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Conditions Enhancing the Socially Inclusive and Environmentally Sound Uptake of Wind Energy: The Case of Germany*

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Abstract: This paper discusses the framework conditions to promote the socially inclusive and environmentally sound uptake of renewable energy with a special focus on wind power in Germany and on the policy framework of the European Union (EU). The analysis of these aspects relates to the achievement of one of the Sustainable Development Goals, namely SDG 7 (affordable and clean energy). Wind power plays an important role for mastering the energy transition, but in many countries of the EU, wind energy has become a subject of contested debates. Besides geographic, market, policy, and other factors which affect the implementation of wind energy projects, low levels of market deployment can also be attributed to a diminishing social acceptance and growing local opposition. This is mostly due to the visual impact, noise annoyance, public perception of health risks, local environmental disruption harming local fauna and flora, potentially negative impact on recreation and tourism, or land and real property values as well as to perceived procedural or distributional injustice including affordability of electricity prices, and insufficient public participation. The paper provides insights from an ongoing research project supported by the European Commission under the research programme Horizon 2020. The WinWind Project identifies similarities and differences between regions in five EU countries and in Norway highlighting barriers and drivers for the uptake of wind energy. The paper analyses the European and the German policy frameworks, social acceptance barriers and drivers in two regions of East Germany, and describes promising approaches that drive social acceptance and enhance the environmentally sound uptake of wind energy projects.

Key Words: Wind Power, Energy Transition, Renewable Energy Policy, Social Acceptance, Germany

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I. Introduction

Germany is currently undergoing a profound process of change in its energy system, a change that has been particularly characterised by the extraordinary growth of renewables and the phase out of nuclear power plants (Brunnengräber and Di Nucci, 2014; Lauber and Jacobsson, 2015; Morris and Jungjohann, 2016). Implementation of local energy projects has played an important role in this transformation, yet this process is faced with environmental and social conflicts (Krug, 2014). Large energy and infrastructure projects not only lack broad support, they also provoke considerable local opposition. Negative attitudes, especially vis-a-vis wind energy, have been increasing during recent years. Social acceptance of wind energy has become a contested issue due to the visual impact and change of landscape, acoustic emissions (including infrasound), the public's perception of associated environmental and health risks, impairment of local fauna and flora, negative impacts on tourism or land and real property values. Often it has been purported that local acceptance is mainly influenced by factors such as distributional justice (fair allocation of costs and benefits), procedural justice (fair and participative decision-making processes) and trust (in information and intentions of investors and actors) (Wüstenhagen, Wolsink and Bürer, 2007; Huijts, Molin and Steg, 2012; Sonnberger and Ruddat, 2017; Lienhoop, 2018). However, participatory processes do not automatically imply acceptance; but shareholding of citizens/local communities and high levels of procedural participation in the decision-making process help minimising conflicts (Lienhoop, 2018).

The paper is based on the preliminary outcomes of the Horizon

2020 project WinWind, which analyses acceptance factors within wind energy scarce regions (WESR) of six European countries. WinWind identifies similarities and differences between the regions highlighting barriers and drivers for the uptake of wind energy. The project also develops a portfolio of good/best practice measures for enhancing the socially inclusive deployment of wind energy that are transferable to specific local, regional, and national contexts in line with the Sustainable Development Goal 7 (Affordable and Clean Energy).

WESR are defined by the project as regions with considerably lower than EU average wind energy penetration levels despite considerable wind energy potentials. Preliminary results of the WinWind project reveal that barriers and drivers for social acceptance significantly differ across countries and regions. Although this field has been rather well investigated, there are still knowledge gaps about critical regional and local factors that are suitable to explain in a convincing way regional and local differences in social acceptance levels. This paper contributes to close this research gap by assessing social acceptance barriers and drivers in Saxony and Thuringia, the two wind energy scarce regions in East Germany which have been selected as target regions in the WinWind project.[1] The paper provides comparative insights from both regions regarding social acceptance barriers and assesses selected good practice measures that drive social acceptance and enhance the socially inclusive and environmentally sound uptake of wind energy projects.

The article is structured as follows: Section 2 presents the energy policy context in the European Union and briefly outlines the

1) Both regions were part of the German Democratic Republic (GDR) between 1949 and 1990 and in 1990 were reconstituted as individual federal states (Länder).

approach and aims of the European WinWind project of which some preliminary outcomes are sketched. Section 3 turns to the specific conditions for the enhancement of wind energy projects in Germany, describes the legal and regulatory framework and the role of wind power and analyses the reasons for diminishing acceptance. Section 4 addresses renewable energy policy developments at a regional level, illustrates key acceptance barriers in Saxony and Thuringia inhibiting a more dynamic market development, and identifies similarities and differences between both regions in terms of local acceptance patterns. This section also discusses the importance of "positive narratives" and good practices that involve citizens, generate local benefits, and have a positive impact on public opinion. These are found to be important means for addressing and buttressing the wind energy supporters in local communities and the group of undecided individuals. Section 4 draws largely on the outcomes of the stakeholder dialogues performed in Germany in the frame of the WinWind project. The conclusions derive lessons about the suitability of targeted measures that can help abating existing barriers concerning planning and permitting procedures, including intransparent decision-making, top down processes, participation deficits and unfair distribution of costs and benefits.

II. Towards a New Policy Framework for Renewable Energy in the European Union

1. The Clean Energy Package and the New Role of Community Energy and Local Involvement

In November 2016, the European Commission (EC) launched the 'Clean Energy for All Europeans' Package, a comprehensive set of legislative proposals, including a recast of the Directive on the Promotion of Renewable Energy Sources (RES) (European Commission, 2016a). In this package, the EC emphasised that half of the EU's electricity should come from renewables by 2030, and it should be completely carbon-free by 2050. The package included eight different legislative proposals, with political agreement having been reached on four of the eight proposals (as of November 2018) including the revised Renewable Energy Directive (RED). The new regulatory framework includes, inter alia, a new binding, renewable energy target for the EU by 2030 of 32% to account for EU's gross final energy consumption, including a review clause by 2023 for an upward revision. It also calls for each Member State to prepare a national energy and climate plan for the period 2021 to 2030.

The new RED encourages local ownership of renewable energy and includes the right of citizens to produce, consume, sell and store renewable energy. The European legislators agreed to acknowledge the important role of energy communities and citizens, to provide them a concrete set of rights, and ensure the development of enabling frameworks at national level. The respective provisions are laid down in Article 22 of the new RED which is dedicated to renewable energy communities (REC). REC are defined as entities through which citizens

and/or local authorities own or participate in the production and/or use of renewable energy. Member States will be obliged to provide enabling frameworks that can ensure that there are no unjustified regulatory barriers to REC, that distribution system operators cooperate with REC, that participation is accessible to all consumers, and that regulatory and capacity-building support is provided to public authorities in enabling and setting up REC. Member States will also need to ensure that they take the specificities of REC into account when designing support schemes.

With the Clean Energy Package, the Commission acknowledged that the specific characteristics of REC in terms of size, ownership structure and number of projects can hamper their competition on equal footing with large-scale players. In its impact assessment of the recast directive (European Commission, 2016b), the Commission underlined that with more than 2,500 initiatives EU-wide, REC have been key in triggering the energy transition in Europe.

2. The European WinWind Project

The overall objective of the EU Horizon 2020 project WinWind is to enhance the socially inclusive deployment of wind energy by increasing social acceptance of, and support for, onshore wind energy in WESR. The target regions are: Saxony and Thuringia in Germany, Latium and Abruzzo in Italy, Latvia as a whole, Mid-Norway, the Warmian-Masurian Voivodeship in Poland and the Balearic Islands in Spain. In each of the six partner countries, the target regions are complemented by selected model regions with comparatively strong market expansion.

Key project activities include:

- Analysing the inhibiting and driving factors for social acceptance;
- Developing a taxonomy of acceptance barriers and drivers to identify similarities and differences in development patterns;
- Setting-up country stakeholder desks and carrying out stakeholder dialogues and dedicated consultations;
- Analysing proven and innovative acceptance-promoting measures that are transferable to specific local, regional and national contexts;
- Initiating a transfer of feasible best practice solutions;
- Formulating policy recommendations;
- Carrying out policy dialogues at a regional and European level.

3. WinWind Conceptual Framework and Links to the UN Sustainable Development Goals

In 2015, the United Nations (UN) adopted 17 Sustainable Development Goals (SDGs) within the framework of the UN Agenda 2030 (UN, 2015). SDG7 aims to ensure universal access to affordable, reliable, sustainable and modern energy for the entire world population and to increase substantially the global share of renewable energy and the level of energy efficiency. However, the use if renewable energy is not automatically sustainable (Krug, 2018). In order to achieve a sustainable transition to a low carbon energy sector, also renewable energy projects need to take into consideration the consequences for the environment, society and the economy and comply with sustainability goals and principles (Holden, Linnerud and Banister, 2017).

Wind energy developments can be categorised according to their impacts on the environment, the economy and the society.

The environmental dimension includes impacts of wind energy development on GHG emissions, air quality, but also on flora and fauna as well as ecosystems. The use of land, rare minerals, metals

and other non-renewable natural resources for the production of wind power (vis-a-vis electricity produced from other RES) should also be taken into consideration.

The economic dimension includes impacts of wind energy development on the economy, e.g. development of new industries, creation of innovative technologies, generation of added value (via profits, employment, tax revenues) both locally, regionally and at a country level. There could also be reverse effects, e.g. in cases where wind energy reduces profitability, growth prospects and employment in other economic sectors, as for example in the case of tourism (although there are also examples for positive effects). Another issue is the impact on electricity prices. The economic dimension also relates to the distribution of impacts across stakeholder groups; the way this distribution is perceived as fair or unfair also affects the social acceptance of wind energy.

Traditionally, sustainable development policies have been strongly focused on the environment; the social dimension is often overlooked. The social dimension comprises impacts of wind energy development on human health and quality of life, which also includes visual impact and noise. But is also linked to socio-psychological and cultural aspects such as place attachment and sense of place (Devine-Wright, 2009). Moreover, the societal dimension includes social welfare issues and all impacts of wind energy projects on human rights, gender, labour and workplace conditions, occupational health and safety, etc.

Following Upham, Oltra and Boso (2015, p.103) we consider social acceptance as "favourable or positive response (including attitude, intention, behavior and – where appropriate – use) relating to

proposed or in situ technology or social technical systems by members of a given social unit (country or region, community or town and household, organisation)". Overall, social acceptance of wind energy is likely to reflect the trade-offs between the three dimensions and to what extent a balance between these dimensions is achieved.

The triangular concept of social acceptance (Wüstenhagen, Wolsink and Bürer, 2007) provides the key reference system for WinWind. Socio-political acceptance refers to the general support for technologies and policies, whereas market acceptance relates to the meso level, involving both consumers and investors and includes also an intra-firm dimension. Community acceptance refers to the specific acceptance of siting decisions and RES projects by local stakeholders, in particular residents and local authorities. Community acceptance is mainly influenced by factors such as distributional justice (fair distribution of costs and benefits), procedural justice (fair and participative decision-making process) and trust (in information and intentions of investors and actors from outside the community (Wüstenhagen, Wolsink and Bürer, 2007). Although the focus of WinWind and also of this paper is on barriers and drivers affecting community acceptance, it should be considered that the three dimensions of social acceptance interact closely and influence each other. Hence, social acceptance can be regarded "a multi-dimensional, context specific and dynamic phenomenon" (Ellis and Ferraro, 2016, p.14).

4. The Role of Wind Power in the EU and Grounds for Its Diminishing Acceptance

Wind power accounts today for 18% of the EU's total installed

electricity generation capacity. With a net installed capacity of 168.7 GW (of which 15.8 GW offshore) wind power has become the second largest generation source for renewable electricity in 2017, overtaking biomass and approaching the magnitude of gas fired installations (WindEurope, 2018a). Ever larger wind turbines are expected to become the norm in the next 5 years, i.e. 4 MW for onshore and 8 MW for offshore turbines respectively. With 87 GW of wind power due to be installed in the next five years, Europe could reach 258 GW of installed capacity by 2022 (WindEurope, 2018b).

The majority of the EU Member States are on track to meeting their mandatory national RES targets for 2020 laid down in the RED. However, for a number of Member States, the achievement of those targets faces difficulties due to persistent market as well as social barriers. This applies in particular to wind power. For example, there are several countries and regions within the EU where wind energy deployment rates have been comparatively low so far. Latvia and Poland are among those countries with fairly lower wind gross electricity penetration levels as compared to the EU average. The same applies to Norway, a member of the European Economic Area.

Besides geographic, market, policy and other factors which affect the economic viability of wind energy, social acceptance issues have started playing a significant role. In the recent past, general surveys addressing socio-political acceptance for wind energy reveal that the public was generally in favour of wind energy (European Commission, 2011; Schumann, Fischer and Hake, 2012). However, implementation at a local level started experiencing growing difficulties. In the period 2007-2008 in the EU-27 over 20% of the wind energy projects were delayed and nearly 20% seriously threatened, mostly because of

lawsuits from local communities (Iuga, Claessens, Dütschke, Schneider, Wesche and Ramsay, 2016). In many countries, local acceptance of wind energy is the source of contested debates. To put it as Wolsink (2007, p.2694) "if local interests are not given a voice in decision-making processes, conditional supporters may turn into objectors".

Recent research findings (Ellis and Ferraro, 2016; Scherhaufer, Höltinger, Salak, Schauppenlehner and Schmidt, 2017) suggest that levels of social acceptance may be improved by "good governance", including transparent planning and decision-making, early involvement of local communities in the process (e.g. in the frame of spatial planning and zoning), community (co-)ownership of wind farms, or by implementing other benefit sharing mechanisms (e.g. shared taxes, reduced electricity tariffs, compensations, local contracting and employment etc.). These success factors, however, need to be considered in their cultural and institutional context. The propensity to accept a wind energy project in the vicinity is higher if local benefits are spread across the community (Wolsink, 2007) or bring benefits to local residents and especially if the affected community participates in planning decisions (Cowell, Bristow and Munday, 2011).

Some patterns of conflict are similar across all the WinWind regions, some are different. The comprehensive literature review carried out within the WinWind project (Linnerud, Aakre, Leiren et al. 2018a, 2018b) shows a particular emphasis on the impacts of wind energy developments on human health and wellbeing, and highlights the importance of landscape change and visual impacts e.g. due to shadow flicker or aviation lighting and noise including fears of

infrasound as major grounds for opposition to wind energy projects as well as the use of contested land. Visual impacts may be determined by the character of the landscape, but also the visibility of the turbines. Cultural identities and place attachment are closely related acceptance factors. In all countries there are particular concerns with nature conservation and biodiversity. The literature review highlights that siting of turbines close to sensitive and protected landscapes provokes the most negative responses to wind energy.

The share of renewable energy in the WinWind target regions vary. While the share of renewables in Norwegian electricity generation is 98%, it accounts for only 13.5% in Saxony. This is an important condition for social acceptability because one aim of increasing the share of wind energy is to phase-out fossil fuels. In Norway, opponents stress the fact that there is no rationale behind damaging the natural environment through wind turbines, when the electricity generation is already fully renewable. This is in contrast to Poland, which is highly dependent on coal and where the social welfare effects of phasing out coal dominate the political agenda and create strong conflicts with climate policy measures. It has been remarked (Linnerud et al., 2018b) that high shares of renewables, as it is the case of Norway as well as high shares of fossil fuels and employment (as in Poland) may have the same effect and generate opposition against wind power.

But wind energy creates also pressures on grid capacity. This is the case in Italy, where a large number of new applications for connecting to the national grid is related to new wind turbines. In Germany a major challenge is the necessary improvement of the

transport of electricity from the northern/eastern regions where there is an abundance of wind energy to the south of Germany that has a high demand for electricity. Other regions, like the Warmian-Masurian Province in Poland, experience grid problems and power loss issues hamper the development of wind power.

Similarly to wind turbines, also the construction of electricity transmission lines is faced with increasing local resistance. In many regions of North Germany wind energy projects face opposition, also because wind turbines often have to cease operation temporarily due to grid congestions. Grid operators are allowed to curtail electricity from wind and other RES, when specific sections of the grid are endangered. The lacking alignment of wind energy expansion and grid infrastructure development and the fact that operators of renewable energy plants, particularly wind turbines get financial compensation for the so called "phantom electricity" (Traufetter, 2016) negatively affects social acceptance for new wind energy plants.

Ⅲ. Wind Power in Germany

1. Status Quo of Wind Power in Germany

Germany has become well-known for its "Energiewende", the energy transition towards a nuclear-free, low carbon and environmentally sound energy supply. In spite of being a large industrial nation and net exporter, Germany has managed to achieve a rapid growth of renewables. Considerable progress has been made in the electricity sector where the share of RES in gross electricity consumption increased from 3.4% in 1990 to 36.0% in 2017. The share of RES in

gross final energy consumption increased from 7.2% (2005) to 15.6% in 2017 (BMWi, 2018). This means that Germany is nearly on track to meeting its national target for 2020 (18%) to be achieved according to the EU RED.

Wind energy (onshore and offshore) represented in 2017 the most important RES and reached a share of 16.1% of total electricity generation. In 2017, due to a significant increase in construction and very good wind conditions, wind turbines delivered record electricity generation of 105.7 TWh (compared to 79.9 TWh in 2016). Wind power thus increased by 32.2% compared to the previous year (UBA, 2018). Wind energy has also become an important economic factor; in 2016, 160,200 persons were employed in the wind industry, of which 27,200 in the offshore and 133,000 in the onshore segment. This means that the wind industry today employs five times as many people in Germany as the coal industry (O'Sullivan, Edler and Lehr, 2018).

2. The Regulatory and Legal Framework

In September 2010, the Federal Government adopted the "Energy Concept" which sets out Germany's energy policy until 2050 and lays down measures for the development of RES, power grids and energy efficiency. Following the Fukushima accident, the role assigned to nuclear power in the energy concept was reassessed and the seven oldest nuclear power plants and the plant at Krümmel were shut down permanently. Additionally, a decision was taken to phase out the remaining nine nuclear power plants by 2022. The Energy Concept describes targets and development paths through the year 2050 including:

- Reduction of GHG emissions by 40% until 2020, by 55% until 2030, by 70% until 2040 and by 80-95% until 2050 (compared to 1990 levels);
- Increase of the share of RES in final energy consumption from roughly 10% to 60% in 2050;
- Reduction of primary energy consumption compared to 2008 levels by 20% until 2020 and 50% until 2050.

The Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG) represents the main support scheme for renewable energy in Germany. This federal law was passed in 2000. Major amendments were made in 2004, 2009, 2012, 2014 and 2016.

Before 2017, the Renewable Energy Sources Act (RESA) promoted the use of electricity from RES through legally fixed feed-in tariffs and feed-in premiums by requiring the grid operators to connect renewable energy installations and remunerate the electricity fed into the power grid for 20 years.

The RESA provided long term security for investors. A specific characteristic of the German renewable energy sector is its ownership structure. In 2016, 41% of total installed wind energy capacity (45,400 MW) were in the ownership of private persons (39%) and farmers (2%), regional and municipal energy supply utilities had a share of 10.6%, the "big four" electric power companies RWE, E.ON, Vattenfall and EnBW (3.7%), funds/banks (15.3%), project developers (22.7%), and industry (6.2%) (Agentur für Erneuerbare Energien, 2018a, 2018b). Community/citizen ownership of wind farms has been successful in many regions in Germany. The coastal region of North Frisia in Schleswig-Holstein (close to the Danish border) is one of the pioneers with 90% of the wind power plants being owned by citizens (Windcomm Schleswig-Holstein, 2012, p.8). Community wind plants/parks are based on different legal forms,

e.g. limited partnerships with a limited liability company as general partner or co-operatives.

The latest major amendments of 2016, which entered into force on 1 January 2017, mark a fundamental transition from legally fixed, guaranteed feed-in tariffs and feed-in premiums to competitive bidding and market-based auctions. Since 2017, remuneration rates for RES based electricity are no longer fixed by the federal government but are generally determined through an auctioning scheme. The auction design is based on a price only selection process, i.e. the only award criterion is the support level for the renewable electricity. The auctions are expected to stabilize the costs for renewable energy and to provide the mechanism for adhering to specific growth corridors by auctioning a specific amount of capacity volume each year (Grashof, 2019). Under the new system, a market premium is paid only to successful bidders in addition to the electricity market price prevailing at the relevant time. The Act also sets targets for the share of electricity generated from RES in annual gross electricity consumption from the current 33% to 40-45% in 2025, to 55-60% in 2035 and to at least 80% in 2050.

For onshore wind installations larger than 750 kW, the "pay as bid" principle applies. This rule grants bidders the prices they have offered. The EEG offers a guaranteed price for 20 years. As a rule, onshore wind projects can only participate in the auctions if the developers have received a permit under the Federal Pollution Control Act (*Bundesimmissionsschutzgesetz*). The difference between the wholesale market price on the electricity exchange and the higher remuneration rate paid for renewable energy is generally borne by the electricity customers through a surcharge included in the electricity price.

To preserve the diversity of market participants, special rules were set up for community energy companies including citizens' wind farms (*Bürgerwindparks*). The aim was to ensure involvement of local communities and community wind projects that so far have played a key role for the market development. Projects comprising at least 10 individuals, where local citizens own the majority of shares, enjoyed preferential treatment under the new auction regime. Initially, such projects were allowed to participate in the auctions without having to obtain a construction permit beforehand. Furthermore, these projects were eligible for the highest successful bid rate (uniform pricing). The Act also granted them a longer implementation period. Those privileges aimed to guarantee a level playing field for small actors and to enhance societal acceptance (Tews, 2018). To benefit from those privileges, community/citizens´ energy companies had to comply with certain eligibility criteria, e.g. with regard to shareholder structure.

The privileges applying for community energy companies helped to make this actor group the big winner in the first three rounds of auctions. 2,730.4 MW of the 2,820.4 MW of onshore wind projects allocated support at the three auctions in 2017 are owned by enterprises that formally fulfil the legal definition of a citizens' wind projects. However, one of the drawbacks of the amended Act is that the eligibility rules for community/citizen energy were rather weak and susceptible to be misused. There is evidence that several traditional project developers artificially established community energy companies to benefit from the privileges (Morris, 2017; Tews, 2018). This means that at least a part of the successful citizen projects were likely "dummy organisations" of commercial project developers. In the meantime, after heavy criticism of the flawed regulations,

certain privileges for citizen energy have been suspended by the government, including the possibility to bid for projects without having a permit.

3. Planning and Permitting

Whereas the basic political decisions about the *Energiewende* and the financial support for RES are made at the federal level, the identification and designation of sites for onshore wind energy developments is responsibility of the federal states. Siting is strongly based on regional and partly municipal spatial planning processes and on the designation of suitability or priority areas in regional plans or by designation of concentration zones on the level of municipal preparatory land use plans (*Flächennutzungspläne*).

However, the criteria for determining no-go areas, the corresponding setback distances and buffer zones applying for, e.g. housing, protected areas, infrastructure objects or cultural objects vary considerably between the federal states. Most states have enacted rules guiding the designation of priority/suitability areas, which is mostly the responsibility of the respective regional planning bodies.

Concerning the permitting of wind energy projects, it is important to note that wind turbines higher than 50 m are subject to licensing pursuant to the German Federal Pollution Control Act (*Bundesimmissionsschutzgesetz*). Permits are usually granted by environmental authorities.

Depending on the size of the projects, Environmental Impact Assessments (EIA) are required assessing the environmental effects of a project and includes an evaluation of possible alternatives. Legislation regarding EIA is based on European regulations and guideline and is regulated at the federal level. Whilst for large projects

with 20 turbines or more EIA are mandatory, for projects with three to 19 turbines EIA are only conditional depending on the results of an environmental pre-assessment ("scoping"). Only for projects with 20 or more turbines participation of the public is mandatory. For projects with 3 to 19 turbines public participation is required only when the pre-assessment leads to the conclusion that significant negative effects for the environment could be expected. In other cases, a simplified procedure without public consultation and without EIA is sufficient.

In recent years, the implementation of wind energy and other RES projects has become increasingly difficult. Despite high socio-political acceptance, local acceptance of wind energy projects at the community level seems to be declining. There is a growing number of local and regional citizen initiatives opposing wind energy projects delaying and in some cases even blocking their implementation. The designation of wind energy suitability or priority areas in regional planning has become a lengthy process. Due to a number of court decisions, many regional plans designating such areas have been declared legally void, which increases insecurity for investors and the population. The permitting processes and EIA procedures are getting increasingly complex due to comprehensive requirements and there is an increasing number of lawsuits, partly due to procedural defaults.

4. The Social Acceptance Paradox

In Germany, there are regular surveys examining the attitudes of the population towards the *Energiewende* and the use of renewable energy sources, including wind power. According to a survey carried out in 2015, the energy transition is supported by the vast majority

of the population in Germany, but one third is still undecided (Sonnberger and Ruddat, 2016). RES technologies enjoy general acceptance mostly in the cases of wind power off the coasts of Germany, solar energy in the immediate vicinity (500m), wind farms 5 km away. Local acceptance problems arise with wind farms at 500m distance to own home and high voltage power lines in the vicinity (500m). Regular public surveys show that support for RES in general has remained strong during the last years.[2] According to a survey conducted by the polling company Kantar Emnid in 2017, 95% of respondents consider further expanding renewable energy "important" or "extremely important". But when it comes to the acceptability of wind turbines in the local neighbourhood, only 57% of the respondents consider wind turbines as good or very good, with those respondents who have already turbines installed in their vicinities showing a higher approval rate (69%) (Agentur für Erneuerbare Energien, 2017).

A recent survey commissioned by the Onshore Wind Energy Agency shows similar results (Fachagentur Wind, 2018b). In 2017, the Institute for Advanced Sustainability Studies (IASS), together with the RWI – Leibniz Institute for Economic Research, conducted a panel survey of more than 7,500 households. This survey showed that despite a high level of support for the objectives of the Energiewende, the population's attitudes towards its implementation are much more critical. Many people tend to associate the Energiewende with negative characteristics such as 'unfair', 'expensive' or 'chaotic'. With regard to wind energy, a quarter of respondents reject the expansion of onshore wind energy, irrespective of whether the plants are built

2) For an overview, cf. Fachagentur Windenergie an Land (2018a).

in their vicinity or elsewhere in Germany (Setton, Matuschke and Renn, 2017).

Ⅳ. Wind Power and Social Acceptance at the Regional Level: The Case of Saxony and Thuringia in East Germany

1. Wind Power Development in Saxony and Thuringia

Saxony, a state situated in the eastern part of Germany bordering with Poland and the Czech Republic, reached in 2015 a gross electricity production of over 42.4 billion kWh. Whilst lignite (brown coal), covered about three quarters of the gross electricity production, renewables made up 13.5% of the electricity mix of which 4.6% is produced by wind energy plants[3] (Statistisches Landesamt, 2017).

During the 1990s, Saxony was among the pioneers in Germany regarding the installation of wind turbines. However, annual installation rates dropped continuously in recent years and Saxony now lags considerably behind other states in terms of total installed wind capacity both in absolute and relative terms. In 2017, the number of wind turbines totalled 891 with an installed capacity of 1,199 MW. Only 16 wind turbines were installed in 2017 with a capacity of 49 MW. In terms of new installations, Saxony covered the third last place of 16 German federal states (representing 0.9% of the gross installations in

3) Approximately 30 million tons of lignite are mined annually, which makes up around 18% of the total volume mined in Germany, representing about 3.5% of the lignite produced worldwide. Around 2,000 persons are employed in lignite mining and lignite based power production.

Germany in 2017) (Fachagentur Windenergie, 2018b).

This comparatively slow development is in contradiction with the available wind harvest potential since almost all areas of Saxony have an average wind speed of more than 5.5 m/s in a height of 140 m above ground. A study published in 2012 by the German Wind Energy Association (Bundesverband WindEnergie, 2012) revealed that 4.9% of Saxony's area outside forests and protected areas would be geographically suitable for wind turbines. The inclusion of forests and protected areas would increase the share to 14.3%, corresponding to an annual electricity production of 20 TWh. This implies that the wind energy potential could cover up to 75% of the gross electricity consumption of 26.5 TWh as of 2015 (Bundesverband Windenergie, 2012). A more recent study concludes that based on the assumption that 2% of the total territory is used for wind energy, in 2016, Saxony only realised 8.5% of the available potential (Agentur für Erneuerbare Energien, 2018b).

Thuringia, situated in the centre of Germany, has a total primary energy supply (TPES) largely based on mineral oil products, gas and to a lesser extent renewables. In 2015, the share of renewable energy in TPES reached 24% of which biomass had the lion´s share with 74.1%. Thuringia covers about 50% of its electricity demand through imports from other regions. The electricity generation mix is rather unique compared to other German states: In 2016, electricity from RES covered 56.9% of gross electricity production, natural gas 22.1% and other sources 21.0%. The share of wind energy in gross electricity production was 22.4%, of bioenergy 20.4%, of PV 11.6%, of hydropower 2.1% and of others 0.5% (Agentur für Erneuerbare Energien, 2018c, p.178).

By the end of 2017, there were 837 wind turbines in operation with a capacity of 1,470 MW, representing 3% of Germany's total wind energy capacity. In 2017, 48 new wind turbines were installed with a power of 148.0 MW representing 2.7% of the newly built gross capacity at the national level (Fachagentur Windenergie, 2018a).

A study on wind energy potential in Thuringia pinpointed that merely 0.56% of the territory fulfils the necessary criteria for the potential use of wind energy production (average wind capacity of 200 W/m2 which corresponds to a wind speed of 5.3-5.5 m/s). This share, equivalent to 9,108 ha, represents a potential wind yield of 7,134 GWh per year. If Thuringia were to fully exploit its wind potential, this could cover around 50% of its total electricity demand (Döpel Landschaftsplanung, 2015). A further study highlighted that, based on the assumption that 2% of the total area were used for wind energy, Thuringia is only realising 14.6% of the available potential (Agentur für Erneuerbare Energien, 2018d).

2. Renewable Energy Policy in Saxony and Thuringia

Supporters of wind power in Saxony constantly claimed that the state government actively impedes a consequent expansion of wind energy, particularly the designation of wind priority areas in the regional plans – being the responsibility of the Ministry of the Interior and particularly the regional planning bodies – e.g. by restrictive zoning including turbine height restrictions (Bundesverband Windenergie Landesverband Sachsen, 2016). They also argue that the state government shows a strong bias in promoting the domestic lignite industry at the expense of the wind energy sector and other RES sectors.

In its Energy and Climate Programme of 2013 (EKP) the previous

state government of Saxony has set out a RES expansion target of reaching 28% in gross electricity consumption by 2022. After the parliamentary elections in Saxony (2014), the new government coalition of the Christian Democratic Union and the Social Democratic Party agreed to follow the (more ambitious) RES targets of the federal government (40-45% until 2025 and 55-60% until 2035). The government parties also agreed to revise the EKP involving the public. In contrast to many other federal states, the state government in Saxony has not set any area-related expansion target for the development of wind energy (e.g. as a minimum percentage of the total area to be reserved for wind energy[4]), but a state wide minimum wind energy output target which has been broken down for each of the four regional planning regions according to their respective size. The regional plans which designate wind priority/suitable zones are currently under revision. But this revision is still based on the former policy goals. Hence, political goal setting and spatial planning are not aligned. Due to the obsolete expansion targets contained in the existing EKP which has been developed by the previous government, the wind power industry expects further stagnation of wind energy in the coming years.

The left-wing state government coalition of Thuringia pursues very ambitious RES expansion targets and seeks to increase the share of RES in the overall energy consumption to 100% by 2040. This target is more ambitious than the targets of the federal government and most other federal states. In order to achieve these targets, the area dedicated to the development of wind energy is to be increased from

4) In Saxony, so far only 0.18% of the state territory has been reserved for the installation of wind turbines.

0.3 to 1% of the total area of Thuringia. The Wind Energy Decree of 2016 stipulates that the installation of wind turbines in forests is not generally prohibited, which means that project developers recently started to plan wind turbines in forests.

3. Acceptance of Wind Energy in Saxony and Thuringia

Public surveys show that support for the Energiewende in general and wind energy in particular in most of the federal states formerly parts of the GDR (particularly Brandenburg, Thuringia, Saxony and Saxony-Anhalt), is generally lower than in the rest of the country.

In a survey on wind energy in Thuringia conducted by forsa and ENBW in 2018 (C-KCM Richard Schmidt, 2018), 59% of 1,051 respondents see rather disadvantages for people in the region, while 18% see rather advantages and 19% no impact. From 364 respondents living in a distance from 600 m to 5,000 m to wind turbines, only 15% see rather advantages, 15% see no impact, while 65% see more disadvantages. However, 57% of those 364 respondents were fully or rather in favour of the plant(s), whereas, 41% were not or rather not in favour of the plants. From 691 respondents who do not live in the vicinity of any wind turbine, 19% see rather advantages, 22% no impact, while 55% see rather disadvantages.

The reasons for higher disapproval of wind energy projects in East Germany are complex and have not been sufficiently well examined. Such an assessment has to take into account multiple historical, cultural, socio-economic, political and institutional factors.[5)]

5) The Annual Report of the Federal Government on the Status of German Unity (Bundesministerium für Wirtschaft und Energie, 2018) illustrates that 28 years after the German reunification many municipalities particularly in rural areas of

General dissatisfaction is aggravated by diminishing trust in political and administrative elites, perceived heteronomy (e.g. perception that leading positions in politics, administration, jurisdiction, media etc. are occupied by elites from West Germany), perception of the rural population of being left behind, perception of the *Energiewende* as an elitist project, increasing distrust towards scientific experts and increasing affinity to (right wing) populistic movements and parties.

In both states, opposition to wind energy projects has been quite successful in networking and professionalising its work. One of the key networks opposing wind energy in Saxony is the network of citizen initiatives for landscape conservation (*Netzwerk der Bürgerinitiativen des Landesverbandes Sachsen des Bundesverbandes Landschaftsschutz e.V.*). On its website the network lists presently 43 local citizen initiatives in Saxony opposing wind energy. There is no information about the number of citizen initiatives not being members of this network. Also in Thuringia opposition towards wind energy projects has been growing steadily. The Thuringian Association for a Reasonable Energy Transition (*Thüringer Landesverband Energiewende mit Vernunft e.V." – Bündnis Thüringer Bürgerinitiativen*), which unites many of the local wind opponent groups and citizen initiatives listed a total of 39 local citizen initiatives as member organisations.

1) Common Acceptance Issues

Opposition in both states is not homogeneous. Opponents of wind

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East Germany still face serious economic problems (e.g. rural depopulation, increasing economic, social and infrastructural disparities between urban and rural areas in East Germany, structural weakness, higher unemployment rates, low average income, decreasing revenues for municipalities).

energy vary from "conditional supporters" to "fundamental opponents" rejecting wind projects completely. Besides "silent" groups of supporters and the group of indifferent/undecided persons, there seems to be a growing share of "fundamental opponents" who are not willing to make any compromise. But this group is often well organised and effective in shaping the local discourses. The culture of debate and conflict has worsened. Conflicts are often highly emotional and the communication increasingly aggressive. Negative reporting in many media plays a key role in influencing wind energy discourses. The most common arguments raised by opponents are the negative visual impact and landscape change, health risks e.g. due to acoustic emissions, as well as risks concerning nature and species protection. Compared to the direct beneficiaries of wind turbines (e.g. land owners, investors/shareholders), host communities often argue that they bear a disproportionate share of negative project impacts.

A common problem is the lacking tradition of community/citizen energy, the dominance of external investors and the low financial participation of local citizens in such projects. Around 80% of all wind turbines in Thuringia are owned by investors outside of Thuringia (Gude, 2015). This leads to the fact that profits and business taxes from operation of the wind farms to a large extent flow off the region.[6)]

6) In general, local business taxes (*Gewerbesteuer*) are charged for profits from wind turbines. On January 1, 2009, the federal government amended its local business tax law. Regarding the allocation of business tax revenues from wind energy projects, at least 70% of the tax revenues is transferred to the municipality where the wind project is located, with the remaining 30% paid to the municipality where the operating company has its headquarters. In addition, local communities can apply to retain up to 100% of the tax. In the case of community-owned wind farms, 100% of the business taxes stay in the hosting municipality.

Furthermore, often the owners of the land on which turbines are installed are not rooted locally. This is mainly due to historical reasons and the process of privatisation of formerly state owned agricultural and forest land (Gotchev, 2016, p.25). Another drawback is that the local administrations including the mayors and other local decision makers lack the capacities and resources to cope with the complex issue of planning, constructing and operating wind turbines and securing public participation. Municipalities and local residents perceive the designation of wind energy suitability/priority zones in regional plans as a technocratic, top down process with very limited scope to influence the outcome. Often they feel badly informed and feel that their concerns and objections are not sufficiently considered. Lack of "genuine" participation causes much discontent.

Local authorities often face time, informational and staff constraints. Many municipalities seem to be overloaded and over-challenged with wind energy planning in their jurisdictions and there is no level playing field between municipalities and project developers/ investors. There is a knowledge gap between professional wind energy developers on the one hand and municipal decision-makers and citizens on the other.

Opponents of wind energy also argue that the electricity price is a too high burden for households and enterprises. In particular, they demand to reduce the surcharge that German consumers pay through their electricity bills to support RES based electricity (see section 3.2). The heterogeneity of state-specific exclusion criteria (hard/soft taboo criteria/zones), minimum setback distances for protected areas, or buffer zones is also a source of increasing discontent among communities and citizens.

2) Region-Specific Acceptance Issues

Despite many similarities, there are also a number of differences between the two regions. One of the key reasons explaining the slow market uptake of wind energy and one of the reasons for the comparatively low level of social acceptance of wind energy in Saxony is the economic importance of lignite mining and combustion for electricity production. Whereas in Saxony, wind energy faces both low political and community acceptance, in Thuringia political acceptance seems to be distinctly higher. However, the opponents of wind energy perceive the political targets and the area-specific target of 1% as arbitrary, ideological and inflexible. The process of target setting and breaking those targets down in the context of regional planning and the designation of suitable/preferable areas for wind energy is often perceived as biased and not open-ended.

A highly controversial and contested issue in Thuringia is the fact that wind turbines are increasingly installed in forest areas. Particularly in East Thuringia this raises massive protests from local citizens, communities and opponent groups.

Opponents of wind energy also criticize the insufficient alignment of RES expansion policies and grid development which leads to temporary shutdowns of wind turbines and compensation payments. Thuringia is directly affected by the construction of three new high voltage transmission lines. Particularly, the Suedlink line has raised strong opposition by citizens, but also by the state government and other stakeholders. In some of the affected municipalities there seems to be a high level of discontent and feeling of injustice due to the double burden and unfair distribution of costs and benefits between regions and federal states. The annulment of two of the four regional

plans designating priority zones for wind energy in Thuringia by court decisions led in those regions partly to aggressive and non-transparent land acquisition practices by developers (Gude, 2015).

4. Good Practices in Thuringia

The state of Thuringia has lately implemented specific measures that, by setting up new institutional infrastructures and instruments, help to overcome key barriers to social acceptance in the field of wind energy (Di Nucci and Krug, 2018). The so-called "Thuringian Model" (Notroff, 2017) is rated by industry representatives and experts as a promising solution. In 2015, the Thuringian Energy and GreenTech Agency (TheGA) established a special service unit which offers a wide range of information, advice, dialogue and support measures, particularly for municipalities and citizens, but also for project developers. The unit's staff comprises presently 3.5 full time employed persons (Notroff, 2018). The unit acts as an intermediary organisation, provides neutral advice and engages in conflict resolution and mediation.

The service unit also awards a quality label/certificate "Fair Wind Energy" to project planners and developers operating in Thuringia based on five criteria/guidelines. In order to qualify for the label, the planners and developers have to commit themselves to adhere to certain transparency and participation standards. Hence, this measure can be qualified as a voluntary agreement between the service unit and project developers. The criteria/guidelines for fair wind energy include:

a. Involvement of all interest groups in the vicinity of a planned wind farm during the entire planning phase;

b. Transparent handling of project-related information on-site, provision of assistance and informational services;
c. Fair participation of all persons affected and residents, including those not directly benefiting as land owners;
d. Involvement of regional energy supply companies and financing institutions;
e. Development of direct financial participation opportunities for citizens, enterprises and municipalities in Thuringia.

These criteria have been further broken down into more specific requirements. Based on these requirements the service unit negotiated individual label contracts with the project developers on a voluntary base. Developers are granted the "fair partner" label for a period of twelve months with the possibility to prolong the contracts. To date, 50 project developing companies have been awarded the label (ThEGA, 2018).

The label is based on an integrated approach seeking to enhance both procedural and distributional justice and trust-building. It contributes to increase transparency of planning processes, credibility of developers, procedural and financial participation of citizens and local communities, generation of local added value, and to achieve a more balanced distribution of costs and benefits of wind power.

The label can be regarded as an integral part of a bundle of measures aiming to promote local acceptance. The activities in Thuringia helped to overcome informational asymmetries and create a level playing field between developers on the one side and municipalities and local decision-makers on the other (Di Nucci and Krug, 2018). Reportedly, the transparency of wind energy planning processes has increased, measures to raise local added value generation have been initiated and several pilot projects have been

successfully launched. Furthermore, it has become almost impossible for project developers to do business in Thuringia without having the label for fair wind energy (Notroff, 2017). The label provides clear orientation for other initiatives and has a standard-setting function. Its wide appreciation is also the result of the strong commitment of the service unit's leadership and management.

The Thuringian model can be regarded as an integrated approach based on a policy mix combining multiple "soft" measures including capacity building, information, consulting, advice and guidance, dialogue and conflict mediation, voluntary agreements and accompanying measures.

Ⅴ. Conclusion

There are multiple sources of conflicts associated with wind energy developments. These are also related to the unequal distribution of costs and benefits and burden sharing (distributional conflicts), procedural conflicts (lack of transparency of information, insufficient formal/informal participation), conflicts on cultural identity/place attachment, conflicts about values/principles, and other conflicts. A compromise between actors opposing and those promoting wind power is not always possible. Several studies show also that compensations and community benefits do not automatically lead to increased acceptance (Cass, Walker and Devine-Wright, 2010; Ellis and Ferraro, 2016).

As discussed in the previous sections, wind energy projects have impacts on ecology, economy, human health and wellbeing, but are

crucial to enable national and regional governments to achieve the aimed renewable energy and climate policy goals. How these impacts are perceived and how they influence social acceptance of wind energy highly depends on the context (environment, society, policy, economy and technology), on how people are involved and integrated in the siting and permitting process and on how cost and benefits are distributed. But finally also the ownership of wind energy plants (private investors, local investors, citizens´ cooperatives, etc.) can represent a strong influencing factor (Nolden, 2013). In the cases where only a very few companies operating renewable energy plants are local companies, revenues from the wind plants do not remain in the "affected" municipalities and regional value creation remains limited. However, if trust can be built, the knowledge gap between wind energy developers and municipal decision-makers and citizens can be filled and this can eventually determine local acceptability.

Practical examples and an increasing number of empirical studies at European level show that local conflicts over wind energy can be avoided or partly mitigated through an integrative approach that takes into account the different needs and expectations of the affected population and stakeholders and considers regional or local processes and cultures. While transparent information, early involvement of citizens, informal forms of participation and the financial participation of citizens and local communities can increase the chances of local acceptance, these measures do not represent the silver bullet. As we have illustrated in the previous sections, social acceptance is determined by a variety of factors and is highly dependent on location and context. Experience also shows the importance of "positive narratives", for example through the dissemination of flagship projects

that involve citizens, generate common sense on local benefits, and generate a positive impact on the public opinion. If it is true that good examples do not necessarily remove the existing barriers and help promoting social acceptance, still good practices provide a framework to inspire the implementation of policies and measures. Above all, it has emerged that it is crucial to develop communication strategies that use good examples to address the supporters in local communities and the group of undecided individuals (cf. Fachagentur Wind, 2017).

Due to its complexity, fostering social acceptance requires integrated approaches. The "Thuringian model" we described is somehow compelling as it seeks to address different dimensions of the multi-faceted phenomenon of social acceptance in an integrated manner. These measures help enhancing procedural and distributional justice and at the same time help increasing confidence in planners and developers. In particular, capacity building, targeted advice combined with voluntary agreements proved to be suitable means to help creating a level playing field between developers and municipalities who often face time, informational and staff constraints. Furthermore, the case of Thuringia also illustrates that intermediary organisations providing neutral information can have important trust building functions. Inspired by the Thuringian example, several other federal states in Germany have already established or plan to establish intermediary organisations providing expertise, advice and conflict mediation services. With its holistic approach, the Thuringian model can serve as an orientation for policy makers not only in Germany, but also in other European countries and even beyond.

Against the background of the change in the support scheme for renewables in the EU, there is an increasing tension between the

quest for more direct and financial participation of citizens and local communities on the one side and the increasing cost pressure in the wind industry along the entire supply chain on the other side. The latter is induced by the transition from a feed-in regime to competitive bidding and auctioning (Grashof, 2019). Hence, there is a growing debate about appropriate policies and measures to be adopted at national level to ensure that minimum standards for financial participation of communities and benefit sharing guarantee a level playing field. Yet, it should not be underestimated that regional and local policy approaches are key to promote direct and indirect financial participation of citizens and communities in wind parks.

Ultimately, local ties and ownership of RES projects have proved not only valuable in terms of social acceptance, but also for the enhancement of the share of renewables, including wind energy. These local projects have not only contributed to reach the RES targets set in the RED at a European level, but also to lower the cost of RES deployment by making available the most suitable and acceptable sites. Independent on whether local, regional approaches or nationwide solutions are pursued, it may be concluded that to follow a path which bundles accompanying measures to enhance participation of citizens and communities in the planning and permitting process is a key milestone for reaching procedural fairness and can be beneficial to restore trust and increase acceptability of wind energy projects.

▌References ▌

Agentur für Erneuerbare Energien, 2017, "Repräsentative Umfrage: 95 Prozent der Deutschen wollen mehr Erneuerbare Energien," https://www.unendlich-viel-energie.de/themen/akzeptanz-erneuerbarer/akzeptanz-umfrage/akzeptanzumfrage2017, [20 November 2017]

_____, 2018a, "Infographic dossier: Renewable energy in the hands of the people," https://www.unendlich-viel-energie.de/media-library/charts-and-data/infographic-dossier-renewable-energy-in-the-hands-of-the-people, [28 November 2018]

_____, 2018b, "Landesinfo Sachsen," https://www.foederal-erneuerbar.de/landesinfo/bundesland/SN/kategorie/wind/auswahl/344-realisiertes und ges/#goto 344.

_____, 2018c, "Bundesländer mit neuer Energie-Statusreport Föderal Erneuerbar 2018, TN (Thüringen)," https://www.foederal-erneuerbar.de/tl_files/aee/FE-Report_2018/AEE_FE-Report_2018_TH.pdf.

_____, 2018d, "Landesinfo Thüringen," https://www.foederal-erneuerbar.de/landesinfo/bundesland/TH/kategorie/wind/auswahl/345-realisiertes_und_abs/#goto_345, [25 November 2018]

Brunnengräber, A. and M. R. Di Nucci, 2014, *Im Hürdenlauf zur Energiewende: Von Transformationen, Reformen und Innovationen,* Wiesbaden: Springer.

Bundesministerium für Wirtschaft und Energie - BMWi, 2018 August, "Energy data: Complete edition".

Bundesverband Windenergie - BWE, 2012, "Windenergiepotenzial Sachsen," http://www.renewable-energy-concepts.com/fileadmin/user_upload/download-infos/din4-bwe-windenergiepotenzial-flyer-sachsen-05-2011.pdf.

Bundesverband Windenergie–BWE, Landesverband Sachsen, 2016, "Höhenbegrenzung für Windenergieanlagen durch Regionalplaner unzulässig," Pressemitteilung 15.08.2016, https://www.wind-energie.de/presse/meldungen/detail/detail/News/hoehenbegrenzung-fuer-windenergieanlagen-durch-regionalplaner-unzulaessig/, [25 November 2018]

Bundesverband Windenergie - BWE, 2018, *Gemeinsam gewinnen –Windenergie vor Ort,* Berlin: BWE.

C-KCM Richard Schmidt, 2018, "Stimmungsbild Windkraft Thüringen," forsa, EnBW, https://www.enbw.com/media/konzern/docs/energieerzeugung/stimmun

gsbild-windkraft-thueringen-2018.pdf, [15 November 2018]

Cass, N., G. Walker, and P. Devine-Wright, 2010, "Good neighbours, public relations and bribes: The politics and perceptions of community benefit provision in renewable energy development in the UK," *Journal of Environmental Policy and Planning*, 12(3), pp.255-275.

Cowell, R., G. Bristow, and M. Munday, 2011, "Acceptance, acceptability and environmental justice: The role of community benefits in wind energy development," *Journal of Environal. Plan., Manag,* 54, pp.539-557.

Devine-Wright, P., 2009, "Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action," *Journal of Community and Applied Social Psychology,* 19, pp.426-441.

Di Nucci, M. R. and M. Krug, 2018, " Innovative und übertragbare Modelllösungen zur Förderung eines fairen Windenergieausbaus," *Energiewirtschaftliche Tagesfragen,* 68(7/8), pp.16-20.

Döpel Landschaftsplanung, 2015, "Ermittlung von Präferenzräumen für die Windenergienutzung in Thüringen. 1. Allgemeiner Teil 10.02.2015," Thüringer Ministerium für Infrastruktur und Landwirtschaft, https://www.thueringen.de/mam/th9/tmblv/rolp/windstudie_zusammenfassung.pdf.

Ellis, G. and G. Ferraro, 2016, *The social acceptance of wind energy,* (JRC Science for Policy Report, EUR 28182 EN), DOI:10.2789/696070.

European Commission, 2011, "Special eurobarometer 364 – Public awareness and acceptance of CO_2-capture and storage," https://data.europa.eu/euodp/en/data/dataset/S848_75_1_EBS364, [15 November 2017]

_____, 2016a, "Proposal for a directive of the European parliament and of the council on the promotion of the use of energy from renewable sources (recast)".

_____, 2016b, "Impact assessment accompanying the document proposal for a directive of the European parliament and of the council on the promotion of the use of energy from renewable sources (recast)," Brussels, SWD (2016) 418 final. Part 1/4.

Fachagentur Windenergie an Land, 2017, "Frühzeitige Öffentlichkeitsbeteiligung im Kontext der Windenergie: Von der Theorie in die Praxis," Berlin, https://www.fachagentur-windenergie.de/fileadmin/files/Veroeffentlichungen/FA_Wind_fruehzeitige_Oeffentlichkeitsbeteiligung_Theorie_Praxis_2017-12.pdf, [28 November 2018]

_____, 2018a, "Umfrage zur Akzeptanz der Windenergie

an Land – Herbst 2018, Berlin," https://www.fachagentur-windenergie.de/fileadmin/files/Veroeffentlichungen/FA_Wind_Umfrageergebnisse_Herbst_2018.pdf, [28 November 2018]

_____, 2018b, "Analyse der Ausbausituation der Windenergie an Land im Jahr 2017, Berlin," https://www. fachagentur-windenergie.de/fileadmin/files/Veroeffentlichungen/FA_Wind_Zubauanalyse_Wind-an-Land_Gesamtjahr_2017.pdf.

Gotchev, B., 2016, *Bundesländer als Motor einer bürgernahen Energiewende? Stand und Perspektiven wirtschaftlicher Bürgerbeteiligung bei Windenergie an Land*, (IASS Working Paper), DOI:10.2312/iass.2016.036.

Grashof, K., 2019, "Are auctions likely to deter community wind projects? And would this be problematic?," *Energy Policy,* 125, pp.20-32.

Gude, M., 2015, "Einbindung der Bürger beim Ausbau der Windenergie," Fachtagung Föderal Erneuerbar 2015, https://www.foederal-erneuerbar.de/tl_files/aee/Praesentationen/FE-Fachtagung_2015/Fachtagung_FE_1_TMUEN_TH_Gude_Windenergie Akzeptanz.pdf.

Holden, E., K. Linnerud, and D. Banister, 2017, "The imperatives of sustainable development: Needs, equity, and limits," *Sustainable Development,* 25(3), pp.213-226.

Huijts, N. M. A., E. J. E Molin, and L. Steg, 2012, "Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework," *Renewable and Sustainable Energy Reviews*, 16(1), pp.525-531.

Iuga, D., M. Dragan, B. Claessens, E. Dütschke, U. Schneider, J. Wesche, and J. Ramsay, 2016, "Final result-oriented report WISE Power, Foster social acceptance for wind power," October 2016 (Deliverable 1.1), http://wisepower-project.eu/wp-content/uploads/FINAL_WISE-Power-Result_oriented-report_Deliverable-D1.1-1.pdf, [23 November 2018]

Krug, M., 2014, "Umwelt-und sozialverträglicher Ausbau der erneuerbaren Energien," In Brunnengräber, A. and M. R. Di Nucci, 2014, *Im Hürdenlauf zur Energiewende: Von Transformationen, Reformen und Innovationen,* Wiesbaden: Springer, pp.225-246.

Lauber, V. and S. Jacobsson, 2015, "Lessons from Germany's Energiewende," In Fagerberg, J., S. Laestadius, B. R. Martin (Eds.), *The triple challenge for Europe: Economic development, climate change, and governance,* Oxford University Press, Oxford, pp.173-203.

Lienhoop, N., 2018, "Acceptance of wind energy and the role of financial and procedural participation: An investigation with focus groups and choice experiments," *Energy Policy,* 118, pp.97-105.

Linnerud, K., S. Aakre, M. D. Leiren et al., 2018a, "Technical and socio-economic conditions: A literature review of social acceptance of wind energy development, and an overview of the technical, socio-economic and regulatory starting conditions in the wind energy scarce target regions," WinWind work package 2, deliverable 2.1, http://winwind-project.eu/resources/outputs/.

_____, 2018b, "Conceptual framework for analysing social acceptance barriers and drivers," WinWind work package 2, deliverable 2.2, http://winwind-project.eu/resources/outputs/.

Morris, C., 2017, "Why no one seems happy with 96% citizen wind power," Energy Transition: The Global Energiewende.

Morris, C. and A. Jungjohann, 2016, *Energy democracy, Germany's energiewende to renewables*, Berlin, Heidelberg.

Nolden, C., 2013, "Governing community energy—Feed-in tariffs and the development of community wind energy schemes in the United Kingdom and Germany," *Energy Policy*, 63, pp.543-552.

Notroff, R., 2017, "Siegel für faire Windenergie Thüringen, Presentation at Conference, Windenergie in Sachsen-Anhalt – Bürgerenergieprojekte erfolgreich umsetzen, 1 June 2017," http://www.kommunal-erneuerbar.de/fileadmin/content/PDF/Dessau_17/Notroff_ThEGA.pdf.

_____, 2018, "Servicestelle Windenergie Thüringen," Presentation at WinWind Thematic Workshop 20 June 2018 in Leipzig, http://winwind-project.eu/germany/meetings/, [20 November 2018]

O'Sullivan, M., D. Edler, and U. Lehr, 2018, "Ökonomische Indikatoren des Energiesystems Methode, Abgrenzung und Ergebnisse für den Zeitraum 2000 – 2016," GWS Research Report 2018 / 01, Osnabrück, Feb. 2018, https://www.bmwi.de/Redaktion/DE/Publikationen/Studien/oekonomische-indikatoren-und-energiewirtschaftliche-gesamtrechnung.pdf?__blob=publicationFile&v=18, [28 November 2018]

Scherhaufer, P., S. Holtinger, B. Salak, T. Schauppenlehner, and J. Schmidt, 2017, "Patterns of acceptance and non-acceptance within energy landscapes: A case study on wind energy expansion in Austria," *Energy Policy*, 109, pp.863-870.

Schumann, D., W. Fischer, and J.-F. Hake, 2012, "Akzeptanz der Transformation des Energiesystems in der Bevölkerung," *Energiewirtschaftliche Tagesfragen,* 62(6), pp.29-33.

Setton, D., I. Matuschke, and O. Renn, 2017, "Social sustainability barometer for the German energiewende 2017: Core statements and summary of the key findings," IASS Study, November 2017, DOI:10.2312/iass.2017.028.

Sonnberger, M. and M. Ruddat, 2016, "Akzeptanz von Energieinfrastrukturen. Ergebnisse aus dem Akzeptanzsurvey 2015," http://www.energiewende-akzeptanz.de/wp-content/uploads/2016/08/Marco-Sonnberger-und-Michael-Ruddat_Akzeptanz-von-Energieinfrastrukturen.pdf.

Statistisches Landesamt des Freistaates Sachsen, 2017, "Medieninformation 75: Stromerzeugung und Stromverbrauch in Sachsen," https://www.statistik.sachsen.de/download/200_MI-2017/MI-75-2017.pdf, [28 November 2018]

Traufetter, G., 2016, "Schleswig-Holstein kämpft gegen den Phantomstrom," June 17, 2016, http://www.spiegel.de/wirtschaft/unternehmen/eeg-neuer-streit-um-die-erneuerbaren-a-1098045.html, [28 November 2018]

Tews, K., 2018, "The crash of a policy pilot to legally define community energy: Evidence from the German auction scheme," *Sustainability*, 10(10), p.3397.

Thüringer Energie- und GreenTech Agentur- ThEGA, 2018, "ThEGA kürt 50. Siegelpartner für faire Windenergie. 25.04.2018," https://www.thega.de/presse/pressemeldungen/detail-pressemeldungen/news/thega-kuert-50-siegelpartner-fuer-faire-windenergie-1/, [25 November 2018]

Umweltbundesamt-UBA, 2018, "Erneuerbare Energien in Zahlen," https://www.umweltbundesamt.de/themen/klima-energie/erneuerbare-energien/erneuerbare-energien-in-zahlen#textpart-1, [19 November 2018]

United Nations (UN), 2015, "Transforming our world: The 2030 Agenda for Sustainable Development," Resolution adopted by the General Assembly on 25 September 2015, A/RES/70/1, United Nations General Assembly.

Upham, P., C. Oltra, and À. Boso, 2015, "Towards a cross-paradigmatic framework of the social acceptance of energy systems," *Energy Research and Social Science*, 8, pp.100-112.

Windcomm Schleswig-Holstein, 2012, "Leitfaden Bürgerwindpark. Mehr Wertschöpfung für die Region," 3. überarbeitete Auflage mit Unterstützung der ARGE Netz GmbH & Co. KG, https://www.windcomm.de/Downloads/Leitfaeden/Leitfaden-Buergerwindpark.pdf.

WindEurope, 2018a, "Wind in power 2017," https://windeurope.org/wp-content/uploads/files/about-wind/statistics/WindEurope-Annual-Statistics-2017.

pdf, [21 November 2018]

_____, 2018b, "Wind energy in Europe: Outlook to 2022," https://windeurope.org/about-wind/reports/wind-energy-in-europe-outlook-to-2022/#download, [21 November 2018]

Wolsink, M., 2007, "Wind power implementation: The nature of public attitudes: Equity and fairness instead of backyard motives," *Renewable and Sustainable Energy Reviews,* 11(6), pp.1188-1207.

Wüstenhagen, R., M. Wolsink, and M. J. Bürer, 2007, "Social acceptance of renewable energy innovation: An introduction to the concept," *Energy Policy*, 35(5), pp.2683-2691.

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