payments, and can be understood as an expansion strategy based on economic and political calculations ("economic" paths). The industry was theoretically assigned, the role of a veto player for a costly transformation in energy generation. In addition to the absence of such a (negative) influence, however, it also seems possible that the absence of a strong industrial base and generally weaker economic performance act as a central positive incentive to pursue an economic growth strategy based on utilizing existing potentials of strongly subsidised renewable electricity generation. Two observations support this interpretation: Firstly, both paths share most of the cases (eight of 12), and only Schleswig-Holstein is a member in "Rich federal state" as a deviation. In addition, however, because the northernmost federal state is not a major net contributor but a (slight) net recipient in financial transfers between the states, the reason for Schleswig-Holstein's expansion strategy (and the mechanism acting there) could be similar to that in the other cases in path 2.[22]

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[19] Up to the year 2030, total demand for electricity in the state of Rhineland-Palatinate is to be covered by renewable energy sources, with wind energy responsible for about two-thirds of total electricity generation. For this, electricity generation from wind power must be increased five-fold by 2020 compared with the level in 2010 (Ministry of Economics 2012, P. 4).

[20] Also possibly serving as evidence of the redirection of Rhineland-Palatinate's energy policy by the Green party, motivated significantly by partisan programming, is the fact that, after the state parliament election in 2016 when the Green party suffered massive losses (sharp drop in the share of votes from 15.4% to 5.3%), many commentators identified excessive focus on the expansion of wind power, neglecting other structural policy objectives, as the core allegation of voters against the Green party's energy and economic policy (for example, Fietz 2016. http://www.focus.de/politik/deutschland/gruene-in-den-landtagswahlen-alle-hoffnungen-auf-baden-wuerttemberg-kretschmanns-ergebnis-koennte-gruene-ueber-enttaeuschungen-hinweghelfen_id_5349028.html. Accessed: 06.12.2016).

[21] In general, it must also be noted that the influence of the Greens was limited by their infrequent involvement in governance during the investigated period. They only participated in 13 of 51 cabinets, being responsible for the energy portfolio in only eight of these cases.

[22] The incentive structures for expansion of renewable energies are particularly favourable in Schleswig-Holstein for two further reasons. Due to its geographical location between the Baltic Sea and North Sea, it offers almost optimal conditions for expansion of wind energy. Furthermore, Schleswig-Holstein's energy system was characterized significantly by nuclear energy until recently. The phase-out decision thus puts the state under special pressure to act. How the actual potential for expanding renewable energy in the state is assessed as a whole is made clear by the target that Schleswig-Holstein should remain an electricity exporting state even after shutdown

Furthermore, a comparison with other relevant cases only provides a mixed picture, which also tends to point out the importance of an economic growth strategy. A relevant null hypothesis in the case of the argued "economic" expansion strategy would be that expansion is driven solely by potential. Accordingly, states which are non-members in "Low share of industry" and members in "Rich federal state" would have to utilize their expansion potential in the same measure as the others. The *truth table* shows only one row with a total of seven cases of relevance for this comparison. This row contains the two successful cases from Lower Saxony, the two unsuccessful cabinets from Rhineland-Palatinate, as well as two cabinets with low expansion and one with high expansion from Bavaria. The result is thus much more mixed than in the consistent paths two and three: In total, four cases (BY1, BY3, RLP1, RLP3) show that states with a strong industrial and financial base use their large potential for expansion less successfully than those exhibiting “Low share of industry” and a lack of financial resources. An outlier is the Christian-liberal coalition in Bavaria which achieved twice the expansion in renewable electricity generation compared with its predecessor.[23] A real contradiction, by contrast, is Lower Saxony where the high potential for expansion has been used by all cabinets despite of a strong industry. Compared to Bavaria, however, Lower Saxony is furthermore not a net contributor to the “Länderfinanzausgleich”, so that expansion might be motivated here by the same (economic) reasons as in the cases covered by paths 2 and 3, especially in view of the very large potential. In general, this comparison also points towards the relevance of a strong economic incentive to achieve high expansion dynamics.

6. Conclusion

This article compares varying expansion rates of renewable energy production in the German federal states. Overall, the result is a surprise in two respects: On the one hand, party-political factors sometimes play a central role in successful expansion of renewable electricity production in individual federal states, but much less than expected. Only in one out of 51 cases does a change to Green party involvement in governance seem to have genuinely been the reason for greater expansion. In most other cases, however, it is the economic benefits of

of the third nuclear power plant in 2021. (Renewable Energies Agency 2015. http://foederal-erneuerbar.de/uebersicht/bundeslaender. Accessed: 11.05.2017; Landesregierung Schleswig-Holstein 2015, P. 10).

[23] Regarding Bavaria in general, it should be noted that the non-members represent more a stagnation at a high level than a basic aversion to expansion. In 2014, for example, per capita generation of renewable electricity amounted to 2515.8 kWh, surpassing Thuringia calibrated here as successful (2149.3 kWh), even if clearly behind leading states such as Brandenburg (5867.3 kWh), Mecklenburg-Vorpommern (4870.4 kWh) and Schleswig-Holstein (4319.5 kWh). In general, however, the outcome selected here aims to register a state government's dynamics which were ultimately not especially high in BY1 and BY3.

renewables to which governments attach priority. The Renewable Energy Sources Act apparently ensures that prosperity, instead of being a prerequisite for costly expansion of this energy form, is rather a factor whose absence provides an incentive to exploit existing potentials for renewables and thus profit from guaranteed sponsorship. This strategy to utilize existing potential is very clearly evident in states with a weaker economic base and Low share of industry. By contrast, the readiness to utilize potentials is significantly lower in states with a strong industry and sufficient financial capacity. It therefore seems generally plausible that sufficient potential, although an important initial condition for successful expansion (and also existent in 20 of 21 successful cases), is most likely to be utilized given ideological and, in particular, economic incentives.

This consequence underscores the special importance of political and institutional factors in the form of the Renewable Energy Sources Act as a scope condition for the results. Without the incentive of guaranteed feed-in tariffs for electricity from renewables, the dynamics of expansion would probably be significantly lower in the states. Still unclear, though, is exactly how this incentive works: Do federal states with "Low share of industry" and limited financial capacities have a special incentive for liberal regulation of expansion of renewable electricity generation, thus attracting more investment than states with potential but stricter requirements? Or do the strong industrial sectors of states use the power at their disposal to block development of these energy sources which are not as appealing to them, as theoretically presumed at the beginning? These questions concerning the exact effect of the explanatory factors identified for successful expansion in this investigation are to be examined in the future in detailed process tracing analysis which allow for a stronger focus on the activities of actors and employed policy instruments at the state level.

Finally, the results also provide relevant insights beyond the German case. Promotion of renewable energies is apparently not only dependent on certain party-political conditions, but also requires an existent potential and the right incentives for expansion at the central government level. The fact that especially economically weaker regions make use of these incentives furthermore suggests that expansion of renewable energies can also result in positive economic effects, besides improving the sustainability of the energy mix.

Literature

Agentur für Erneuerbare Energien. 2015. *Bundesländer. Übersicht zu Erneuerbaren Energien*. http://foederal-erneuerbar.de/uebersicht/bundeslaender. Accessed: 11.05.2017.

Agentur für Erneuerbare Energien. 2016. *Bundesländer-Übersicht zu Erneuerbaren Energien*. https://www.foederal-erneuerbar.de/uebersicht/bundeslaender/BW|BY|B|BB|HB|HH|HE|MV|NI|NRW|RLP|SL|SN|ST|SH|TH|D/kategorie/akzeptanz/auswahl/394-befuerwortung_des_au/#goto_394. Accessed: 06.12.2016.

Agentur für Erneuerbare Energien. 2017. *Bundesländer. Übersicht zu Erneuerbaren Energien*. http://foederal-erneuerbar.de/uebersicht/bundeslaender. Accessed: 26.04.2017.

Becher, Gerhard, Jens Hemmelskamp, Janina Scheelhaase, et al. 1997. Nachhaltigkeit und technische Innovation. In: *Nachhaltigkeit. ZEW- Wirtschaftsanalysen, Bd. 8,* Eds. Rennings, Klaus and Olav Hohmeyer, 221-260. Mannheim: Zentrum für Europäische Wirtschaftsforschung.

Bräuninger, Thomas and Marc Debus. 2012. *Parteienwettbewerb in den deutschen Bundesländern*. Wiesbaden: Springer.

Budge, Ian and Hans Keman. 1990. *Parties and Democracy. Coalition Formation and Government Functioning in Twenty States*. Oxford: Oxford University Press.

Bundesministerium für Wirtschaft und Energie. 2016a. *Bundesbericht Energieforschung 2016. Forschungsförderung für die Energiewende*. https://www.ptj.de/lw_resource/datapool/_items/item_6608/bundesbericht-energieforschung-2016.pdf. Accessed: 24.01.2017.

Bundesministerium für Wirtschaft und Energie. 2016b. *Erneuerbare Energien*. https://www.bmwi.de/DE/Themen/Energie/Erneuerbare-Energien/erneuerbare-energien-auf-einen-blick.html. Accessed: 06.12.2016.

Cox, Robert H. and Mariam Dekanozishvili. 2015. German Efforts to Shape European Renewable Energy Policy. In: *Energy Policy Making in the EU. Building the Agenda,* Eds. Tosun, Jale, Sophie Biesenbender and Kai Schulze, 167-184. London: Springer.

Dagger, Steffen B. 2009. *Energiepolitik & Lobbying. Die Novellierung des Erneuerbare-Energien-Gesetzes (EEG) 2009*. Stuttgart: ibidem-Verlag.

Dusa, Adrian. 2007. User manual for the QCA (GUI) package in R. *Journal of Business Research* 60, 576-586.

Eichelbrönner, Matthias and Hermann Henssen. 1997. Kriterien für die Bewertung zukünftiger Energiesysteme. In: *Energiepolitik Technische Entwicklung, politische Strategien, Handlungskonzepte zu erneuerbaren Energien und zur rationellen Energienutzung,* Ed. Brauch, Hans G., 461-470. Heidelberg: Springer.

Fietz, Martina. 2016. *Landtagswahl 2016. Warum nur Kretschmann die Grünen vor einer Wahl-Schmach bewahren kann*. http://www.focus.de/politik/deutschland/gruene-in-den-

landtagswahlen-alle-hoffnungen-auf-baden-wuerttemberg-kretschmanns-ergebnis-koennte-gruene-ueber-enttaeuschungen-hinweghelfen_id_5349028.html. Accessed: 06.12.2016.

Fiss, Peer C. 2011. Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research. *Academy of Management Journal* 54, 393-420.

Hibbs, Douglas A. 1977. Political parties and macroeconomic policy. *American political science review* 71, 1467-1487.

Hildebrandt, Achim. 2016. Die Finanzpolitik der Länder nach den Föderalismusreformen: Begrenzte Spielräume, fortdauernde Unterschiede. In: *Die Politik der Bundesländer,* Eds. Hildebrandt, Achim and Frieder Wolf, 115-137. Wiesbaden: Springer.

Hildebrandt, Achim and Frieder Wolf (Hrsg.). 2008. *Die Politik der Bundesländer. Staatstätigkeit im Vergleich*. Wiesbaden: Springer.

Hildebrandt, Achim and Frieder Wolf. 2016. Politik in den Bundesländern unter reformierten institutionellen Rahmenbedingungen. In: *Die Politik der Bundesländer. Zwischen Föderalismusreform und Schuldenbremse,* Eds. Hildebrandt, Achim and Frieder Wolf, 1-9. Wiesbaden: Springer.

Hörisch, Felix and Stefan Wurster (Hrsg.). 2017. *Das grün-rote Experiment in Baden Württemberg. Eine Bilanz der Landesregierung Kretschmann 2011-2016*. Wiesbaden: Springer.

Hough, Dan. 2011. Small but perfectly formed? The rise and rise of Germany's smaller parties. *German Politics* 20, 186-199.

Jochum, Gerhard and Wolfgang Pfaffenberger. 2006. Die Zukunft der Stromerzeugung. *Aus Politik und Zeitgeschichte* 13, 19-26.

Landesregierung Schleswig-Holstein. 2015. *Energiewende und Klimaschutz in Schleswig-Holstein - Ziele, Maßnahmen und Monitoring 2015. Bericht der Landesregierung. Drucksache 18/3074*.

Lipset, Seymour M. and Stein Rokkan. 1967. *Party Systems and Voter Alignments. Cross-national perspectives*. Free Press.

Mahoney, James and Gary Goertz. 2006. A Tale of Two Cultures: Contrasting Quantitative and Qualitative Research. *Political Analysis* 14, 227-249.

Medzihorsky, Juraj, Ioana-Elena Oana, Mario Quaranta, et al. 2017. SetMethods: Functions for Set-Theoretic Multi-Method Research and Advances QCA. *Package* 2.1.

Mez, Lutz, Sven Schneider, Danyel Reiche, et al. 2007. *Zukünftiger Ausbau erneuerbarer Energieträger unter besonderer Berücksichtigung der Bundesländer. Endbericht für das Bundesministerium für Umwelt, Naturschutz und Reaktorsicherheit*. Berlin: Forschungsstelle Für Umweltpolitik, Freie Universität Berlin.

Ministerium für Wirtschaft, Klimaschutz, Energie und Landesplanung, Rheinland-Pfalz. 2012. *Road-Map zur Energiewende in Rheinland-Pfalz*. Mainz.

Niedermayer, Oskar. 2013. Wahlsystem und Wählerverhalten. In: *Studienbuch Politikwissenschaft*, Eds. Schmidt, Manfred, Frieder Wolf and Stefan Wurster, 265-288. Wiesbaden: Springer.

Ohlhorst, Dörte. 2006. Windenergie – eine Innovationsbiographie aus interdisziplinärer Perspektive. In: *Ökologische Transformation der Energiewirtschaft Erfolgsbedingungen und Restriktionen, Initiativen zum Umweltschutz, Bd. 65*, Eds. Bechberger, Mischa and Danyel Reiche, 101-118. Berlin: Forschungszentrum für Umweltpolitik, Freie Universität Berlin, Fachbereich Politik- und Sozialwissenschaften.

Ostheim, Tobias and Manfred G. Schmidt. 2007. Die Machtressourcentheorie. In: *Der Wohlfahrtsstaat. Eine Einführung in den historischen und internationalen Vergleich*, Eds. Schmidt, Manfred G., Tobias Ostheim, Nico A. Siegel and Reimut Zohlnhöfer, 40-50. Wiesbaden: Springer.

Ragin, Charles C. (Eds.). 2008. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press.

Ragin, Charles C. and Peer C. Fiss. 2008. Net Effects Versus Configurations. An Empirical Demonstration. In: *Redesigning Social Inquiry: Fuzzy Sets and Beyond*, Eds. Ragin, Charles C., 190-212. Chicago: University of Chicago Press.

Rose, Richard. 1984. *Do Parties Make a Difference?* Basingstoke: Palgrave Macmillan.

Schmidt, Manfred G. 1993. Policy Analyse. Theorien in der international vergleichenden Staatstätigkeitsforschung. *Politische Vierteljahresschrift* 24, 371-393.

Schmidt, Manfred G. and Tobias Ostheim. 2007. Die Lehre von der Parteiendifferenz. In: *Der Wohlfahrtsstaat. Eine Einführung in den historischen und internationalen Vergleich*, Eds. Schmidt, Manfred G., Tobias Ostheim, Nico A. Siegel and Reimut Zohlnhöfer, 51-62. Wiesbaden: Springer.

Schneider, Carsten Q. and Claudius Wagemann. 2012. *Set-Theoretic Methods for the Social Sciences. A Guide to Qualitative Comparative Analysis*. Cambridge: Cambridge University Press.

Schneider, Herbert and Hans-Georg Wehling. 2006. *Landespolitik in Deutschland. Grundlagen - Strukturen - Arbeitsfelder*. Wiesbaden: Springer.

Turner, Ed. 2011. *Political Parties and Public Policy in the German Länder – When Parties Matter*. Bakingstoke: Palgrave Macmillan.

Wagschal, Uwe and Georg Wenzelburger. 2009. Determinanten der Haushaltskonsolidierung der Bundesländer (1992–2006). *Zeitschrift für vergleichende Politikwissenschaft* 3, 33-58.

Wenzelburger, Georg and Reimut Zohlnhöfer (Hrsg.). 2015. *Handbuch Policy-Forschung*. Wiesbaden: Springer.

Wurster, Stefan. 2010. *Zukunftsvorsorge in Deutschland. Ein Vergleich der Bildungs-, Forschungs-, Umwelt-, und Energiepolitik*. Baden-Baden: Nomos.

Wurster, Stefan. 2013. Zielkonflikte in der Energiepolitik. Ein OECD-Ländervergleich. In: *Staatstätigkeit, Parteien und Demokratie. Festschrift für Manfred G. Schmidt,* Ed. Armingeon, Klaus, 353-376. Wiesbaden: Springer.

Wurster, Stefan. 2016. Energiewende in Baden-Württemberg: Ausmaß und Folgen. In: *Das grün-rote Experiment - Eine Bilanz der Landesregierung Kretschmann*, Eds. Hörisch, Felix and Wurster, Stefan, 251-278. Wiesbaden: Springer.

Wurster, Stefan and Christina Köhler. 2016. Die Energiepolitik der Bundesländer. Scheitert die Energiewende am deutschen Föderalismus? In: *Die Politik der Bundesländer Zwischen Föderalismusreform und Schuldenbremse,* Eds. Hildebrandt, Achim and Frieder Wolf, 283-314. Wiesbaden: Springer.

Zohlnhöfer, Reimut. 2008. Stand und Perspektiven der vergleichenden Staatstätigkeitsforschung. In: *Die Zukunft der Policy-Forschung. Theorien, Methoden, Anwendungen,* Eds. Janning, Frank and Katrin Toens, 157-174. Wiesbaden: Springer.