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Windy Business: Exploring a Local Wind Power Project in Germany

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Keywords: Sustainable Development, Wind Energy, Community Acceptance, Public Participation

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1 Introduction

"Sustainable energy is opportunity – it transforms lives, economies and the planet" (UN, 2015). The need for a sustainable energy supply is widely recognized, as formulated under goal 7 of the United Nations' Sustainable Development Goals. Energy should be "affordable, reliable, sustainable and modern", and accessible to all (UN, 2015).

Wind power is among the best performing energy systems, when looking at the "relative aggregate footprint", which takes into consideration four sustainability criteria, "namely carbon footprint, water footprint, land footprint, and cost of energy production" (Hadian & Madani, 2015, p. 197). Onshore wind is second only to Geothermal, while off-shore wind scores the fourth place in the footprint analysis.

When it comes to national endeavours, Germany is known for the large share of renewable energy in the mix. In 2016, renewable energy sources contributed to 12.6% of primary energy consumption and 29.5% of total electricity production (Bundesministerium für Wirtschaft und Energie, n.d.). The German government aims to increase the total use of electricity generated by renewable energy systems to 40 to 45 percent by the year 2025 (Bundesministerium der Justiz und für Verbraucherschutz, n.d.).

Since more than 65% of decentralized renewable energy systems are owned by regional actors, regions play a crucial role in the German energy transition (Lutz, Fischer, Newig, & Lang, 2017, p. 136). Yet, on the local level problems may arise with the implementation of renewable energy systems, such as wind power. Issues around visual intrusion of the landscape, noise and shadow flicker, and concerns over wildlife protections are often in the heart of local resistance to wind power projects (Henningsson et al., 2013; Lehnert et al., 2014; Wolsink, 2000). Therefore, it is important that wind power projects are planned and decided upon in an inclusive, transparent and collaborative way (Jami & Walsh, 2016). But due to a privileging policy framework for wind energy in Germany, this is not always the case (Jobert et al., 2007).

1.1 Aim and Research Questions

The aim of this thesis is to closely examine the developments for wind power in the city of Euskirchen in Germany, including the planning and decision making processes, with regards to milestones and obstacles encountered over the last two decades.

The analysis is guided by the following research questions:

1) What challenges and opportunities for local wind power project development are identified in scholarly literature on wind power?
2) What milestones and obstacles can be identified in developing wind power in Euskirchen, since the issuing of the wind power concentration zones twenty years ago?
3) To which extent were affected parties such as residents, citizen initiatives and local natural protection agencies involved in the planning and decision making process, and how does this affect their opinion on local wind energy?
4) What lessons can be learned from the case, and can they contribute to finding recommendations to future wind power development in the region?

The analysis applies the methodology of a qualitative case study. Furthermore, views and opinions of involved and affected parties are collected and analysed through the lenses of social acceptance and public participation. Specifically, the three-dimensional approach to social acceptance after Wüstenhagen, Wolsink, & Bürer (2007) is adopted, which incorporates the corner stones of socio-political, market and community acceptance. The latter is chosen as focal point for the analysis in this thesis, since the object of this case study is a single community. Moreover, public participation is chosen as an additional perspective and is understood as the "contribution by groups or individuals

(independent of project developers, governmental agencies etc.) to the decision-making process", since those actors might be affected by the decision and therefore have a clear interest in the outcome (Jami & Walsh, 2014, p. 195)

Finally, from the examination of the planning and decision making processes and the discovered local attitudes towards wind energy, recommendations will be formulated to guide future wind power developments in the region.

2 Theoretical Framework

This section describes the theoretical lens chosen for the analysis of data collected from the interviews and other literature excluding scholarly articles. The first part of this framework is made up by theory on social acceptance, which consists of three dimensions, namely community, market and socio-political acceptance (Wüstenhagen et al., 2007). The focal point for this thesis lies within community acceptance of wind power developments. This is connected to the resistance and opposition to local projects, which can be divided into four different resistance types. Moreover, public participation is chosen as an additional perspective, since successful communication and participation in decision-making processes is supposed to amend or ameliorate negative attitudes, and is a vital part of positive community acceptance (Jami & Walsh, 2014; Szarka, Cowell, Ellis, Strachan, & Warren, 2012; Wolsink, 2007).

2.1 Social Acceptance

According to Wüstenhagen, Wolsink, & Bürer (2007), social acceptance can be divided into three dimensions, namely socio-political, community and market acceptance (see figure 1). It is important to take social acceptance into account when implementing wind power and other renewable energy systems, since contradictions between general public support for renewables and conflicts in local contexts arise during the realisation of specific projects (Wüstenhagen et al., 2007, p. 2683). All three dimensions have different factors of influence, but altogether they determine the overall acceptance of a project (Szarka et al., 2012, p. 218). Socio-political acceptance of wind power is influenced by the general opinion of the technology. Is wind energy considered useful and acceptable in the broad public, and how is it being depicted in the media and politics? Market acceptance of wind power concerns the financial factors of the technology, including investors, planners, suppliers and utilities and electricity consumers among others. For this thesis community acceptance is of focal importance, since it concerns itself with the opinion of residents living in close vicinity of a wind power project, which are affected by the developments directly in various ways (Szarka et al., 2012, p. 218). Factors of trust, legitimacy and justice become important in this dimension especially, (Wüstenhagen et al., 2007, p. 2684). This thesis uses local acceptance as a synonym, and the dimension of community acceptance as a focal point, since the object of the case study is a single community, which is developing wind power projects.

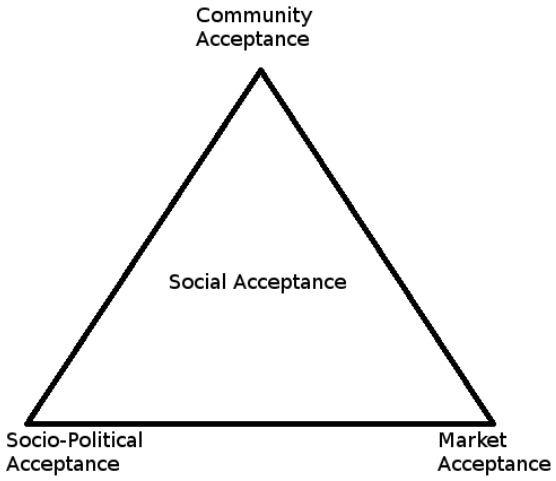

Figure 1: Three dimensions of social acceptance according to Wüstenhagen et al. (2007)

In their paper "Local acceptance of wind energy: Factors of success identified in French and German case studies", Jobert et al. (2007) identify and analyse factors that led to positive outcomes on wind power project developments in local contexts. Investigating how policy frameworks influence local acceptance by conducting a literature review, the authors came to the hypothesis that factors can fall into two different categories: (1) institutional conditions, for example economic incentives and regulations, or (2) the territorial and site-specific factors, such as local geography, actors and economy, as well as the actual wind power planning process, meaning the on-site project management (p. 2751). The authors analyse the cases through the lens of eight factors, with four belonging to the site-specifics and the other four to the project management (p. 2752):

- Site specific factors:
    - Geography and visual impact
    - Former use and perception of the territory
    - Ownership of the territory
    - Local economy
- Project management factors:
    - Local integration of developers
    - Information and participation
    - Creation of a network of support around the project
    - Ownership of the park and financial participation

These eight factors are implemented in the thesis, in order to investigate the specific local factors influencing the community acceptance for wind power in the city of Euskirchen. Furthermore, the eight-factor approach helps in designing and reviewing the questions in the semi-structured interviews. The factors of success are taken into account when designing a recommendation for the future wind power developments in Euskirchen.

2.2 Resistance Types

In his high impact paper ”Wind power and the NIMBY-myth” Maarten Wolsink (2000) discusses different opposition movements of wind power in the Netherlands. He investigates how strong the influence of the Not-In-My-Backyard (NIMBY) movement is in reality, since it is mentioned a lot or felt strongly when talking about opposition to plant siting. The scholar concludes that NIMBY-ism in not as strong as other types of resistance, which are often more sophisticated, since NIMBY is described by generally favouring the technology, but opposing it in the own region for purely selfish reasons. He identifies four specific resistance types, which are summarized as follows (Wolsink, 2000, p. 57):

1. Resistance Type A refers to the NIMBY attitude. Opposition of a wind farm anywhere near the own region, while being generally in favour of the technology.
2. Resistance Type B describes the rejection of the technology in general, and can be described by a Not-In-Any-Backyard (NIABY) attitude.
3. Resistance Type C reflects a change in attitudes due to concerns that arose during the planning phase of a wind power project. Whereas the attitude was positive to wind energy before, it turned into a NIABY attitude during the decision-making process.
4. Resistance Type D refers to a more sophisticated opposition to a specific wind power project, without rejecting the technology as a whole. Representatives of this type could be concerned over the suitability of a specific site for a wind farm, due concerns over environmental damages, or impacts on the ecosystem. Audio-visual impacts can also be of importance. This type is different from type A, because it is not merely for selfish reasons.

For the analysis within this thesis, the four resistance types will be used to identify and investigate the attitudes and views of the interviewed individuals.

2.3 Public Participation

For this thesis, public participation is defined as the “contribution by groups or individuals (independent of project developers, governmental agencies etc.) to the decision-making process”, since those actors might be directly or indirectly affected by a decision and therefore have a clear interest in the outcome (Jami & Walsh, 2014, p. 195).

As Wolsink points out, poor communication is most often the source of problems in wind power implementation, and it is caused by the framing of decision making, for example by “limiting the options for public participation to only consultation after the design and announcement of a project” (Wolsink, 2007, p. 1204). Furthermore, “communication misses its targets when it does not address

the affected public's concerns" (Jami & Walsh, 2016, p. 5). Therefore, it is crucially important, how means for public participation are implemented. It is suggested that "honest" offers for participation have a positive effect on community acceptance, whereas "participation simulation" is almost immediately unmasked as insincere (Marg, 2015, p. 26). Research shows that people react more positively to project development, when they are informed about it early on in the process (McLaren Loring, 2007).

In their paper "The role of public participation in identifying stakeholder synergies in wind power project development", the authors Jami and Walsh (2014) investigated the role of public participation in wind power project development. They conducted a literature review to build their conceptual framework and additionally conducted a case study in Ontario, Canada. The authors find that the engagement of the public can be incremental to identify "synergies between public and industry stakeholders that encourage project development", but also acknowledge that this engagement does not come without certain challenges. Key challenges in public participation for wind power projects include for example, "a lack of technical knowledge in a case of complex technical issues; the process has become more time consuming than may be necessary; a different perception of risk by citizens and experts; and individual differences in values, beliefs, and motivations, that may prevent the reaching of a joint consensus" (p. 194). These factors can limit the positive effect of public engagement in the decision-making process. The paper also provides valuable insight into what makes a wind power project successful. According to the authors, there are six major factors for the success of a wind energy project, namely (1) Credible Regulatory Governance, (2) Strong Regulatory Incentives, (3) Financial Compensation, (4) Involvement of a Full Range of Potential Stakeholders, (5) Addressing Public Concerns, and (6) Transparent Communication (p. 196). When discussing wind power development and participation, this paper is valuable in understanding positive and negative sides of public participation and present an informative comparison of factors. Starting from Arnsteins Ladder of Participation (Arnstein, 1969), the authors present a recommended public participation model, which includes several steps that build on each other. The model includes five consecutive steps: (1) Inform, (2) Consult, (3) Involve, (4) Collaborate, (5) Empower (Jami & Walsh, 2014, p. 199). As the authors point out, most wind power projects will inform, consult and involve with the public in one way or another, and sometimes even collaborate, depending on the nature of the decision-making processes and issues. An example for collaboration is community ownership of a wind farm. Their research suggests that development approaches, including collaboration and public involvement in the decision-making process, are more likely to reduce the resistance to a wind power project development, when compared to a "top-down imposed approach" (Jami & Walsh, 2014, p. 201). The proposed participatory model will be used in this thesis, to analyse the public participation in the case of Euskirchen.

The steps include the following suggestions (Jami & Walsh, 2014, p. 199):

1. Inform
    - Fact sheets, websites, open houses
2. Consult
    - Public comment, focus groups, survey, public meetings
3. Involve
    - Workshops, deliberative polling
4. Collaborate
    - Citizen advisory committee, consensus building, participatory decision making
5. Empower
    - Citizen juries, ballots, delegated decisions

In addition, three factors are suggested to be influential for the social acceptability of wind power development, namely (1) public engagement into the decision-making process, (2) addressing the public concerns, and (3) incorporating their suggestions in the process (Jami & Walsh, 2016, p. 2).

Since, “engagement”, “addressing”, and “incorporating” can be understood in various ways and are rather vague formulations, it is important to relate those terms to a more specific framework, such as the one suggested above by Jami & Walsh (2014), which recommends at least four steps for wind power project development, including (1) Inform, (2) Consult, (3) Involve and (4) Collaborate. The fourth step is crucial when it comes to collaborative planning, which is defined as an “approach in a multi-stakeholder society”, which is more efficient and politically legitimate than other processes, since it aims for “building shared knowledge and understanding, generating opportunities for creative synergy, and developing the capacity among stakeholders to work together locally to solve common problems” (Healey, 1998, p. 18). Here, stakeholders will be understood as parties and actors, who are affected by the wind power project development.

In relation to the third research question, the analysis within this thesis will investigate how far and how much the five steps were used in the decision-making process in Euskirchen by evaluating the results from the interviews and data gathered from secondary sources, such as local newspapers.

3 Methodology

This thesis is performed as a case study, in which the wind power project development in the city of Euskirchen (located in the federal state North Rhine Westphalia in the west of Germany) is investigated, with different views and opinions regarding community acceptance. Preliminary information on the project has been gathered through an informal interview with an employee of the municipality, and analysis of newspaper articles. Furthermore, a literature study and review is used for the theoretical background and further data analysis. To obtain views and opinions, semi-structured interviews are conducted.

According to Baxter (2008), a qualitative case study is a research approach, which enables the "exploration of a phenomenon within its context using a variety of data sources", ensuring that problems are investigated not only through one lens, "but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood" (Baxter & Jack, 2008, p. 544). Additionally, Yin emphasizes that a case study approach should be selected, if the study aims to answer "how" and "why" questions (Yin, 2014).

This thesis is placed in the greater context of Germany's endeavours for an energy transition („Energiewende") towards renewable energy systems. It aims to investigate how the wind power developments in the city region of Euskirchen were planned and decided upon, as well as the reasons why it took about twenty years for the first construction to finally come close to realisation. Furthermore, views and opinions of involved and affected parties are collected to find out which attitudes on wind power technology exist in the local context. These attitudes are then analysed to answer why they are negative, if they are indeed found to be as such. For these reasons, a qualitative case study methodology was selected as the main methodological framework of this Master's thesis.

3.1 Literature Review

Research should be grounded in previous scientific knowledge (Thiel, 2014, p. 60). To gain insight and overview over the existing research on wind power, energy transitions, public acceptance and opposition, a literature review is conducted. It is mainly "descriptive", focussing on the methodology, findings, the interpretation and relevance for this thesis (Khoo, Na, & Jaidka, 2011, p. 255). Nevertheless, an integrative part will be present as well, to find common themes or concepts from the reviewed material.

To find relevant articles and paper, the following keyword combinations were entered in the search engine Google Scholar (with time restrictions 2005-2017):

- "wind power, Germany, acceptance"
- "social acceptance, wind energy"
- "wind power, opposition, resistance"
- "energy transition, social acceptance"
- "local wind energy Germany"
- "public participation, wind power"

From these hits, the highest ranked papers and papers with a high number of citations were selected for further review. Additional articles were found by following references and links from the selected papers. Finally, the papers were analysed to compile "good practices" for local wind power project developments, which will be assessed for their suitability in the region of Euskirchen.

3.2 Interviews

To obtain the data for qualitative analysis, semi-structured interviews with certain actors within the community of Euskirchen are performed. Interviewees include a resident and spokesperson of a local citizen initiative and opposition movement; an employee of the municipality to gather further information on the project; and a representative of the Naturschutzbund NaBu (Natural Protection

Alliance), as shown in table 1. Semi-structured interviews use open-ended questions to obtain the views and opinions of the answering participant on the topic at hand (Creswell, 2003). They are chosen, because structured interviews on the one hand, ”only allow for limited participant responses and are, therefore, of little use if ’depth’ is required”, and unstructured interviews ”are usually very time-consuming (often lasting several hours) and can be difficult to manage, and to participate in, as the lack of predetermined interview questions provides little guidance on what to talk about” (Gill, Stewart, Treasure, & Chadwick, 2008, p. 291). Semi-structured interviews are the best choice for this project, since they have a certain flexibility and allow for ”the discovery or elaboration of information that is important to participants but may not have previously been thought of as pertinent by the research team” (Gill et al., 2008, p. 292). Follow up questions and wording of the questions can be varied, depending on the course of the interview and the interviewees answers. The focus of the interviews lies on the views and opinions towards wind energy, and the local project in Euskirchen, as well as the experience in the project planning and decision making process.

All three interviews were conducted in German via phone calls. Telephone interviews might take away some inhibitions in the interviewee, since it’s not a face-to-face situation, where some people might feel additional pressure. The calls were recoded, after interviewees expressed their consent. To ensure that misunderstandings around the wording of the questions would not arise, some guidelines were kept when designing the questions: (1) formulating the questions in a short and concise manner and (2) avoiding negative or leading question (Robson, 2013, p. 280).

Nevertheless, some limitations are identified. If a question is poorly formulated, an inherent bias can undermine the answer. This must be avoided, by asking the questions in a neutral and open ended way. On the one hand, interviewees themselves might have limited knowledge about the wind power or wind energy technology and therefore give answers that are not entirely based on facts. Or they might remember events in a different way they actually were. On the other hand, interviewees might feel pressure from the interview situation itself or even more so, if a question that was formulated in an aggressive manner (Yin, 2014, p. 106). This can be avoided by designing questions according to the aforementioned guidelines, and by building rapport with the interviewee before the interview starts. Notice, that all interviewed actors are male, thus limiting the gender-sensitivity regarding wind power.

Table 1: Interviews

No	Date of Interview	Interviewee	Duration	Form of Interview
1	04.02.2017	Inhabitant A; Member of Citizen Association	25 min.	Telephone
2	21.02.2017	Employee of Planning Bureau	7 min.	Telephone
3	24.02.2017	Spokesperson of Nature Protection Association (NABU)	36 min.	Telephone

3.3 Limitations

As not more than two residents of affected towns answered requests for interviews, the base for meaningful analysis of the local opinion is therefore limited. Nevertheless, the interview conducted with the spokesperson of the citizen initiative gives an impression of the feelings of the population of the village towards the wind power project in their neighbourhood. Since he is the contact person at the citizen initiative, many residents come to him regarding the issues around their hometown. On the other hand, his statement might be subject to his own perception of the situation at hand and therefore might distort the actual nature of things. As a result, no significant consensus among the residents can be produced, but rather an analysis of single selected perspectives, since he cannot represent the whole of the local community.

None of the farmers contacted for this research answered the request for an interview. Therefore, the perspective of people actively using the surrounding land for agriculture is missing in the analysis.

Furthermore, the land owner remains anonymous to the researcher and could not be contacted for an interview either. Missing background information for the history of the wind power development on the corresponding body of land were extracted from newspaper articles and the interview with the employee of the municipal planning office.

4 Background

Germany is often seen as a vanguard, when it comes to wind power development, and is currently among the three countries with the largest wind energy market in the world, right after the USA and China (Nordensvärd & Urban, 2015, p. 156). Since the introduction of the feed-in laws of 1991 and 2000, and the changes to the Federal Building Code in 1997, wind power has seen a massive growth in the country (Jobert et al., 2007, p. 2753). According to numbers by the IEA Wind, Germany had the highest installed wind power capacity per km² land area in the world in 2014, with 109.6 kW/km² (IEA, 2015). Already in 1980, the term "Energiewende" was coined in relation to Germany's energy transition (Krause, Bossel, & Müller-Reissmann, 1980), which is the subject of the next subsection.

4.1 Germany's Energy Transition – The "Energiewende"

Energy transitions generally mean the shift from one major source of energy to another. This could be from biomass to coal, like in the 18th century, or the following shift from coal to oil (Smil, 2010). Nowadays it's mostly associated with the transition from fossil fuels to renewable energy sources, such as solar, hydro or wind energy. In Germany, the term "Energiewende" has been coined back in the 1980's by a paper from the Öko-Institut, in which they describe scenarios for the departure from nuclear energy and crude oil as energy source (Krause et al., 1980). Over the years, the "Energiewende" became more prominent, especially in relation to climate change and Germany's leading role for renewable energy systems such as photovoltaic and wind power. It is also connected to the nuclear phase-out following the Fukushima disaster in 2011. Today, the government defines the goal of the Energiewende in reaching the age of renewable energies as soon as possible, while keeping electricity prices low (Bundesregierung, 2017). Specific targets are set for the generation of electricity, which is supposed to be covered by renewable sources with a share of 55 to 60% in 2035 (BMWi, n.d.). With 29.5%, renewable energies produced the majority of Germany's electricity in 2016, 12.3% coming from wind power alone (BMWi, n.d.). The second pillar of the German energy transition lies in energy efficiency and saving energy. The government sees most potential in improving the insulation of buildings, and in e-mobility. Funding exists for the renovation of older buildings, and for the purchase of electric cars (Bundesregierung, 2017).

Nevertheless, the energy transition in Germany is facing barriers and problems. Physical obstacles include for example the aging grid system, which acts as a bottleneck for electricity from the wind resource rich north to the industrialised south (Nordensvärd & Urban, 2015, p. 156). The renovation and extension of the grid system through underground cables and new transmission lines ("Stromtrassen") is both expensive and debated in society. The cost of this planned extension is estimated to be over 50 billion Euros (Hoffmann, 2012). Social barriers exist with the rise in electricity prices due to the feed-in tariff, and opposition to local implementations of renewable energy systems, including new transmission lines. The feed-in tariff of the Renewable Energy Act (Erneuerbare Energien Gesetz EEG) determines a certain payment to operators of renewable energy systems for their generated electricity. The electricity is then sold on the stock market. The so-called reallocation charge ("EEG Umlage") is paid by the consumers (part of the total electricity price), and is calculated as the difference between the generated profit and the payment to operators. In recent years, the reallocation charge increased disproportionately, increasing consumer electricity prices in the process. This has two major reasons. Firstly, the surcharge exemptions for the industry. Electricity intensive companies can get exempted from paying the reallocation charge, and it will be instead redistributed to private consumers, which carry an additional burden as a result. Therefore, the more exemptions exist, the higher the surcharge will be, and the electricity price in the process as well. Secondly, if the stock market prices for electricity decrease, the profits will be lower, too, resulting in a higher difference to be paid by the consumers (IWR, n.d.).

Society's support for the German Energiewende is decreasing in recent years, according to some studies. Whereas in 2012, 73% of the population were in favour of restructuring the energy system towards renewables, only approximately two thirds of all people were still supporting the energy transition in 2014, according to a survey by Infratest (Marg, 2015). According to a survey, conducted by the Forsa institute, only 41% of respondents are confident that the Energiewende will succeed, as it is being planned by the government (Wingas, 2016). It is unclear, though, how significant or representative these surveys were, since there can be found other studies, which hint at a higher overall acceptance of Renewable Energy in Germany. For example, a representative survey conducted in 2016 by TNS Emnid, on behalf of the AEE (Agency for Renewable Energy), found that for 93% of the 1000 respondents, the expansion of renewable energies is still important to extraordinarily important (AEE, 2016).

4.2 Overview of Wind Power in Germany

In 2015, Germany had an installed capacity of 44,946 MW of wind power (IEA, 2015), which accounted for 88.0TWh of wind-based electrical energy. This means that 14.7% of the national electricity demand was met by wind energy. Germany is the leading country for wind energy in Europe, when looking at the net installed capacity (IEA, 2015). Figure 2 shows the rapid expansion, which started in the early 1990s and kept on rising throughout the years[1]. At the end of 2016, Germany had an installed onshore capacity of 45,910.67 MW from 27,270 turbines (WindGuard, 2017b), and an installed offshore capacity of 4,108.30 MW from 947 turbines (WindGuard, 2017a). The federal state of North-Rhine Westphalia contributed with an installed capacity of 4,604 MW (3,345 onshore turbines), and a sectoral increase of 12.2 % for 2016, placing the state as the third strongest in the extension of wind power, behind the coastal states of Lower Saxony and Schleswig-Holstein (EnergieAgentur.NRW, 2017).

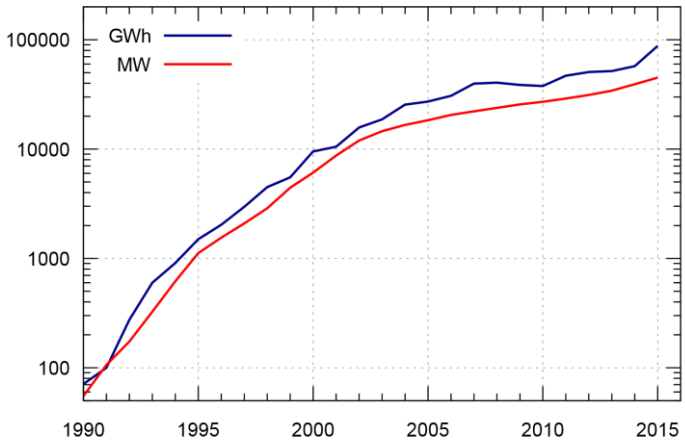

Figure 2: Installed wind energy in Germany from 1990 to 2015

4.4.1 The Fuel for the Rapid Expansion of Wind Energy

Three milestones can be seen as the main reasons for the swift and strong development of wind energy in Germany: The feed-in law of 1991, the modification of the Federal Building Code in 1997 and the feed-in law of 2000, also known as the "EEG", short for Erneuerbare-Energien-Gesetz (Renewable Energy Act).

Feed-in tariffs are often seen as effective instruments in the development of renewable energy systems, and are "suggested as an appropriate instrument to drive" extension and repowering of wind energy (Drechsler, Meyerhoff, & Ohl, 2012, p. 730). As a price-driven regulation, they guarantee "renewable energy supplies with priority access and dispatch", and set a fixed price per unit of electricity delivered over a set number of years (IRENA, 2012, p. 8). Feed-in tariffs are used in over 60 countries worldwide and have been the dominant regulatory instrument for the support of renewable energy deployment (IRENA, 2012, p. 9). Nevertheless, those tariffs come with certain trade-offs, for example between long term goals, such as technology innovation, and short term goals, like a fast expansion of renewable energy (Drechsler et al., 2012, p. 731). Whereas research suggests that feed-in tariffs are the

[1] Source: https://upload.wikimedia.org/wikipedia/commons/4/42/GermanyWind.svg

most effective support scheme for the promotion of renewable energy systems (compared to alternatives), the proper design is paramount (Lesser & Su, 2008).

The first feed-in law in Germany (Stromeinspeisegesetz StrEG) was passed at the very end of 1990, and from then on "determined that there was a duty of acceptance and required that energy companies paid a minimum price for third-party electricity generated in their areas of supply" (Hake, Fischer, Venghaus, & Weckenbrock, 2015, p. 539). The law linked compensation rates for renewable electricity to average electricity prices, electricity from wind power for example amounted to 90% of the average proceeds (Hake et al., 2015, p. 539). This linkage was the main reason for a slow development, and hindered a cost-effective operation of large-scale wind turbines. Nevertheless, the feed-in law improved the "compensation rates for renewable electricity" and "had laid the groundwork for the market integration of renewables" (Hake et al., 2015, p. 539).

The modification of §35 in the Federal Building Code (BauGB) in 1997 gave rise to increased wind power developments, since the code now gave privileges to wind turbines in the "outer areas" (Außenbereich). The paragraph §35 describes the legitimacy of building projects in the outer areas. Since 1997, projects for the "research, development or utilization of wind- or water energy" are privileged by Section 1 No. 7 of §35 in the Federal Building Code (Section 1 No. 5 since 2004). A building project is only legitimate, if it does not oppose "public concerns" (BauGB §35 Abs 1), which are summarized in Section 3 of §35 BauGB (Lexetius, 2017). The privileges given to wind power development were accompanied by a controlling mechanism for the regional planning authorities, so that wind turbines could not be built anywhere in the territory. Local communities could now define concentration zones for wind power developments, where they determine appropriate areas. Outside of these zones, the installation of wind turbines is not permitted. Complications arise, when no concentration zones are issued by the planning authority, since then the law applies to the whole outer zone, and wind turbines can be installed anywhere (given they meet all other legal requirements, e.g. do not oppose public concerns). Therefore, the communities cannot keep wind power developments out of their territory completely, they can only minimize them, by defining appropriate zones (Jobert et al., 2007, p. 2753).

In the year 2000, the Renewable Energy Act (Erneuerbare-Energien-Gesetz EEG) was introduced as the successor of the 1990 feed-in law (StrEG), and led to a large-scale deployment of renewable energy technologies, distributed ownership and a strong German industry (Lauber & Jacobsson, 2016, p. 148). The EEG was revised and renewed in the years 2004, 2009, 2010, 2012 and 2014, and is still "seen as the corner stone and key instrument for driving forward national innovation in wind energy in Germany" (Nordensvärd & Urban, 2015, p. 159). Back in 2000, the EEG introduced new fixed feed-in tariffs for renewable electricity, which were now decoupled from current electricity prices and significantly higher than under the former feed-in law of 1990 (Hake et al., 2015, p. 540). There now was an obligation for the grid operators to accept and feed in the electricity from third party renewable energy suppliers and pay the fixed prices per unit. In 2004, the amendment made to the EEG reduced some tariffs and adjusted the law to European legal requirements. It is worth mentioning that the "issues of climate change and climate protection were explicitly mentioned in the EEG and named as reasons for the increased support for renewable energies" (Hake et al., 2015, p. 540).

4.3 The Permission Process for Wind Power in Germany

4.3.1 Issuing of Concentration Zones

When evaluating the suitability of concentration zones for wind power projects, certain criteria have to be abided by. For this purpose, the city of Euskirchen has published a guideline document for the controlling of wind power, which summarizes hard and soft criteria (Kröger, Hänfling, & Conrad, 2013). Figure 3 visualises the process of selecting suitable exclusion zones for wind power projects (source (LANUV, 2015, p. 23)). Substantial space in this regard means an area that is large enough to physically enable the application of wind power. Criteria for hard taboo zones include the distances to national parks and natural protection and bird protection areas, with minimum distances of 500m and 1200m, respectively (Kröger et al., 2013, p. 3). Soft criteria, on the other hand, include the distances to residential areas and settlements, which have to be great enough to ensure the compliance with legal boundaries on shadow flicker and noise levels. A distance of at least 1000m has to be kept to pure housing and recreation areas (Kröger et al., 2013, p. 4) .The visual intrusion of the landscape and recreational areas is also part of the soft taboo criteria. German limits for shadow flicker, are a maximum of 8 hours per calendar year and 30 minutes per day (LANUV, 2015, p. 44). Noise limits in Germany include 40dBA at night just outside houses in general residential areas and small urban areas (Nieuwenhuizen & Köhl, 2015, p. 4).

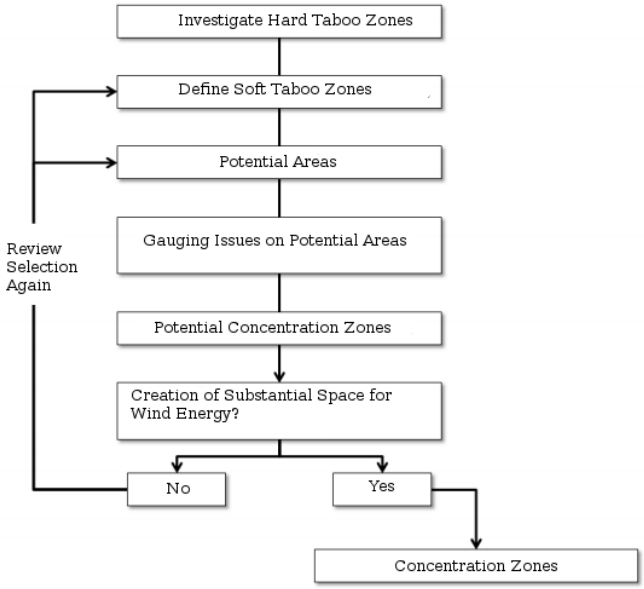

Figure 3: Issuing Concentration Zones

4.3.2 The Grid Permission Application Process

Generally, the building permission and the grid permission applications are handled independently in Germany. The time between the initial investment and the finished wind farm is called “lead time”, as shown in figure 4, which has been adopted from (EWEA, 2010).

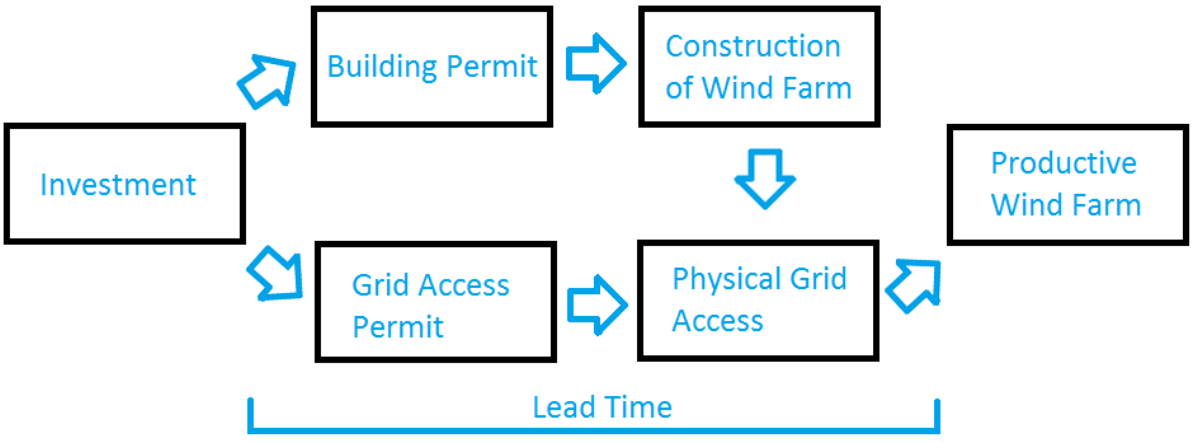

Figure 4: The Permission Processes

When applying for access to the local electricity grid, the project developer has to draft a permit application including the technical characteristics of the proposed wind farm, such as layout, proposed point of connection, and total capacity among others (EWEA, 2010, p. 39). This draft is sent to the corresponding system operator, who will evaluate it and give appropriate feedback before he can give the final approval for the connection point and the connection date (EWEA, 2010, p. 39). In Germany, as well as in other EU states, the electricity systems are "unbundled", which means that the transportation is separated between distribution and transmission, handled by different companies (ibid). Smaller projects will generally apply to the Distribution System Operator (DSO), and only if the proposed wind farm exceeds a certain grid capacity (mostly more than 132kV), the application is transferred to the Transmission System Operator (TSO), which will have an impact on connection costs for the project developer (EWEA, 2010, p. 41).

4.3.3 The Building Permission Application Process

There are two general building application processes a project might have to go through, depending on the size of the proposed wind farm (EnergieAgentur.NRW, 2014). For a project with under 20 turbines, the simplified process is applied in normal cases, which does not require a formal environmental impact assessment. There are exceptions when the EIA is required anyway, for example when the applicant insists on it, or an environmental pre-assessment is negative, meaning the chosen area might be highly sensitive. The latter should have been excluded by the issuing of concentration zones beforehand. For projects with more than 19 turbines, the formal process is applied, where an EIA is mandatory (Wizelius, 2007, p. 187). These processes are valid for all projects developed in Germany, as they stem from the BundesImmissionsSchutzGesetz (BImSchG) — the federal immission protection law.

Independent of the chosen application path, reservations can be claimed in high court by concerned citizens, environmental associations or other affected parties, according to paragraph §35 of the Federal Building Code. Developers must make sure that any environmental damages and other detriments are avoided and within legal boundaries (such as noise levels and shadow flicker).

4.4 Overview of the Case Area

Euskirchen is a municipal city of 55,620 inhabitants in the federal state of North Rhine-Westphalia. It belongs to the administrative region of Cologne and is itself the administrative city of the belonging municipality (Kreis Euskirchen), see figure 5.

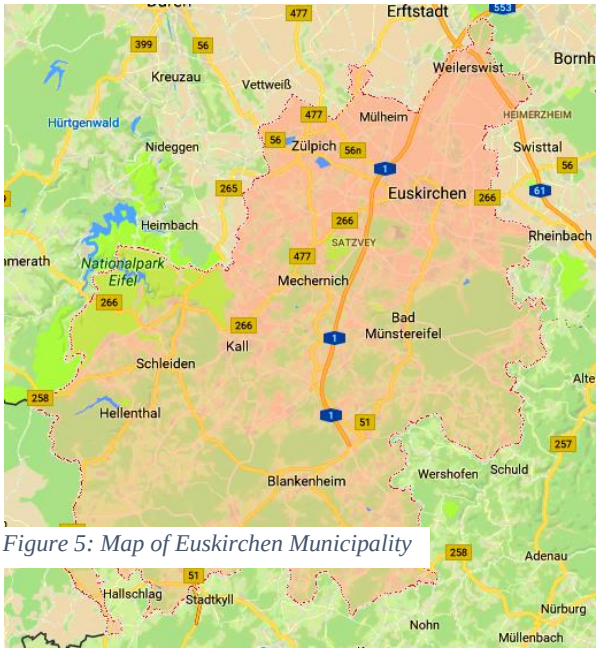

Figure 5: Map of Euskirchen Municipality

4.4.1 The City Environment

There are several opposing interests that had to be taken into account, when issuing the concentration zones for wind power developments, such as historic sights, military communication measuring systems, and environmentally protected areas, for example. The Bundeswehr has a base with scientific research facilities around geoinformation systems (GIS) and information technologies in Euskirchen, that could be interfered with by operating wind turbines (Wizelius, 2007, p. 129).

4.4.2 Kleinbüllesheim, Großbüllesheim and Dom-Esch

Two villages on the outer districts of Euskirchen are directly affected by the planned wind power project, due to their close proximity to the concentration zones (see figure 6). The first village is Kleinbüllesheim, which is inhabited by approximately 1300 people and spans over an area of 4.13km².

Figure 6: The Concentration Zones (brown) and the surrounding Villages

Neighbouring to the east lies the village of Dom-Esch, which has about 860 inhabitants on an area of 4.45km². In Kleinbüllesheim, a citizen association exists, with over 100 members, who concern themselves with development issues in the village's vicinity, for example the construction of a new supermarket, a bypass, and the planned wind power project (Bürgerverein Kleinbüllesheim, 2017). Such an association does not exist in Dom-Esch. The third village is Großbüllesheim, which has some residential areas from which the potential wind turbines could be visible for the inhabitants. The biggest part of the village, however, would not be visually impacted. Whereas the citizen association of Kleinbüllesheim is informing their subscribers about the wind power project status, the citizen association of Großbüllesheim does not. On their website, no information on the development plans can be found (Bürgerverein Kleinbüllesheim, 2017).

4.4.3 The IPAS

The important industry park (Industriepark am Silberberg IPAS) is located adjacent to Großbüllesheim (see figure 7) and is seen as a "key factor for the economic development" of the city of Euskirchen (Stadt Euskirchen, 2017). Small and medium sized companies are settled there on an area of over 2 million m², as well as a factory of the international giant Procter & Gamble (Stadt Euskirchen, 2017). The location of the park is advantageous, because of the proximity to the autobahn A61 and A1, as well as the railway.

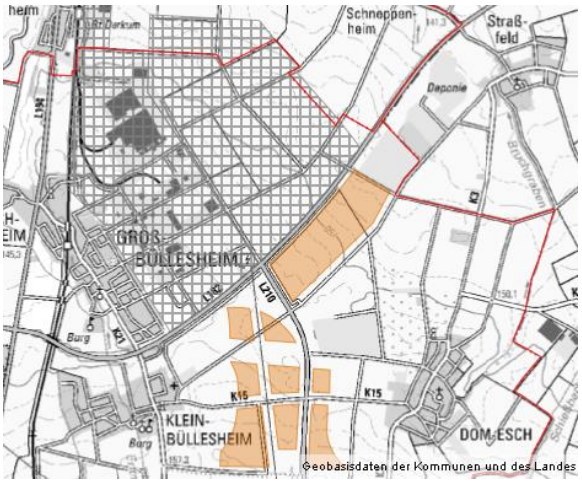

Figure 7: The IPAS (checkered)

4.4.4 The Concentration Zones

In 1998, changes were made to the land-use plan ("Flächennutzungsplan") under the umbrella for environmentally friendly energy production with technologies of the future, in connection to the IPAS industry park. With this development, the concentration zones shown in figure 8 were issued for the construction of wind power turbines (Kuckertz, 1998, p. 2). All zones combined comprise of an area of about 192ha (Interviewee 2, telephone interview, 21.02.2017). Of great advantage for wind energy, is the proximity to the power grid and a 110KV transformer. In addition, the area is very close the Autobahn A61, offering easy access for transportation of the required materials, such as the tower base, the turbine and the rotor blades. The road leading from the Autobahn to the industry park (L210) runs through the concentration zones and is rather wide, accustomed to frequent transports in and out the IPAS. Heavy and long transport vehicles should have no problems to reach possible construction sites for the wind turbines. Even though the concentration zones do not possess the highest wind speeds in the city region, they do have very advantageous infrastructure access. Regions with higher wind speeds are located too close to housing and/or protected forests.

Figure 8: The Concentration Zones

When the city region was first evaluated for wind power developments in 1996, suitable areas had to be free of or low in conflict potential with opposing interests. Furthermore, those areas where then evaluated for wind speeds, size, economical grid access, visual impact, minimum distances between other wind parks, and the accordance with the urban development concept of Euskichen (Stadt Euskirchen, 2004, p. 79). With these factors in mind, the concentration zones were issues, as shown above.

4.5 The Wind Power Project Development of Euskirchen

The endeavours of constructing wind power plants in the city of Euskirchen started with the issuing of concentration zones in 1998, following the changes in the Federal Building Code §35 (see section 4.2.1 and 4.4.4). Suitable sites in the cities surrounding were evaluated and then freed for future wind farm construction. The land is owned by a local farmer, who initially prevented any wind power development on his soil, since it was more profitable for him to continue farming sugar beets (Interviewee B, Telephone Interview from the 21.02.2017). This changed, when the EU reduced the sugar beet contingents (quotas) in 2007, leading to less crops being sold and a decrease in prices (Mattes, 2007). For the landowner, this meant that wind power became more attractive and profitable in the long run (Interviewee B, Telephone Interview from the 21.02.2017). As a result, the North German wind power construction company WKN AG, came forward with a new development plan in 2008, which included six wind turbine locations within the concentration zones (see figure 9). Due to concerns over natural protection of certain bird species, the process has been stalled repeatedly over the years, up until now. The issues over the possible endangerment of a species of eagle-owl have been resolved, as time frames were set up, when the turbines have to be shut down (around dusk and dawn). These safety measurements are supposed to minimise the risk of collision between birds and the running rotor blades. When it comes to public consultation, information meetings have held by the investor and project developer, most recently in the city's main event centre in 2015, where the AKN AG presented the plans for the construction of the wind farm to the public (Mager, 2015).

Figure 9: The Approved Turbine Locations (red)

As a result, two of the six proposed turbines are now cleared for construction, namely turbines A1 and A6, the upper and lower positions, respectively, see figure 9. The turbines are of the type E-92, manufactured by Enercon, and come with a capacity of 2.3MW each and a total height of 149,90m. The following table, summarizes the specifications of the wind turbines[2].

Table 2: Wind Turbine Specifications

Turbine	Type	Rated Power	Rotor Diameter	WEC Concept
A1	Enercon E-92	2350kW	92m	Gearless, variable speed
A6	Enercon E-92	2350kW	92m	Gearless, variable speed

[2] http://www.enercon.de/en/products/ep-2/e-92/

5 Literature Review

Connecting to the first research question, this section reviews the challenges and opportunities for local wind power development identified in scholarly literature on wind energy.

In their critical article "The stuttering energy transition in Germany: Wind energy policy and feed-in tariff lock-in by", Nordensvärd & Urban (2015) examine the question if low carbon policy instruments, such as the German feed-in tariff, can "partly be a barrier to a comprehensive energy transition" (p. 156). Their research includes qualitative interviews, policy and data analysis combined with a literature review. Their results emphasize the rapid development of wind power in the country, due to the feed-in tariff, with the drawback that it favours "specific wind innovation, rather than energy transition" (p. 156), meaning that wind energy has been introduced to a "modified socio-technical regime", which resembles the preceding fossil fuel dominated regime, instead of achieving a regime transition (p. 156). The authors conclude that there is no shift to a low carbon economy, but an integration of renewable energy into the industrial economy of the present (p. 163). Rising electricity prices are also emphasized and are being ascribed to "corporate greed and poorly designed energy policy" (p. 163). These findings can be used to compare and analyse the statements given in the interviews for this thesis. Their key policy recommendations focus on the promotion and financing of "deployment technologies and systems integrations technologies", instead of only supporting the "up-scaling of turbines and core technologies", since the aging grid system is the major bottleneck, restricting the growth of wind energy in Germany (p. 164). This paper explains the financial issues caused by the faulty feed-in tariff, and may explain the viewpoints of people questioning the necessity of renewable energies, since they are only incorporated into the existing system, instead of leading to a holistic transition. This leads to recommendations for a nation-wide revision of the feed-in tariff, but also assists in finding recommendations on the local scale.

With their study "Against the wind: Local opposition to the German Energiewende" on a local conflict on wind energy in Germany, Reusswig et al. (2016) move away from pure NIMBY-ism as an explanation for opposition to wind power developments. Their case of the community of Engelsbrand is interesting, because the local wind farm project was finally rejected, after starting off with very favourable conditions, such as "a supporting state government planning process, a local supporter group, a transparent planning process, including a majority vote pro wind energy, and a round table discussion" (p. 214). The opposition movement was able to turn about the progress of the project due to strong "resource mobilisation strategies", which included "social networks, mass and social media use" (p. 214). The authors conclude that conflicts in the context of the German energy transition are often misconceived, when they are framed as being "general acceptance" vs. "local opposition" (p. 215). The "Energiewende" is instead a "large socio-technical transition process with intrinsic potential for conflicts" (p. 215). Very important lessons can be learned from this case study, namely that "at the core of the conflict are specific interpretations of the common good: questions of public health, local beauty and identity, and the economic feasibility of the project" (p. 226), which could be used to create a discourse in the local context in order to mediate planning and decision-making processes for wind power projects. With regards to participation the authors discovered that "careful timing and design of participation processes is needed – otherwise public participation can reinforce conflicts instead of resolving them" (p. 226). Gaining understanding to what drives resistance again wind power project from this study assists in producing recommendation for future endeavours in the city of Euskirchen. The community of Engelsbrand is a good example for failure through opposition, but also has a valuable mission statement on energy ("Energieleitbild"). Such a strategic document could be drafted for Euskirchen as well. It could even include mediation measures for planning processes, as the "planning games", suggested by the authors of the paper, in which opponents are invited to take part and develop their own idea on local energy systems. This can act as a "productive stimulus" (p. 226).

In their paper "Public Acceptance of Renewable Energies: Results from Case Studies in Germany", Zoellner, Schweizer-Ries, & Wemheuer (2008) analysed various case studies which investigated the public acceptance of renewable energies, including photovoltaic, biomass plants, and wind turbines in West Germany. They used an environmental-psychological approach, combining questionnaires and interviews, which focussed on the residents' perceptions and views. The results of this analysis showed that the "importance of landscape evaluation" became evident, as well as the "strong connection between procedural justice criteria, such as transparency, early and accurate information as well as possibilities to participate during the planning and installation process" (Zoellner, Schweizer-Ries, & Wemheuer, 2008, p. 4136). In close analysis, it could be shown that there is a significant correlation "between the perceived fairness of a planning process and a reported acceptance" (p. 4140). The authors suggest that transparency of the implementation processes seems relevant and that opposition to project stems from a feeling of being "left out of the planning process" (p. 4140). Furthermore, "planning processes should be arranged as a cooperation of the communities and operating companies" (p. 4140). The paper by Zoellner et al. helps in formulating general recommendations for future endeavours in wind power project development.

Warren & McFadyen (2010) investigated the effects of community ownership on public attitudes to wind energy in the region of south-west Scotland in their paper "Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland". Their hypothesis is that "community ownership would lead to greater public acceptance of windfarms", which is then tested by using a questionnaire-based survey with a sample size of 106 (Warren & McFadyen, 2010, p. 204). The results point out that community ownership does in fact increase the public acceptance of wind energy, but rather with "difference of degree" instead of "diametrically opposing viewpoints" (p. 204). Visual impact and intermittent production were among the most critical concerns, whereas residents and tourists of both case areas were generally positive about the visual impact of windfarms. It is worth noting, that visual factors might be influenced by different values and perceptions of the landscape. Values can differ from region to region, and consensus in windfarm debates are hard to reach, since the "nature of landscape evaluation" is "subjective and unquantifiable" (p. 205). Nevertheless, the study by Warren & McFadyen (2010) shows that development models "towards community ownership" are an opportunity that "could have positive effects on public attitudes towards windfarm developments" (p. 204), which is an insight that can be used to formulate recommendations for future projects in Euskirchen.

The basis for the paper "Local acceptance of renewable energy—a case study from southeast Germany" by Musall & Kuik (2011) are empirical findings that show the positive influence of community ownership on local acceptance. Therefore, the authors wanted to investigate the effect of the similar community co-ownership models in the context of renewable energy on a local scale. Two specific wind power projects in South-Germany are studied; one with a community co-ownership in place, the other without. The comparative case study uses quantitative research to investigate the possible effects of community co-ownership on the acceptance of wind power. As mentioned before, the empirical data show that community ownership increases local acceptance. The authors conclude that a community co-ownership may achieve similar positive results and help to "reconcile local acceptance with an increased use of renewable energy in Germany" (p. 3252). For the analysis, the insights gained from Musall & Kuik assist in finding solutions for issues within future wind power development in the city of Euskirchen. The research suggests that the city and municipality alike should consider a community or co-ownership for future wind power projects.

In their paper, "Wind Power Deployment: The Role of Public Participation in Decision-Making Process in Ontario, Canada", Jami & Walsh (2016) investigate the role of public participation in the decision-making process of wind power development. The authors propose another participatory framework, which applies a knowledge broker in collaborative decision-making. Emphasis is put on the role of effective communication in that regard and how the "proposed framework could have improved the process" for five wind power projects in the Ontario region of Canada (p. 1). The paper

shows how important the factor of visibility of wind turbines in the landscape is, when it comes to public opposition, since it is connected to "aesthetics and the feat of plummeting property values" (p. 1). Behind these issues lie "perceived values that need consideration that need consideration and deeper dialogue to be resolved" (p. 1). Secondly, economic factors play a significant role, since some members of the community might profit from wind power more than other, for example if they lease their land and earn rental income for hosting the wind turbines on their property. This is the case in Euskirchen as well. The authors stress the positive impact of collaborative planning and decision-making, since it "seeks to involve the key (if not all) stakeholders in the decision-making process to achieve consensual policy outcomes and balanced solutions for the benefit of all" (p. 5). Crucial components of collaborative approaches include "the integration of different forms of knowledge (e.g., local and expert knowledge); mutual and social learning; criticism with respect; and trust" (p. 5). Furthermore, this collaborative approach may be assisted by a trusted third party, known as the knowledge broker, which acts as a mediator, who negotiates with the parties involved and establishes "an effective communication process" (p. 6). It is paramount that the knowledge broker is a professional and experienced person, since "negotiation is a powerful method for conflict resolution and requires special skills and experience" (p. 5). For the analysis, these insights assist in finding solutions for future wind power endeavours in the city Euskirchen.

5.1 Summary of Good Practices for Wind Power Project Development

The following subsection summarizes good practices for highlighting challenges and opportunities for wind power development on a local scale. Additionally, they are used to find recommendations for future wind energy endeavours in Euskirchen.

When it comes to wind power and community acceptance, effective communication is paramount (Jami & Walsh, 2016; Wolsink, 2007). Therefore, the approach chosen by the project developer should be accompanied by using a trusted third party, such as a knowledge broker, to make communication both effective and credible. A knowledge broker is a person who is assisting in transferring research evidence into practice and policy, with the brokerage being "a way of breaking down barriers that impede interaction, healthy communication, and collaboration" (Partidario & Sheate, 2013, p. 27). The knowledge broker acts as a mediator between the involved parties, such as the public, politicians and scientists (Jami & Walsh, 2016, p. 8), and assists in the negotiation phases of the decision-making processes. The aim of this negotiation "is to create shared goals or positions leading in some cases to long-term relationships (Jami & Walsh, 2016, p. 5). Furthermore, the knowledge broker as a neutral third party is able to "extract the issues from the manifesting emotions of negotiating parties, thereby keeping the parties focused on the resolution of those issues (Jami & Walsh, 2016, p. 5).

If possible, wind power developers and responsible authorities may consider co-ownership models, since these are suggested to have a positive impact on local acceptance (Jobert et al., 2007; Musall & Kuik, 2011; Warren & McFadyen, 2010). This can also increase the perceived fairness, which is correlated to an increased acceptance (Zoellner, Schweizer-Ries, & Wemheuer, 2008, p. 4140). Naturally, this approach can be of limited applicability, for example, when the land is owned by a private party.

6 Analysis

6.1 Overview of the Milestones and Barriers

Relating to the second research question, the following graph summarizes all important milestones and barriers, encountered in relation to Euskirchen's wind power development over the years (see figure 10). The information was compiled during the interviews and the study of secondary literature.

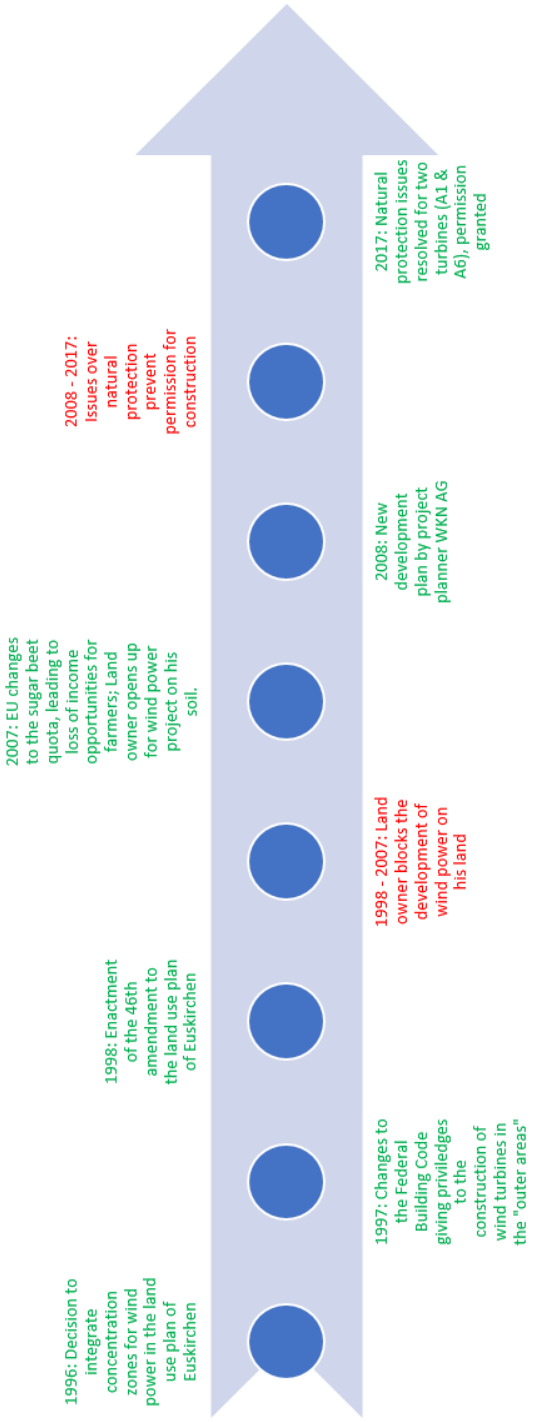

Figure 10: Milestones (green) and Barriers (red)

6.2 Analysis of Framework Factors

Jobert et al. have investigated, how policy frameworks influence local acceptance and came to the hypothesis that factors can fall into two categories: (1) institutional conditions, for example economic incentives and regulations, or (2) the territorial and site-specific factors, (Jobert et al., 2007, p. 2751). Eight factors were identified, with four belonging to the site-specifics and the other four to the project management, which will be used to analyse the circumstances in Euskirchen. Table 2 summarizes the results.

Table 3: Site Specific and Project Management Factors

Site Specific Factors	**Results**
Geography and Visual Impact	Fields and settlements; some protection areas around
Former Land Use and Perception	Land formerly used for farming
Ownership of the Territory	Private land owner
Local Economy	Farming and Industrial Park (IPAS)
Project Management Factors	**Results**
Local Integration of Developers	Developer from the outside (North Germany)
Information and Participation	Communication good at first; several meetings
Network of Support	No official network, only self-organised resistance
Ownership and Financial Participation	Owned and operated by WKN AG, land lease

6.2.1 Site Specific Factors

The land surrounding the concentration zones is flat with large fields and settlements in the outskirts of the city. Tourism in the close vicinity is practically non-existent. Some natural protection areas exist in the vicinity, but are sufficiently far away, for a wind farm to be built there. The flight paths of the eagle-owl, however bears certain risks. The land was formerly used for sugar beet agriculture, and is still owned by the farmer. Due to the geographical conditions, the visual impact will be rather high, since the ground is flat and the view will not be hidden by hills or forests.

6.2.2 Project Management Factors

The investor and project developer, the WKN AG, is a company from the North of Germany, and therefore an outsider. The communication by the city administration was good at first, as interviewee A pointed out, whereas the developer only engaged in contact after the resistance movement became more visible. During the time of the project planning, a few information meetings have been held, to inform the public about the developments. Those took place after 2008, when the new development plan was designed. The first meeting was held in 2009, to which many people attended with engagement, which a regional newspaper commented as “late awoken interest”, since the wind power endeavours in the region go back to 1997 (Schmitz, 2009). Apart from these information meetings, no official network for support exists, neither does any efforts to consult or involve residents further in the project. The wind farm will be owned by the planner WKN AG, who also acted as the investor in the early stages of the project. The company will profit directly from the produced electricity, but pays a lease to the private land owner. Indirect profits go to the city in the form of tax revenue.

6.3 Participatory Framework after Jami and Walsh

The five steps of the participatory framework after Jami & Walsh (2014) assist in answering the second research question. Firstly, the project developer in Euskirchen only engaged in the first step “Inform”. The meetings in 2009 and 2015 were held to inform the local community of the processes in the project’s development. Consultation (Step 2) in the form of, for example, public comment, focus groups or surveys was missing, merely the public meetings itself can be seen as a first step towards consulting the public. But since the opinions of residents and associations don’t have an influence in

the *legal* process of the application for the building permit, this step is not of crucial importance to the project developer. However, community and natural protection associations do have a voice and a part to play in the decision-making process and beyond, as the interview results show. Firstly, it is important that actors are informed "early enough" in the process (Interviewee C). Secondly, an impact could potentially be achieved if enough people raise their voices and become active on their own initiative (Interviewee A). Interviewee A feels that he has been informed sufficiently about the project, but only "in the beginning". As the project took its course the contact with the project developer became less and less frequent. In his view, him and the other resident do have in fact a voice in the decision-making process, saying "it is up to us to report and contribute". He states that "he doesn't want to complain", since the municipality was very engaged in the beginning and "asked many questions" to the project planner. As he experiences the situation, it would be wrong to say that they as citizens didn't have a voice in the process.

Interviewee C, who works for a natural protection association, said, that for the project at hand in Euskirchen, the association was not able to affect the decision-making process significantly, since it abided by legal rules, at least for the outer turbine locations, which are now permitted for construction. The inner turbines, however, endanger the eagle-owl species and are therefore not yet permitted. In his view, it is possible for a nature protection association to contribute and influence the decision-making process, given that the association is informed about wind power development plans early enough in the process. He states an example from another region, where a wind farm was installed within a forest. This project would have remained undiscovered by the association, if the mayor of the neighbouring town had not contacted them. This led to the discovery of an infringement by the operator, who refused to shut down the wind farm within the agreed times for the natural protection of certain animal species affected by the wind farms operation.

As Jami & Walsh (2016) point out, "the greatest barriers for the public are: time commitments, financial resources required for effective participation, and potential power imbalances" (p. 6). These barriers were partially evident in Euskirchen as well, as the interviews show. Interviewee A expressed his discontent in his fellow residents, who relied on him to do most of the work. This put pressure on him, not only affecting his motivation, but also robbing him of his free time (high time commitments). In his opinion, the residents of his town would answer negatively, if they were asked about the wind part, but when it comes to actually taking action, most of them stay passive and rely on him to do the legal work. In his experience, the "silent majority" lives with a feeling of powerlessness, thinking "that we can't do anything about it anyway." His statement shows frustration with the lack of participation of other residents, making it harder for him to keep on doing what he does.

Naturally, the given policy framework in Germany comes with inherent power imbalances, since it is uncomplicated and easy for wind power developers to apply for permission in the outer areas. Even more so, if no concentration zones were issued by the local planning authorities. In Euskirchen, the existence of concentration zones gave the planner a "legal right" to permission, given the plans abided by all boundaries and stayed with the allowed limits for shadow flicker and noise pollution. Once the permission is granted, it is very hard for opposing parties to stop the project from realisation (strong power imbalances), although not impossible (Reusswig et al., 2016).

6.4 Relevance for Local Acceptance

Since there is no mandatory involvement of the public in the simplified application process for a building permit, there is no real incentive for a project developer to involve, consult or collaborate with the public. With the existence of a concentration zone, the developer has a legal right for permission. Collaboration is made voluntary by the German wind power policy. The literature shows that this circumstance can lead to negative attitudes in local wind power development. In addition, Interviewee C described the process as "intransparent". To him, "the big problem" with many wind power developers is insincerity, since many only entered the business "for the money" and hide their capitalist agendas behind the façade of a "green heart". Low interest rates for investments and high

profit possibilities make wind power project “pure Wall Street”. One example he states was an infringement of the shut-down regulations of a wind farm within a forest, where the operators did not abide by the agreed shut-down time, and instead just let the turbines run uninterrupted. The problem is the lack of a controlling body, keeping sure that operators abide by their agreements. His association uncovered this infringement at that particular wind farm.

Furthermore, the eight factors show a disadvantageous project development, with outcomes that benefit only a few, while affected a larger group of residents and the surrounding nature. The profits of the running wind power operation will go mainly to the investor WKN AG, who is also the operator and project developer. A rent is paid to the land owner, whose land the turbines are constructed on, and the city will get a revenue through local business taxes. If the community would profit from the project more, for example in the form of co-ownership models, the acceptance might be more positive, as previous research suggests (Musall & Kuik, 2011; Warren & McFadyen, 2010). The situation in Euskirchen, however, did not allow for such an approach, since the land is already under private ownership.

6.5 Analysis of Opinions and Views

Relating to the third research question, the research on wind power resistance by Wolsink (2000) assists in classifying the attitudes expressed by the individuals interviewed for this thesis. Interviewee A exhibited a Type D resistance, meaning a more sophisticated reason for the rejection of wind power in the region than pure NIMBYism. He did not reject the technology as a whole, but rather the local implementation in areas that are either close to settlements or endanger certain animal species. Interviewee C exhibited a Type D resistance as well, since he did not reject the technology as a whole either, but rather called for a careful evaluation and planning of appropriate sites on a state-wide basis, as well as an effective technology mix and a circle of innovation, making Germany’s energy system more flexible and tolerable. It can be assumed that those critical attitudes relate to a more active wish for participation in the decision-making process, since “people generally do not come forward with positive responses to planners' agendas” (Wolsink, 2000, p. 58).

7 Discussion and Recommendations

This section discusses the case findings and puts them in the context of wind power project development and social acceptance. Finally, a set of recommendations is formulated to give guidelines for possible wind power endeavours in the future of Euskirchen.

As mentioned before, social acceptance of wind power is comprised of three dimensions, namely socio-political, market and community acceptance (Wüstenhagen et al., 2007). We can see in the case studies from the literature review and the case at hand, that in the community dimension it is not easy to achieve positive attitudes, and that local views on the technology often contradict the overall socio-political acceptance. While wind power in Germany is mostly seen positive (AEE, 2016), and the media often depicting the country’s endeavours as a success (Shankleman, 2016), the local dimension faces resistance from the tangible issues such as visual intrusion and noise disturbance, which often leads to serious annoyance (Warren & McFadyen, 2010; Wolsink, 2000).

Interviewee A mentioned his discontent with the focus on wind energy as the main renewable energy source in the region of Euskirchen. He explains the example of a heat pump in his backyard, and the availability of empty rooftops for photovoltaics. While these technologies are certainly an option, it is often a matter of financial affordability, since those installations are mostly private. However, the city could work on incentives or schemes to subsidise and support the installations of alternative renewable energy sources for private households. This could be part of a city-wide energy plan (“Energieleitbild”), which includes certain targets and goals for reduction of greenhouse gases and the increase in energy production by renewable sources, such as solar power and biogas. While the

development of wind power is still controlled by federal law, such an energy plan could assist the authorities in issuing future concentration zones for wind power projects. With the targets at hand, city planners could decide on the appropriate size and location of the zones, so that social and environmental compatibility is maximised. Furthermore, the aforementioned good practices for wind power developments should be included in such an energy plan, emphasizing the importance of consulting and engaging the public in the projects process as much as possible.

However, most of those practices have limited applicability in Germany, due to the disadvantageous policy framework, which is in principle a top-down approach. Since with the existence of concentration zones, wind power developers have a legal right for permission, local resistance movements have limited power to object. This is a problem, identified by the interviewees as well, and should be addressed by the federal or at least the state governments. The findings of this case study align with findings from the literature review, such as the studies undertaken by (Jobert et al., 2007; Reusswig et al., 2016; Zoellner et al., 2008).

A note shall be given on the importance of values. The questions that have to be asked, when talking about the "visual intrusion of the landscape" is: What is landscape, anyway? Is there a natural landscape? And what is natural? There are opponents of wind power that may argue that wind turbines disturb and destroy the scenery, but of course this is connected to a certain value that those opponents connect with their environment. As the Swedish scholar on wind power Tore Wizelius puts it: "There is no natural landscape" (Wizelius, 2007, p. 217). Almost everything we see around us has been shaped by the actions of humanity. We have chopped down trees, created farmland and built cities where once nature has bloomed. Then again, as humans are animals that are part of nature, our actions can also be called "natural." In that sense, everything is natural. The point is, however, that landscape is always changing, and that the landscape of a sustainable society will look differently that the landscape of today (Wizelius, 2007). So, how will landscape values develop in the future? Maybe we will see wind power differently in a couple of decades, maybe resistance will grow, or maybe it will vanish completely.

However, if wind power is to be called sustainable, it has to fulfil the common definition in all three dimensions, namely environmental, social and economic sustainability. The focus of this thesis lies within the dimension of social sustainability, of which the social acceptance can be assumed to be a part of (Assefa & Frostell, 2007). Without support from society on the macro and micro levels, can wind power be called sustainable? On the one hand, environmental and economic sustainability of wind power can be assessed positively, when looking at the relative aggregate footprint, which takes into consideration the environmental impacts and the costs of energy production (Hadian & Madani, 2015). Endangerment of birds and bats during operation on wind farms can be countered by timing the operational times and additionally monitoring and enforcing the compliance by the operators. On the other hand, the social sustainability depends on the social acceptance. Whereas statistics show that the overall support for wind power in the society is rather high (AEE, 2016), concrete projects often face resistance in the community (Reusswig et al., 2016; Wolsink, 2000, 2007). As a result, for wind energy to become more sustainable, solutions have to be found to amend the objections by resistance movements. The proposed good practices and recommendations can lead the way to a more transparent and cooperative wind power project development.

It is paramount, however, that an industrial economy like Germany does not and cannot rely on wind power alone, as a renewable energy innovation. As interviewee C pointed out, it can be dangerous relying on a single energy source alone. This is also emphasized by other researchers within the field of energy transitions, who observed that the current feed-in tariff is favouring wind power over other technologies, which is leading to a so called socio-technical lock-in (Nordensvärd & Urban, 2015, p. 164). Since wind power is a profitable business at the moment, with favourable policy conditions for investors and project developers, it is easy to lose track of where the energy system is heading. There

are other bottlenecks in the German energy systems (such as an ageing grid system) that have to be overcome for a successful energy transition.

All in all, this study can provide as a baseline for future researchers that want to look at the wind power development in Euskirchen. The next steps should include a greater number of interviews with residents, and even other parties, such as farmers and politicians, which failed to establish contact in this research. A greater sample size for qualitative analysis should be reached, and also surveys could be developed to provide data for a comprehensive qualitative study on the topic in the region at hand.

8 Conclusion

The case of Euskirchen shows a long history of wind power endeavours, spanning over 20 years, until the first turbines are coming close to realisation. Milestones were set with the change in the Federal Building Code of 1997, giving privilege to wind energy in the outer areas; the changes to the land use plan of Euskirchen in 1998, establishing the concentration zones for wind power; the EU changes in sugar beet quotas from 2007, leading to a change of course in the private land owners mindset towards wind power on his property, and leading to a new development plan by the investor and project planner WKN AG in 2008; and finally the resolve of environmental protection issues for the outer two out of six turbines, leading to a granted permission for construction, which is anticipated for 2017. Main barriers for wind energy in Euskirchen were the land-owner's rejection of the technology until 2007, and the unresolved environmental protection issues over the year from 2008 to 2017.

The literature shows various factors that influence the local acceptance and overall success of a wind power project. These can be broadly related to the territory and the project management. But it can be concluded that these factors are highly dependent on the given circumstances, as well as legal and policy frameworks. In Euskirchen, they can be used to investigate the existing attitudes towards the wind power project in the public. Visual impacts on the landscape, and endangerment of animal species were the dominant factors, which negatively impacted the community's acceptance of the wind farm. Financial aspects and the top-down policy framework play a role as well, since the main profiteers are the planner/operator and the private landowner, leaving the remaining public with the negative impacts. The Federal Building Code generally gives privilege to wind power development in the outer areas of a city, unless a concentration zone for wind farms exists. This, on the other hand, gives wind power developers and investors a general right for permission, given legal boundaries are not crossed. The permission application process for small scale wind power projects (like the one in Euskirchen) does not require a mandatory involvement of the public. This leaves a feeling of intransparency. Positive aspects of wind power technology with regards to climate protection were seen critically by the interviewees, since wind power is still implemented in the existing economic system. Instead a circle of innovation is called for, with a more diverse energy mix. All in all, both interviewees from citizen initiatives and natural protection associations expressed a type D resistance to the wind power project in Euskirchen, which means neither a true NIMBY attitude, nor a rejection of the technology as a whole, but more sophisticated reasons for the rejection of the concrete project in the neighbourhood.

Relating to the lessons learned from the case study and literature review, several recommendations can be found for future wind power project developments in the region of Euskirchen.

- Set city-wide energy production goals for renewable sources, and climate mitigation targets, which can be quantified and reported by industry and authorities.
- Evaluate new concentration zones more carefully in the future, with regards to environmental and social compatibility. In new guidelines, the minimum distances to settlements and environmental protection zones should be extended.
- The federal building permission process for small scale projects lacks transparency. There should be efforts to include mandatory public consultations decision-making process.
- Consider planners from closer or within the region and involve a trusted third party in the form of a knowledge broker, which mediates between the planner, authorities and residents.
- Consider community ownership or co-ownership models, if applicable.
- When planning wind power projects, (1) Inform the public early and regularly, (2) Consult, (3) Involve and (4) Collaborate with the community in order to build trust and legitimacy in the project.

- Include mediation measures for planning processes, for example “planning games”, as suggested by Reusswig et al., in which opponents are invited to take part and develop their own idea on local energy systems, which can act as “productive stimulus” (Reusswig et al., 2016, p. 226).

The limitations for this research included a low number of interviews, due to low response rates. This gives only a partial insight into the attitudes present and allowed for no in-depth statistical analysis.

Future research should look at the project again, after the permitted wind turbines have been built, and apply more interviews with a larger size of the sample group. Another angle could be the comparison between wind power projects and other renewable energy projects in the region. Even further into the future, trial projects could be developed, which apply the recommendations given in this thesis.

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10 References

AEE. (2016, September 23). Repräsentative Umfrage: Weiterhin Rückenwind für Erneuerbare Energien. Retrieved March 15, 2017, from https://www.unendlich-viel-energie.de/themen/akzeptanz-erneuerbarer/akzeptanz-umfrage/repraesentative-umfrage-weiterhin-rueckenwind-fuer-erneuerbare-energien

Arnstein, S. R. (1969). A Ladder Of Citizen Participation. *Journal of the American Institute of Planners*, *35*(4), 216–224. https://doi.org/10.1080/01944366908977225

Assefa, G., & Frostell, B. (2007). Social sustainability and social acceptance in technology assessment: A case study of energy technologies. *Technology in Society*, *29*(1), 63–78. https://doi.org/10.1016/j.techsoc.2006.10.007

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, *13*(4), 544–559.

BMWi. (n.d.). Erneuerbare Energien. Retrieved February 3, 2017, from http://www.bmwi.de/Redaktion/DE/Dossier/erneuerbare-energien.html

Bundesministerium der Justiz und für Verbraucherschutz. (n.d.). Gesetz für den Ausbau erneuerbarer Energien (ErneuerbareEnergien-Gesetz - EEG 2017). Retrieved March 24, 2017, from https://www.gesetze-im-internet.de/bundesrecht/eeg_2014/gesamt.pdf

Bundesministerium für Wirtschaft und Energie. (n.d.). Entwicklung der erneuerbaren Energien in Deutschland im Jahr 2016. Retrieved March 24, 2017, from http://www.erneuerbare-energien.de/EE/Navigation/DE/Service/Erneuerbare_Energien_in_Zahlen/Entwicklung_der_erneuerbaren_Energien_in_Deutschland/entwicklung_der_erneuerbaren_energien_in_deutschland_im_jahr_2016.html

Bundesregierung. (2017). Energiewende im Überblick. Retrieved March 2, 2017, from https://www.bundesregierung.de/Content/DE/StatischeSeiten/Breg/Energiekonzept/0-Buehne/ma%C3%9Fnahmen-im-ueberblick.html

Bürgerverein Kleinbüllesheim. (2017). Bürgerverein Kleinbüllesheim e.V. Homepage. Retrieved February 21, 2017, from http://www.bv-kleinbuellesheim.de/

Creswell, J. W. (2003). *Research design: qualitative, quantitative, and mixed method approaches* (2nd ed). Thousand Oaks, Calif: Sage Publications.

Drechsler, M., Meyerhoff, J., & Ohl, C. (2012). The effect of feed-in tariffs on the production cost and the landscape externalities of wind power generation in West Saxony, Germany. *Energy Policy*, *48*, 730–736. https://doi.org/10.1016/j.enpol.2012.06.008

EnergieAgentur.NRW. (2014). Windplanung.Navi - EnergieAgentur.NRW. Retrieved March 15, 2017, from http://www.windplanung-navi.de/#

EnergieAgentur.NRW. (2017). Überblick - Windenergie - EnergieAgentur.NRW. Retrieved February 20, 2017, from http://www.energieagentur.nrw/windenergie/ueberblick_windenergie

EWEA. (2010, July). WindBarriers Administrative and grid access barriers to wind power. Retrieved March 1, 2017, from http://www.ewea.org/fileadmin/files/library/publications/reports/WindBarriers_report.pdf

Gill, P., Stewart, K., Treasure, E., & Chadwick, B. (2008). Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal*, *204*(6), 291–295.

Hadian, S., & Madani, K. (2015). A system of systems approach to energy sustainability assessment: Are all renewables really green? *Ecological Indicators*, *52*, 194–206. https://doi.org/10.1016/j.ecolind.2014.11.029

Hake, J.-F., Fischer, W., Venghaus, S., & Weckenbrock, C. (2015). The German Energiewende – History and status quo. *Energy*, *92, Part 3*, 532–546. https://doi.org/10.1016/j.energy.2015.04.027

Healey, P. (1998). Collaborative planning in a stakeholder society. *Town Planning Review*, *69*(1), 1. https://doi.org/10.3828/tpr.69.1.h651u2327m86326p

Henningsson, M., Jönsson, S., Bengtsson Ryberg, J., Bluhm, G., Bolin, K., Bodén, B., … Johansson^, K. (2013, January). The Effects of Wind Power on Human Interests A Synthesis. Retrieved March 24, 2017, from http://www.naturvardsverket.se/Documents/publikationer6400/978-91-620-6545-4.pdf

Hoffmann, K. (2012). Stromnetzausbau soll bis zu 52 Milliarden kosten. Retrieved February 3, 2017, from http://www.tagesspiegel.de/wirtschaft/energiewende-stromnetzausbau-soll-bis-zu-52-milliarden-kosten/7507740.html

IEA. (2015). *IEA WIND 2014 Annual Report*. Retrieved from https://www.ieawind.org/annual_reports_PDF/2014/2014%20AR_smallfile.pdf

IRENA. (2012). EVALUATING POLICIES IN SUPPORT OF THE DEPLOYMENT OF RENEWABLE POWER. Retrieved March 15, 2017, from http://www.irena.org/DocumentDownloads/Publications/Evaluating_policies_in_support_of_the_deployment_of_renewable_power.pdf

IWR. (n.d.). Erneuerbare Energien werden subventioniert - Staat zahlt keinen Cent. Retrieved February 3, 2017, from http://www.iwr-institut.de/de/presse/presseinfos-energiewende/erneuerbare-energien-werden-subventioniert-staat-zahlt-keinen-cent

Jami, A. A., & Walsh, P. R. (2014). The role of public participation in identifying stakeholder synergies in wind power project development: The case study of Ontario, Canada. *Renewable Energy*, *68*, 194–202.

Jami, A. A., & Walsh, P. R. (2016). Wind Power Deployment: The Role of Public Participation in Decision-Making Process in Ontario, Canada. *Sustainability*, *8*(8), 713.

Jobert, A., Laborgne, P., & Mimler, S. (2007). Local acceptance of wind energy: Factors of success identified in French and German case studies. *Energy Policy*, *35*(5), 2751–2760.

Khoo, C. S., Na, J.-C., & Jaidka, K. (2011). Analysis of the macro-level discourse structure of literature reviews. *Online Information Review*, *35*(2), 255–271.

Krause, F., Bossel, H., & Müller-Reissmann, K. F. (1980). Energie-Wende–Wachstum ohne Erdöl und Uran. *Frankfurt aM*.

Kröger, K., Hänfling, A., & Conrad, S. (2013, January). Leitfaden zur Steuerung der Windenergie Harmonisierung der Datenerfassung und -bewertung im Kreisgebiet Euskirchen Bewertung von Eignungsgebieten und Ausschlusszonen. Retrieved March 15, 2017, from https://www.kreis-euskirchen.de/umwelt/downloads/umwelt/leitfaden_windenergie.pdf

Kuckertz. (1998). *Erläuterungsbericht zur 46. Änderung des Flächennutzungsplans der Stadt Euskirchen*.

LANUV. (2015). Erlass für die Planung und Genehmigung von Windenergieanlagen und Hinweise für die Zielsetzung und Anwendung (Windenergie-Erlass). Retrieved February 22, 2017, from https://www.umwelt.nrw.de/fileadmin/redaktion/PDFs/klima/windenergieerlass.pdf

Lauber, V., & Jacobsson, S. (2016). The politics and economics of constructing, contesting and restricting socio-political space for renewables – The German Renewable Energy Act. *Environmental Innovation and Societal Transitions*, *18*, 147–163. https://doi.org/10.1016/j.eist.2015.06.005

Lehnert, L. S., Kramer-Schadt, S., Schönborn, S., Lindecke, O., Niermann, I., & Voigt, C. C. (2014). Wind Farm Facilities in Germany Kill Noctule Bats from Near and Far. *PLOS ONE*, *9*(8), e103106. https://doi.org/10.1371/journal.pone.0103106

Lesser, J. A., & Su, X. (2008). Design of an economically efficient feed-in tariff structure for renewable energy development. *Energy Policy*, *36*(3), 981–990. https://doi.org/10.1016/j.enpol.2007.11.007

Lexetius. (2017). § 35 BauGB. Bauen im Außenbereich. Retrieved March 15, 2017, from http://lexetius.com/BauGB/35,8

Lutz, L. M., Fischer, L.-B., Newig, J., & Lang, D. J. (2017). Driving factors for the regional implementation of renewable energy - A multiple case study on the German energy transition. *Energy Policy*, *105*, 136–147. https://doi.org/10.1016/j.enpol.2017.02.019

Mager, J. (2015, September 10). Euskirchener Planungsausschuss: Trotz Gutachten noch keine Lösung für den Windpark. Retrieved March 21, 2017, from http://www.ksta.de/region/euskirchen-eifel/euskirchen/euskirchener-planungsausschuss-trotz-gutachten-noch-keine-loesung-fuer-den-windpark-22963354

Marg, S. (2015). Alles BANANAs. *Böll Thema*, *1*(2015), 25–28.

Mattes, H. (2007, October 25). Zuckerrüben: Vertragsrübe vom Aussterben bedroht. *Frankfurter Allgemeine Zeitung*. Retrieved from http://www.faz.net/aktuell/rhein-main/wirtschaft/zuckerrueben-vertragsruebe-vom-aussterben-bedroht-1489444.html

McLaren Loring, J. (2007). Wind energy planning in England, Wales and Denmark: Factors influencing project success. *Energy Policy*, *35*(4), 2648–2660. https://doi.org/10.1016/j.enpol.2006.10.008

Musall, F. D., & Kuik, O. (2011). Local acceptance of renewable energy—A case study from southeast Germany. *Energy Policy*, *39*(6), 3252–3260.

Nieuwenhuizen, E., & Köhl, M. (2015). Differences in Noise Regulations for Wind Turbines in Four European Countries. Retrieved March 15, 2017, from https://www.mp.nl/sites/all/files/publicaties/Nieuwenhuizen_Euronoise_2015.pdf

Nordensvärd, J., & Urban, F. (2015). The stuttering energy transition in Germany: Wind energy policy and feed-in tariff lock-in. *Energy Policy*, *82*, 156–165.

Partidario, M. R., & Sheate, W. R. (2013). Knowledge brokerage - potential for increased capacities and shared power in impact assessment. *Environmental Impact Assessment Review*, *39*, 26–36. https://doi.org/10.1016/j.eiar.2012.02.002

Reusswig, F., Braun, F., Heger, I., Ludewig, T., Eichenauer, E., & Lass, W. (2016). Against the wind: Local opposition to the German Energiewende. *Utilities Policy*, *41*, 214–227.

Robson, C. (2013). *Real World Research* (3rd ed). Wiley.

Schmitz, T. (2009, November 3). Geplanter Windpark: Spät erwachtes Interesse. Retrieved March 29, 2017, from http://www.ksta.de/geplanter-windpark-spaet-erwachtes-interesse-12940832

Shankleman, J. (2016, May 16). Germany Just Got Almost All of Its Power From Renewable Energy. *Bloomberg.com*. Retrieved from https://www.bloomberg.com/news/articles/2016-05-16/germany-just-got-almost-all-of-its-power-from-renewable-energy

Smil, V. (2010). *Energy transitions: history, requirements, prospects*. Santa Barbara, Calif: Praeger.

Stadt Euskirchen. (2004). *Erläuterungsbericht - Flächennutzungsplan der Stadt Euskirchen*. Retrieved from http://www.o-sp.de/download/euskirchen/109475

Stadt Euskirchen. (2017). IPAS: Kreisstadt Euskirchen. Retrieved February 21, 2017, from https://www.euskirchen.de/wirtschaft-bauen/wirtschaftsstandort/gewerbe-industriegebiete/ipas/

Szarka, J., Cowell, R., Ellis, G., Strachan, P. A., & Warren, C. (2012). *Learning from wind power: governance, societal and policy perspectives on sustainable energy*. Palgrave Macmillan. Retrieved from https://www.google.com/books?hl=de&lr=&id=EEq-_ENyC-0C&oi=fnd&pg=PP2&dq=szarka+2012+wind+power&ots=psLgxET4Rg&sig=gWSSShxnhl4_aa7EFcGZyn08zL8

Thiel, D. V. (2014). *Research methods for engineers*. Cambridge University Press. Retrieved from https://www.google.com/books?hl=de&lr=&id=NbhUBAAAQBAJ&oi=fnd&pg=PR9&dq=david+thiel+%22Research+Methods+for+Engineers%22&ots=fY-wIw_0sn&sig=8sFDeVBVE6AfZg7woATgdjM1meg

UN. (2015). Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all. Retrieved March 24, 2017, from http://www.un.org/sustainabledevelopment/energy/

Warren, C. R., & McFadyen, M. (2010). Does community ownership affect public attitudes to wind energy? A case study from south-west Scotland. *Land Use Policy*, *27*(2), 204–213. https://doi.org/10.1016/j.landusepol.2008.12.010

WindGuard. (2017a). STATUS DES OFFSHORE-WINDENERGIEAUSBAUS IN DEUTSCHLAND 2016. Retrieved February 20, 2017, from https://www.wind-energie.de/sites/default/files/attachments/page/statistiken/factsheet-status-offshore-windenergieausbau-jahr-2016.pdf

WindGuard. (2017b). STATUS DES WINDENERGIEAUSBAUS AN LAND IN DEUTSCHLAND 2016. Retrieved February 20, 2017, from https://www.wind-energie.de/sites/default/files/attachments/page/statistiken/factsheet-status-windenergieausbau-land-2016.pdf

Wingas. (2016). Forsa-Umfrage 2016 „Energieversorgung und Energiewende“. Retrieved March 15, 2017, from https://www.wingas.com/mediathek/studien/forsa-umfrage-2016-energieversorgung-und-energiewende.html

Wizelius, T. (2007). *Developing wind power projects: theory and practice*. London ; Sterling, VA: Earthscan.

Wolsink, M. (2000). Wind power and the NIMBY-myth: institutional capacity and the limited significance of public support. *Renewable Energy*, *21*(1), 49–64.

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), 1188–1207.

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

Yin, R. K. (2014). *Case study research: design and methods* (Fifth edition). Los Angeles: SAGE.

Zoellner, J., Schweizer-Ries, P., & Wemheuer, C. (2008). Public acceptance of renewable energies: Results from case studies in Germany. *Energy Policy*, *36*(11), 4136–4141.

Appendix A: Data from Interviews

Interviewee A

Interviewee A is a resident who is living closely to the concentration zones and therefore in risk of visual impacts from the wind farm. He says that he probably will not be impacted from noise, though. Generally, he calls himself "distanced" from the technology as a whole, but acknowledges the need to develop ourselves further ecologically, meaning the search for environmentally benign energy systems. He emphasizes the existence of viable alternatives, such as heat pumps, which he operates for his house, and photovoltaics, which should be applied more prominently on rooftops or wide fields, which can't be used as farm land. He accepts off-shore wind farms, but expresses some reservations to that as well, which he did not specify. Generally, he acknowledges that the issues around social acceptance of wind power is an issue of worldviews or disposition ("Gesinnung"), showing a well reflected mindset.

He feels that he has been informed sufficiently about the project, but only "in the beginning". In his view, the planning authority issued the concentration zones back in 1998, knowing that the technical possibilities were rather limited, so that an actual realisation of a wind farm would not have been profitable at the time. Now, as he explains, this has changed with the increased height and power, and therefore increased effectiveness of current wind turbines.

Him and his citizen association have voiced reservations on the ground of natural protection issues, such as an endangerment of a species of eagle-owl. These were reviewed by the municipal administration, who is in charge of permitting the project development.

From his experience, the project developer WKN AG has not made public appearances until the resistance movement around the proposed wind farm was formed. Only then the company sought contact with Interviewee A, due to his function as lawyer and chairman of the citizen initiative.

In his view, him and the other resident do have in fact a voice in the decision-making process, saying "it is up to us to report and contribute". He states that "he doesn't want to complain", since the municipality was very engaged in the beginning and "asked many questions" to the project planner. In his view, it would be wrong to say that they as citizens didn't have a voice in the process.

Interviewee A is of the impression that politicians in Euskirchen are not really trying to stop the wind power development, since firstly, they are legally bound to the concentration zones and secondly, they do earn revenue from the operation of a wind park.

Finally, he expresses certain disappointment with the low interest of other residents in taking part in the resistance. In his opinion, the residents of his town would answer negatively, if they were asked about the wind part, but when it comes to actually taking action, most of them stay passive and rely on him to do the legal work. In his experience, the "silent majority" lives with a feeling of powerlessness, thinking "that we can't do anything about it anyway." His statement shows frustration with the lack of participation of other residents, making it harder for him to keep on doing what he does.

Interviewee B

Interviewee B was not interviewed for his opinion on the project developments, but for more background information, since he is working first hand with wind energy matters in the city and municipal region.

Interviewee C

Interviewee C is a member of a natural protection association, active in the region. He states that his organisation is mostly known for engagements around other wind power projects in the greater region surrounding Euskirchen. For the project at hand, the association was not able to affect the decision-

making process significantly, since it abided by legal rules, at least for the outer turbine locations, which are now permitted for construction. The inner turbines, however, endanger the eagle-owl species and are therefore not yet permitted.

In his view, it is possible for a nature protection association to contribute and influence the decision-making process, given that the association is informed about wind power development plans early enough in the process. He states an example from another region, where a wind farm was installed within a forest. This project would have remained undiscovered by the association, if the mayor of the neighbouring town had not contacted them. This led to the discovery of an infringement by the operator, who refused to shut down the wind farm within the agreed times for the natural protection of certain animals species affected by the wind farms operation.

However, the Interviewee criticises the whole building permission process as "intransparent". To Interviewee C, "the big problem" with many wind power developers is insincerity, since many only entered the business "for the money" and hide their capitalist agendas behind the façade of a "green heart". Low interest rates for investments and high profit possibilities make wind power project "pure wallstreet". One example he states was an infringement of the shut-down regulations of a wind farm within a forest, where the operators did not abide by the agreed shut-down time, and instead just let the turbines run uninterrupted. The problem is the lack of a controlling body, keeping sure that operators abide by their agreements. His association uncovered this infringement at that particular wind farm.

His next criticism is about the lack of state wide wind power development plan. There is no body within the state government, which issues and evaluates appropriate zones for wind power developments. This is instead left to communities, in the form of concentration zones. Problems arise here, when no such development plans (Flächennutzungsplan) exists, since in that case, wind power developers can install wind farms without constraint.

He goes on to compare those small-scale wind farms with miniature versions of brown coal mines, referring to problems around environmental and social compatibility. In his view, it is the fault of the governments, who have no plans on how to design or control the wind power developments in a "reasonable" way.

As he points out, "you can apply brown coal and wind power in moderation", without crossing the ecological "buffering capacity". But one has to be careful, not to reach a "point of no return." In his view, Germany is relying too one-sidedly on wind power as future energy supply. Politics is too short-sighted and is unable to estimate the impact of the used technologies. From his experience, an overexploitation of wind power risks the extinction of certain animal species.

For Interviewee C, the solution for Germany's climate mitigation efforts lies, among others, in the saving of energy and energy efficiency in the building sector, applying for example low-resource insulation such as aerogels, photovoltaics and solar thermal water heating. In his view, we need to create "a circle of innovation", accompanied by a smart control of energy usage ("internet of things").

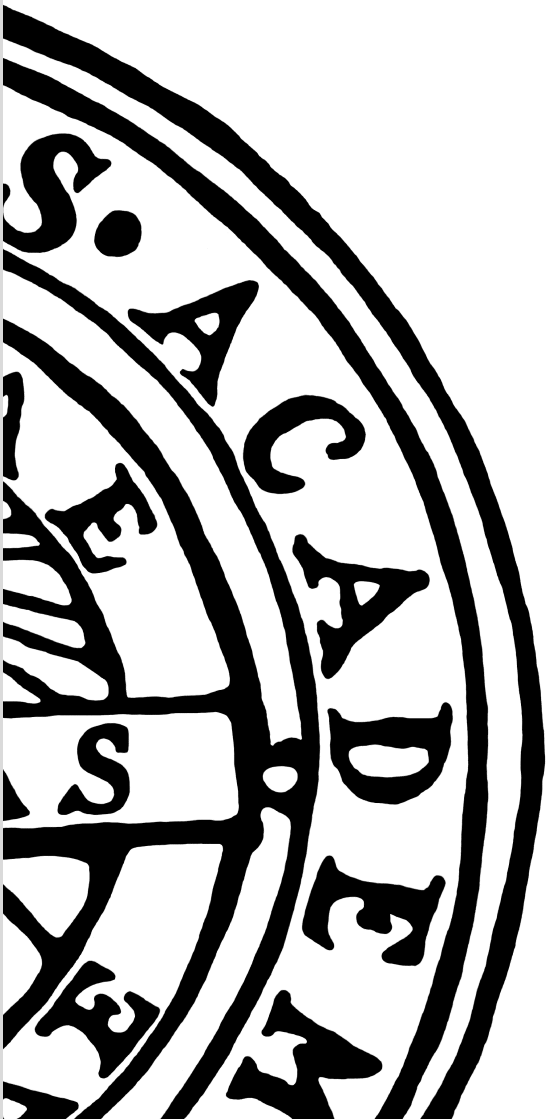
In summary, Interviewee C criticises the lack of transparency and ineffective planning by state governments, as well as the unfavourable groundwork laid by an economic system, which is built upon the need for growth. He does not reject the technology as a whole, but rather called for a careful evaluation and planning of appropriate sites on a state-wide basis, as well as an effective technology mix and a circle of innovation, making Germany's energy system more flexible and tolerable.

Summary

Both interviewee A and interviewee C raise important points connected to the acceptability of a local wind farm and the governing policy framework. Those points include the following:

- There are better alternatives to wind power in a local context
- Careless wind power development endangers animal species

- Both citizens and natural protection associations have a voice in the decision-making process, given they are informed sufficiently early and seize the opportunities to participate
- The policy and planning instrument of the concentration zones is problematic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