Dynamics of community acceptance - Local responses to wind energy projects

D I S S E R T A T I O N
of the University of St.Gallen,
School of Management,
Economics, Law, Social Sciences,
International Affairs and Computer Science,
to obtain the title of
Doctor of Philosophy in
International Affairs and Political Economy

submitted by

Nina Schneider

from

Austria

Approved on the application of

Prof. Dr. Rolf Wüstenhagen
and
Prof. Patrick Devine-Wright, PhD

Dissertation no. 5309

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The University of St.Gallen, School of Management, Economics, Law, Social Sciences, International Affairs and Computer Science, hereby consents to the printing of the present dissertation, without hereby expressing any opinion on the views herein expressed.

St.Gallen, October 21, 2022

The President:

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Fußach, August 2022 Nina Schneider

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Abstract

To mitigate climate change, a decarbonization of the electricity system is necessary. This requires a vast expansion of renewables such as wind energy and solar photovoltaics. Renewables are often outperforming fossil-fuel-based or nuclear alternatives in terms of levelized costs and they are supported by a variety of policies. However, to enable a successful transition, social acceptance is essential.

This dissertation contributes to a better understanding of the dynamics of local responses to wind energy projects by examining local responses within their institutional context, and by highlighting the interdependencies between different factors, such as key stakeholders, frames, and public discourse.

The first study investigates in a comparative case-study design how the public discourse changed in Austria and Switzerland between 2010 and 2020. It shows how the public discourse reflects and influences the acceptance of wind energy by either legitimizing or delegitimizing the technology. It shows that low deployment rates in Switzerland can be related to the predominance of delegitimizing storylines in the Swiss discourse. The Austrian discourse is characterized by more consistent support for wind energy.

The second study explores through a survey what positive and negative effects respondents associated with wind energy, and second, addressed respondents' evaluations of the spatial scale these positive and negative effects occur. This study found that the negative implications of wind energy are perceived to be at the local level. While positive effects of wind energy are evaluated to occur more at the global scale. This difference in the associated spatial scale of positive and negative implications highlights that wind energy opponents, who already have a slight advantage due to certain cognitive heuristics (e.g., status-quo bias), use arguments that more effectively reach people.

The third study analyzes how four wind energy projects in Bavaria were perceived by the local population, and how these responses changed over time. The study shows how various stakeholders such as mayors, local council members, and project developers influence local responses and highlights the importance of communication. Here, alongside the timing of project announcements, how, what, and by whom the project is communicated are found to play an essential role.

Zusammenfassung

Um den Klimawandel einzudämmen ist eine Dekarbonisierung des Stromsystems unerlässlich. Dies erfordert einen enormen Ausbau erneuerbarer Energien wie Windenergie und Photovoltaik, die in Bezug auf die Stromgestehungskosten oft besser abschneiden als fossile oder nukleare Alternativen und zudem durch eine Vielzahl von Policies unterstützt werden. Zusätzlich ist für eine erfolgreiche Energiewende die gesellschaftliche Akzeptanz eine wichtige Voraussetzung.

Diese Dissertation trägt zu einem besseren Verständnis der Dynamiken lokaler Reaktionen auf Windenergieprojekte bei, indem sie die lokalen Reaktionen in ihrem institutionellen Kontext untersucht und die Interdependenzen zwischen verschiedenen Faktoren wie relevanten Akteuren, Rahmenbedingungen und dem öffentlichem Diskurs aufzeigt.

In der ersten Studie wird anhand einer vergleichenden Fallstudie untersucht, wie sich der öffentliche Diskurs zwischen 2010 und 2020 in Österreich und der Schweiz verändert hat. Die Studie zeigt, dass der öffentliche Diskurs durch De-(Legitimierung) die Akzeptanz der Windenergie widerspiegelt und beeinflusst. Die niedrigeren Ausbauraten in der Schweiz können mit der Dominanz delegitimierender *Storylines* im schweizerischen Diskurs zusammenhängen. Im österreichischen Diskurs wird die Windenergie hingegen stärker legitimiert.

Die zweite Studie untersucht mittels einer Umfrage, welche positiven und negativen Auswirkungen die Befragten mit der Windenergie assoziieren und befasst sich mit den Einschätzungen der Befragten bzgl. des räumlichen Maßstabs der Auswirkungen. Diese Studie ergab, dass die negativen Auswirkungen der Windenergie auf der lokalen Ebene wahrgenommen werden. Wohingegen, die positiven Auswirkungen der Windenergie eher auf globaler Ebene gesehen werden. Dieser Unterschied zwischen positiven und negativen Auswirkungen verdeutlicht, dass WindenergiegegnerInnen, die aufgrund bestimmter kognitiver Heuristiken (z.B. Status-quo-Bias) bereits einen leichten Vorteil haben, Argumente verwenden, die andere besser erreichen.

Die dritte Studie analysiert die Reaktionen der Bevölkerungen und deren Veränderung auf vier Windenergieprojekte in Bayern. Die Studie zeigt, wie verschiedene Akteure wie BürgermeisterInnen, Gemeinderäte und ProjektentwicklerInnen die Reaktionen der Bevölkerung beeinflussen und unterstreicht die Bedeutung von Kommunikation. Dabei spielt neben dem Zeitpunkt der Projektankündigung auch die Art und Weise, wie, was und durch wen das Projekt kommuniziert wird, eine wesentliche Rolle.

Introductory Chapter[1]

1. Background and research motivation

At the COP21 in Paris, 195 countries agreed to reduce emissions and keep global warming below 2 degrees Celsius above preindustrial levels and, if possible, to even strive to limit the temperature increase to 1.5 degrees Celsius (UNFCCC, 2015). In 2021, electricity production and consumption was responsible for 46% of global CO_2 emissions (International Energy Agency (IEA), 2022). Thus, for addressing climate change and achieving the objective of the Paris Agreement, it is essential to decarbonize electricity systems (Estevão, 2020; Sindhwani et al., 2022). This demands a vast expansion of low-carbon technologies, such as wind energy and solar photovoltaics. Hence, their deployment has been supported by a variety of policies in Europe (BFE, 2017; European Commission, 2018) and beyond (REN21, 2020).

Renewable energy technologies are not only low-carbon technologies, but they are also cost-competitive as they often outperform fossil-fuel-based and nuclear alternatives in respect of the levelized cost of electricity (IRENA, 2020; Ritchie & Roser, 2021; Timilsina, 2020). Also, the urgency of reacting now is generally appreciated as humanity will not be able to stay within planetary boundaries otherwise (Brand, Görg, & Wissen, 2020; Intergovernmental Panel on Climate Change [IPCC], 2018; Rockström et al., 2009).

Nonetheless, the expansion of low-carbon technologies is lagging behind stated policy objectives in many countries (UNFCCC, 2021). This discrepancy between what is aimed for and what is being achieved or implemented has many, often interrelated, causes. On the one hand, lock-in and path dependency can explain this slow development. Cultural, institutional, social, and technological factors associated with our fossil energy system are reinforcing the status quo (Geels, Sovacool, Schwanen, & Sorrell, 2017; Seto et al., 2016; Unruh, 2002; Verbong & Geels, 2007). This is also linked to a lack of divestment strategies in many countries (Rinscheid & Wüstenhagen, 2018). Additionally, the transition in socio-technical systems is not only hindered by path dependence but also resistance to change (Geels et al., 2017). This is especially true for wind energy, the technological focus of this dissertation. Many projects face local opposition and

[1] Please note that the introductory chapter introduces and summarizes the three individual papers of this dissertation. Hence, several sections of the introductory chapter are drawn from Paper 1, Paper 2, and Paper 3 without explicit citations.

resistance, which can result in delays in projects or project stops (Kontogianni, Tourkolias, Skourtos, & Damigos, 2014; Reusswig et al., 2016; Walker, Stephenson, & Baxter, 2018; Wüstenhagen et al., 2007).

Transitions affect various stakeholder groups such as "civil society groups, the media, local residents, city authorities, political parties, advisory bodies, and government ministries" (Geels et al., 2017: 463). These are complex social relations that are influenced by many different aspects, such as beliefs, conflicting interests, aims, and values and also power imbalances in terms of resources or information (Delina & Janetos, 2018; Verbong & Geels, 2007; Wolsink, 2012). Thus, transitions always imply trade-offs between conflicting aims and interests (Breukers & Wolsink, 2007; Delina & Janetos, 2018; Geels et al., 2017).

To encourage the successful transition within democracies from an electricity system based on fossil fuels to one based on renewables, social acceptance of low-carbon technologies is essential. Social acceptance of renewable energy technologies has been investigated thoroughly over the last two decades (e.g. Batel et al., 2015; Bell, Gray, & Haggett, 2005; Devine-Wright et al., 2017; Ellis, Barry, & Robinson, 2007; Rand & Hoen, 2017; Wüstenhagen et al., 2007) and can be divided into three subareas: socio-political, market, and community acceptance. These three levels are highly interdependent and interlinked. Socio-political acceptance is social acceptance at the most general level (Wüstenhagen et al., 2007). This level is often investigated through opinion polls, where the acceptance of enforcing the energy transition is often high (Pidgeon & Demski, 2012; Wolsink, 2007; Wüstenhagen et al., 2007). The second level is market acceptance, or the process of the market adoption of an innovation. Here, the focus is on consumers and investors. The third level involves the responses at the local level: community acceptance (Wüstenhagen et al., 2007).

Social acceptance is often investigated by either looking at the macro level (socio-political acceptance) or by looking at the micro-level (community acceptance) (Devine-Wright et al., 2017). These two levels have often been presented as a dichotomy of positive general attitudes and local resistance (Aitken, 2010; Batel & Devine-Wright, 2015; Ellis, Barry, & Robinson, 2007; Wüstenhagen et al., 2007; Zoellner, Schweizer-Ries, & Wemheuer, 2008). However, these two levels are highly interdependent and interlinked and local responses are influenced by the specifics of a project as well as the institutional context. Thus, local responses cannot be investigated by focusing solely on individuals (Baxter et al., 2020; Devine-Wright, 2007; Wolsink, 2000). Further, local responses to wind energy projects are often investigated through cross-sectional

research designs, but local responses to wind energy projects are complex and dynamic (Aitken, 2010; Blumer, Braunreiter, Kachi, Lordan-Perret, & Oeri, 2018; Devine-Wright, 2005; Huijts, Molin, & Steg, 2012; Wolsink, 2000, 2012). This is not only because responses themselves change over time, but also due to changes in the institutional context, such as policies or the regulatory framework. The objective of this dissertation is to increase understanding of the dynamics of local responses to wind energy projects by examining local responses within their institutional context, and thus emphasize the interdependencies between community and socio-political acceptance.

2. Theoretical foundations

In this section, the theoretical foundations of the dissertation will be illustrated. First, a short overview of factors that have been identified that affect local responses will be introduced (2.1). Second, the relevance of discourse, frames, and communication will be shown in section 2.2.

2.1. Community acceptance of wind energy

To move from an electricity system that is dependent on fossil-fuels to one based on renewables, social acceptance of low-carbon technologies is essential. This is also reflected in the rich body of research on social acceptance that has been produced over the last two decades (Baxter et al., 2020; Bell et al., 2005; Blumer et al., 2018; Devine-Wright, 2007; Huijts et al., 2012; Scherhaufer, Höltinger, Salak, Schauppenlehner, & Schmidt, 2017; Walker et al., 2010; Wolsink, 2007; Wüstenhagen et al., 2007). Next to socio-political and market acceptance, local responses are critical since the decentral siting of renewables brings electricity production closer to communities (Rand & Hoen, 2017; Wüstenhagen et al., 2007). This is especially relevant for wind energy projects. The scientific literature has evolved from employing a reductionist NIMBY (Not in My Backyard) approach, which has been strongly criticized (e.g. Devine-Wright, 2009; Wolsink, 2000) to a more nuanced understanding of local responses (Batel, 2018; Batel et al., 2015; Breukers & Wolsink, 2007; Olson-Hazboun, Krannich, & Robertson, 2016; Walker et al., 2018). The responses of local populations regarding the energy transition are complex and dynamic, and various interrelated factors influence these local responses to wind energy projects (Batel & Devine-Wright, 2015; Blumer et al., 2018; Devine-Wright, 2005; Huijts et al., 2012; Wolsink, 2000, 2012). The following provides an overview of the determinants of local responses that have been identified so far and indicates potential research gaps. For a better overview, they will be categorized

according to three levels: institutional context, project characteristics, and individual characteristics.

Institutional context

The institutional context defines the general framework of a wind energy project, and its components range from social norms to participatory structures, the regulatory framework, the political context, and pre-existing policies and discourses (Aitken, 2010; Blumer et al., 2018; Devine-Wright et al., 2017; González & Lacal-Arántegui, 2016; Walker et al., 2018; Wolsink, 2000). The regulatory framework plays an essential role regarding wind energy deployment. Many studies have analyzed the effect of different regulatory frameworks, such as support schemes (Geels et al., 2017; González & Lacal-Arántegui, 2016; Haas et al., 2011; Klessmann et al., 2013). Most countries have changed and revised their support schemes for wind energy, either due to strategy changes and stronger emphasis on supporting wind energy or due to budgetary constraints. These changes have always had an effect on the deployment rates in the following years, either positively or negatively (González & Lacal-Arántegui, 2016) and can also affect local responses.

Another part of the institutional framework that influences local responses is participatory structures. Vuichard et al. (2022) found that local responses in countries with a direct democratic decision-making process put stronger focus on procedural justice. This is connected to the concept of perceived control, which stands for a belief in one's own ability to influence events or certain outcomes (Ly, Wang, Bhanji, & Delgado, 2019). Others have also referred to this as "outcome efficacy" (Huijts et al., 2012). Whether people think that supporting or opposing a project will have an effect on the actual implementation of a technology influences whether they act (Blumer et al., 2018; Huijts et al., 2012).

Project characteristics

At the project level, project design (Baxter et al., 2020), the project phase (Wolsink, 2007), the impacts of the project on fauna and flora (Warren, Lumsden, O'Dowd, & Birnie, 2005), the project site (rural vs. industrial) (Walker et al., 2018), and ownership structures (Breukers & Wolsink, 2007; Devine-Wright, 2007; Warren et al., 2005) are among others relevant factors.

If the local community is involved in the planning process and has a say, this can result in higher levels of acceptance. According to Rand and Hoen (2017), acceptance is

stronger if the planning process is perceived as being fair and just, even if the outcome is not satisfactory. This is also linked to trust. Usually, trust in responsible actors results in greater acceptance (Gölz & Wedderhoff, 2018; Huijts et al., 2012). According to Devine-Wright (2007), if people do not trust the project developer, the project will face local resistance independently from any incentives offered to the local population. However, trust is not only relevant regarding the project developer or the investor, but so is trust in institutions and the stakeholders behind them (Gölz & Wedderhoff, 2018). Procedural justice can increase trust in the people and institutions responsible for the related decisions and consequently, the outcome is more likely to be accepted (Gross, 2007). However, this is not a linear relationship. Public engagement does not guarantee higher acceptance, and may even cause resistance by creating a platform on which opposition may be organized against a project (Devine-Wright, 2007).

Individual characteristics

Whether general attitudes can be a predictor for local responses has been investigated by many authors and the results are not conclusive (Bell et al., 2005; Huijts et al., 2012; Olson-Hazboun et al., 2016; Walter, 2014). Warren et al. (2005) found that a higher level of environmental concern can also have negative effects on acceptance level if the concerns are local rather than of global nature. Overall negative general attitudes seem to have a stronger influence on local responses and actual behavior than positive general attitudes (Walter, 2014). However, people that are concerned about climate change and who perceive that a certain technology will be beneficial to mitigate climate change, will evaluate the technology higher (Huijts et al., 2012).

Another important aspect regarding the project characteristics are the impacts as well as perceived impacts of a project. They consist of environmental, health, and economic concerns including impacts on fauna and flora, noise, annoyance, change of landscape, infrasound, shadow flicker and potential effects on property value (Ellis et al., 2007; Stephens, Rand, & Melnick, 2009). Negative evaluations of perceived impacts were found to be a strong predictor for low acceptance rates (Brudermann, Zaman, & Posch, 2019). Concerns about the visual impact next to noise have been identified as one of the main factors behind local opposition (Brudermann et al., 2019; Jones & Eiser, 2010; Petrova, 2016; Warren et al., 2005; Wolsink, 2000, 2007).

Brudermann, Zaman, and Posch (2019) found that regions that already have a high density of wind turbines were associated with higher acceptance levels than regions with only a few turbines. Thus, people who are already familiar with wind energy tend to

support the technology more (Baxter, Morzaria, & Hirsch, 2013; Brudermann et al., 2019). Further, these perceptions, interpretations, and evaluations of wind energy are also strongly influenced by the belief system that people have and these in turn are highly dependent by the cultural and social context (Blumer et al., 2018). Similarly, Firestone, Bates, and Knapp (2015) suggested that positive and negative perceptions of wind energy are socially constructed and less influenced by the physical aspects of the wind turbine.

What has been presented is a broad overview of the current state of the art within the community acceptance literature. Factors at the individual, the project level, and the institutional level can play a role. The underlying mechanisms and the different aspects that are identified here may overlap and reinforce as well as counteract each other. This highlights the importance of the context-sensitivity of local responses and indicates that the explanation for local responses cannot be found solely at the individual level, but rather in the situational context and the frames that are used (Batel, 2018; Devine-Wright, 2005, Thornton & Knox, 2022). Therefore, to generate better understanding of local responses, it is important to investigate them within the economic, socio-political, cultural, and geographical context (Devine-Wright et al., 2017).

Additionally, local responses can change over time and are influenced by the above-described factors, which themselves can change. Dynamics can play a role in various ways. First, the local responses themselves can change over time. Wolsink (2007) showed that local responses change according to the project phase. He identified a U-shaped curve with higher acceptance before the planning phase, lower acceptance level during the planning phase and more positive responses again after the project has been implemented. Second, the planning phase can be crucial in regards to trust and participation of the community (Gölz & Wedderhoff, 2018; Rand & Hoen, 2017). Third, factors that influence local responses can change, such as the regulatory framework or policies in place (González & Lacal-Arántegui, 2016). Finally, the overall context or public discourse can change and influence local responses (Batel & Devine-Wright, 2014).

2.2. Discourse, Frames, and communication

Transitions are complex and non-linear processes and affect a multitude of stakeholder groups (Geels et al., 2017). They involve complex social relations that evolve out of conflicting interests, aims, beliefs, and values that mirror power imbalances concerning resources, but also information (Delina & Janetos, 2018; Verbong & Geels, 2007;

Wolsink, 2012). Hence, to enable a better understanding of local responses to wind energy projects, it is crucial to explore how wind energy is conceptualized, understood, and framed in different contexts and by different stakeholder groups.

Social representations theory (Batel & Devine-Wright, 2014; Devine-Wright et al., 2017) accentuates the crucial role of communication, as this is "the basis of constructing knowledge and our understanding of the objects around us, and is shaped by power asymmetries between actors" (Devine-Wright et al., 2017: 28). Batel and Devine-Wright (2014) emphasize the importance of communication and discourse by different stakeholders, such as policymakers, project developers, the public, but also the media, that affect local responses. However, not only are the different conceptualizations of the stakeholders relevant, but the geographical scale is also important. Specifically, it makes a difference whether an issue is framed in a local, regional, or global context as this affects who is included and who is excluded (van Lieshout, Dewulf, Aarts, & Termeer, 2011). Similarly, Breukers and Wolsink (2007) highlight the difficulty of recognizing competing interests at different scales ranging from the local level to a more global scale.

Narratives used and the way an issue is presented influences how a project is perceived (Baumgartner & Mahoney, 2008). Frames are not only shaping the understanding of the problem itself but also limit and influence the solutions one detects as necessary or useful (Collier, 1998; Geels et al., 2017). By highlighting one aspect or another, the perception of wind energy is consciously and unconsciously influenced. Nevertheless, frames have their limitations and policies cannot be presented in any arbitrary way (Baumgartner & Mahoney, 2008). Baumgartner and Mahony (2008: 442) state that the "underlying multidimensionality" of an issue is limited by the frames used by others. Additionally, frames are also constrained by prior beliefs (Kunda, 1990). Thus, conflicts are not necessarily about fighting for "the truth," but about convincing others of one's narrative and having control (Stone, 1989). Frames are more effective if they align with pre-existing cultural values (Stone, 1989) and the public discourse (Ellis et al., 2007). Hence, it is not only important to investigate how wind energy projects are presented at the local level, but it is also necessary to investigate the representations of wind energy in mass media (Batel & Devine-Wright, 2014).

Frames can be distinguished along their level of abstraction to episodic and thematic frames. The former are specific and the latter are more general and abstract (Iyengar, 1990). The level of abstraction can influence the frame strength. Episodic frames were found to be more effective in a context with a strong emotional response. Whereas, thematic frames can enable policy support (Aarøe, 2011) and result in a shift of responsibility from the individual to society (Iyengar, 1991).

Wind energy can be framed in various ways. Stephens et al. (2009) differentiated between six perspectives that can be used to examine wind energy, namely: *economic, environmental, technological, political, cultural,* or *a health and safety perspective*. These different perspectives can either be used to highlight the positive aspects of wind energy or negative ones. Further, they can also be used at different geographical scales, focusing on regional aspects or local consequences, or putting the topic into a broader context by focusing on the global level (Khan, 2003; Warren et al., 2005).

This is also reflected in so-called *green-on-green* disputes in the context of wind energy projects, where global environmental concerns are contrasted with local environmental concerns. Conflicts between technological development and landscape conservation and ecological concerns have a long history. Although most conflicts have so far been about economic benefits versus environmental concerns, some of them are now evolving out of the same source of motivation on both sides – environmental concerns (Warren et al., 2005). This is an essential part of conflicts around wind energy projects that benefits are found more on the global level and negative implications on the local level (Khan, 2003; Warren et al., 2005).

3. Conceptual Framework

So far most prior research has investigated local responses to wind energy projects in a cross-sectional way and with a focus on individuals (Bell et al., 2005; Huijts et al., 2012; Walter, 2014). However, since perceptions are to some extent socially constructed, it is important to investigate local responses within the economic, socio-political, cultural, and geographical context to create a more comprehensive understanding of local responses (Devine-Wright et al., 2017). Further, local responses are dynamic and complex (Batel & Devine-Wright, 2015; Devine-Wright, 2005; Huijts et al., 2012; Wolsink, 2000, 2012).

The conceptual model depicted in Figure 1 illustrates the conceptualization of local responses in this dissertation. It builds on the triangle of social acceptance defined by Wüstenhagen, Wolsink, and Bürer (2007). It illustrates local responses through a context-sensitive understanding by incorporating local conditions (Walker et al., 2018), institutions (Breukers & Wolsink, 2007; Wolsink, 2000), project characteristics, and relevant stakeholders, as well as emphasizing the importance of communication, frames, and discourses (Olson-Hazboun et al., 2016; Wolsink, 2007) in shaping and changing local responses.

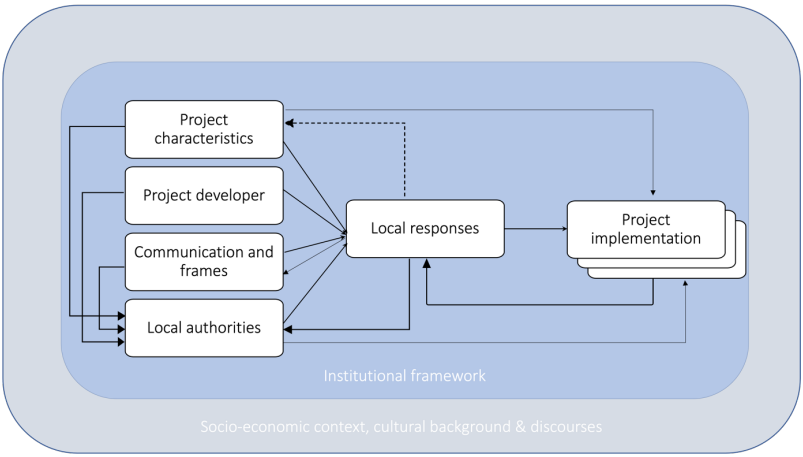

Figure 1: Conceptual Framework of local responses

Local responses to wind energy projects are conceptualized as embedded in the socioeconomic context, cultural background, and public discourse. Further, the institutional framework also plays a key role in understanding local responses better (Geels et al., 2017; González & Lacal-Arántegui, 2016; Haas et al., 2011; Klessmann et al., 2013). They are also influenced by project characteristics such as for instance ownership structure (Breukers & Wolsink, 2007; Devine-Wright, 2007; Warren et al., 2005) and participatory structures (Vuichard, Broughel, Wüstenhagen, Tabi, & Knauf, 2022), but also by the communication and frames that are deployed to describe wind energy projects. Public discourses about the energy transition or wind energy specifically can also affect local responses (Devine-Wright et al., 2017; Olson-Hazboun et al., 2016; Thornton & Knox, 2002; Wolsink, 2000). Additionally, other relevant stakeholders such as project developers and local authorities affect local responses (Karakislak, Hildebrand, & Schweizer-Ries, 2021). The conceptual framework also links local responses to the local context, where they are implemented or planned. Whether there are already existing wind energy projects can have an effect on local responses (Baxter et al., 2013). Local responses are influenced by a multitude of different aspects, while local responses also affect other stakeholders' perceptions and opinions (Dehler-Holland et al., 2022). Thus, local responses are dynamic, they change over time and also the factors that influence local responses can change.

The three papers of this dissertation investigate different aspects of this conceptual framework. *Paper 1* investigates the public discourse about wind energy in Austria and

Switzerland and how the discourse changed between 2010 and 2020. This comparative case study sheds some light on the divergence in deployment rates between these two countries. It shows how the public discourse reflects and influences the acceptance of wind energy by either legitimizing or delegitimizing wind energy. In *Paper 2,* positive and negative effects of wind energy are distinguished along a perceived spatial scale to generate a better understanding of the strength of frames that are used in the context of wind energy projects. *Paper 3* analyzes how four wind energy projects in Bavaria were perceived by the local population, and how these responses changed over time. The study shows how various stakeholders such as mayors, local council members, and project developers influence local responses and highlights the importance of communication. Here, alongside the timing of project announcements, how, what and by whom the project is communicated are found to play an essential role.

The objective of this dissertation is to increase understanding of the dynamics of local responses to wind energy projects by examining local responses within their institutional context, and by highlighting the interdependencies between different factors, such as key stakeholders, frames, and public discourse. The overall research questions for my dissertation are:

- Which factors influence local responses to wind energy projects and how do these change over time?
- How do public discourse and frames both reflect and influence local responses?

Understanding the different factors and their interdependencies better can enable improvements in implementation processes, communication strategies, and siting decisions. This in turn will hopefully enable a more socially and environmentally just transition.

4. Research Design

In the following section, I present the research design of my dissertation. It is a cumulative thesis, which consists of three papers. First, I discuss the philosophy of science the research is grounded in – critical realism. Second, the methods used to collect the data for the three papers as well as the type of analysis for each paper will be presented.

4.1. Philosophy of Science

It is important to discuss the philosophy of science that researchers or even whole research areas are grounded on as this influences, limits, and specifies not only what answers can be disclosed, but also what questions can be raised (Spash, 2012). Therefore, it is imperative to be aware of one's own philosophy of science and consequently of the preanalytical vision that guides one's research as this influences the research questions that are asked.

The philosophy of science this dissertation is based on is critical realism. Critical realism emphasizes the correspondence between knowledge and the object of knowledge (Danermark, Ekström, Jakobsen, & Karlsson, 2002; Sayer, 2010) and acknowledges that knowledge is influenced and dependent on the questions we raise and the problems we are trying to understand or address (Danermark et al., 2002). Thus, "facts are theory-dependent but they are not theory-determined" (Danermark et al., 2002, p. 15).

4.2. Methods and Analysis

In this section, the data collection process, the methods used, and the type of analysis employed for the research described in the three papers will be introduced. For the three research foci, different research methods were applied. *Paper 1* is a comparative study that analyzes public discourses and their influence on social acceptance and technological legitimacy based on newspaper articles. *Paper 2* examines the positive and negative implications of wind energy through a representative survey and investigates what the difference in perceived spatial scales could imply. *Paper 3* dives into four case studies in Bavaria and investigates the responses to actual wind energy projects through semi-structured interviews.

Paper 1 builds on newspaper articles retrieved from the Factiva database to study public discourses surrounding wind energy in Switzerland and Austria over time. The time frame spans the years 2010 to 2020, and after removing false positives, the data set consisted of 298 newspaper articles for Austria and 510 for Switzerland. The analysis relies on six major newspapers, and for both countries a liberal and a conservative quality newspaper and a tabloid newspaper with broad reach were selected. Inspired by the multi-dimensional discursive approach (Rosenbloom, Berton, & Meadowcroft, 2016) and following the principles of qualitative content analysis (Mayring, 2014), the 808 relevant articles were analyzed to identify relevant storylines that are used to either legitimize or delegitimize wind energy in Austria or Switzerland. Through an iterative and inductive process, a preliminary list of narratives was established, which was based

on thematic analysis (Braun & Clarke, 2012) consolidated and merged. This resulted in 45 different narratives for Austria and 68 for Switzerland. These narratives were summarized in four overarching storylines that can be either applied to legitimize or delegitimize wind energy. Further, we were also interested in the actors that were involved and the emerging discourse coalitions. For this analysis, we applied discourse network analysis (DNA), which is a method used to systematically investigate policy debates (Leifeld & Haunss, 2012) over time. Statements made by actors that facilitated certain narratives in the context of wind energy were coded. If two actors made statements that employed the same storyline, a link between the actors was established. This enabled the identification of actor congruence networks, which allowed for a comparison of the salience of discourse coalitions and storylines over time within the same country and helped detect differences and similarities between the countries.

For *Paper 2*, data were collected through a representative study (N = 1229) of wind energy in Austria. The survey was conducted in 2021. The respondents were asked to list the positive and negative implications of wind energy by replying to the following two questions: "What positive effects do you think wind energy has?" and "What negative effects do you think wind energy has?" For both categories, all survey participants were asked to define at least one implication of wind energy and a maximum of five. In a next step, respondents were requested to evaluate each of their own associations on a six-point scale by indicating whether they were effects of wind energy that "*affect people in the vicinity of the wind turbine"* (point 1) or whether they "*affect all of us"* (point 6). This helped with obtaining a better understanding of the perceived spatial scale of the indicated positive and negative implications. The spatial scale was used as a proxy of the level of abstraction to differentiate between episodic and thematic frames. After cleaning the data, the final data set consisted of 2147 positive effects and 2039 negative effects of wind energy. To analyze whether the stated implications and the perceived spatial scale differs between wind energy supporters and opponents, the survey participants were asked whether they agreed (1 – totally disagree; 4 – totally agree) with the following statement: "*I would approve the development of a wind turbine close to my hometown.*" This question was used as a proxy for local responses and to categorize the sample into two groups: opponents and proponents. Respondents who indicated their approval of a wind turbine near their home (by selecting 3 or 4) were categorized as supporters, while those indicating disapproval (choosing 1 or 2) were categorized as opponents. By using R, the mean spatial scales of positive and negative implications of wind energy were calculated for the whole sample and for the two groups to allow comparison within and between them. A higher score indicated a more global

spatial scale and a lower score a more local spatial scale. Thus, the former suggests a thematic frame and the latter an episodic frame. A Mann-Whitney U-Test was conducted to analyze whether the differences within and between groups were significant. For further analysis, the sample was split into four sub-groups: strong opponents (1), mild opponents (2), mild supporters (3), and strong supporters (4). The data was analyzed qualitatively, with the identification of common themes. This resulted in 23 categories for the positive implications and 20 for negative effects. To identify differences between the four groups, relative frequencies and mean spatial scales were compared.

Paper 3 illustrates the dynamic processes of four wind energy projects. Based on four selection criteria, we identified four relevant case studies in Bavaria. This resulted in two case studies with implemented wind energy projects and two case studies in the initial planning phase. Between December 2021 and June 2022, 18 semi-structured qualitative interviews were conducted. The interviews took place online, were conducted in German, and lasted between 20 and 60 minutes. For the analysis, the interviews were transcribed and translated. The interviews were analyzed through a framework method that is affiliated with the broader context of thematic or qualitative content analysis (Gale, Heath, Cameron, Rashid, & Redwood, 2013; Ritchie & Lewis, 2003). First, the data is organized to identify similarities and differences within and between cases (Gale et al., 2013). To obtain a better understanding of the Bavarian context, this analysis was complemented with relevant documents and reports. Both authors coded the transcripts independently and through an inductive process the relevant themes were identified and analyzed with "MaxQDA," which allows for the application of the framework method (Kuckartz, 2010). Emerging patterns were identified from the case studies (Yin, 2014) and these were used to analyze the local responses and project outcomes.

5. Research Papers

The aim of this dissertation is to improve understanding of the dynamics of local responses. The three individual papers are summarized below by highlighting the research objectives, the methodology, and the findings of each paper. Table1 gives an overview of the three papers by providing information about the title, authorship, the research objective(s), the method, and publication status.

Paper 1

The first paper, with the title *"The (de-)construction of technology legitimacy: Contending storylines surrounding wind energy in Austria and Switzerland,"* investigates wind energy discourses in Austria and Switzerland. The two countries are quite similar in many regards (e.g., population size, energy transition objectives, strength of green parties, role of participatory processes), but differ strongly in terms of the importance of wind energy in the electricity mix. While wind energy accounts for 12% of electricity demand in Austria (WindEurope, 2022), it only covers 0.2% in Switzerland (Suisse Eole, n.d.). Intrigued by this divergence, the paper compares the processes of technology (de-)legitimation in both countries to shed some light on how the construction and deconstruction of technology legitimacy both reflects and influences the social acceptance of wind energy and the deployment rates of wind energy. By bridging the conceptual lenses of sustainability tranistion research and discourse theory, the study investigates the research questions based on the multi-dimensional discursive approach developed by Rosenbloom et al. (2016). This approach captures how politically relevant actors use so-called storylines in policy debates. To get a better understanding of who these actors are and what role they have in the (de-) construction of technology legitimacy, we complement this approach by applying discourse network analysis (DNA). By analyzing 808 newspaper articles between 2010 and 2020 in Austria and Switzerland, the discourses surrounding technology legitimacy are systematically compared. This allows the unveiling of the broader societal forces that shape low-carbon pathways over time and that can increase understanding of how discourse and regulatory frameworks affect local responses to wind energy. Further, we identify four overarching storylines that are used to either legitimize or delegitimize wind energy. The four storylines are "*risks and benefits*," "*regulatory framework*," "*future-proof electricity system,*" and "*small country*." Our analysis shows that the discourses in the two countries differ tremendously. Storylines that delegitimize wind energy were predominant in Switzerland. The Swiss discourse evolved around concerns about the suitability and feasibility of wind energy in Switzerland regarding effects on landscape and the stability of the electricity system, which contributed to delegitimizing wind energy in that country, whereas in Austria the discourse has evolved around identifying the steps that are necessary to enable a more rapid wind power deployment (involving discussion about the best ways to integrate wind energy into the grid and what potential policy changes would foster this). There is also a difference in the importance of discourse coalitions between the two countries, and a difference between the actors that influence the discourse.

One explanation for this difference between the two countries could be the population density, but also which actors shape the media discourse. Alongside political actors, the energy sector, and academia, which are present in both countries, the most relevant groups of actors in the Swiss discourse are NGOs and citizen initiatives that often raise concerns about wind energy and its potential negative effects on landscape, fauna, and flora. In contrast, in Austria associations are the next most important group of actors, most of which support wind energy. This is also reflected in decisions that are made about actual wind energy projects. In both countries, the local population or the municipality can decide whether projects are implemented. In Austria, most projects are approved, while in Switzerland most projects are rejected at the local level.

Paper 1 was accepted for the 13th *International Sustainabiliy Transitions Conference* IST 2022 in November 2022, and has been submitted to the journal *Technological Forecasting and Social Change*.

Paper 2

The second paper, entitled "*Think global, talk local: Episodic and thematic frames of wind energy projects*," investigates the different spatial scales of positive and negative implications of wind energy. Social acceptance research has explored many factors that influence local responses to wind energy projects. However, the importance of scale frames has received little attention so far. This paper draws on framing theory, which may enable a better understanding of the effect of the different spatial scales applied in the context of conflicts about wind energy projects. Frames can be distinguished into episodic and thematic types. Episodic frames are concrete and specific, and more likely to elicit an emotional response, whereas thematic frames are more abstract and general (Aarøe, 2011; Iyengar, 1990). In a context of strong emotional reactions, episodic frames have been found to be more effective at reaching others (Aarøe, 2011).

Based on a representative survey in Austria, *Paper 2* first explores what positive and negative effects of wind energy respondents associated with wind energy, and second, addressed respondents' evaluations of at what spatial scale these positive and negative effects occur. This study found that the negative implications of wind energy are perceived to be at the local level. Hence, they can be categorized as episodic frames. Positive effects of wind energy are evaluated to occur more at the global scale, where wind energy is located in the context of climate-change mitigation, and thus is presented through a thematic frame. This difference in the associated spatial scale of positive and negative implications highlights that wind energy opponents, who already have a slight

advantage due to certain cognitive heuristics (e.g., status-quo bias), use arguments that more effectively reach people.

Paper 2 has been submitted to the journal *Energy Research and Social Science.*

Paper 3

The third paper has the title "*The mayor said so? The impact of local political figures and social norms on local responses to wind energy projects*" and investigates how the assessment of mayors and other relevant stakeholders affects local responses to wind energy projects. Through semi-structured interviews, four Bavarian case studies are analyzed and compared. The study found that the support of mayors is a prerequisite for the implementation of wind energy projects in Bavaria but does not guarantee their local acceptance. The paper shows that, in addition to mayors, other stakeholders are important, as is communication. Confirming previous findings, we found that early information and transparency are essential for local acceptance. However, it is not only important when details of a project are communicated, but also how, where, and by whom. For instance, it is important that the mayor explains his or her support for a project by delivering a vision and clearly communicating how the municipality or the community can benefit from a project. Another important stakeholder is the project developer. Generally, it seems that regional project developers are preferred since they are perceived as caring about the community rather than prioritizing their own interests, which is assumed to be the case for external project developers. Further, trust and social norms were found to be extremely relevant regarding local responses.

This paper was presented in June 2022 at the 3rd *International Conference on Energy Research and Social Science* in Manchester, Great Britain, and was submitted to the Energy Policy virtual special issue "*Dynamics of Social Acceptance*," where it is currently in the second round of reviews and has been presented at the respective paper-development Workshop in St. Gallen, Switzerland.

Table 1: Overview of the dissertation research papers.

Paper No.	Title	Author(s)	Research objectives	Methods	Publication status
1	**The (de-)construction of technology legitimacy:** Contending storylines surrounding wind energy in Austria and Switzerland	Nina Schneider[a] Adrian Rinscheid[a]	Paper 1 centers on the question how the construction and deconstruction of technology legitimacy reflects, and influences the socio-political acceptance of wind energy	Qualitative content analysis & Discourse Network Analysis	Submitted to ***Technological Forecasting and Social Change***
2	**Think global, talk local:** Episodic and thematic frames of wind energy projects	Nina Schneider[a]	Paper 2 investigates positive and negative implications of wind energy and the influence different spatial scales have on frame strength	Online survey, Mann Whitney U-Test, thematic analysis	Submitted to ***Energy Research and Social Science***
3	**The mayor said so?** The impact of local political figures and social norms on local responses to wind energy projects	Irmak Karkislak[b] Nina Schneider[a]	Paper 3 explores the influence of different stakeholders and communication on local responses	Four case studies, semi-structured interviews, framework analysis	Under review after 1st R&R at ***Energy Policy***

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6. Overall findings and conclusion

The overarching objective of this dissertation was to improve understanding of the dynamics of local responses in relation to wind energy projects and highlight the interdependence between different factors, such as key stakeholders, frames, and public discourse. The three papers of this dissertation contribute valuable insights to the literature of community acceptance research. The following chapter highlights the theoretical and practical contributions of the three papers.

6.1. Theoretical contributions

This dissertation makes valuable contributions to the field of social acceptance research by highlighting the dynamic interplay of various factors that influence local responses. First, through illustrating the importance of discourses and frames in relation to local responses to wind energy projects. Second, by showing how the different stakeholder and actor coalitions can influence the conceptualizations of wind energy and either enable or hinder technology legitimacy and thus its acceptance. Third, the importance of the institutional framework, specifically the regulatory framework, is highlighted. The contributions of the individual papers are depicted in more detail below.

Paper 1 bridges two related, but independent literature strands: technology legitimacy and social acceptance. This allows to generate a better understanding of how public discourses construct or deconstruct technology legitimacy and this in turn, reflects, and to some extent influences socio-political acceptance. Wind energy is less contested in the Austrian discourse, which is also reflected in the approval of most projects at the local level. Further, the storylines that are conveyed in the Swiss discourse, are often also found at the local: namely, noise, landscape protection, and concerns about birds (Dällenbach & Wüstenhagen, 2022; Vuichard et al., 2022). Further, the study highlights the importance of the regulatory framework for wind energy deployment. This is not only relevant for attracting investment but affects local responses. The relevance of the storyline "*regulatory framework*" in both countries highlights the importance of the regulatory framework for the deployment of wind energy. This resonates with findings in the literature. For example, González and Lacal-Arántegui (2016) emphasize the importance of the stability of the regulatory framework.

Paper 2 bridges community acceptance research and framing theory by investigating what the different perceived spatial scales of positive and negative implications associated with wind energy can tell us about frame strength in conflicts related to wind

energy projects. The most frequently mentioned positive consequences of wind energy are climate-change mitigation and environmental protection, followed by reliability and renewable energy. These implications are perceived to affect all of us. In contrast, the most frequently mentioned negative consequence is noise, which is a concern that is more locally relevant. Thus, conflicts about wind energy can be described as taking place on two different spatial scales.

Paper 3 highlights the importance of structural frameworks, key stakeholders, and the provision of information. This study illustrates that the approval of mayors is an important prerequisite for wind energy projects, but is no guarantee of local support. Karakislak, Hildebrand, and Schweizer-Ries (2021) also identified mayors as relevant stakeholders. The latter can play a mediating role between different stakeholders. In addition to the support of the mayor, other factors such as early communication and transparency and the project developer are relevant.

The three papers emphasize the importance of a dynamic understanding of local responses and show that local responses are more than the sum of individuals. They are influenced by the context, by different stakeholder, by the public discourse and the conceptualizations and frames of wind energy that are used.

6.2. Practical contributions

The three papers also offer valuable insights that are relevant for policymakers and project developers. *Paper 1* and *Paper 3* highlight the importance of socio-political acceptance for project implementation and community acceptance, and the relevance of a regulatory framework that is clear, stable, and allows the municipality to benefit from the project. In *Paper 1*, a direct link between changes in the regulatory framework and an increase/halt in wind energy deployment is identified for Austria. The first significant expansion of wind energy happened after the implementation of the ÖSG 2012, but the increase in installed MW decreased as soon as the FITs cap was reached. Further, in *Paper 1*, the importance of the storyline "*regulatory framework*" shows how relevant the institutional setup is for wind energy deployment. Since transitions are non-linear but dynamic, policymakers need to constantly adapt regulatory frameworks (Geels et al., 2017; Szarka, 2006). However, this can also cause new difficulties since it can have a negative effect on the risk perception of investors (González & Lacal-Arántegui, 2016). In *Paper 1*, the Austrian discourse showed that if the market is mature, there is a call for stability in the regulatory framework, whereas if there are difficulties, faster adaptation of the regulatory framework would be useful and is recommended. Geels et

al. (2017) state that policymakers can mitigate risk through diversifying the policy portfolio by including financial instruments, regulatory instruments, and processual instruments. *Paper 3* shows how a distance regulation can affect project developments and local responses. Next to resulting in fewer possible project site, the study showed that local politicians had the impression that gaining community acceptance was more difficult due to the 10H-rule since the municipality needed to undermine the rule. Additionally, *Paper 3* highlights that municipalities require regulatory frameworks that enable them and/or the people living close to the planned project to benefit from it. In *Paper 3*, alongside financial benefits, environmental compensation measures were highlighted as a positive means of benefitting the local population.

Another key learning of the three papers is the importance of communication at different spatial scales. *Paper 1* shows that the discourse that occurs in newspapers reflects and influences wind energy deployment in both countries. In Austria, most articles legitimize wind energy and highlight necessary amendments at the policy level or discuss different options for the better integration of wind energy into the electricity system. In contrast, in Switzerland the discourse evolves around landscape protection and birds, and it is questioned whether wind energy is feasible or useful in Switzerland. This finding is connected to *Paper 2*, where the most frequently mentioned negative implications of wind energy are identified as – alongside noise – changes in the landscape, as well as the risk to birds. This shows that the negative implications of wind energy are more often illustrated by using episodic frames, and thus focus on the consequences of wind energy projects, whereas the positive implications of wind energy are much wider and highlight climate-change mitigation and environmental protection. Therefore, one conclusion to draw from these findings is that when communication about wind energy projects takes place, it is important to highlight positive implications at the local level and emphasize how the municipality or the community could benefit from the project. This is also confirmed by *Paper 3*, where mayors and local council members underline the importance of local benefit creation. Therefore, it seems to be important to make sure that the community and/or municipality directly benefits from the project. Further, *Paper 3* includes suggestions for communicating about projects. In addition to emphasizing local benefits, early communication and transparency is essential. Here, not only is timing important, but also the nature of information events. The study found that it seems to be better to have information stands rather than one big panel discussion.

7. Limitations

This dissertation was designed to investigate the dynamics of local responses and to create better understanding of the interdependence between various factors that affect local responses. While the dissertation has provided valuable insights into the latter, it is subject to limitations. The study-specific limitations are discussed in each paper, and here the focus is on the general limitations of this dissertation. From these limitations, suggestions for future research are derived.

The overall objective of the dissertation is to analyze the dynamics of local responses. *Paper 1* investigates how public discourse changes over time. *Paper 3* investigates the development of four case studies. They provide insights into the dynamic processes and changes, but they investigate those in retrospect. Thus, future research could apply a longitudinal study design and accompany a project from the time of first announcement until it is implemented or even beyond. This would enable a better understanding of the dynamics of local responses.

Another limitation of this dissertation relates to the operationalization and measurement of local responses. In *Paper 1*, the public discourse is understood as an influence on local responses. However, the local responses themselves are not directly analyzed. In *Paper 2*, local responses are operationalized by asking respondents whether they would approve a wind energy project close to their home. These stated preferences do not allow an assessment whether this would translate into actual support or opposition. Future research could take a longitudinal approach and investigate local responses to wind energy projects over time. This would allow a better understanding of the dynamics of local responses.

Paper 3 investigated local responses to actual wind energy projects by interviewing different relevant stakeholder groups, local authorities, and the local population. However, this implies a smaller sample size and a narrow geographical context. Thus, additional studies in other regions or countries could provide further insights.

This dissertation highlights some interdependencies between the socio-political level and local responses. However, market acceptance is not analyzed in the three papers. To enable a more holistic understanding of social acceptance, it would be necessary to analyze all three dimensions of social acceptance. Thus, future research could assess the different levels and interdependencies between them using a longitudinal study design. This could increase understanding of how changes at the socio-political level affect market acceptance *and* local responses, and, in turn, how local responses influence market attractiveness and regulatory changes.

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Paper I

The (de-)construction of technology legitimacy: Contending storylines surrounding wind energy in Austria and Switzerland

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Abstract:

Why do some countries assign a major role to wind energy in decarbonizing their electricity systems, while others are much less committed to this technology? We argue that processes of (de-)legitimation, driven by discourse coalitions who strategically employ certain storylines in public debates, provide part of the answer. To illustrate our approach, we comparatively investigate public discourses surrounding wind energy in Austria and Switzerland, two countries that differ strongly in wind energy deployment. By combining a qualitative content analysis and a discourse network analysis of 808 newspaper articles published 2010-2020, we identify four distinct sets of storylines used to either delegitimize or legitimize the technology. Our study indicates that low deployment rates in Switzerland can be related to the prominence of delegitimizing storylines in the public discourse, which result in a rather low socio-political acceptance of wind energy. In Austria, by contrast, there is more consistent support for wind energy by discourse coalitions using a broad set of legitimizing storylines. By bridging the related but separate literatures of technology legitimacy and social acceptance, our study contributes to a better understanding of socio-political conflict and divergence in low-carbon technological pathways.

Keywords: Socio-political acceptance, Technology legitimacy, Wind energy, Discourse network analysis, Austria, Switzerland

1. Introduction

To effectively mitigate climate change and reduce air pollution, it is essential to decarbonize electricity systems (Estevão, 2020; Intergovernmental Panel on Climate Change (IPCC), 2018; Sindhwani et al., 2022). This requires a vast expansion of low-carbon technologies, such as wind energy and solar photovoltaics. Most renewable energy technologies have become technically and economically viable (Duić, 2015; IRENA, 2020), often outperforming fossil fuel-based or nuclear alternatives in terms of levelized cost of electricity (International Renewable Energy Agency (IRENA), 2022; Timilsina, 2020). Still, their deployment is lagging behind stated objectives in many countries (United Nations Framework Convention on Climate Change (UNFCCC), 2021).

This discrepancy has various, often interrelated causes. Due to the sunk costs of existing systems along with institutional, cultural, and cognitive-behavioral lock-ins, electricity supply infrastructures are inherently inert (Geels, Sovacool, Schwanen, & Sorrell, 2017; Seto et al., 2016; Unruh, 2002; Verbong & Geels, 2007; Wolsink, 2012). Relatedly, socio-technical transitions often face resistance by actors expecting to lose from changes (Geels, 2014; Rinscheid, 2020; Trencher, Healy, Hasegawa, & Asuka, 2019), and the deployment of new technologies frequently faces local opposition at the project level, which is particularly the case for wind energy (Devine-Wright, 2005; Reusswig et al., 2016; Scherhaufer, Höltinger, Salak, Schauppenlehner, & Schmidt, 2017). Nevertheless, various countries have been quite effective in increasing the share of low-carbon technologies for electricity production, including Sweden, Denmark, Austria and others (Ritchie & Roser, 2021). This paper is set out to further explore the differences between leaders in renewable energy adoption and countries that are lagging behind.

Research has focused on *social acceptance* of technologies as a necessary condition for their deployment (e.g., Batel, 2020; Ellis & Ferraro, 2016; Rand & Hoen, 2017; Wüstenhagen, Wolsink, & Bürer, 2007). While social acceptance may refer to a more or less 'active' endorsement, it generally captures the positive reaction of actors (e.g., citizens, stakeholders and policy-makers) towards a technology (Dermont, Ingold, Kammermann, & Stadelmann-Steffen, 2017). Social acceptance has been established as a multi-dimensional concept, with socio-political acceptance being the foundation for other dimensions, including community and market acceptance (Wolsink, 2018). The social acceptance literature provides a valuable conceptual repertoire to study social conflicts in socio-technical transitions. However, it often fails to appreciate the *dynamics* of multi-actor processes (Cuppen & Pesch, 2021) and has generated little insight into

the factors that shape *socio-political* acceptance, in particular. We contend that studying processes of technology legitimation can help to better understand how socio-political acceptance of technologies is shaped over time.

The key role of *technology legitimacy* in the diffusion and decline of technologies is underscored by research on innovation systems and socio-technical transitions (Binz, Harris-Lovett, Kiparsky, Sedlak, & Truffer, 2016; Geels & Verhees, 2011; Markard, Rinscheid, & Widdel, 2021). Technology legitimacy refers to the "commonly perceived alignment (or misalignment) of a focal technology with institutional structures in its context" (Markard et al. 2016, p. 333) and is shaped and contested in public discourse. For a niche technology to enter mass markets, it is essential to build up legitimacy across broader constituencies (e.g., consumers and investors) (Smith & Raven, 2012). Further, also in later phases, technology legitimacy is essential (Geels & Verhees, 2011). Bridging the literatures on technology legitimacy and social acceptance, we argue that gaining legitimacy is necessary for a technology to be accepted by policymakers, investors, and the broader public. By investigating technology legitimacy in the context of low-carbon transitions across cases, we aim to better understand differences in the adoption of sustainable energy technologies, which we assume is closely associated with divergence in their social acceptance.

Empirically, we focus on legitimation processes surrounding wind energy. Globally, wind energy capacity has grown notably in recent years (REN21, 2020). However, the importance of wind energy varies strongly across countries (WindEurope, 2022). We comparatively study processes of technology (de-)legitimation in two European countries, Austria and Switzerland. While these two cases are similar in many respects (e.g., size, population size, energy transition objectives, strength of green parties, role of participatory processes), they differ strongly regarding the role of wind energy in their electricity systems. Wind energy is an important part of the electricity generation portfolio in Austria, where it accounted for 12% of electricity demand in 2020 (WindEurope, 2022), but it only delivered 0.2% of electricity demand in Switzerland in the same year (Suisse Eole, n.d.). With the contribution of onshore wind energy being on par with the United Kingdom's, Austria is by far the leader among all landlocked countries in Europe in terms of the share of annual electricity demand covered by wind energy (WindEurope, 2022). Switzerland, on the other hand, is among the least developed wind markets in Europe, with only 41 large wind turbines being installed at the end of 2020 (WindEurope, 2022).

Puzzled by this divergence, our research centers on the question how the construction and deconstruction of technology legitimacy reflects, and influences, the socio-political acceptance of wind energy and the development of deployment trajectories. We examine this question based on the multi-dimensional discursive approach developed by Rosenbloom, Berton, and Meadowcroft (2016). Weaving together conceptual lenses from sustainability transitions research and discourse theory, this approach captures how politically relevant actors use so-called storylines in public debates. Complementing this approach, we apply Discourse Network Analysis (DNA) to systematically study discourse coalitions over time, which helps to better understand the role of actors in the (de)construction of technology legitimacy. Going beyond previous research that looks at lock-in and path dependence (Verbong & Geels, 2007; Wolsink, 2012) or local opposition against renewables (Jones & Eiser, 2010; Kontogianni, Tourkolias, Skourtos, & Damigos, 2014; Reusswig et al., 2016) as primary explanations for low deployment rates of wind energy, we systematically compare discourses surrounding technology legitimacy, thereby unveiling broader societal forces that shape low-carbon pathways over longer periods of time.

Studying public discourses based on 808 newspaper articles published between 2010 and 2020, we identify four overarching storylines used to (de)legitimize wind energy in both countries. Our analysis shows that storylines that delegitimize wind energy were far more prevalent in Switzerland than in Austria. Specifically, our study documents how concerns about landscape protection and the stability of the electricity system, along with perceived economic risks and questioning the suitability of wind energy, have dominated the public discourse, and contributed to delegitimizing wind energy in Switzerland. We argue that the highly contested legitimacy of wind energy in Switzerland has contributed to shaping a hostile investment environment in which not a single wind turbine was built over several consecutive years in the 2010s. By contrast, while concerns are voiced in Austria too, the legitimacy of wind energy is much less contested. Instead, the public discourse is characterized by efforts to construct legitimacy with broad actor coalitions supporting the fast deployment of wind turbines and seeking to overcome implementation obstacles to make wind energy a central part of a low-carbon energy system.

Based on our analysis, we make three main contributions. First, conceptually, we bridge the related but separate literatures on social acceptance and technology legitimacy. While both concepts are important for the analysis of technology-society interactions and offer complementary insights, they have evolved mostly independently of each other so far. Second, we systematically examine public discourses on wind energy in a

comparative setting, thereby identifying key storylines and shifting discourse coalitions over time. This contributes to explaining variation in countries' technology deployment pathways and their embeddedness in broader societal forces over time. Third, by applying the DNA method to studying processes of (de-)legitimation, we advance the methodological repertoire of the analysis of the interactions of technology with socio-political and behavioral aspects.

The remainder of this article is structured as follows: Section 2 discusses the concept of socio-political acceptance, its relationship with technology legitimacy, and the role of public discourse and discourse coalitions in shaping both, technology legitimacy and socio-political acceptance. Section 3 introduces the methods, case selection rationale, dataset, and analysis technique. Section 4 entails the results of our comparative case study. After discussing the results in section 5, the paper concludes by reviewing the main findings and suggesting implications for future research.

2. Theoretical Foundations

2.1. Social acceptance

At least in democratic states, social acceptance is a prerequisite for the large-scale deployment of new technologies like wind energy. Over the last 20 years, scholars have produced a rich body of research on the social acceptance of energy technologies (Bell, Gray, & Haggett, 2005; Blumer, Braunreiter, Kachi, Lordan-Perret, & Oeri, 2018; Devine-Wright, 2007; Ellis & Ferraro, 2016; Huijts, Molin, & Steg, 2012; Rand & Hoen, 2017; Vuichard, Broughel, Wüstenhagen, Tabi, & Knauf, 2022; Wolsink, 2007a). We follow Wüstenhagen et al.'s (2007) suggestion to conceptualize social acceptance along the following three interlinked dimensions: socio-political, market, and community acceptance. *Socio-political acceptance* refers to social acceptance at the broadest societal level. This includes the acceptance of technologies and associated institutional frameworks by the broader public as well as acceptance and the deliberation thereof by key stakeholders and policy-makers (Wüstenhagen et al., 2007). In terms of institutions, research has examined the role of spatial planning (Warren, Lumsden, O'Dowd, & Birnie, 2005; Wüstenhagen et al., 2007), participatory processes (Blumer et al., 2018), and financial procurements systems (Szarka, 2006; Wüstenhagen et al., 2007), among others. Socio-political acceptance has implications for the *market acceptance* of a technology, which includes acceptance by consumers and investors (Klessmann et al., 2013). In the case of wind energy, market acceptance is highly robust nowadays. In

2021, 41bn Euros were invested in new wind energy developments in Europe alone (WindEurope, 2022). Globally, onshore wind energy accounts for 769.196 installed MW capacity, which equals 25% of all renewable sources (International Renewable Energy Agency (IRENA, 2022).

Socio-political acceptance is also strongly interlinked with *community acceptance*, which refers to acceptance of technologies and infrastructures at the local level (Wolsink, 2000; Wüstenhagen et al., 2007). With respect to wind energy projects, local responses have been investigated widely and many factors could be identified as influential, including trust in project developers and public administration, distributive justice, and procedural justice (Susana Batel et al., 2015; Bell et al., 2005; Devine-Wright et al., 2017; Ellis, Barry, & Robinson, 2007; Kontogianni et al., 2014; Rand & Hoen, 2017; Walker et al., 2010; Wolsink, 2007b). Often, opposition by the local population is depicted as a cause for slow wind energy deployment that 'needs to be overcome' (e.g., Reusswig et al., 2016). Acknowledging that local responses to wind energy projects cannot be explained, understood, or predicted by adopting a methodological individualist ontology (Thornton & Knox, 2002; Wolsink, 2000), social acceptance research at the community level moved from the reductionist "NIMBY" concept, which has been extensively criticized for postulating that rational and egoistic individuals engage in opposition against wind projects when their personal well-being is at stake (Devine-Wright, 2009; Wolsink, 2000), to a more nuanced, context-sensitive understanding. The latter attends systematically to local conditions (Walker, Stephenson, & Baxter, 2018), institutions (Breukers & Wolsink, 2007; Wolsink, 2000), as well as communication and discourse (Olson-Hazboun, Krannich, & Robertson, 2016; Wolsink, 2007b) in shaping acceptance. Along these lines, Firestone, Bates, and Knapp (2015, p. 248) suggested that positive and negative impressions of wind energy "are more reflective of socially and culturally constructed aspects associated with the wind turbine than physical ones."

Building on this line of research, we concur with Devine-Wright et al. (2017) who emphasized that, given that perceptions are socially constructed, achieving a comprehensive understanding of local responses to electricity infrastructure deployment requires analyses of the broader economic, socio-political, cultural, and geographical influences by which they are shaped. Relatedly, Blumer et al. (2018) highlighted how the perceptions and beliefs of communities affected by new energy technologies are influenced by public discourses and the cultural and social context in which they are embedded. At the level of individual projects, Huijts et al. (2012) showed that communication has a strong influence on local responses. In sum, all these works point

to the malleability of technology acceptance and the crucial role of public discourses and actors in shaping the public's responses to new infrastructure deployment.

2.2. Technology legitimacy and discourse coalitions

Technology legitimacy

Research on innovation systems and sustainability transitions has underscored the key role of technology legitimacy, which is a prerequisite for the adoption and diffusion of innovations (Bergek, Jacobsson, & Sandén, 2008; Binz et al., 2016; Bork, Schoormans, Silvester, & Joore, 2015). Legitimacy can be understood as a shared perception that an object (e.g., a technology) fits into a socially constructed system of institutions, norms, and values (Geels & Verhees, 2011; Markard, Wirth, & Truffer, 2016). In the context of energy technologies, legitimacy thus refers to shared perceptions among a set of actors that a technology is a desirable and appropriate component of broader energy systems. While a technology may be perceived as legitimate among certain actors, such as investors, this does not automatically translate into legitimacy among other constituencies, such as policymakers or consumers. However, if legitimacy is gained among a broad range of actors, this facilitates other processes relevant for the development and diffusion of innovations, including resource mobilization, market formation, and the configuration of favorable regulatory frameworks (Bergek et al., 2008), all of which may in turn again shape perceptions of legitimacy in a dynamic, co-evolutionary process (Hekkert, Suurs, Negro, Kuhlmann, & Smits, 2007).

The legitimacy of a technology can rarely be taken for granted, as it is constantly constructed and contested in social processes (Geels & Verhees, 2011; Johnson, Dowd, & Ridgeway, 2006). This dynamic understanding also implies that legitimacy needs to be maintained to enable continuing public support (Geels & Verhees, 2011; Geels et al., 2017). Therefore, to assess the prospects of technology adoption and diffusion, it is important to understand these processes (Binz et al., 2016; Kishna, Niesten, Negro, & Hekkert, 2017). Legitimacy-building entails various activities by organizations and individuals seeking to influence others' expectations and beliefs about the role of a new technology in the context of existing systems (Bergek et al., 2008). As Geels and Verhees (2011, p. 913) put it, the study of legitimacy-building "emphasizes that collective sense making takes place on public stages (e.g., public debates, media, newspapers)", with various actors including industry associations, policy makers, social movements and others "perform[ing] on these public stages and engag[ing] in discursive

struggles that aim to influence collective discourses". Several studies have since more deeply investigated the construction of technology legitimacy in public arenas (e.g., Dehler-Holland, Okoh, & Keles, 2022; Markard et al., 2016; Tziva, Negro, Kalfagianni, & Hekkert, 2020). Importantly, the legitimacy of the status quo; i.e., the widespread acceptance of existing configurations, often works against such legitimacy-building efforts of new technologies (Johnson et al., 2006). Consequently, discursive struggles surrounding new technologies typically also involve active efforts to *erode* legitimacy, such as in the cases of genetically modified food (Jansma, Gosselt, Kuipers, & de Jong, 2020) or solar photovoltaics (Rosenbloom et al., 2016).

Public discourse & discourse coalitions

The multi-dimensional discursive approach developed by Rosenbloom et al. (2016) provides a valuable framework to study the making and breaking of technology legitimacy in public discourses. This approach captures how politically relevant actors use *storylines* to strategically frame a technology in a particular way and modulate the menu of options perceived as desirable and feasible. Following Hajer, (2006, p. 69), the multi-dimensional discursive approach defines storylines as "condensed statement[s] summarizing complex narratives" about the alignment of a technology with a given context. Narratives, hence, can be seen as the "key vehicle" by which structures of legitimation are built (Hermwille, 2016, p. 239), and storylines encapsulate a variety of specific narratives that contribute to a common direction of sense-making regarding the object of reference. Obviously, storylines can be employed for the construction of legitimacy, but they can also be used to erode it (Bosman, Loorbach, Frantzeskaki, & Pistorius, 2014), as in Roberts' (2017) discursive analysis of "negative storylines" surrounding historical American railroads.

Building on the institutional work literature (Fuenfschilling & Truffer, 2016), which highlights the role of actors in shaping beliefs and meanings through discourses, the multi-dimensional approach also emphasizes the importance of actors "who behave in a fashion that advances their perceived interests" (Rosenbloom, 2018, p. 131), when investigating processes of (de-)legitimation. Going one step further, we submit that a more systematic analysis of *discourse coalitions* may be helpful to better understand both the motivations and influence of actors in the construction and deconstruction of technology legitimacy, especially when the interest lies with exploring variation across cases. This resonates with Bergek et al. (2008) who assign great importance to actors and actor networks in innovation processes. To examine the construction and diffusion of particular storylines, we argue that we need to better understand the emergence and

reconfiguration of actor networks who nurture these storylines. We thereby follow Hajer's (1995, p. 65) definition of discourse coalitions as "the ensemble of (1) a set of storylines; (2) the actors who utter these storylines; and (3) the practises in which this discursive activity is based" (Hajer, 1995, p. 65). In our analysis, we use the case of wind energy deployment in Austria and Switzerland to examine discourse coalitions and their utterance of storylines over time.

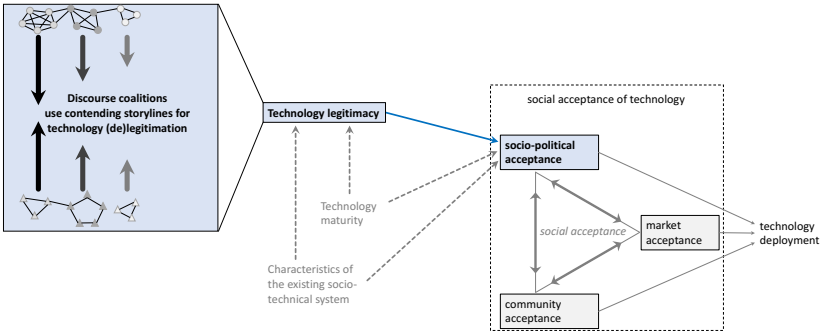

Figure 1: Conceptual framework. Blue parts highlight the core focus of this study.

Fig. 1 illustrates our conceptual framework. Ultimately, we aim at explaining differences in deployment levels of new technologies, which are presumably related to differences in social acceptance. We focus specifically on socio-political acceptance – acceptance of policies and technologies by the public, stakeholders, and policymakers – as it is influencing community and market acceptance (Wolsink, 2018). We contend that apart from other factors such as technology maturity and characteristics of the existing socio-technical systems, socio-political acceptance is shaped by discourses about technology legitimacy. In our study, we focus on technology legitimacy which we understand as core aspect that affects socio-political acceptance. To conceptualize the underlying discursive interactions, we take inspiration from the multi-dimensional discursive approach by Rosenbloom et al. (2016) and Hajer's (1995) discourse coalitions approach.

3. Empirical Approach

3.1. Cases

We selected Austria and Switzerland due to our interest in exploring differences in technology adoption across countries and because these countries share several important characteristics. While we deliberately refrain from conducting a causal analysis, which would require a different research design, selecting cases that are similar on several dimensions helps to narrow down the menu of factors that can plausibly be linked to the remarkable divergence in technology adoption.

Both Austria and Switzerland are relatively small and wealthy countries in the middle of Europe. They share similarities with respect to culture, population size, geographical conditions, and the importance of institutions for citizen participation in the context of infrastructure deployment such as wind energy projects, where the local population or the municipality have a direct say in the process and hence a strong influence on project implementations.

In terms of climate and energy policy, both countries aim at becoming climate neutral over the following decades (Austria by 2040; Switzerland by 2050) (Austrian Parliament, 2021; BFE, 2017). In both countries, the green parties are a relevant political factor. Austria's current Head of State (since 2017) is a former federal spokesman for the Austrian Green Party, and the party reached 13.9% in the last parliamentary election (BMI, 2019). In Switzerland, the Green Party and Green liberal Party, both strong supporters of wind energy deployment, are represented in parliament (Federal Statistical Office (FSO), 2019).

2020	Austria	Switzerland
Electricity Mix	62% Hydro, 21% RE, 18% Thermic	58% Hydro, 33% nuclear, 9% other
Electricity consumption	61,3 TWh	55,7 TWh
Electricity imports	24,52 TWh	32,78 TWh
Electricity exports	22,3 TWh	37,99 TWh
Energy imports	1.362.570 TJ	621.380 TJ
Energy exports	579.961 TJ	136.150 TJ
Energy import dependency	58,32%	71.95%

Table 1: Electricity and Energy market structure in Austria (Statista, 2022) *and Switzerland* (Statista, 2021)

Regarding their electricity supply, hydropower plays a particularly important role in both countries (AT: 62% of electricity generation[2] / CH: 58%[3] as of 2020). Electricity demand in 2020 was similar in Austria (61,3TWh[4]) and Switzerland (55,7TWh[5]), and both countries had an approximately leveled electricity import/export balance in 2020 (AT: 24,52 TWh imports[6]; 22,3 TWh exports[7] / CH: 32,78 TWh imports[8]; 37,99 TWh exports[9]). Considering the entire energy sector, both countries are highly dependent on energy imports (AT: 58,32% (Eurostat, 2022) of primary energy supply and CH: 71,95% (Bundesamt für Statistik (BFS), 2021)).

There are also two major differences between the countries, which we assume have an influence on the discursive legitimation of wind energy and wind energy deployment. First, while absolute population size is similar (AT: 8.9 million / CH: 8.6 million), Switzerland has a considerably higher population density (210 inhabitants per km^2) than Austria (106 inhabitants per km^2). Second, Switzerland runs nuclear power plants, while Austria does not.

The reliance on wind energy differs tremendously between the two countries. In 2020, Austria had 1.307 wind turbines, while in Switzerland, only 41 turbines were operational (Suisse Eole, n.d.). In terms of electricity generation capacity, this translates to 3.105 MW (covering 12% of electricity demand) in Austria (WindEurope, 2022) and 86,9 MW in Switzerland (0,2%) (Suisse Eole, n.d.). In the following, we provide a brief overview on the development of wind energy and supporting policies in both countries.

[2] https://de.statista.com/statistik/daten/studie/325519/umfrage/stromerzeugung-in-oesterreich-nach-energietraeger/
[3] https://de.statista.com/statistik/daten/studie/182186/umfrage/struktur-der-bruttostromerzeugung-in-der-schweiz/
[4] https://oesterreichsenergie.at/downloads/grafiken/detailseite/stromverbrauch-in-oesterrech-ab-1970
[5] https://de.statista.com/statistik/daten/studie/291735/umfrage/stromverbrauch-der-schweiz/
[6] https://de.statista.com/statistik/daten/studie/325080/umfrage/stromimport-oesterreichs/
[7] https://de.statista.com/statistik/daten/studie/325125/umfrage/stromexport-oesterreichs/
[8] https://de.statista.com/statistik/daten/studie/291753/umfrage/stromimport-der-schweiz/
[9] https://de.statista.com/statistik/daten/studie/291758/umfrage/stromexport-der-schweiz/

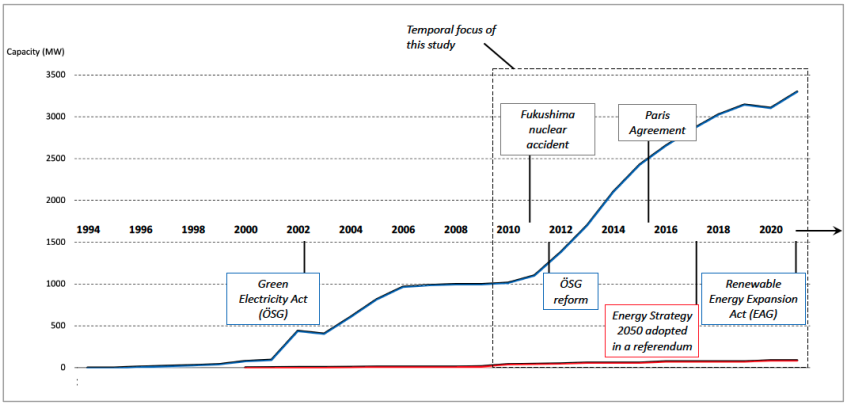

Figure 2: Development of wind power capacity and relevant policy developments in Austria (blue) and Switzerland (red), 1994 to 2020.

Austria

In 1994, the first wind turbines were installed in Austria. A notable increase in capacity occurred between 2001 and 2005, when installed capacity rose from 94 to 817 MW within four years (see Fig. 2). This growth was mainly due to the *Green Electricity Act* (Ökostromgesetz, ÖSG), which defined feed-in tariffs (FIT) for all renewable electricity generation technologies. Adopted in 2002, this law was the first to regulate the purchase of green electricity on a nationwide (rather than provincial) basis. Yet, only a few wind projects were realized in the following years. The next period of dynamic growth started in 2011, after the amendment of the ÖSG. Adopted in 2011, this reform entailed specific expansion targets for renewable energies (ÖSG, 2012). Moreover, the ÖSG stipulates that renewables are subsidized through guaranteed FITs for a period of 13 years. In total, the installed MW capacity increased from 1103MW to 2425MW between 2011 and 2015 (IG Windkraft, 2022). However, the ÖSG amendment also included a cap on the total volume of financial support provided via FITs of 11.5 million Euros for wind energy (ÖSG, 2012). This resulted in a curb of growth in 2015, when the cap was reached, because new projects that had already been permitted but not yet constructed were put on a waiting list. In 2021, parliament adopted the *Renewable Energy Expansion Act* (Erneuerbaren Ausbau-Gesetz, EAG) to resolve this situation. Implemented in 2022, the EAG aims at increasing annual electricity generation from renewable sources by 27 TWh, with a target of 10 TWh for wind energy. Based on this new policy, renewables are supported through market premiums (EAG, 2022).

Switzerland

In Switzerland, the first turbine was installed in 1990[10]. In contrast to Austria, there has been no dynamic growth at any point in time since then (see Fig. 2). Overall, the installed MW capacity in Switzerland in 2020 was still lower than Austria`s installed MW capacity 20 years earlier. In terms of policies, the *Energy Strategy 2050* (Energiestrategie 2050), adopted in 2017, is most relevant. As part of the Energy Law (Energiegesetz, EnG), it defines expansion targets for renewables and regulates the renewable energy market. The stated objective is to generate 7% of electricity generation from wind energy by 2050, which translates to an increase of the number of wind turbines by a factor of 20 (Art. 2 and 3 EnG). Based on the EnG, renewables are supported through feed-in-tariffs. While these were initially granted for 20 years, there is a long waiting list since there are more project applications than available funds (Swiss Federal Office of Energy, 2018).

3.2. Data set

Our study builds on newspaper data to study public discourses surrounding wind energy. Compared to other data sources, newspapers have a number of advantages. First, they are published regularly and thereby generate a reliable base for systematic empirical analysis over longer periods of time. Second, in contrast to parliamentary protocols or position papers, newspaper data presumably represent a broader variety of actors (Leifeld, 2013). This is also due to the fact that newspapers tend to highlight conflicts to attract attention (Bennett, 2016), thereby providing space to a greater diversity of actors and arguments compared to policy documents (Delshad & Raymond, 2013). Third, by carefully selecting various newspapers, it is possible to explicitly consider different types of newspapers (quality press versus tabloid journalism) and ideological leanings. Presumably, this contributes to obtaining a comprehensive account of the socio-political acceptance of wind energy. Fourth, newspapers are relevant in shaping citizens', stakeholders' and policymakers' views (Crow & Lawlor, 2016; Gamson & Modigliani, 1989) and are widely read. In Austria, 58,3%[11] of the population regularly read newspapers, while this share even reaches more than 90% in Switzerland (WEMF, 2019). Batel and Devine-Wright (2014) highlight the relevance of studying representations of renewables in mass media to allow a better understanding of the public's responses to renewable energy technologies.

[10] https://de.statista.com/statistik/daten/studie/296206/umfrage/windstromerzeugung-in-der-schweiz/
[11] https://de.statista.com/statistik/daten/studie/307036/umfrage/nettoreichweiten-der-tageszeitungen-in-oesterreich-nach-zeitungen/

Our analyses rely on six major newspapers in Austria and Switzerland. We selected a liberal and a conservative quality newspaper as well as a tabloid newspaper with a broad reach for each case (bpb, n.d.) (see Table 2). For comparability, we only use the German-speaking part of Switzerland, which represents ca. 63% of the population (BFS, 2017).

	Austria	Switzerland
liberal	Der Standard[12]	Tages-Anzeiger[13]
conservative	die Presse[14]	NZZ[15]
tabloid	Kronen Zeitung[16]	20 Minuten[17]

Table 2: Newspapers used for the analysis.

We used the Factiva database to systematically retrieve newspaper articles about wind power from the newspaper archives. The time frame encompasses 11 years from 2010 to 2020. We selected 2010 to start our analysis for two reasons. First, in both countries, deployment of wind energy was at a relatively low level before 2010, with little or no capacity additions in the years leading up to 2010. However, a notable growth set in around 2010/2011 in both countries, albeit at different levels (see Fig 1). Second, our pre-tests of systematic searches for relevant newspaper articles showed that the salience of wind energy in public discourse was rather low prior to 2010, becoming higher at the turn of the decade. After the 2011 Fukushima nuclear disaster public debates on the energy transition intensified.

The search string used to identify relevant articles included the terms “wind energy“ and/or „wind turbine“. This resulted in 460 articles for Austria and 782 articles for Switzerland. After removing false positives and irrelevant articles, our analyses rely on 298 articles for Austria and 510 articles for Switzerland.

3.3. Coding and analysis

Inspired by the multi-dimensional discursive approach (Rosenbloom et al., 2016) and following principles of qualitative content analysis (Mayring, 2014), we conducted an in-depth review of the 808 relevant articles to identify storylines employed to legitimize

[12] https://www.eurotopics.net/de/148488/der-standard
[13] https://www.eurotopics.net/de/148807/tages-anzeiger
[14] https://www.eurotopics.net/de/148502/die-presse
[15] https://www.eurotopics.net/de/148731/neue-zuercher-zeitung
[16] https://www.eurotopics.net/de/148614/kronen-zeitung
[17] https://www.eurotopics.net/de/148396/20-minuten

or delegitimize wind energy in Austria or Switzerland. This was an iterative and inductive process. After having read all articles, a first preliminary list of narratives was established. Based on thematic analysis (Braun & Clarke, 2012), this list was then revised and consolidated by merging similar categories and classifying related narratives into higher-order storylines. For example, the narratives "Wind power puts grid stability at risk", "Nuclear energy is necessary" and "A transition towards renewables is not feasible" were classified into the delegitimizing storyline "Future-proof electricity system", as all these narratives portray wind energy as a barrier to an efficient and 'future-proof' electricity system. After three rounds of consolidating and informed by feedback the authors received following a presentation of the preliminary dataset at a research workshop, the final dataset entails 45 different narratives for Austria and 68 for Switzerland. These were classified into four distinct storylines employed to legitimize wind energy, and four storylines used to delegitimize the technology. Finally, each individual newspaper article was re-coded as one of the four bi-directional storylines. Relevant articles in which no storyline could be identified were categorized as "other" (AT: 47, CH: 96). As these are not examined in depth, our analyses of storylines in section 4.1 rely on 251 articles from Austrian newspapers and 414 articles from Swiss newspapers.

The second step of our analysis involves closer attention to actors and emerging discourse coalitions. For this analysis, we made use of Discourse Network Analysis (DNA), a method developed by policy scholars to investigate policy debates in a systematic way (Leifeld & Haunss, 2012). DNA combines qualitative discourse analysis and quantitative actor network analysis, thereby allowing to identify discourse coalitions and reconfigurations of coalitions over time. Based on the category scheme developed in the first step and the same dataset, we coded statements made by actors that conveyed certain narratives with respect to wind energy. As new narratives emerged during this coding process, the original coding scheme was amended where necessary. Despite some new narratives, the subsequent classification led to the same storylines established earlier. For our analysis of discourse coalitions in sections 4.2 and 4.3, we analyze these discourse data at the level of storylines. In particular, we rely on actor congruence networks, in which a link between actors is established if the latter employ narratives classified under the same storyline. For example, if two actors both portray wind energy as a barrier to a future-proof electricity system, they are connected in the actor network, even if they differ in terms of the specific narrative employed to convey this overarching storyline. We opted for this highly aggregated mode of analysis as it facilitates the comparison between cases and helps to uncover broader trends, but we are mindful of

the fact that a lot of fine-grained information about specific narrative clusters and argumentative struggles, which are often temporally and spatially bound, remains unattended to. Yet, in line with our research objective, these highly aggregated network graphs allow us to visualize and compare the salience of specific storylines over time and help to identify coalitions of like-minded actors working towards the legitimation or delegitimation of wind energy.

4. Results

Our analysis proceeds in three steps. First, we introduce the main storylines identified in Austrian and Swiss newspapers and compare their relevance both across time and scale. Second, based on DNA, we analyze and compare the evolution of wind energy discourse coalitions. Third, using the same data, we trace those actors over time that are particularly influential in constructing or eroding the legitimacy of wind energy in both countries.

4.1. Four storylines

Based on our qualitative content analysis, we identified four bidirectional storylines. As we describe in more detail below, each of them can be used to either legitimize or delegitimize wind energy.

Wind energy as part of a future-proof electricity system

The storyline "*future-proof electricity system"* entails narratives discussing the role of wind energy as part of electricity systems, often referring to the future of electricity supply and discussing other technologies alongside wind. The main thrust of the storyline, in its legitimizing form, is that wind energy contributes to the efficient and effective operation of the electricity system. Going one step further, many articles subsumed under this storyline proceed from the standpoint that wind energy is a viable technology and discuss the necessary changes of the electricity system that are required to better integrate wind energy. On the other hand, articles that delegitimize wind energy with reference to electricity systems tend to portray the technology as a barrier to an efficient electricity system, e.g. by highlighting grid stability risks or evoking an increased risk of blackouts.

As can be seen in Fig. 3, throughout the entire period of observation, this storyline plays an important role in the legitimation of wind energy in the Austrian discourse. Prominent

narratives highlight the need to expand the grid, improve grid integration, and enhance the infrastructure to support large-scale deployment of wind energy. Additionally, to productively address the technology's volatility in electricity generation, the role of wind energy in the future electricity system is portrayed as benefitting from solutions like power-to-gas and power-to-x.

In the Swiss discourse, the storyline is a prominent vehicle to legitimize wind energy especially at the beginning of the decade, but less so later. Interestingly, our data reflect a 'Fukushima effect' in the Swiss wind power discourse. Under the impression of the nuclear disaster, many articles in 2011 interrogate the contribution of wind energy in an electricity system. This discourse, however, appears to be polarized, with an almost balanced number of articles delegitimizing or legitimizing wind energy. In terms of technology legitimation, several articles highlight the feasibility of a transition towards higher shares of renewable energies, the role wind energy could play in replacing nuclear power, and the required grid expansion. Regarding the delegitimizing side, concerns about grid stability and potential blackouts, a recurring issue in Swiss energy debates, are evoked as downsides of wind energy, alongside general doubts about the feasibility of transitioning away from nuclear power and towards a higher share of renewable energies. Over time, this nuclear narrative and other narratives that call into question the contribution of wind energy to an efficient electricity system became quieter, only to re-emerge over the years 2019/2020. In Austria, on the other hand, the role of wind energy in electricity systems has rarely been a relevant anchor to delegitimize the technology, even if grid stability and related system challenges are repeatedly evoked in a small number of articles.

Risks and benefits of wind energy

The "*Risks and Benefits*" storyline summarizes narratives that frame wind energy as a force influencing economic development, innovation, and environmental performance. When used to legitimize wind energy, the storyline highlights opportunities and benefits associated with the deployment of wind turbines. On the other hand, when used to delegitimize wind energy, the technology is portrayed as a threat to economic development, innovation, public acceptance, and the environment.

Fig. 3 shows the relevance of the "*Risks and Benefits"* storyline for both Austria and Switzerland over time. As mentioned, this analysis relies on the coding of the dominant storyline in individual newspaper articles. As can be seen, overall, Swiss newspaper coverage is characterized by a considerably higher number of articles highlighting risks.

Important narratives to delegitimize wind energy in Switzerland foreground the impact of wind turbines on landscapes, risks for birds, and associated concerns with regard to social acceptance. Not only is the frequency of articles that convey delegitimizing narratives under the "*Risks and Benefits"* storyline much lower in Austria (21 versus 42 in Switzerland), but the narratives also differ. Concerns about social acceptance are raised in Austria, too, but landscape and bird protection only play a subordinate role in the discourse surrounding wind energy. Instead, pointing to economic risks, concerns about costs of the energy transition are raised more frequently.

When it comes to the construction of legitimacy, the number of articles is about equal and decreases in both countries over time. In Austria, the most prevalent narratives highlight the economic potentials of wind energy, for instance as a job creator and viable business opportunity. Moreover, the potential participation of citizens (e.g., as investors) is seen as an advantage of wind energy vis-à-vis more centralized energy technologies, and arguments about the much lower externalities of wind energy when compared with fossil fuels contribute to the build-up of legitimacy via this storyline. Similarly, in Swiss newspapers, legitimacy is attempted to be built up primarily on the basis of economic considerations. Most importantly, the (future) profitability and technological advances are highlighted to underscore the benefits of wind energy.

Figure 3: Number of storylines identified per year in Austria (left column) and Switzerland (right column)

Regulatory framework

The *"regulatory framework"* storyline highlights the policy dimension of technology deployment. It foregrounds that policy risks need to be reduced in order to ensure a reliable environment for investors. Almost all instances of this storyline are employed to legitimize wind energy. In Austria, the storyline is prominent in particular between 2012 and 2014 and then again from 2019. This reflects the policy risks associated with the cap on the volume of financial support for wind energy introduced in 2011. From 2012 to 2014, several articles called for a more reliable regulatory framework, but the issue was not resolved in the legislative arena at that time. With an ever growing queue of projects awaiting realization, problem pressure has mounted since 2016, which is reflected in numerous articles calling for changes to the regulatory status quo in order to remove the cap and provide further incentives for wind energy expansion.

Overall, the storyline is equally prominent in Switzerland. Again, a 'Fukushima effect' can be seen in Fig. 3, reflecting the calls for a new energy policy framework and suggestions to introduce a stable financial support scheme for wind energy. Another policy risk narrative reflecting a Swiss particularity relates to calls for the European Union and Switzerland to enact a common electricity market. In contrast to Austria, the "*regulatory framework"* storyline was repeatedly used to delegitimize wind energy in Switzerland. Accordingly, some articles argued that regulatory changes or policies to incentivize deployment (such as FITs) would distort market forces, thereby giving wind energy an advantage that it does not deserve.

Wind energy in a small country

Finally, the storyline "*small country*" encompasses narratives that link the desirability of wind energy deployment with spatial perceptions and country identity. When used to legitimize wind energy, narratives highlight the need to strengthen energy transition efforts in Austria or Switzerland to catch up with other countries. Frequently, this also involves references to role models; i.e. countries seen as good examples for a successful technology adoption. When the storyline is evoked in a delegitimizing sense, this typically entails references to other countries whose experiences with wind energy are portrayed as problematic. Another frequent narrative implies that wind energy investments should be made abroad and not domestically.

As Fig. 3 shows, the "*small country*" storyline is an especially important part of the Swiss discourse. With 101 articles on the delegitimizing side and 66 on the legitimizing side, it is the most frequently used storyline overall. When used to legitimize wind

energy, the most prevalent narratives in Switzerland center on positive examples of wind energy projects and energy transitions in other countries, often combined with statements that Switzerland currently risks fostering its positions as a laggard. Likewise, in the Austrian discourse, the development of the country's wind power sector is frequently evaluated against positive examples from other countries, with a number of articles highlighting achievements within specific federal states, such as Burgenland, and others emphasizing that the energy transition is flourishing in Austria.

When it comes to delegitimizing uses of the "*small country*" storyline, there is a strong contrast between Austria and Switzerland. Swiss articles often refer to country size and geographical conditions as an excuse to assert that wind power has no place in Switzerland. However, this narrative is not invoked in Austria. Interestingly, however, many Swiss newspaper articles argue that Swiss companies should invest in wind energy abroad, due to better regulatory conditions, better and faster project implementation, higher profitability, and better wind conditions. Again, this narrative does not occur in the Austrian discourse, where the small country storyline is occasionally used to delegitimize wind energy based on problematic experiences made in other countries. In sum, while country size, geographical conditions and associated issues of national identity are frequently evoked to delegitimize wind power deployment in Switzerland, the "*small country*" storyline is mostly used to legitimize the technology in Austria.

Overall, our analysis indicates that the discourse in Switzerland is more polarized than in Austria. While delegitimizing storylines are slightly more frequent in Switzerland (52.7% of the categorized articles) more than two thirds (68.4%) of the Austrian articles convey storylines that legitimize wind energy. Apart from the frequency of storylines, the relevance of themes differs as well. In Switzerland, the most prevalent narratives center on landscape protection, birds, and the viability of wind energy in a small, alpine country. In contrast, the Austrian discourse evolves more around the necessary steps to better integrate wind energy into the electricity system and policy changes necessary to enable faster wind power deployment. In the next section, we substantiate the relevance of storylines and analyze the role of actors in giving direction to discourses surrounding wind energy.

4.2. Discourse coalitions over time

We assess discourse coalitions based on actors' statements in the newspaper articles. In order to trace reconfigurations of coalitions over time, we split the period of investigation into four equal segments of 33 months each. The graphs in Fig. 4 entail

so-called 'actor congruence networks', in which nodes are linked if the actors they represent have uttered statements subsumed under one or more of the same storylines. Hence, for each phase, the graphs illustrate clusters of actors who share the same storylines that legitimize or delegitimize wind energy. Apart from delivering a comparative actor network analysis, the graphs also help to better understand the importance of storylines. While a storyline may be more or less salient at a certain point in time (as assessed with Fig. 3), this does not automatically translate into discursive resonance; i.e., the "extent to which a storyline gains traction among policymakers and the public" (Rosenbloom, 2018, p. 131). For instance, a storyline may be transmitted repeatedly by the same newspaper, but unless it is taken up and shared by various actors, it does not generate a lot of discursive resonance and, hence, in our case can be assumed to have no particularly strong influence on the socio-political acceptance of wind energy.

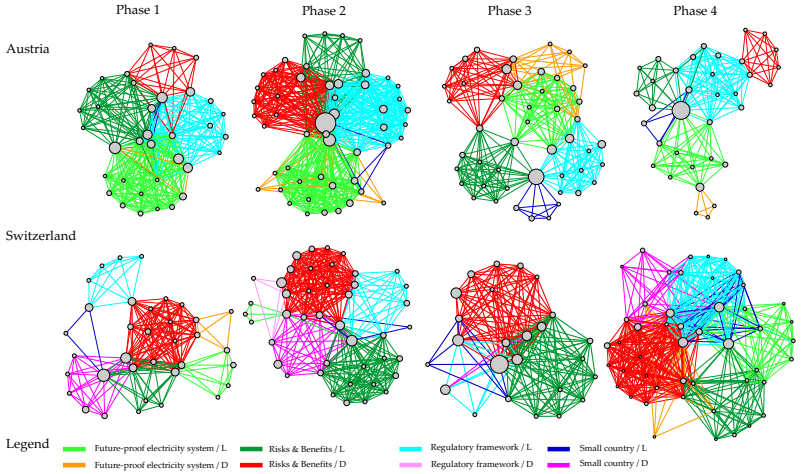

Figure 4: Actor congruence networks for Austria and Switzerland over 4 periods of time. Nodes (representing actors) are connected (via edges) if they share at least one storyline during the respective phase. Edge color represents the shared use of a storyline by adjacent actors. Actors who share several storylines are linked by the respective number of edges. Node size is proportional to the number of statements made by an actor in the respective phase. Graph layout is based on a stress minimization (MDS) of graph-theoretic distances (Brandes & Pich, 2009). *Each period includes 33 months (Phase 1: 1.1.2010 - 30.9.2012; Phase 2: 1.10.2012 - 30.6.2015; Phase 3: 1.7.2015 - 31.3.2018; Phase 4: 1.4.2018 - 31.12.2020). Graphs were generated with the open-source software visone.*

In Austria, legitimizing storylines are dominant from the first through the fourth phase. In the first phase, three discourse coalitions of equal size covering the legitimizing storylines "*future-proof electricity system*", "*regulatory framework*" and "*risks and benefits of wind energy*" can be identified. While a number of actors are part of two or

even all three of these coalitions, the level of discursive integration overall appears to be moderate. In other words, most actors are more likely to either discuss that the regulatory framework needs to be improved, *or* that wind energy is necessary for a future-proof electricity system, *or* that the technology has certain other benefits (e.g., environmental), rather than conveying several statements and thereby supporting more than one storyline. On the delegitimizing side, the only relevant storyline during phase 1 is "*risks of wind energy*". While the storyline is shared by eight actors, five of them convey at the same time statements that legitimize wind energy. This indicates a relatively low level of discursive polarization, as numerous actors try to build bridges between the discourse coalitions working towards legitimizing versus delegitimizing wind energy.

During the second phase (October 2012 to June 2015), the structure of the entire discourse network is similar, but the delegitimizing version of the storyline "*risks and benefits*" gains importance, as it is shared by a higher number (18) of actors. This reflects that during this period of dynamic growth, a relatively strong discourse coalition voices concerns about social acceptance and the short-term costs of wind turbine deployment. Yet, two coalitions working towards legitimizing wind energy dominate. In light of the imminent cap on financial support for the further expansion of wind energy, one coalition calls for a more stable and long-term oriented regulatory framework. Another coalition re-emphasizes the contribution of wind energy to a "*future-proof electricity system*".

Since July 2015, the discourse network becomes more fragmented, as fewer actors are part of more than one discourse coalition. While a second delegitimizing coalition appears as sizeable for the first time – the one challenging wind energy in terms of grid stability and its overarching function as part of the electricity system –, the share of actors working towards delegitimation is similar as before. Notably, most intersections during phase 3 concern the coalitions debating the role of the technology in electricity supply. This indicates that some actors see challenges, but at the same time propose solutions for how these may be overcome. During the final phase, the discourse becomes even more fragmented and less dense. While almost no new wind turbines are built 2018-2020, policy debates center on the design of the Renewable Energy Expansion Act. In the public arena, this is not accompanied by a particularly sizeable coalition seeking to delegitimize wind energy. Instead, several smaller, moderately integrated discourse coalitions continue to convey legitimizing storylines.

To summarize, discourse coalitions working towards the legitimation of wind energy dominate throughout the period of investigation. In particular, the coalitions submitting that wind energy supports a future-proof electricity system and that an improved regulatory framework is required for further wind energy deployment in Austria are consistently present in public debates. There is a somewhat higher discursive resonance for delegitimation during the period of strong growth (which approximately equals phase 2 and 3), but this tendency attenuates over time. Finally, an interesting finding concerns the "*small country*" storyline. While it is regularly evoked in newspapers and was coded as the dominant storyline in many articles (see Fig. 3), it plays a less important role for actors. Except for a small group of actors that legitimizes wind energy based on spatial considerations, the storyline is less relevant for the formation of coalitions.

Compared to Austria, discourse coalitions working towards the delegitimation of wind energy are much more present throughout time in Switzerland. During the first phase, the most prominent discourse coalition working against wind energy forms around the "*risks and benefit*s" storyline. Another sizeable coalition is bound together by the "*small country"* storyline, arguing that wind energy is neither feasible nor desirable in Switzerland. Both coalitions remain vocal over time, crystallizing much of the opposition against wind energy in the public discourse. By contrast, the third delegitimizing storyline identified as relevant in Fig. 3, which portrays wind energy as a barrier to an efficient electricity system, only generates little discursive resonance in phase 1. What is more, it plays almost no role in subsequent discourse networks.

While the discourse coalitions that form around legitimizing storylines are small and highly fragmented in phase 1, this changes in phase 2, when two sizeable clusters of legitimation can be identified. One of these is based on the *"future-proof electricity system"* storyline, which gains some prominence in discussions about the role of wind energy in the context of the process leading to the Energy Strategy 2050. The second centers on broader benefits of wind energy, emphasizing economic opportunities and the prospect of gaining from innovation. Interestingly, a number of members of both of these discourse coalitions also voice concerns about the role of wind energy, which indicates that these actors take decisively balanced views – a tendency deeply engrained in the Swiss political culture. This pattern gets reinforced during phase 3, although the discourse network is now strongly dominated by only two coalitions, each of which mobilizes the "*risks and benefits*" storylines in one of their opposing variants. In phase 4, the pattern gets more differentiated again, when discourse coalitions form around several storylines.

In sum, several differences stand out in the comparison of discourse coalitions. In contrast to Austria, where the discourse becomes more fragmented over time, the Swiss discourse is characterized by an increasing number of links between discourse coalitions, frequently connecting coalitions that pursue different objectives with respect to wind energy. Second, while the number of actors participating in the discourse decreases over time in Austria, there is a remarkable increase in Switzerland especially during the last phase, which coincides with the first phase of implementation of the Energy Strategy 2050. Third, while the storyline capturing wind energy's contribution to an efficient electricity system is used to legitimate the technology since (at least) 2010 in Austria, it generates considerable discursive resonance in Switzerland for the first time only since 2018. Finally, the "*small country*" storyline plays no role to erode the legitimacy of wind energy in Austria but is the most prominent storyline in Swiss newspaper articles (see Fig 4.2) and generates discursive resonance among actors seeking to delegitimize wind energy in Switzerland.

4.3. Relevant actors

Based on our DNA coding, Fig. 5 carves out similarities and differences with respect to the presence of different types of actors in the discourses. In both cases, actors representing the energy sector, politics and academia are among the top 5 actor types and, hence, important in shaping the discourses surrounding wind energy. However, for a better understanding of the role of particular actors in the (de-)construction of legitimacy, analyzing differences is more relevant than assessing commonalities. Three differences stand out as particularly striking. First, associations, who represent the third most important actor type in Austria, play a very subordinate role in the Swiss discourse. In Austria, the wind lobby group IG Windkraft is the most dominant actor in this category, alongside other associations such as the European Wind Energy Association (Wind Europe) or umbrella organizations for renewables. These actors play a crucial role in the legitimation of wind energy, as they articulate several legitimizing storylines, thereby leveraging their institutional role as a broker between politics, applied science, and the energy sector or the private sector more broadly. In Switzerland, on the other hand, these voices are not playing a key role in the public discourse. Second, non-governmental organizations (NGOs) do not occur frequently in the Austrian discourse but leave their imprint on the Swiss discourse. Importantly, most NGOs that appear frequently in Swiss newspapers can be classified as landscape or bird protection NGOs, which tend to articulate their concerns about effects of wind energy projects on the landscape or birds. And similarly, third, citizen initiatives against wind projects are

much more engaged in the Swiss discourse. These groups typically voice their opinions about specific projects, thereby amplifying local opposition against energy infrastructure deployment. Counterintuitively, this actor type is much less represented in Austrian newspapers despite many more wind projects being active in Austria throughout the period of observation, which could provide many opportunities for local initiatives to express their displeasure.

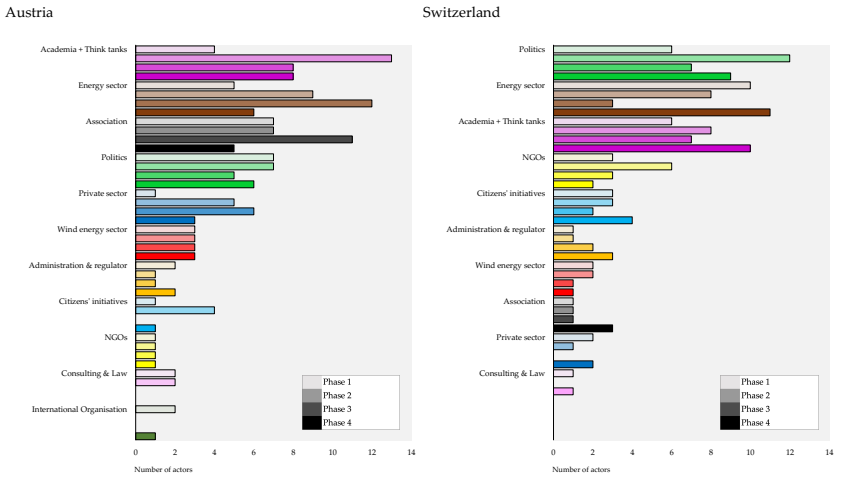

Figure 5: Actor types present in the discourse over time in Austria and Switzerland.

The differences in actors present also reflect the discursive discrepancy between the countries. In the following, we give some examples to illustrate some important arguments that are used frequently in Switzerland by NGOs but do not occur in Austria. For instance, concerns about risks for birds are often raised in Switzerland:

> "Overall, the danger of wind turbines on birds continues to be underestimated because dead or injured animals occur in a large radius and are often quickly eaten by other animals." [Swiss Bird Protection NGO, 22.08.15][18]

Further, the "*small country*" storyline is predominant in the Swiss discourse, where it is argued that Switzerland is not suitable for wind energy and that Switzerland should rather invest abroad.

[18] Swiss Bird Protection (Schweizer Vogelschutz) quoted in „Windrad-Warnsystem beruhigt Vogelfreunde nicht; Studie zu den Auswirkungen des Windkraftwerks Haldenstein" (22.07.15). NZZ.

> "Wind farms could not make a substantial contribution to the power supply, the impairment of landscape, humans and nature, on the other hand, is great." [Freie Landschaft Schweiz, 06.07.19][19]

5. Discussion & Limitations

While numerous case studies have helpfully carved out the "road to technology legitimation" (Binz et al., 2016) in a variety of (typically single-country) contexts (e.g. Dehler-Holland et al., 2022; Kishna et al., 2017; Roberts & Geels, 2018), technology legitimacy has rarely been studied in a comparative framework. Yet, given the remarkable differences between countries' progress toward low-carbon electricity systems, comparing the construction and deconstruction of technology legitimacy *across cases* yields important analytical leverage. In our case it helps explain seemingly puzzling divergences in transition pathways between Austria and Switzerland. In this section, we summarize our main findings and discuss them with respect to related works.

Our analysis indicates several differences between Austria and Switzerland with respect to discourse coalitions, actors involved, and storylines surrounding wind energy. First, while the Austrian discourse becomes more fragmented over time, the Swiss discourse is characterized by an increasing number of connections between different discourse coalitions. Second, over time, the number of actors participating in public debates decreases in Austria but increases in Switzerland. In combination, these findings suggest that legitimacy struggles have calmed down in Austria, where wind energy has become a mainstream source of electricity, while they tend to intensify in Switzerland, where wind turbines are still a curiosity for most citizens.

Third, the relevance of storylines differs between the two countries. The storyline "*future-proof electricity system*" is prevalent in Austria to legitimize wind energy since 2010. However, in Switzerland, the storyline only achieves some discursive resonance in its legitimizing variant since 2018. Still today, the legitimacy of wind energy is frequently denied based on claims that it rather destabilizes electricity systems. This result ties in with recent evidence from a survey among stakeholders of the Swiss energy system, according to which the aim of expanding wind energy considerably until 2050 is not aligned with most stakeholders' visions of the future energy system (Duygan, Kachi, Oeri, Oliveira, & Rinscheid 2022).

[19] Freie Landschaft Schweiz, quoted in „Windräder sind nur schwach ausgelastet" (06.07.19). Tages Anzeiger.

With respect to the storyline "*risks and benefits of wind energy*", the discourses in Austria and Switzerland differ regarding the specific arguments used. While concerns about landscape protection and risks for birds play an important role in the Swiss discourse, they are of minor importance in Austria. Explanations for this difference could be found in the population density, but also in the actors involved in the discourse. Apart from actors representing politics, the energy sector and academia, who were present in both countries, the most relevant actor groups in the Swiss discourse are NGOs and citizen initiatives who often raise their concerns about wind energy, and especially about potential negative effects on landscape, fauna, and flora. In Austria, on the other hand, most associations, who represent an important actor type here, are supportive of wind energy.

The most prominent storyline in the Swiss discourse is the "*small country*" storyline. At the same time, it contributes strongly to delegitimizing wind energy in Switzerland, in particular by questioning the feasibility and suitability of the technology in Switzerland. The main arguments here center around country size and geographical conditions, but also on better wind conditions, higher profitability, and better regulatory frameworks abroad. Taken together, these arguments are used by some actors to call for investments in wind energy abroad rather than in Switzerland. In Austria, by contrast, the storyline is rarely used to delegitimize wind energy.

Our discursive analysis also reveals commonalities. In particular, the storyline "*regulatory framework*" is prominently used in both countries, highlighting the importance of the regulatory framework for the deployment of wind energy. This resonates with findings from the literature. González and Lacal-Arántegui (2016) emphasize the importance of a stable regulatory framework. Vuichard et al. (2022) found that a regulatory framework that allows direct democratic decision-making results in a stronger emphasis on procedural justice, which is an important factor influencing community acceptance.

We close this section by highlighting some limitations of our approach. First, our research design is not suited to detect causal relationships in a straightforward way. Conceptually, we considered processes of (de-)legitimation to influence the socio-political acceptance of technology, which in turn has a bearing on both market and community acceptance and, in mutual relationships with the latter, shapes deployment trajectories. However, social acceptance and deployment pathways feed back into discourses about legitimacy, both in reinforcing and undermining ways. For instance, our case study of Austria indicates that once a strong deployment dynamic has been set in place and a technology is a well-established part of a socio-technical system, its

legitimacy becomes less contested. In line with transitions thinking, it is therefore more accurate to conceptualize these relations as complex and co-evolutionary, and future research could employ more sophisticated research designs to better trace these complex causal patterns. Second, our analysis is characterized by certain temporal bounds (2010-2020). Thus, we do not capture early discourses about technology legitimacy. Likewise, we do not trace whether and which new storylines and discourse coalitions surrounding wind energy emerged in the wake of the European energy crisis in 2022. Third, in contrast to other recent work on discourses surrounding technology legitimacy (e.g., Dehler-Holland et al., 2022), our empirical analysis follows an explicitly qualitative logic and is hence characterized by certain limits regarding the amount of materials that can be analyzed. Future work may compare the results of our study with discursive analyses relying on computational approaches to investigate whether our conclusions would be corroborated by the latter. Fourth, for better comparability, the Swiss newspaper sample relies exclusively on German-speaking media. While the German-speaking part represents almost two thirds of the Swiss population, we cannot rule out that the legitimacy of wind energy is higher in the French- and/or Italian-speaking regions of Switzerland.

6. Conclusion

Why does the role of particular technologies on the way to low-carbon electricity systems differ between cases that are similar in many respects? Taking wind energy in Austria and Switzerland as an example, we proposed to investigate technology legitimacy and how the (de-)legitimation of wind energy unfolds in public discourses. Inspired by Bergek et al. (2008), who showed that technology legitimacy facilitates resource mobilization, market formation, and a favorable regulatory framework, we studied processes of (de-)legitimation empirically. By bridging two separate yet related strands of literature – technology legitimacy and social acceptance – we gain important insights into the analysis of technology-society interactions. Specifically, by analyzing 808 newspaper articles on wind energy in Austria and Switzerland, we identify four distinct sets of storylines that are used to either delegitimize or legitimize the technology in both countries, centering on (1) the contribution of wind energy in future-proof-electricity systems, (2) risks and benefits of wind energy, (3) regulatory frameworks for wind energy, and (4) the role of geography and scale.

Our analysis highlights three main differences between the countries. First, the number of newspaper articles legitimizing wind energy from 2010 to 2020 is much higher in

Austria. While more than two thirds of articles are characterized by a legitimizing dominant storyline, more than half of all articles published in Switzerland have a dominant storyline delegitimizing wind energy. Second, the discourses in both countries focus on different topics. In the Austrian discourse, required institutional or policy changes and the next steps to better integrate wind energy into the electricity system are prominently discussed. The Swiss discourse, by contrast, is characterized by a more fundamental questioning of the technology as such and focuses more on possible negative consequences of the adoption of wind energy. Third, the composition of discourse coalitions differs between the two countries. While actors from academia, the energy sector and politics are represented strongly in both countries, renewable energy associations supporting wind energy are more relevant in Austria. In Switzerland, on the other hand, discourse coalitions are more dynamic over time, and NGOs and citizen initiatives are much more strongly represented than in Austria. These actors often raise their concerns about wind energy and its potential effects on landscape, fauna, and flora.

Our study demonstrates that the legitimacy of wind energy is highly contested in Switzerland, but less so in Austria. The strongly contested legitimacy of wind energy ultimately helps to explain the relatively low socio-political acceptance and deployment rates in Switzerland. More generally, by applying the DNA method in a comparative setting, our study enriches understanding of the role of actors in the construction and deconstruction of technology legitimacy.

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Paper II

Think global, talk local: Episodic and thematic frames of wind energy projects

Nina Schneider

Abstract

Climate change mitigation measures often face the challenge of having global long-term objectives, while causing local and immediate effects. This is also reflected in conflicts surrounding wind energy projects. Social acceptance research has explored various factors influencing local responses to wind energy projects. So far, however, the role of the perceived spatial scale of positive and negative implications has received little attention. This paper draws on framing theory, which holds great potential for better understanding the implications of these diverse spatial scales. It derives implications from this literature by distinguishing episodic and thematic frames. The former are specific, the latter abstract and general. Episodic frames are more likely to evoke an emotional response, which in turn more effectively reaches others. Based on a representative survey in Austria, this study shows that the associated negative effects of wind energy often focus on one wind energy project and the consequences for the local population and the natural environment and thus, fall in the category of an episodic frame. In contrast, the perceived positive effects of wind energy remain mainly on a much broader level. Arguments in favor of wind energy are often put in the context of a national or even global context for mitigating climate change. This difference in the associated spatial scale of positive and negative implications highlights that wind energy opponents, who already have a slight advantage due to certain cognitive heuristics (e.g., the status-quo bias), also use arguments that more effectively reach people.

Keywords: wind energy, social acceptance, thematic frames, episodic frames

1 . Introduction

In many countries, the energy transition is one of the main pillars for addressing climate change (Austrian Parliament, 2021; Estevão, 2020; European Commission, 2018; Intergovernmental Panel on Climate Change (IPCC), 2018; Swiss Federal Office of Energy, 2018). However, the actual shift in electricity production often lags behind the stated policy objectives (Sattler, Clemmer, Richardson, & Cowin, 2020; UNFCCC, 2021). On the one hand, this slow development can be explained by a certain lock-in and path dependency (Geels, Sovacool, Schwanen, & Sorrell, 2017; Seto et al., 2016; Unruh, 2002; Verbong & Geels, 2007; Wolsink, 2012) since cultural, institutional, social, and technological factors of today's fossil energy system reinforce the status quo (Seto et al., 2016; Verbong & Geels, 2007). On the other hand, local opposition against renewables decelerates the shift towards decarbonization of the electricity system since many projects face resistance. This is especially the case for wind energy projects (Devine-Wright, 2005; Reusswig et al., 2016; Wüstenhagen, Wolsink, & Bürer, 2007).

Many factors have been identified that impact local responses to wind energy projects (Batel & Devine-Wright, 2015; Bell, Gray, & Haggett, 2005; Devine-Wright et al., 2017; Ellis, Barry, & Robinson, 2007; Ellis & Ferraro, 2016; Rand & Hoen, 2017; Walker, Stephenson, & Baxter, 2018; Wolsink, 2007a; Wüstenhagen et al., 2007). So far, most research has investigated why wind energy projects opposition arises or what factors influence local responses to such projects. However, what effect the different spatial scales of wind energy effects have and their potential implications on conflicts has received little attention so far.

Wind energy conflicts can be interpreted as a clash of two different spatial scales: global versus local. Climate change mitigation on the one side, immediate and local effects of a specific wind energy project on the other (Straka, Fritze, & Voigt, 2020; Warren, Lumsden, O'Dowd, & Birnie, 2005). Wolsink (2007b: 1191) stated:

> "The proponents argue about global warming, but this is nothing more than a distant background argument in the context of local decisions being taken on actual renewables projects."

Neither global nor local objectives are a priori more important (Straka et al., 2020). Climate change is one of multiple ecological crises, with the energy transition playing an important role in climate change mitigation (Estevão, 2020; Sindhwani et al., 2022). Nonetheless, like any other form of energy production, renewables need resources and can have environmental as well as social consequences (Straka et al., 2020; Warren et al., 2005).

Most policy issues are complex and multidimensional. Thus, it is doubtful whether a complex issue can be discussed without some kind of framing (Baumgartner & Mahoney, 2008). As such, it is important to investigate how wind energy projects are framed and how these frames influence the siting process of wind energy projects. In doing so, it is essential to consider which aspects are highlighted and which ones remain unmentioned or are even denied. This study is interested especially in the level of abstraction that is used to depict the positive and negative implications of wind energy, which is conceptualized as spatial scale in the conducted survey.

Based on a representative survey in Austria, this study therefore investigates the different perceived spatial scales of the negative and positive implications of wind energy. Drawing on framing theory, and especially on the importance of the level of abstraction, it examines how these different spatial scales affect the effectiveness of reaching others. The paper addresses two research questions: (1) What spatial scale/level of abstraction do opponents and proponents use to describe the negative and positive implications of wind energy? (2) What implications do the different spatial scales have?

How a wind energy project is presented affects its perception. Presentation thus impacts local responses and makes support or resistance more or less likely. According to social representations theory (Batel & Devine-Wright, 2014; Devine-Wright et al., 2017), communication is essential since it is "the basis of constructing knowledge and our understanding of the objects around us, and is shaped by power asymmetries between actors" (Devine-Wright et al., 2017: 28). Frames can significantly influence communication processes and ultimately shape human behavior (Collier, 1998). Not only do they shape understanding of the issue in question. They also limit and influence which solutions are considered necessary or useful (Collier, 1998; Geels et al., 2017; van Lieshout, Dewulf, Aarts, & Termeer, 2011).

Conceptually, this paper draws on framing theory. Based on the level of abstraction, frames can be distinguished as episodic and thematic. Episodic frames describe an issue by referring to one case, making them more specific and concrete. In contrast, thematic frames describe an issue in a broader context, making them more abstract and general (Aarøe, 2011; Iyengar, 1990). Aarøe (2011) investigated why frames are effective and what influences the strength of frames. She found that emotional responses have a strong effect on frame strength. In her study, she showed that episodic frames are stronger, when there are strong emotions in place. While thematic frames are more effective in a context with weak emotional responses. Further, since episodic frames are more likely to evoke an emotional response as they are more specific, this can result in an increased

frame strength, since an emotional response makes them more effective for reaching people (Aarøe, 2011). Olson-Hazboun, Krannich, and Robertson (2016) investigated how different frames of renewable energy influence public views. They found that frames that focus on locally relevant aspects are more successful in reaching people than more general frames. Further, whether an issue is framed locally or globally also affects who is included or excluded in the process (van Lieshout et al., 2011).

This paper investigates whether drawbacks are more often illustrated through episodic frames and advantages of wind energy through thematic frames. Linking wind energy to local populations, such frames have a local spatial scale. In contrast, thematic frames place wind energy projects in the broader context of climate change mitigation and energy independence, and thus have a more general or global spatial scale. Potentially, this implies that opponents have a slight advantage in conflicts over wind energy projects. There are two main reasons that make defending the status quo easier than advocating change. On the one hand, certain cognitive heuristics, such as the status-quo bias, make us reluctant to change (Quattrone & Tversky, 1988). On the other hand, the level of abstraction together with emotional responses influences frame strength (Aarøe, 2011). In this study, the positive and negative implications used to describe wind energy projects are categorized in terms of their spatial scale, which serves as a proxy for the level of abstraction.

The remainder of this article is structured as follows: Section 2 introduces the theoretical foundations. The first part highlights the importance of frames, distinguishes thematic and episodic frames, and introduces relevant cognitive heuristics. The second part discusses the conflicts arising over wind energy projects. Section 3 introduces the research design, the methods applied and the type of analysis. Section 4 presents the results and discusses the findings. Section 5 reviews the main findings and concludes with the implications for communication strategies and policy design.

2. Literature Review

2.1. Theoretical Foundations

This section introduces cognitive heuristics, such as *status quo bias*, *loss aversion*, and *biased assimiliation* as well as framing theory and explains why frames are effective. It also highlights the importance of frames and distinguishes episodic and thematic frames.

Cognitive heuristics

To cope with the vast amount of information encountered every day, we assess that information according to certain patterns and rely on some cognitive processes or heuristics, which can partly explain the influence of framing (Kunda, 1990; Quattrone & Tversky, 1988). Mainstream economics has assumed that preferences, values, and opinions are stable over time and innate, and thus context-independent (Iyengar, 1990). However, behavioral economics has shown that preferences, values, and opinions are often constructed during decision-making (Slovic, Griffin, & Tversky, 1990). The cognitive heuristics with which we assess information are systemic and nonarbitrary. Therefore, framing can influence our values as well as our choices and judgments (Quattrone & Tversky, 1988).

One cognitive heuristic that influences people's attitudes and behavior is the status quo bias (Quattrone & Tversky, 1988). It results in overrating the status quo, while assessing potential change as rather risky. Yet a certain risk is inherent in policy change or change as such. Thus, every change can be framed as involving risk since most policies or policy implementations can also have unintended consequences (Baumgartner, 2013). This implies that also opponents of wind energy projects start from a stronger position than proponents as it is easier to defend the status quo than to elicit change. Additionally, according to Baumgartner (2013), it is common for those defending the status quo to question the qualifications and motives of those striving for change. This is also evident in wind energy projects. Dällenbach and Wüstenhagen (2019) found that opponents mostly emphasize the risks of such projects, often claiming that these risks are downplayed by project developers, which underscores their considerable distrust of developers and their motives.

Another cognitive heuristic is loss aversion. It makes a difference whether a policy issue is framed in terms of gains or in terms of losses. People value losses stronger than the same amount of gains gives them pleasure (Quattrone & Tversky, 1988; Tversky & Kahneman, 1986). Loss leads to risk-seeking, while gain entails risk aversion (Quattrone & Tversky, 1988). This could be another explanation why framing wind energy negatively is sometimes more successful. While the potential loss of a natural environment and the status quo prompts action, the potential gain of more renewable energy does not.

And once these opinions become manifest and projects already face resistance, matters grow even trickier. People with strong opinions on a complex social issue, such as opposing or supporting a wind energy project, explore information in a biased way.

Evidence or information that contradicts existing beliefs is assessed more critically than information confirming existing beliefs. This cognitive heuristic is called biased assimilation (Lord, Ross, & Lepper, 1979). The same is true if a specific conclusion is desired. Preference-consistent information is assessed less critically (Ditto & Lopez, 1992). Therefore, confronting people with facts and figures might reinforce their position rather than lead them to reflect on their opinion (Corner, Whitmarsh, & Xenias, 2012; Lord et al., 1979).

Importance of frames

Frames can influence our perceptions. Various definitions of frames exist (Aarøe, 2011). A frame "organizes everyday reality" (Tuchman, 1978: 193) through "the selection, organization and emphasis of certain aspects of reality, to the exclusion of others" (De Vreese, Peter, & Semetko, 2001: 108). A frame "shape[s] individual understanding and opinion concerning an issue by stressing specific elements or features of the broader controversy" (Nelson, Clawson, & Oxley, 1997: 568). Frames not only shape how a problem is understood but also limit and influence the solutions one detects as necessary or useful (Collier, 1998; Geels et al., 2017).

Policy decisions and implementations are consciously influenced by drawing attention to one aspect or another. Thus, it is essential to consider which aspects are highlighted and which ones remain unmentioned or are even denied. Nevertheless, frames have their limitations and policies cannot be presented in any arbitrary way (Baumgartner & Mahoney, 2008). Baumgartner and Mahony (2008: 442) emphasized that the "underlying multidimensionality" of an issue is limited by frames used by others as some discourses are "highly structured with little room for framing".

Just as frames are limited in their lines of argumentation, so is their effectiveness constrained by prior beliefs (Kunda, 1990). Causal theories are not necessarily about fighting for the truth, but about convincing others of one's narrative and having control (Stone, 1989). Further, frames are more effective if they align with existing cultural values (Stone, 1989) and the public discourse (Ellis et al., 2007).

Frames can be differentiated in terms of the level of abstraction as episodic and thematic (Aarøe, 2011; Iyengar, 1990). According to Iyengar (1990: 22), "thematic frames focus on political issues and events in a broader context and present collective, abstract, and general evidence." In contrast, episodic frames highlight the issue by depicting a specific event or a concrete case (Iyengar, 1990). Hence, thematic frames put the issue in a broader context, while episodic frames refer to a concrete case.

Depending on the context, episodic or thematic frames can be stronger and more effective in reaching others. Episodic frames have a "specific focal point of reaction" (Aarøe, 2011: 212). Therefore, they are more likely to evoke a stronger emotional response than thematic ones (Aarøe, 2011; Gross, 2008; Springer & Harwood, 2015). Episodic frames were found to be more engaging (Gross, 2008) and if there is an emotional response, the capacity of episodic frames to influence others is stronger than for thematic frames. Furthermore, emotions that are triggered by episodic frames are more likely to result in action than emotional responses caused by thematic frames. Aarøe (2011) found a statistical difference between the emotional response toward an episodic and a thematic frame among others for anger. Episodic frames elicited stronger anger than thematic frames (Aarøe, 2011). Anger, in turn, is an emotional response that more likely results in action than other emotional responses as it gives individuals "a sense of individual control and certainty" (Lerner & Keltner, 2001: 147). Another difference between episodic and thematic frames is that the former results in a perceived responsibility in the individual, while the latter results in attributing responsibility at the societal or political level (Hart, 2011; Iyengar, 1991). Thus, thematic frames can be quite effective to facilitate "change at a broader societal level" (Gearhart, Adegbola, & Guerra, 2019, p. 953) and can result in an increased policy support (Hart, 2011).

2.2. Conflicts around wind energy

Social acceptance of wind energy can be divided into three subareas: socio-political, market, and community acceptance. All three areas are interlinked and highly interdependent. Socio-political acceptance refers to social acceptance at the most general level (Wüstenhagen et al., 2007). At this level, acceptance of enforcing the energy transition is in general high (Hampl & Sposato, 2022; Wolsink, 2007a; Wüstenhagen et al., 2007). The second level is market acceptance, or innovation adoption. Here, the focus is on consumers and investors (Wüstenhagen et al., 2007). Wind energy brings electricity production closer to communities and is visible; consequently, projects may face local opposition and resistance (Rand & Hoen, 2017; Wüstenhagen et al., 2007). This is relevant at the third level: community acceptance, that is, project and site adoption by the local population (Wüstenhagen et al., 2007).

Community acceptance of wind energy has been investigated in many different countries (Batel et al., 2015; Bell et al., 2005; Devine-Wright et al., 2017; Ellis et al., 2007; Kontogianni, Tourkolias, Skourtos, & Damigos, 2014; Rand & Hoen, 2017; Walker et al., 2018; Wolsink, 2007a; Wüstenhagen et al., 2007). What follows

summarizes the literature on community acceptance and the determinants of local responses that have been identified so far. The summary is not exhaustive. For an easier overview, responses are categorized on three levels: individual, project, and institutional.

On the individual level, general attitudes toward environmental issues and renewables (Bell et al., 2005; Huijts, Molin, & Steg, 2012; Olson-Hazboun et al., 2016; Walter, 2014) can have an influence as well as emotions (Cousse, Wüstenhagen, & Schneider, 2020; Russell & Firestone, 2021), place attachment (Devine-Wright, 2009), procedural and distributive justice (Baxter et al., 2020; Walker & Baxter, 2017), and perceived impacts (Kontogianni et al., 2014; Petrova, 2016; Warren et al., 2005). On the project level, the site (Walker et al., 2018), communication and frames (Devine-Wright et al., 2017; Gearhart et al., 2019; Wolsink, 2007b), environmental impacts (Straka et al., 2020; Warren et al., 2005), project design (Baxter et al., 2020), ownership structures (Vuichard, Broughel, Wüstenhagen, Tabi, & Knauf, 2022), and project phase (Wolsink, 2007b) can affect local responses. On the institutional level, culture (Aitken, 2010; Devine-Wright et al., 2017), policies in place (González & Lacal-Arántegui, 2016; Szarka, 2006), local political context (Karakislak, Hildebrand, & Schweizer-Ries, 2021), participatory structures (Blumer, Braunreiter, Kachi, Lordan-Perret, & Oeri, 2018), and discourses (Blumer et al., 2018; Walker et al., 2018) can influence project perception and in turn local responses.

How people relate to places and landscapes is to some extent socially constructed (Batel et al., 2015). Therefore, it is essential not to conceptualize people and place relations as being “there” “but instead to examine how they are used to negotiate and pursue specific interests and projects, including identity ones” (Batel et al., 2015: 157). Perceptions, interpretations, and evaluations of wind energy are also heavily influenced by the prevailing belief system. Blumer et al. (2018) emphasized the importance of subjective perceptions and the belief system. They also found that beliefs are highly relevant for opinion formation while being influenced by the cultural and social context. According to Thornton and Knox (2002), the explanation for local responses cannot be found solely in the individual, but rather in the situational context and in the frames being used.

Conflicts between technological developments and landscape conservation have a long history. So far, most of these conflicts have centered on economic benefits rather than on environmental concerns. Now, however, some of these conflicts have arisen for the same reason on both sides: environmental concerns (Warren et al., 2005). Some support wind energy due to its low emissions and because it is a clean energy source, while others oppose it due to its potential environmental impacts on the local level (Kunz et

al., 2007; Sattler et al., 2020; Warren et al., 2005). These so-called "green on green" conflicts arise from environmental concerns on different spatial scales (Straka et al., 2020; Warren et al., 2005). In sum: Climate change mitigation on the one side; immediate and local effects of a concrete wind energy project on the other. Warren et al. (2005: 868) observed that the difference in spatial scale is "exacerbated by the fact that the impacts of climate change are diffuse, large scale, long term and (so far) largely imperceptible, whereas the impacts of windfarms are localized, immediate and highly visible." This raises important questions about siting decisions and climate change mitigation. Every energy source impacts the environment. How should these different environmental considerations be assessed? How should they be evaluated? And by whom?

3. Research Design

Sample

Data were collected in a representative study (N = 1229) on wind energy conducted in Austria in 2021. This study received funding for data collection from IG Windkraft – Interessengemeinschaft Windkraft Österreich (Austria). The sponsors, however, did not influence the study design, data collection methods, analysis, or interpretation. All survey participants were asked to list positive as well as negative implications of wind energy. Respondents received the following two questions (whose order was randomized): "What positive effects do you think wind energy has?"; "What negative effects do you think wind energy has?" They had to provide at least one implication and a maximum of five implications for each category (negative and positive). Responses ranged from single words (e.g., "clean" or "noise") to narrative statements (e.g., "Wind is abundant and permanent" or "storage of wind is problematic"). Next, respondents evaluated their own associations on a six-point scale from 1 (affects people in the vicinity of the wind turbine) to 6 (affects all of us). These evaluations were used to gain an understanding of the perceived spatial scale of the mentioned positive and negative implications of wind energy. The spatial scale was used as a proxy for the level of abstraction to distinguish episodic and thematic frames. Spatial scale is a social construct, and thus, the interest is on the perceptions of the respondents. Therefore, the respondents had to evaluate the previously mentioned positive and negative implications themselves rather than using a fixed scale to categorize them. Spatial scales are often relational and used in disputes to emphasize ones standpoint (Chateau, Devine-Wright,

& Wills, 2021). Thus, I wanted to investigate whether the spatial scale was evaluated differently between the different groups, for instance, did participants evaluate "noise" as local consequence and "climate change mitigation" as global effect or are there differences in these perceptions between respondents.

In total, 2240 positive implications and 2190 negative implications were gathered from the 1229 survey participants. Responses stating "I don't know," numbers, blank fields, or single or random combinations of letters were excluded, which resulted in a final data set of 2147 positive effects and 2039 negative effects of wind energy.

As a proxy for local responses, respondents were asked whether they agreed on a scale of 1 (totally disagree) to 4 (totally agree) with a wind energy project close to their home: "To what extent do you agree with the following statement? I would approve a development of a wind turbine close to my hometown." This question was used to categorize the sample into two groups: opponents and supporters. Respondents indicating their approval of a wind turbine near their home (by selecting point 3 or 4) were categorized as supporters, those indicating disapproval (by choosing point 1 or 2) were categorized as opponents. This resulted in 986 proponents (80.23%) and 243 opponents (19.77%). While this question does not measure respondents' opposition to or approval of wind energy projects per se, it nonetheless indicates existing attitudes. For further analysis, the sample was split into four sub-groups: strong/mild opponents and strong/mild supporters. By selecting point 1, respondents were categorized as strong opponents, by selecting 2 as mild opponents, by choosing 3 as mild supporters and respondents who selected point 4 were categorized as strong supporters.

The mean was calculated separately for both categories (positive/negative implications), with a higher score indicating a more global scale. Thus, the higher the score, the more global the spatial scale, and the more abstract and general the implication, which is closer to a thematic frame. The lower the score, the more local the argument, and thus also the more specific, which suggests an episodic frame.

Procedure

Survey data were analyzed by using R. First, the mean average was used to explore the different perceived spatial scales between the mentioned positive and negative implications of wind energy for the whole sample. Next, a Mann-Whitney U-Test was used to investigate whether the difference was significant and how the spatial scale differed between the two groups (opponents and supporters). Firstly, by looking at the difference between positive and negative implications within the same group and

secondly, by considering the differences between positive and negative implications between the two groups and respectively four groups.

Subsequently, statements were also assessed qualitatively by coding them into different categories. The 2147 stated positive implications of wind energy were classified into 23 different categories. The 2039 indicated negative implications resulted in 20 distinct categories. The data was analyzed by looking at relative frequency and the mean average to detect differences between the categories, but also between the two or four groups.

4. Results

4.1. Perceived spatial scale of positive and negative implications of wind energy

Respondents had to evaluate their own associations on a six-point scale from 1 (affects people in the vicinity of the wind turbine) to 6 (affects all of us). These evaluations were used to gain an understanding of the perceived spatial scale of the mentioned implications of wind energy. The mean of all associations (negative and positive) is mean_all = 4.55 (min = 1, max = 6). The mean of the perceived spatial scale for the positive implications of wind energy is 5.10 (min = 1, max = 6) and the mean of the perceived spatial scale for all negative implications is 3.97 (min = 1, max = 6). Thus, the negative implications of wind energy are perceived to be more on the local level, whereas the positive implications of wind energy are seen more on the general level. The difference between the two categories is significant.

In a next step, the perceived spatial scales are compared between the two groups. The perceived spatial scale of the positive effects shows that the mean for proponents is higher with 5.20, compared to 4.60 for opponents. Thus, proponents evaluated their positive associations as more general than opponents (see Table 1). The difference between the two groups is significant with a value of $p = 0.000$. The difference between the assessed spatial scale of the negative effects between the two groups is also significant ($p = 0.000$). Proponents evaluate the negative effects more locally (mean = 3.79) than opponents (mean = 4.44). Hence, both proponents and opponents evaluate the implications that are in line with their opinion about wind energy as being more on the global level.

The difference between positive and negative effects within the same group confirms the overall assumption that positive effects are found more on the global scale, which

indicates a more general level of abstraction, which would represent a thematic frame. In contrast, negative effects are found more on the local level. Consequently, the level of abstraction is more concrete and specific, which implies an episodic frame. For proponents, the mean of the perceived spatial scale of the positive effects is 5.20 and of the negative effects is 3.79. The difference is significant with p = 0.000. For opponents, the mean of the perceived spatial scale is 4.60 for the positive effects and 4.44 for the negative implications. The difference is not significant.

	Positive Effects	Negative Effects	Difference within Groups
Opponents (N = 243)	4.60	4.44	p = 0.8593
Proponents (N = 986)	5.20	3.79	p = 0.000
Difference between groups	p = 0.000	p = 0.000	

Table 1: Mann-Whitney U-Test (N=1229) – difference in mean spatial scale within and between groups

4.2. Positive implications of wind energy

From the data set of 2147 positive effects, 314 statements came from opponents (14.63%) and 1833 from supporters (85.37%). This implies that on average supporters stated 1.86 positive statements per person (N=986), while opponents indicated 1.29 per person (N=243). Thus, proponents stated on average 44% more positive implications per person than opponents.

The positive implications of wind energy were categorized into 23 distinctive categories, e.g., climate change mitigation, environmental protection, available/reliable, renewable energy, cost-efficient, natural, electricity production, and efficient. For a full list of the categories, see appendix A. Figure 1 illustrates the 10 most frequently mentioned positive effects and the mean of each spatial scale. The most frequently mentioned positive association is “climate change mitigation” with 374 statements, which equals 17.35% of all positive statements (see Figure 1). Here, wind energy was described as a CO_2-neutral and clean technology that enables climate change mitigation. The next category “environmental protection” appears 360 times (16.70%). Positive effects that fall in this category are depicting wind energy as environmentally friendly and sustainable energy source. The third most frequently mentioned positive implication of wind energy is “available/reliable” with 185 occurrences (8.58%). The participants stated that wind is a resource that cannot be exhausted, that is always there and reliable. The fourth rank was reached by statements around “renewable energy” with 162

mentions (7.51%). In sum, these four categories together account for more than half of all statements made by the survey participants (50.14%). The mean of the spatial scale of the ten most frequently stated positive implications of wind energy is between 4.82 and 5.41 (see Figure 1).

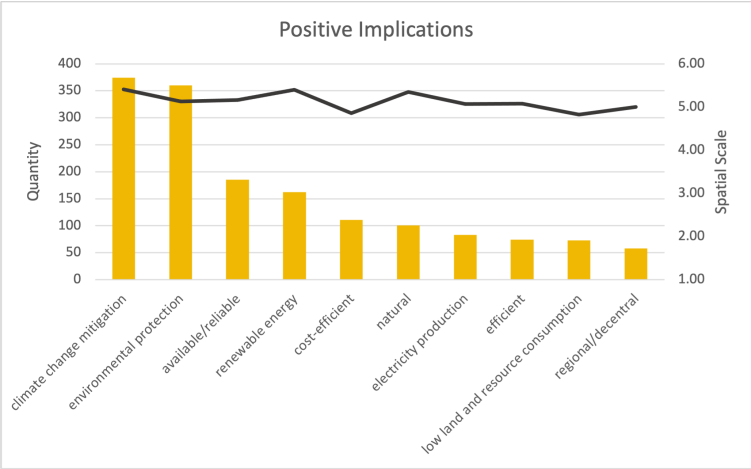

Figure 1: Positive Implications (full sample)

For the ten most often associated positive effects of wind energy, figure 2 depicts the relative importance of each of the categories per subgroup. Overall, climate change mitigation was mentioned 374 times. Out of these, 40% of the statements in this category came from strong supporters, 45% from mild supporters, 9% from mild opponents and around 6% from strong opponents. In absolute numbers, climate change mitigation was for mild supporters and strong opponents the most important category. However, comparing the importance within one category, statements that fall into the categories "*renewable energy*" and "*electricity production*" reached the highest shares for opponents. They only account for 14.63% of the sample, but around 20% of all statements that fall into these two categories come from opponents. Whereas "*natural*", "*efficient*" and "*low land and resource consumption*" were categories that were more important for supporters. Opponents did not mention "*natural*" once, "*efficient*" only four times and "*low land and resource consumption*" only five times.

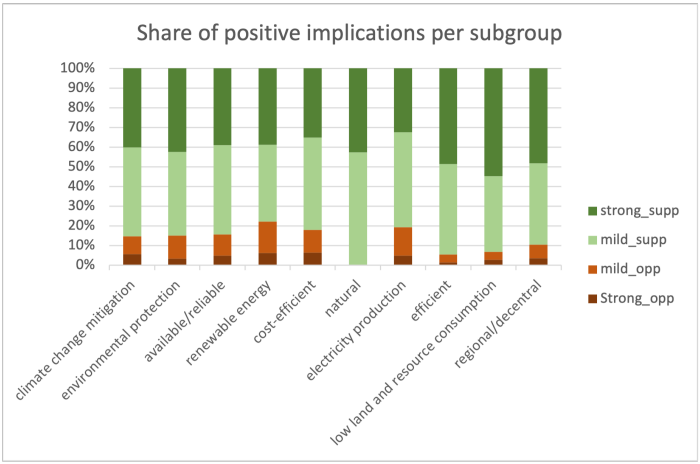

Figure 2: Percentage of number of statements per category_4 subgroups

Table 2 depicts the number of positive statements made by each subgroup, the sum of the evaluations, the mean of the spatial scale and the average number of statements made per person in each group. The number of stated positive implications per person increase from 1.08 (N=95) to 2.03 (N=434) from strong opponents to strong supporters. Further, also the perceived spatial scale of the positive implications differs between the four groups and increases steadily from strong opponents with 4.58 to strong supporters with 5.34. Out of 879 indicated positive implications, 598 statements were evaluated by strong supporters with a 6, which stays for "*affects all of us*". Hence, strong supporters evaluated almost 70% of the positive effects as affecting all of us. Thus, the implications that align the participants` position are evaluated to be more on the global spatial scale.

Positive Implications					
	N	Statements	Sum_Evaluation	Mean_Evaluation	Average Statement p.P.
strong opponents	95	103	472	4.58	1.08
mild opponents	148	211	1013	4.80	1.43
mild supporters	552	954	4849	5.08	1.73
strong supporters	434	879	4692	5.34	2.03

Table 2: Positive implications of the four sub-groups

By looking at the mean spatial scale of the categories individually, this trend continues. Figure 3 shows that proponents assess the most frequently mentioned positive implications of wind energy as more general than opponents. The highest difference is between strong opponents and strong supporters for "*available/reliable*" with 4.00 and 5.47 and "*cost-efficient*" with 3.71 and 5.21. This illustrates that proponents evaluated all positive implications closer to "*affecting all of us*". Whereas, opponents assess among others "*available/reliable*" and "*cost-efficient*" as a rather local implication of wind energy.

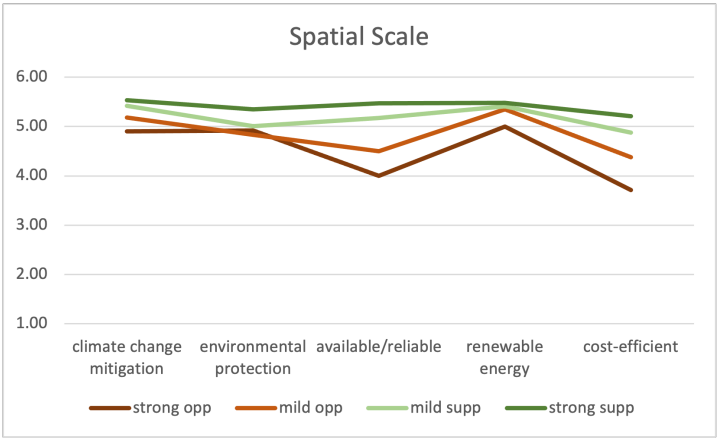

Figure 3: Spatial scale mean _4 sub-groups [1 – "affects people in the vicinity of the wind turbine" – 6 "affects all of us"]

4.3. Negative implications of wind energy

Of the 2039 mentioned negative effects, 580 associations were made by opponents. Thus, 28.45% of the negative associations were made by opponents (N = 243) and 71.55% by proponents (N= 986). On average, opponents indicated 2.4 negative effects per person, compared to 1.5 negative associations per person among proponents. Thus, opponents state around 60% more negative implications of wind energy per person than supporters and twice as many negative implications of wind energy than positive ones. The negative implications of wind energy are distributed along 20 categories, e.g., *noise, effects on landscape, birds, visual effects, grid stability/unreliable, land and resource-intensive* and *expensive.* For a full list, see appendix B. Figure 4 shows how often the ten most frequently mentioned categories were stated and their mean spatial scale. The

most frequently mentioned negative implication of wind energy is *"noise,"* where concerns about sound and noise were raised 332 times, which equals 16.29% of all negative implications. Statements about negative effects on landscape appeared 313 times (15.36%). Concerns about risks for birds are indicated 230 times, which equals 11.29% and statements about the aesthetics of wind turbines ranged from "unattractive" to "ugly" and summarizes 201 statements (9.96%) (see Figure 4). Together, these four effects account for over half of all associated negative implications of wind energy (52.90%). Overall, the spatial scale is lower than for the positive implications, but it also varies more. Noise has a mean spatial scale of 2.47, while concerns about grid stability reaches 5.35. This shows that respondents mentioned negative consequences that are rather local, but also negative consequences that affect people on a more global scale.

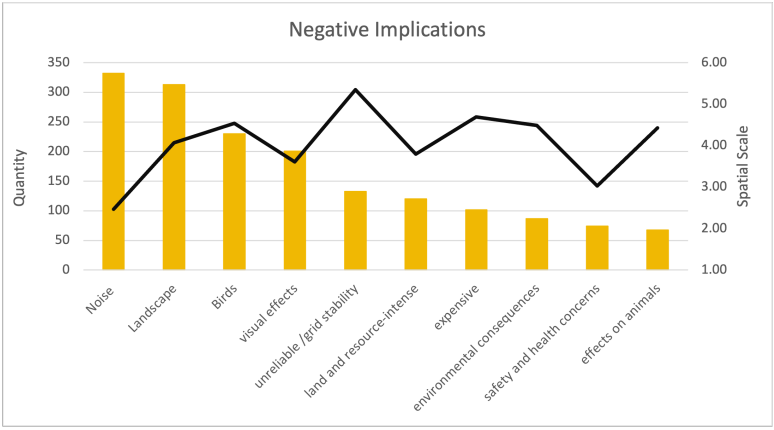

Figure 4: Negative Implications (full sample)

Figure 5 shows the relative importance of the categories for each subgroup for the ten most frequently mentioned negative effects. As mentioned before, opponents only account for 14.63% of the sample, however, in contrast to the positive implications, opponents reach between 20-40% of all statements within the most frequently stated negative implications. Out of 87 statements about possible negative consequences of wind energy on the environment, 74 statements about wind energy being dangerous and 68 for effects on animals (excluding birds), around 40% come from opponents for all three categories. Hence, every fifth strong opponent raised concerns about possible safety and health risks of wind energy.

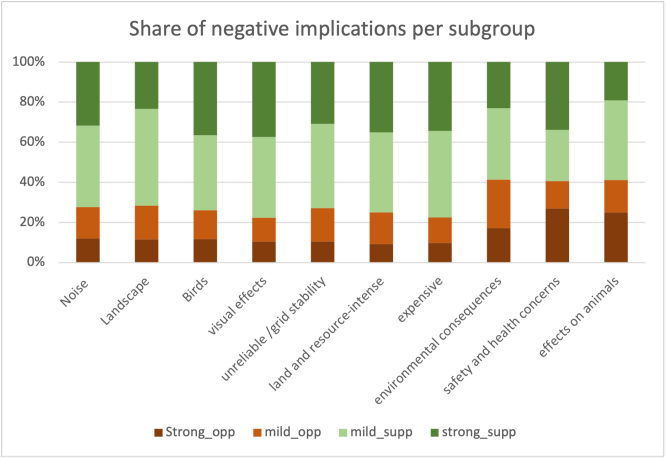

Figure 5: Percentage of number of statements per category_4 subgroups

Table 3 shows the number of statements per group, the sum of the evaluations of the statements, the mean of the spatial scale and the average number of statements per person for each group. It illustrates an increase of indicated negative implications per person from strong supporters with 1.42 (N=434) statements on average per person to strong opponents indicating 2.8 (N=95) implications per person. Again, similar to the positive implications, respondents evaluated implications that confirm their opinion about wind energy as being more on a global scale. On average, strong opponents evaluated 266 negative implications on a scale from 1 to 6 as a 4.92. Whereas strong proponents evaluated their 617 negative implications as 3.73. Thus, as implications that affect people in the vicinity of the wind energy project.

Negative Implications					
	N	Statements	Sum_Evaluation	Mean_Evaluation	Average Statement p.P.
strong opponents	95	266	1310	4.92	2.80
mild opponents	148	314	1266	4.03	2.12
mild supporters	552	841	3268	3.89	1.52
strong supporters	434	617	2303	3.73	1.42

Table 3: Negative Implications of the four sub-groups

By looking at the distinct categories in more detail, Figure 6 shows that in contrast to supporters, opponents evaluate the negative implications of wind energy as being more on the global scale. Thus, again showing that confirming implications are evaluated as more general rather than affecting only the people living in the vicinity of the turbine. The biggest difference between strong opponents and strong supporters lies in the evaluation of the effects on landscape. Strong supporters evaluate it as a consequence that is affecting people at the vicinity of the turbine (3.55), while strong opponents evaluate it with 5.44 as a rather global effect that affects all of us. All four groups agree that "*grid stability*" is a concern that affects all of us and that noise is a rather locally relevant negative consequence. The other most frequently mentioned statements are evaluated by strong opponents as more general consequences.

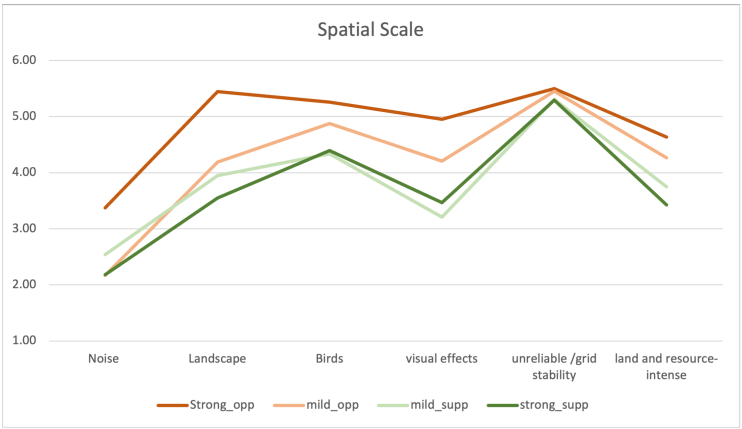

Figure 6: Spatial scale mean _4 sub-groups [1 – "affects people in the vicinity of the wind turbine" – 6 – "affects all of us"]

Discussion

Overall, negative implications of wind energy are evaluated as being more on the local level (3.97). Here, noise, effects on landscape, birds, and visual effects are the most frequently mentioned implications of wind energy. In contrast, positive consequences of wind energy are assessed to be on a more global level (5.10). Climate change mitigation, environmental protection, reliability, and renewable energy were mentioned the most. Thus, positive aspects of wind energy are often on a national or global scale (thematic frames), whereas the negative aspects are illustrated on a local scale (episodic

frames). This shows that arguments for and against wind energy involve different spatial scales. In line with framing theory, arguments that are more specific and more closely related to people often reach others more effectively than more abstract ones (Aarøe, 2011; Iyengar, 1990). This is especially the case, if there are strong emotional reactions involved (Aarøe, 2011). Further, people tend to focus more on immediate impacts (Spash, 2008), which could again enhance the position of opponents.

Together these aspects can explain to some extent why negative implications to wind energy projects attract more attention than positive ones in a conflict. Petrova (2016) reached similar findings. She discovered that general environmental positive consequences [here thematic frames] do not result in the same level of support as negative local environmental consequences [here episodic frames] are able to generate opposition. Therefore, emphasizing positive local environmental aspects next to global consequences is important (Petrova, 2016; Wolsink, 2007b). Also Olson-Hazboun, Krannich, and Robertson (2016) found that frames that focus on locally relevant aspects are more successful in reaching people than more general frames. Van Lieshout et al. (2011) emphasize that scale frames also affect who is excluded or included in the process.

Overall, the evaluations of positive and negative consequences of wind energy confirmed that negative effects are more often represented by episodic frames and positive implications by thematic frames. However, interestingly, both proponents and opponents differed in their evaluations. Overall, opponents and supporters assess the implications that are in line with their opinion towards wind energy on average as more global than the respective other group. Hence, next to biased assimilation in terms of assessing confirming arguments less critically (Lord et al., 1979), confirming statements seem to be evaluated as being of a more general or global relevance. For instance, supporters evaluated "*cost efficiency*" similar to "*environmental protection*". Whereas opponents made a clearer distinction between the two categories with 3.71 for "*cost-efficiency*" and 4.92 for "*environmental protection*". The same is also true for opponents. Visual effects of wind energy were evaluated by strong supporters as affecting people close to the vicinity of the turbine with 3.79. Whereas strong opponents evaluated the aesthetics of wind turbines to be something that affects all of us with 4.95.

5. Conclusion & Limitations

Conclusion

This study illustrated that opponents could have a slight headstart in a conflict around wind energy. First, certain cognitive heuristics (e.g., loss aversion and the status-quo bias) make us reluctant to change. Therefore, defending the status quo is easier than eliciting change (Quattrone & Tversky, 1988). Second, according to framing theory, the level of abstraction of arguments affects their effectiveness (Aarøe, 2011; Iyengar, 1990). The perceived spatial scale is used as a proxy for the level of abstraction in this study. The negative implications of wind energy are found more on the local scale, that of episodic frames. In contrast, the perceived positive effects of wind energy remain on a more general level, that of thematic frames. Since episodic frames are more likely to evoke an emotional response (Aarøe, 2011), they are more likely to elicit action. Thus, frames used by opponents are to some extent more effective in reaching others. Especially, if there is a strong emotional reaction (Aarøe, 2011), which is often the case in conflicts around wind energy projects. Responses to wind energy projects and renewable energy projects more generally, are often influenced by emotions and affect (Cousse, Wüstenhagen & Schneider, 2020). Additionally, the emotions that are triggered by the different communication strategies can also have an effect on local responses (Huntsinger, 2013; Lerner & Keltner, 2001).

Conflicts around wind energy projects take place on two different spatial scales. How projects are communicated and presented has an influence on local responses (Devine-Wright, 2007). Whether they are framed in a local context or broader context, reaches people differently and can make acceptance more or less probable (Olson-Hazboun et al., 2016; Petrova, 2016). Consequently, in conflicts over wind energy projects, proponents therefore should also focus on positive consequences on the local level rather than only on general implications of wind energy, such as climate change mitigation. This would enable establishing a more balanced debate. Positive local arguments might include positive environmental effects on the local level, potential additional income for rural municipalities, raising awareness of climate change and the importance of energy independence, sites as possible tourist attractions, and many others. However, this does not imply that thematic frames are not useful. Thematic frames can enable policy support or even elicit social change (Gearhart et al., 2019; Hart, 2011). Thus, it is also important to communicate climate change mitigation and environmental protection. However, in a context with strong emotional reactions, such as a conflict around wind

energy projects, episodic frames seem to be stronger and more effective. Thus, this could to some extent explain why within a conflict around a wind energy project, opponents that are often outnumbered, are more successful in convincing others and also more likely to reach their primary objective, namely to either delay or stop projects.

Limitations

While this study is based on a large-scale survey and has been bridging two literatures, framing theory and social acceptance research, there are three main limitations that could be interesting for further research. First, the operationalization of spatial scale. In order to investigate episodic and thematic frames, the perceived spatial scale of positive and negative implications of wind energy was used as a proxy. By allowing respondents to evaluate the spatial scale themselves, it does not follow a specific metric and hence, it does not have a clear geographical or spatial demarcation that defines "local", "regional", "national" or "global". In this study, spatial scale is understood as a social construct that is based on the respondent's own assessment. Thus, future research could investigate the spatial scale of positive and negative implications of wind energy through other measures.

Further, instead of investigating episodic and thematic frames through a proxy of spatial scale, the level of abstraction of the frames used in a conflict around wind energy could be investigated in an empirical study. Thus, future research could analyze the frames used by opponents and supporters in a conflict around a planned or implemented wind energy project to investigate whether drawbacks of wind energy are more often depicted by using episodic frames and positive consequences through the use of thematic frames.

Third, the operationalization of the acceptance of wind energy. Through the hypothetical question about the evaluation of a wind energy project close to their home, it is not possible to assess how respondents would react to a real project. Future research could use a longitudinal approach to investigate the local responses to a wind energy project.

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Appendix A: Positive Implications - Categories

Category	Examples
climate change mitigation	climate neutral, less CO_2 emissions, clean
environmental protection	sustainable, environmentally friendly
available/reliable	reliable, all-season, available
renewable energy	renewable energy
cost-efficient	cheap, cost-efficient
natural	natural, energy from nature
electricity production	electricity, more energy, electricity production
efficient	efficient, efficiency, power efficient
low land and resource consumption	low resource consumption, low land consumption
regional/decentral	decentral, locally added value, regional benefits
free resource	resource is free
no nuclear	better than nuclear, no nuclear
simple	easy to build, easy to implement
no fossil fuel	better than fossil fuels
energy independence	energy independence, less dependency on imports
less waste	less waste, less wastewater
quiet	quiet
healthy/safe	safe electricity, not dangerous, healthy
jobs	more jobs, creates jobs
better than other RE	better than hydro, not dependent on sunshine
cheaper electricity	lowers electricity costs
beautiful	beautiful
other	positive statements that could not be categorized

Appendix B: Negative Implications - Categories

Category	Examples
noise	loud, volume, loudness
landscape	negative effects on landscape
birds	risks for birds
visual effects	visual appearance of turbines, ugly
unreliable /grid stability	unreliable, risk for grid stability
land and resource-intense	needs a lot of resources and land
expensive	expensive, high costs
environmental consequences	negative environmental consequences
safety and health concerns	ice toss, dangerous, hazardous
effects on animals	negative effects on wildlife
manufacturing & implementation	concerns about manufacturing and implementation
not everywhere possible	concerns about justice
end of life	recycling, end of life
high maintenance effort	high maintenance effort, maintenance intensive
electricity storage	concerns about electricity storage
not energy-efficient	not energy-efficient, inefficient
not enough electricity	does not produce enough electricity, low energy output
short lifetime	short lifetime, short service life
transport	concerns about transport
other	negative statements that could not be categorized

Paper III

The mayor said so? The impact of local political figures and social norms on local responses to wind energy projects

Irmak Karakislak & Nina Schneider

Abstract

Wind energy plays an important role in the energy transition. However, many wind energy projects result in conflicts at the local level. Mayors and local council members are key actors who can play a supportive, moderating, escalating, or mediating role in siting decisions about wind energy. Further, the social norms of communities encapsulate their belief about what a wind energy project ought to be like. Alongside public expectations, these norms indicate the layers of cultural dynamics and standards of communities. Hence, this study investigates the impact of the assessments of mayors concerning local responses to wind energy projects and their outcome. This is achieved through an empirical-qualitative approach in which the experiences of four Bavarian case studies in Germany are illustrated using document analysis and in-depth interviews. The results of this study indicate that mayors play a key role in local responses to wind energy projects in Bavaria. Their support is necessary, but not sufficient for local acceptance. Other stakeholders, as well as project characteristics and communication, also affect local responses. The paper concludes with lessons learned about communication and information strategies as the study has implications for policymakers and practitioners in relation to designing and planning wind energy projects.

Keywords: wind energy, local responses, social norms, mayors

1. Introduction

The German energy transition (*Energiewende)* has long been a role model for other countries (Strunz, 2014). However, the amount of newly installed capacity in 2020 was the lowest since 2010, despite the country being ranked the second leading country in Europe for new wind installations (WindEurope, 2021). The decrease in installations and investment can partly be explained by the existence of complex and lengthy permitting processes and the challenges connected to the switch to an auction scheme in 2017 (Lundberg, 2019). Indeed, the German wind industry is currently not only facing challenges related to permitting, legislation, and auctions, but also social barriers (Kimm, 2017). Many wind energy projects are facing local opposition and resistance, resulting in project delays or failures (Langer et al., 2017; Reusswig et al., 2016; Zoellner et al., 2008).

The transition to renewable energy sources is affected by dynamics that go beyond technical issues, being part of a political, social, cultural, and spatial transformation. To facilitate a successful transition from fossil fuels to renewables next to the strategic site planning of federal and/or local governments, it is important to obtain the acceptance of local communities (Huijts et al., 2012; Warren et al., 2005). To enable a socially just energy transition, a better understanding of the concerns and motivations of local communities is inevitable. This could generate valuable insights into how projects should be sited, designed, communicated, and implemented (Olson-Hazboun et al., 2016). Understanding why some projects face resistance, while others are supported is necessary (Wolsink, 2007).

German federal states define guidelines that regulate wind energy siting. Therefore, we chose only one federal state (Bavaria) as the research focus to ensure that the regulatory framework was the same in all four cases. One common regulatory path for addressing acceptance-related problems is determining requirements for their proximity to residential areas (Masurowski et al., 2016; Watson et al., 2012). Even though proximity has some effect on the perceptions of wind farms, the intensity of this effect is shaped by the norms and values of the affected communities (van der Horst, 2007). Political power can produce and promote certain norms in social systems (Fraser, 2014), and institutional norms have the potential to regulate market dynamics (Nyborg et al., 2016). Additionally, increasing procedural justice through citizen participation in planning and decision-making procedures (Wolsink, 2007) can increase acceptance (Bell et al., 2013).

Further, this paper focuses on wind energy in forest areas because some of the main concerns of those who oppose wind energy projects are related to landscape protection

and impacts on biodiversity, especially in forest areas (Dai et al., 2015). While the deployment of wind parks in forest areas is a complex one in terms of local acceptance in Germany, the development of wind energy in such zones is necessary for achieving climate and renewable energy goals (FA Wind, 2021). Wind turbines in forested areas are situated almost exclusively in the southern federal states; namely, in Rhineland-Palatinate, Hessen, Bavaria, Baden-Württemberg, and North Rhine-Westphalia (Bunzel et al., 2019). In Bavaria, forests account for around 37% of the land area, making it the state with the greatest forest coverage among all 16 German states (FA Wind, 2021). Additionally, Bavaria has introduced a state regulation, the 10H rule, which defines the minimum distance between the power plants and residential areas as at least ten times the height of the wind turbine hub plus the radius of the blades (Baugesetzbuch, 2014). With wind turbines reaching overall heights of 250 meters, the 10H rule increases the challenge for municipalities of finding appropriate project sites.

Even though there have been several studies on how politics and energy policies shape local conflicts (Avila-Calero, 2017; Busch & McCormick, 2014), the role of local political figures has received little attention so far and is thus a promising area of research. Policymakers often use regulations that address acceptance in a unilateral way, such as distance requirements or obligatory offers of financial participation for communities (Masurowski et al., 2016). Analysis of the local actors that influence community norms can increase understanding of conflicts and dynamics related to wind energy projects (Karakislak et al., 2021). This paper aims to fill the gaps in the literature by exploring the relationship between local political figures and social norms and examining their effect on local responses to wind energy projects. It does so by addressing the following research questions:

1) What is the role of mayors in wind energy projects? 2) What influence do their opinions have on local responses? and, 3) What actors and processes influence project outcomes?

The remainder of this article is structured as follows: Section 2 introduces our conceptual framework and its theoretical foundation by discussing the role of social norms, local political figures, and the local population. Section 3 introduces the methodological approach, the case study selection, the methods, and the analytical approach. Section 4 gives a detailed overview of the case studies. Section 5 illustrates the results of the four case studies. The paper concludes in section 6 by reviewing the main findings and suggesting implications for policymakers and practitioners.

2. Theoretical foundations

This paper applies the conceptual framework described in Karakislak et al. (2021). This two-dimensional framework specifies factors and variables for analyzing the definitions, influencing factors, and impacts of social norms and perceived justice within communities. The first element of the framework proposes that three different groups of individuals are influential in terms of the norms that impact local responses: community spokespersons, political figures, and opposition groups. Community spokespersons are defined as individuals with resources and networks capable of influencing others (e.g. support group leaders) (Karakislak et al., 2021). Mayors and local council members are defined as actors that have political power, social resources, and strong ties to the community. Therefore, they have a key influence on local responses to wind energy projects (Karakislak et al., 2021). The theoretical foundations on which the conceptual framework is based are elaborated in this section by reflecting on the interdependencies between social norms, local political figures, and local responses.

2.1. Social norms

How members of the public respond to the social and environmental changes around them is widely linked to the expected reactions of others. These conditional expectations about how people will react, or how they should react, are conditional behavioral regularities - or social norms (Bicchieri & Mercier, 2014).

Overcoming conflicts associated with energy projects requires a deeper understanding of the embedded influences and values related to the social context (Upham & Johansen, 2020). There tends to be a gap between what others typically do (descriptive norms) and what is considered socially acceptable (injunctive norms) (White et al., 2009). The distinction between intention and behavior is also relevant when estimating responses to wind energy projects (Sokoloski et al., 2018). Moreover, social norms or social pressure from family, friends, and neighbors, alongside political actors, have the potential to influence local responses in both directions (Huijts et al., 2012). Social influence[20] within groups tends to increase the effects of social norms relevant to climate change (Cialdini & Jacobson, 2021). Hoi-Wing Chan et al. (2022) found that perceived social norms concerning support for the energy transition influence individuals to behave consistently with such norms.

[20] Intentional or unintentional demands to change the behaviors of others.

In this study, local responses to projects are addressed as implicit normative indicators of communities. Descriptive norms about climate change mitigation are also factors that are considered.

2.2. The role of local political figures

Local politicians are directly affected by public opinion, while their engagement in wind energy projects affects local responses (Friedl & Reichl, 2016). Consequently, local politicians may have significant impact by shaping the dynamics of community acceptance of wind energy projects. Active local support for community-led projects[21] strongly shapes the distribution of power and the relationships between local actors (Bell et al., 2013).

As key agents of societal inclusion and local policies, the needs and views of the mayors should be better understood (Gürtler & Herberg, 2021). Young and Brans (2017) and Beermann (2009) found from their case studies that the role of the mayor as a policy entrepreneur in implementing 100% renewable energy systems is crucial. In other cultural contexts, for example, a case study comparison in Japan underlined the role of shared social norms in relation to community initiatives for renewable energy as part of policy learning by mayoral leadership and other stakeholders (Takao, 2020). Mayors may become advocates or leaders of renewable energy projects that influence local citizens (Honvári & Kukorelli, 2018). Local politicians have the social and political power to influence public opinion (Busch & McCormick, 2014; Friedl & Reichl, 2016; Karakislak et al., 2021). The power of the local politicians may be applied in different ways. Partzsch (2016) explains this using three concepts in environmental politics: "*power with*", which includes learning and cooperation; "*power to*", which involves resistance and empowerment; and "*power over*", which refers to manipulation. These understandings of power are embedded in the actors, agents, and structures that influence decisions (Partzsch, 2016). Thus, support from the mayor and the local council has the potential to increase cooperation leading to successful project implementation within a municipality (Schwarz, 2020; Wüste & Schmuck, 2013).

Public trust in local decision-makers also impacts the acceptance of power plants (Fast & Mabee, 2015; Titov et al., 2021). Developing trust could be understood as a chain whereby leaders first build trust in themselves, then in a process, and then an outcome

[21]Renewable energy projects that a community of place or interest owns shares in, participates in, or distributes energy services through (see e.g., community energy [Hoffman and High-Pippert 2005], energy citizenship [Ryghaug et al. 2018], prosumers [Ford et al. 2016], community liaisons [Fast, 2017]).

(Dwyer & Bidwell, 2019). Moreover, trust between local community and project stakeholders tends to increase when local people are involved in the project development (Walker et al., 2010). The transparency and openness of local actors could also potentially influence project outcomes (Firestone et al., 2018).

Christidis et al. (2017) found that the perceptions of community members and local politicians tend to differ regarding wind energy projects, which could become a barrier to their implementation. In cases when communities have a direct democratic impact on projects, such as through referendums (Bell et al., 2005), political actors have the advantage of being able to create open dialogue that overcomes such potential barriers. There is a potential for conflicts between the local politicians' influence on the public and how this might affect their re-election (Friedl & Reichl, 2016). For example, Walker et al. (2018) showed that a divisive political context in a province could spur the rise of opposition and even create an electoral backlash. Hence, in relation to projects, mayors may avoid taking sides until they are ensured of having enough public support. This paper explores how the positioning of mayors can impact local responses, and whether having supportive local politicians is key to successful project implementation.

2.3. Local responses to wind energy projects

Local responses influence the outcome of wind energy projects directly (e.g., through referendums), but also indirectly through their influence on local politicians (Jolivet & Heiskanen, 2010). However, it is important not to understand local responses as an obstacle to the energy transition, but rather to aspire to increase understanding of them (Devine-Wright, 2007).

Local responses are multi-layered and dynamic and can range from support, to opposition and indifference, resistance, tolerance, or acceptance (Batel & Devine-Wright, 2015b; Walker et al., 2018). Energy-related social science research has been developing a more nuanced understanding of local responses (Walker et al., 2018) than simply labelling opposition groups self-interested or irrational (Wolsink, 2006) – the not-in-my-backyard (NIMBY) concept. Discussions about the attitudes, behaviors, and responses of individuals are adapted to different concepts and theoretical frameworks (Fast & Mabee, 2015; Huijts et al., 2012).

Estimating and understanding local responses also requires that local actors acknowledge and cope with the emotions associated with wind energy (Perlaviciute et al., 2018). How people feel about wind energy in general and their environmental beliefs might not reflect how they respond to projects. Positive associations about wind power

tend to be more abstract than negative ones, resulting in the responses of opponents being more clearly elaborated (Cousse et al., 2020). Being directly affected by a project tends to be a strong driver of people's attitudes, thus this requires better anticipation (Russell & Firestone, 2021). Van der Horst (2007) found that only people with strong feelings against wind energy in general, engage in local resistance. Warren et al. (2005) claim that local opposition involves a minority of people, but that they receive more attention from the press. On the other hand, in locally rooted projects, some actors have the potential to foster positive emotions and opinions about wind energy (van der Schoor & Scholtens, 2015). In the past, most referenda about wind energy projects resulted in project abandonment. However, more recently decisions have tended to be pro-wind energy (Langer et al., 2016). A similar trend can be perceived in Bavaria. One explanation may be that people who have personal experience with wind energy tend to be more positive about it (Langer et al., 2018). The ‘silent majority’ either passively support (Schweizer-Ries, 2008) wind energy or have no strong beliefs about it (Gross, 2007).

3. Research Methodology

The aim of this study is to investigate how local politicians and social norms influence local responses to wind energy projects. In order to do that, the paper analyses four case studies in Bavaria and examines the processes around these wind energy projects. In this section, we will explain our case study selection, present our methods, and conclude with the analysis.

3.1. Case Studies

Germany is a relevant context for examining the local dynamics of wind energy development threefold. First, Germany’s phase-out of nuclear and coal energy requires a substantial expansion of renewable energy. Second, Germany has great potential for wind energy expansion, and third, the deployment faces various challenges.

The Bavarian state government introduced the Bavarian Energy Action Program in 2019 to spur the deployment of 300 new wind turbines with a 1GW newly installed capacity (StMWi, 2019). However, this significant goal of expanding wind energy and informational instruments has met with regulatory setbacks. Since there is no national regulation about wind turbines in forest areas, each state employs restrictions on planning which steer the expansion of wind energy (Bunzel et al., 2019). Particularly in

Bavaria, forest areas carry a large potential for wind power, but – as Ludwig and Bosch (2014) suggest – this requires alternative socio-ecological integration models. In November 2014, Bavaria introduced the 10H rule, which defines the minimum distance from the residential areas to the closest wind turbine as ten times the turbine's total height (Baugesetzbuch, 2014). There are recent changes to 10H that allow dropping the distance rules in priority and reserved areas for wind energy (e.g., motorways and forest areas). However, local municipalities can define exceptions to the 10H rule in their local setting through urban land use plans that allow wind energy projects within the 10H limits. Municipal actors also have to balance the local and national interests in situations when hierarchical interventions such as the 10H rule exist (Verhoeven et al., 2022). Despite the intention to avoid conflicts, local projects still face strong opposition in Bavaria (Langer et al., 2016). In practice, the 10H rule can put additional pressure on local municipalities. First, the 10H rule can take power away from municipalities, and second, the exception to the rule puts pressure on them since they have to justify why a distance lower than 10H is allowed (Watson et al., 2012). This often results in considerable resistance in the form of citizens' initiatives or from neighboring municipalities (Langer et al., 2016).

Bavaria is a particularly interesting area for wind energy because of its significant role in the German energy transition. Bavaria ranks third on the list of German federal states in terms of its ambition and implementation of renewable energy to create socio-technical change (AEE, 2019). Thus, it is one of the states that prioritized the energy transition. However, the 10H rule has affected the expansion of wind energy and created further conflict.

In order to identify relevant case studies, we screened news articles, the Bavarian Energy Atlas and the State Ministry for Economic Affairs, Regional Development and Energy to create a list of wind energy projects that fit our criteria. We used focal points to examine wind energy projects, such as the institutional conditions (e.g., land ownership, developer/operator, planning authority), project features (e.g., number of turbines, distance, and location), opinion of the mayor, and intensity of active opposition or support groups. We chose four case studies based on the following four selection criteria: project size, implementation status, project site, and opinion of the mayor (see Table 1).

First, we made sure that all projects were similar in size. Second, to illustrate how local actors could influence the different phases of the projects, we chose two projects that were already in operation. The other two projects are in the initial planning phase, with one already being cancelled. Third, for the project location, we only selected projects

that were planned or implemented in a forest area since 37% of the landscape in Bavaria consists of forest areas (FA Wind, 2021), and one of the main concerns about wind energy is landscape protection. Fourth, we distinguished the projects by the mayor's response: support, opposition, or indifference. However, we could not identify projects that a mayor was openly against; thus, we could not include a case study with an opposing mayor. Projects seem to not even to get initiated if the mayor is against wind energy; consequently, we could not find respective projects. We present the four case studies as examples of various project outcomes in similar social contexts and illustrate the different processes rather than compare the project actors or results. Thus, this study presents the case studies descriptively and discusses their implications interpretatively. In Case Study 4 (CS4), the possibility of wind energy in the municipality was prevented before a project could occur. Therefore, CS4 is investigated through fewer interviews.

Case study	Number of turbines	Year	MW (each turbine)	Total height	Distance from residential areas	Inhabitants of the municipality	Financial participation	Ownership	Project developer	Opinion of the mayor
1	4	2015*	2.5 MW	197m	800m	2400	Yes	Bürgerwind	Regional	Advocate & initiator
2	3	2019*	3.6 MW	199.5m	900m	5600	No	Private	Regional	Advocate
3	4	2019**	6 MW	250m	>1000m	12000	Planned	Private	National	Hesitant support
4	5	2021***	N/A	230-250m	N/A	6400	Planned	Bürgerwind	N/A	Advocate & initiator

*Implementation; **In planning; ***Cancelled

Table 1: Information on the case studies (Source: Interviews and document analysis)

3.2. Data Collection

For the data collection, we conducted 18 semi-structured interviews between December 2021 and June 2022 (see Table 2), which enables comparability between the cases, while providing us with enough flexibility to react with content-specific questions. Through a web search, we identified relevant stakeholders and contacted them via email. All the interviews were conducted in German using online tools and took between 20 and 60 minutes. At the end of the interview, we asked respondents to identify relevant

stakeholders of the project. We stopped interviewing at the point of data saturation for each case study.[22]

Three types of knowledge can be gathered through interviews: technical, process, and interpretative knowledge. First, facts and figures were explored which did not depend on individuals, i.e. *technical knowledge* (Bogner, Littig, & Wolfgang, 2014). Here, we were interested in the project specifics such as location, number of turbines, turbine height, MW capacity, ownership structures, and proximity to residential buildings. *Process knowledge* provides insight into processes and activities that is obtained through experience and direct involvement (Bogner, Littig, & Wolfgang, 2014). Here, we were especially interested in participation structures, the actors involved, communication strategies used, and the local responses to the projects. *Interpretative knowledge* refers to subjective perspectives, interpretations, and constructions of the interviewees (Bogner, Littig, & Wolfgang, 2014). The interviewees provided us with their assessment of the projects and the role of key actors, their perceptions about local responses, and their explanations for the success or failure of the projects.

Case study	Interviews	Mayor	Local council	Project developer	Local population
1	6	1	3	1	1
2	5	1	1	2	1
3	4	1	2	1	-
4	3	1	2	N/A	-

Table 2: Interview participants

3.3. Analysis

After transcribing and translating the interviews, we used a framework method to analyze the data, which involves qualitative data management and analysis and is affiliated with the broader context of thematic or qualitative content analysis (Gale et al., 2013; Ritchie & Lewis, 2003). It consists of first organizing the data to enable interpretation within and between cases to identify similarities and differences (Gale et

[22] When no new information was forthcoming.

al., 2013). This analysis was complemented by examining documents and reports that are of relevance for better understanding the Bavarian context.

In the first step, both authors went through all interview transcripts independently and coded them in an inductive way by identifying themes. As a result, an index was created that identified main and sub-themes. The software "MAXQDA" was used for the data management and analysis. This software facilitates the application of the framework method and offers several visual tools and mapping options for the analysis (Kuckartz, 2010).

Initially, the concepts that addressed our research questions were identified. Next, we studied emerging patterns within the results from the case studies (Yin, 2014). Finally, we searched for explanatory patterns and factors. We connected these patterns, insights, and concepts that relate to the outcomes of the projects as the findings to our research questions.

4. Case Study Descriptions

Figure 1: Case study areas in Bavaria, Germany (Created with mapchart)

This section describes the social and cultural context of the case studies and summarizes the process of wind energy projects. The information presented here is collected from documents and interviews.

Most of the landscape (80-90%) for all four locations was rural, divided between agriculture and forest areas. Their respective local economies depend on manufacturing, trading, transportation, and the hospitality industries. According to the last federal and

state elections, the towns supported political parties similarly. The Christian-democrat and conservative political party of Germany (CSU) received the most votes in all four towns. There are three male mayors (CS1, CS2 and CS4) and one female first mayor (CS3) in these municipalities. Gross annual household income of the residents in the towns was also similar (Bavarian State Office for Statistics, 2021). We, therefore, argue that the towns have a relatively similar socio-economic and cultural context.

4.1. Case Study 1

Case Study 1 (CS1) is in a town in the northwest of Bavaria, close to the borders with Baden-Württemberg. The town has one mayor and a 14-seat town council. Most of the council members are independent candidates, including the mayor.

The project was initiated by the mayor, who has been in office since 2008. When project planners showed interest in implementing a wind energy project, the mayor initiated a community-owned project through an alliance with four neighboring municipalities to ensure the benefits stay in the region. He saw an opportunity to generate income and create regional value since the municipality did not have many other sources of income. Additionally, prior to the wind farm proposal, municipal actors formed a group that supported environmentally friendly projects in the municipality, such as installing solar photovoltaic projects and building nature trails, which led to a supportive and trustworthy environment in the municipality.

The project developer was chosen from eight applicants and was described by our interviewees as "*from the grassroots*", trustworthy, experienced, and caring about the region. He mostly develops community-owned projects to ensure that benefits stay in the region. The project developer also recognized the concerns of the public, addressed people personally, and described members of the small opposition group as "*simply afraid*". He was described as one of the reasons for the high level of acceptance. The local council members assumed that the project would not have been successful with an external project developer. Compared to having an external company involved, council member 3 perceived that the developer "*had not gotten rich from the project*" but rather made sure that the profits stayed within the municipality.

The mayor's motivation and advocacy of wind energy was explained as the decisive factor in terms of the project outcome. The local council member 2 described the mayor as "*far-sighted and driven*". Another local council member described his impact in the following way:

> "*And above all the mayor, who is pushing this quite massively, and then of course there is also the effect, uh, that people trust the mayor and therefore perhaps don't speak out as loudly against it...*" (Local council member 1, Biologist)

The initiative is a citizen project that involves the investment of five municipalities and 215 citizens. Other than financial participation, there was no possibility for the local population to become involved in the planning process, but the local population was informed early on and regularly. The option to buy shares in the project was communicated in all municipalities through citizens' meetings and through local media channels. The project has been very successful and profitable for the stakeholders. Recently, the developer proposed to extend the wind farm with a turbine, but one of the neighboring communities rejected it.

Some individuals were against the project, but the opposition was never very strong, and the local population mainly supported it. The mayor would not have proceeded with the project without the support of the local population, noting "*the danger of being voted out of office*" in this respect. One of the community members expressed their concern about Bavaria being not an optimal region for wind energy siting because of the presence of dense forest area, waterfalls, and water reservoirs. The project was planned around existing infrastructure to avoid as much deforestation and impact on the local environment as possible. Further, the municipality invested between 180,000 and 200,000 euros into nature conservation measures and reforestation in compensation for the wind energy project. According to local council member 1, these mandatory compensation measures also raise awareness about climate change and other environmental issues, since people realize that for other quite invasive infrastructure projects, compensation measures are not required.

Acceptance of the project was not really an issue. A community member from CS1 explained that the people of Franconia[23] were "*very patient*" and "*tolerant*". But the project encountered other obstacles. Delays were caused by the implementation of the 10H rule, the presence of a nearby American helicopter airport, and the connection to the grid. The biggest challenge, however, was that the project was planned to be located in a state forest and a minister in Bavaria disallowed the state forest authority from signing the respective contract. However, through political pressure, the project ultimately received permission.

[23] Franconia is defined as the cultural region in Bavaria with its own Franconian dialect.

4.2. Case Study 2

The media and our interviewees described the second case study (CS2) as a showcase example in Bavaria. Located in north-eastern Bavaria, the town is close to the border with the Czech Republic borders. The town has a council with 20 members and three[24] mayors. The current mayor is a democratic and conservative party representative, similarly to most of the council members. The previous mayor of this town was from the same party that also initiated the project in 2015. In addition, the municipal council members were unanimously in favor of the project, which increased the coherence between local representatives of all parties.

The Bavarian minister from the Ministry of Economic Affairs had visited the wind park with six delegates to learn more about the project and to obtain insights about the reasons for its successful implementation. This was the first project that to be implemented with a distance to residential buildings less than specified by the 10H rule. Local acceptance was high, and it was also the only project that was not legally challenged at the time. Additionally, the average CO_2 consumption per capita in this municipality is higher than the Bavarian average, which was interpreted by a local council member as a reason for the greater awareness of the need for the energy transition. The turbines were installed close to existing infrastructure to avoid unnecessary impacts on the environment and the forest.

The previous mayor was the key facilitator of the project and was identified as one of the reasons for the project's success. According to our interviewees, the public supported the project strongly due to their belief in the necessity of renewable energy development and advocacy. The project planner stated that:

> "*I think what had a very positive effect here was a courageous mayor who communicated to the population from the outset that this procedure, which was necessary, would be started in a results-oriented manner and that if insurmountable problems became apparent, then it would be possible to practically discontinue it again.*" (Project and landscape planner)

After some initial concerns that the use of wind energy could cause *"trouble",* the local council voted unanimously for the project and all related resolutions were approved. The local council also included a member of the German Federal Parliament (Bundestag) who is a strong advocate of wind energy, which may be one of the reasons for the strong

[24] In Bavaria, the first mayor (Erste/r Bürgermeister*in) is directly voted within the community. The municipality may have second or third mayors that are elected by the council members.

support for the project. There were lengthy discussions between the council members, which resulted in harmony through the leadership of the mayor. Initially, the municipality was approached by an external energy corporation that planned to build six wind turbines. This corporation's approach was described as "*brisk*". The responses of the local population were not solely positive. The local council wanted to promote wind energy but wanted to remain in control over the locations and consequently, decided through zoning about potential sites. In the end, the project was planned by a regional company together with a regional planner, while an employee of the local municipality carried out the urban planning. The project ended up being planned by a regional company together with a regional planner, while the urban planning was carried out by an employee of the local municipality. The previous energy corporation had an approach that mainly focused on maximizing profits, whereas the new project developer considered the needs of the municipality. The latter chose a pooling approach, meaning that not only the landowner where the turbines stand profits from the lease, but also anyone who is affected through access roads or the grid connection. Additionally, the project developer wanted to use a citizen participation model in terms of implementation. The second mayor of CS2 described the landowners as positive about the project, which created an advantage for the developers. Further, the turbines were installed close to existing infrastructure to avoid unnecessary environmental and forest impacts. Moreover, a local described the siting of the wind turbines to be favourable without any shadow cast.

Having an experienced project planner with an open approach that won the trust of the community played an important role in the success of this project. The interviewees also highlighted that the communication strategy of the developer company worked well because the planner was approachable. The local population was informed about the project through an information event, not through a panel discussion. There was a presentation at the beginning, followed by an opportunity for residents to visit different information tables and obtain information they were interested in. The event was described as constructively critical by our interviewees. This was identified by a local council member, community member and project developer as one of the reasons for the high level of local acceptance. The project manager shared this assessment:

> "*This led to the fact that the citizens' initiatives from outside were actually there, but as they saw that they were not given the platform for their protest, they left again."* (Project manager for administrative procedures)

The planning process took three years and there was no possibility for financial participation. The project developer did not face any opposition but encountered other challenges. During the planning phase, they faced two main obstacles: the 10H rule, and a military helicopter training area, which was located close to the project site. After completion, the current mayor stated that they had realized that the dismantling of wind turbines would be classified as special waste (*Sondermüll*), which was not accounted for in the original budget.

4.3. Case Study 3

In central eastern of Bavaria, Case Study 3 (CS3) is located at the border with Austria. It is a more densely populated town than the other three cases, with 24 members on the local council and three mayors. The first mayor of the town is an independent candidate, while most of the council members represent conservative parties.

The project is still in the planning phase and was the most controversial of the four case studies. After an external energy corporation indicated their interest in implementing wind turbines in this municipality, resistance formed quickly and strongly. One of the targets was the mayor, who was elected ten years ago. While the second and third mayors, other council members, and the project developer were not directly exposed to the aggressive activities of the opposition, the first mayor was held accountable for the project. The mayor received threats, although she was neither a vocal advocate of the project, nor has she pushed strongly for it. The mayor supports the project but has not clearly voiced her opinion since, as she reported, she did not want to influence the local council or the local population. She stated:

> "*I've always said that we have to deal with the question of where our energy should come from in the future, and we can't always say that others have to fix it for us. […] We can't always just be against it without saying what we're for.*" (First mayor)

The backlash she has faced for her political stance was exceptionally intense. She had received a dead rat by post, which she explicitly argued is associated with fear by women. When asked whether a male mayor or the other town mayors would have faced the same reactions, she replied, "No". However, the sample size is too small to conclude gender-related issues.

Other political actors in the municipality argued that the hesitant position of the first mayor had created further conflicts. Local council member 1 who is against the project also stated that politicians should rely on being elected by a large percentage of the

population and take a stand. Moreover, he is part of a political party in the local council that emerged from the opposition group against the wind energy project. The third mayor of CS3 explained the lack of leadership as "*decisive*", and added:

> "*The principle in a Bavarian municipality is quite simple, in my opinion: the mayor is the leader. The mayor defines the direction in which a municipality can develop. They have everything in their hands, they have the staff that works for them and the other members of the city council... Simply, the first mayor, who says, "Dear administration, we now have the application here, how do we deal with it, or what could we do with it?" - and the rest is all incidental."* (Third mayor, local council member 2)

The project developer wanted to install turbines of the maximum height. One of the local council members criticized this goal and suggested having smaller turbines instead. Local council member 1 stated that the planned project will only be profitable for investors and "*will fill their wallets*" but ignore the concerns of the community. A financial participation model is planned for this project, but the details have not been decided yet. The project developer further elaborated on the details of information in the following way:

> "*The difficult thing about early information is that it is always very vague. If we provide information at an early stage, we don't yet have a bird survey or a noise survey. So, we don't have all these things yet, because we inform early and sometimes there is a conflict with the expectations. Yes, for example, when we say that we will inform, we will inform as early as possible. Then we are asked a lot of questions that, of course, can only be answered in a general way at the beginning of a project and not in a project-specific way. And then again, I would say that the disappointment is sometimes very great because people expect to learn a lot of details that it is not possible to give at that point*." (Project developer)

This project is associated with the strongest opposition of the four cases. Concerns included a drop in tourism, visual impacts, the impact of infrasound, disruption of the water sources, and health risks. The strong response to the interest of the energy company in building a wind energy project in the municipality was surprising to the mayor, since in 2010 and 2011 the same municipality had stated its intention to become a role model regarding wind energy in Bavaria. At the beginning of her term, the land-use plan was adapted and concentration zones for wind energy were defined, which did not provoke a response from the local population. However, she described the energy

company as being too confident and not willing to make any concessions, and by "*gambling away*" the town as their communication methods had failed to address people's concerns. The local population was informed through an event that was held in response to the local opposition. Additionally, the third mayor described the 10H rule as a further burden at the municipal level as local politicians would prefer not to undermine the 10H distance.

The case exhibits the striking difference between perceptions of the local council and the project developer. The project developer sees the project as being on a good track with opposition within the normal range, while the mayor and the local council perceived this quite differently. According to the project developer, the difference was only that there was a greater media presence.

4.4. Case Study 4

Case Study 4 (CS4) is a town in the north of Bavaria, close to the state of Thuringia. The local council consists of mostly independent candidates and local party members, as well as their mayor. The town council has 21 members and one mayor.

The mayor initiated the project and was an advocate, but the project was cancelled through a municipal council vote before it started. The project was planned around existing infrastructure to ensure little interference, and financial participation would have been offered to make sure that financial benefits stayed in the region.

According to the mayor, a project was initiated ten years ago, the population was open to it, and the contracts with landowners had already been signed. However, after the introduction of the 10H rule, the project could not proceed. Since municipalities can circumvent the 10H rule through a land-use plan, the mayor put the topic back on the agenda. In February 2021, the local council decided during the non-public part of local council meeting in proportions of 19:1 that they wanted to investigate the possibility of developing wind energy projects in their municipality. This was a decision that indicated interest in the topic, but no concrete project was initiated at that time.

At this time, a lockdown due to the COVID-19 pandemic was ongoing and the local population was informed via the local newspaper. It was also not possible to invite them to an information event, so the event took place online. According to local council member 2, this made it more difficult to interact and to get a feeling about the assessment of the local population. He also mentioned that questions remained unanswered since many details were not known or decided at that point. In the non-public part of the next local council meeting, the local council voted unanimously to investigate the use of wind

energy in the municipality. After the local population was informed, opposition emerged rapidly and intensely. Concerns included shadow, noise, flashing lights, and bird strikes. The mayor was surprised by the intensity of the reactions.

At the local council meeting in May 2021, when a decision had to be made about whether to move ahead with the project, the same local council that had voted 19:1 a few weeks earlier for the project, voted against the project 13:7. According to the local council member 1, opponents put a lot of pressure on local council members, stating that they would divide the local population. The local council meeting took place under police protection. The mayor described the situation the following way:

> "*This was a real storm, which was hard to beat in clarity with whistles and tractor torso before the municipal council meeting, with 100 people chanting and bawling, so it was already very violent.*" (Mayor)

For the mayor the rejection was a significant setback since members of his own party voted against the project. The local council member 2 suggested that it might have been better to postpone the decision rather than make it in such a heated environment. A referendum would have been another solution and which a neighboring municipality chose (with 70% of the local population supporting the project).

5. Findings

The following section presents our findings from the four case studies. From the analysis of the four case studies, four main factors emerged that influence local responses to wind energy projects: the assessment of the mayor and local council, the project developer, project communication, and the local responses.

5.1. The assessment of the mayor and local council

Many of our interviewees mentioned the importance of the support of the mayor and the local council in realization of wind energy projects and local acceptance. Our case studies confirm the findings in the literature that the approval of the mayor and the local council for a project seems to be pivotal to success (Busch & McCormick, 2014). Approval of a project by the mayor is no guarantee of successful implementation, but disapproval of a project proposal seems to hinder project development in the first place. We could not identify any wind energy projects opposed by a mayor, suggesting such approval might be a prerequisite in Bavaria for initiating a project. This was also confirmed by our interviewees.

As local political figures, mayors are representatives of their communities but also their political parties or groups. We found that the local leadership of the mayors tends to be independent of the national standpoint of the affiliated political parties towards the energy transition, similar to Adesanya et al. (2020). Even though some participants argued that the political parties of the mayors and council members can steer responses to projects, we found no correlation between these factors in the case studies.

The influence of mayors on the project outcome is twofold. Firstly, they can stop projects directly since they have to adapt the land use plan. The project developer of CS3 stated that they do not start projects without the approval of the local council and the mayor since they will need to change the land use plan in the end. The project developer explained that many projects fail because the mayor says "*no*" thinking "*why should they get themselves into trouble?*". Secondly, mayors can also have an influence on local responses. Mayors can play a mediating role between project developers, planners, and the local population, providing them with a strategic position through encouraging and inviting the public to participate in projects, addressing concerns, or acting as intermediaries. The vision they have of their town and their leadership could impact the development of the project significantly. Nonetheless, mayoral support does not guarantee local support. Thus, the mayor's support is essential but not sufficient for local acceptance.

Our findings also indicate that mayors need the support of the local council. Especially in municipalities where the projects need to be approved locally, council members directly impact outcomes. In turn, mayors and local council members are also directly affected by the reactions to projects of the local population. They can face pressure from the public, which may affect their attitudes towards project development. Thus, the mayors' responses can change over time, but their influence on the local population can also change and is highly influenced by social norms and trust.

In our case studies, mayors were elected representatives by the local communities which portrays them as trusted leaders. However, trust is not the sole explanatory factor for acceptance. The current mayor of CS1 and the previous mayor of CS2 have been in office for over 10 years and had long-lasting relationships with their local communities. Here, the mayors were supporting and initiating the projects, and the local population supported them as well, which resulted in the project implementation in the end. Whereas, in CS4, the mayor has been in office for over 20 years who would be arguably perceived as a trusted local leader. However, his attempts for initiating a project were not successful. Trust in mayors as stakeholders played an important role in the distinctive outcomes of these three projects. However, However, other factors impact

the relationship between the community and mayors, such as providing a clear vision, project communication and project characteristics.

5.2. Project developer

Next to the mayor, our interviewees identified project developers as having an influence on local responses and project outcomes. Confirming findings from the literature (Goedkoop & Devine-Wright, 2016; Walter, 2014), regional project developers were trusted more than external project developers. Alongside their role in the projects, we analyzed how they perceive local responses. Project developers tend to make assumptions about emotional responses towards energy projects. Whether they frame the latter as NIMBY responses or try to solve conflicts through compensation (Perlaviciute et al., 2018), their approach to overcoming negative responses influences the outcome of projects. Therefore, it is not only relevant *who* the project developer is, but also *how* they interpret their role, and consequently, how they interact with the local population and *how* they set up the project.

In the four case studies, regional project developers were favored over external corporations. The former were perceived as caring about the region and its inhabitants and as trying to make sure that added value stayed in the region. They were perceived as attempting to minimize negative impacts on the local population and the local environment. In contrast, the latter are perceived as being interested in maximizing profit and output without caring too much about environmental and social consequences.

In CS2 and CS3 concerns were raised by the public. However, they were addressed differently by the project developers. The project planner of CS3 argued that the public was prejudiced against the project from the beginning. In contrast, in CS2, an external developer was associated with a failed project, which the current developer had taken over. Moreover, the external developer of CS3 explained the advantages of the project for the town in terms of siting and distance from the residential areas, whereas the regional developer of CS2 emphasized first the social, environmental, and economic advantages for the community, and then for their company. The communication between the local population, municipality, and the developer of CS3 was also found to be problematic due to the absence of the provision of information and leadership. This difference in the project presentation narrative might also have led to the dissimilar local responses in these two case studies. Additionally, we identified that it is important whether the community trusts the project developer, similarly to the findings of previous studies (Dwyer & Bidwell, 2019; Kalkbrenner & Roosen, 2016). Moreover, when a

project developer is perceived as caring about the people and the region, this correlates positively with the project outcome. This is also strongly linked to the set-up of the project. Regional project developers were associated with projects that are set-up in a way that they benefit the municipality or community either financially or in other ways.

5.3. Transparency and early information

Almost all interviewees agreed that early information and transparency make acceptance more likely. It is not only important what is communicated, but also how, when, and by whom. It is essential to inform the public early about projects to avoid trust-related problems and to avoid any feeling that everything is being managed and decided behind closed doors.

This conclusion confirms the findings of many studies (Dai et al., 2015; Dermont et al., 2017; Wolsink, 2007). However, our case studies suggest that the early provision of information is not enough. The "*right timing*" is critical for avoiding raising more questions than it settles. Many of our interviewees agreed that there needs to be a balance between informing early and having enough information to share. When informing early, it is inevitable that there will be many factors that are unknown, not assessed, or undecided. This implies that residents will not receive answers to every question they have, which may result in the feeling that local decision makers or project developers are not being entirely open and transparent. The mayor in CS4 saw timing as one of the reasons for the failure of the project. He considered that they had informed the public too early, leaving many questions unanswered. Similarly, the project developer of CS1 described the balance between providing early information and having enough information as a "*tightrope walk*".

Project communication is a process and alongside the importance of the timing, our interviewees agreed on the relevance of how information is provided and how the events are set up. In CS4, one of the reasons for the strong opposition was believed to be the online context of the public information meeting. A positive example is the information event of CS2. Here, our interviewees agreed on the positive influence of the set-up on the constructive dialogue that was enabled. Panel discussions do not seem appropriate to inform the local population about a planned project. Moreover, personal discussions and raising awareness within the community regarding the alternatives to wind energy were found helpful.

Therefore, how and when the public is informed strongly influences local responses and in turn, the project outcome. In other words, information should be communicated when

there is considerable room to elaborate, not too early when there are no proposals for siting or project features. Moreover, the context of information sessions tends to impact how meetings proceed. Further, it is crucial that the whole process of the project is explained and that the local population is informed about when they can expect which decision and the respective information.

5.4. Local responses

The local population plays a vital role in wind energy projects since they influence outcomes in two ways. First, through democratic and participatory processes - for instance, lawsuits, objections, and referenda. Second, through their influence on local political figures (Jolivet & Heiskanen, 2010). For the current mayor of CS2, the approval of the local population was a prerequisite for moving forward with the project. He stated that:

> "*I would say that the most important thing for me was that citizens did not massively oppose it at any of the participatory events. I mean, why should I as a politician, as a politically responsible person, push something through against the resistance of my citizens.*" (Mayor of CS2)

As political actors, the mayors' position relies merely on the support of their community. One challenge that our interviewees mentioned is to assess the opinion of the community as a whole and ensure that not only the people are heard that voice their opinions. Because opposition groups tend to be more audible and visible, taking into account the responses of the whole community becomes difficult. A local community member of CS3 stated that when people feel threatened or endangered, they tend to respond emotionally. On the other hand, the relevance of considering members of the silent majority that either do not have strong emotions, or do not express their opinions about wind energy projects (Stephenson & Lawson, 2013) was also highlighted in our case studies. In both cases, it was argued that the two sides of the spectrum stay in their own bubble, creating problems changing attitudes and behavior.

In our case studies, we explained these polarized views of the public through social norms, similar to Huijts et al. (2012). Responses to energy projects tend to create a *domino effect*, which might enforce strong opposition, like in CS3 and CS4. In CS3, proponents did not want to voice their opinion since the opposition was substantially intense. Similarly, in CS4, the opposition group directly influenced the local council's voting behaviour. In other examples like CS1 and CS2, where similar concerns were raised by the public, norms are argued to cultivate the responses in the other direction.

Consequently, mayors have a significant role in shaping local community social norms, but their impact alone is not always the deciding factor.

6. Conclusion and policy implications

The energy transition is an important means of addressing climate change. In Germany, decentralized energy production through "Bürgerwind" (citizen wind) projects and energy cooperatives is the backbone of the energy transition. We have presented four case studies from Bavaria, illustrating the importance of the structural frameworks, key stakeholders, and information. Our study adds a unique contribution to the research on social acceptance and has implications for practitioners due to the following conclusions.

This paper has shown that the outcome of wind energy projects depends on multiple interlinked relationships between different stakeholders. Regarding the first research question ("What is the role of mayors in wind energy projects?"), this study shows that the approval of the mayor and the local council for wind energy projects seems to be important. However, support from the mayors is not enough to guarantee local support. Our findings also indicate that mayors need the support of the local council members, as shown in CS4, in which case the lack of support of the local council resulted in a project stop. Additionally, they need to present a clear vision and make sure that the community or the municipality benefits from the project and clearly communicate why the project should be implemented.

The second research question was on the mayor's influence on local responses. Mayors can play a mediating role between project developers, planners, and the local population, defining a strategic position. A decisive factor in the local responses was how the mayors addressed the concerns. Thus, their role in the municipality administration and project development sets the tone of the local environment.

Concerning our third research question ("What actors and processes influence project outcomes?"), we identified three main factors: early communication, the role of project developers, and the local responses. First, our study shows that early communication with communities and transparency during the decision-making process of wind energy project developments are important factors that influence local responses. Beyond this, our results also highlight the importance of timing and context in communicating with the public. Second, our results suggest that regional project developers may be favored over external corporations. While regional developers are foreseen as benefitting communities more, external corporations are often perceived as prioritizing their own

interests over those of local communities. This is strongly interlinked to the project, which needs to enable positive effects for the community or the municipality. Building trust within the local community, local political actors, and project developers play an important role in the outcome of the projects as well. Third, this study confirms that the local population plays an important role when it comes to wind energy developments. Local responses to wind energy are dynamic and influence the outcomes of projects directly and indirectly. Moreover, these responses are impacted by the social norms in the community. Finally, the whole planning and permitting process is complex and long creates a challenge for municipalities, especially small ones. The 10H rule is a burden for municipalities, not only because of the complicated process that needs to be followed if a project fails to satisfy the 10H rule, but also because it may put municipalities in a difficult position by giving the impression that they are harming the local population.

Based on these insights, five implications for policymakers and practitioners are derived. First, the role of mayors is not limited to political leadership but can extend to other functions such as project initiator, mediator, and facilitator in public participation processes. Creating educational and endorsement programs to enhance their mediating skills and competencies could help support them in these activities. Surrounding counties and federal states could establish learning and experiences networks and encourage the joint planning of municipalities so that mayors are not left alone. Second, mayors are interested in creating benefits for their municipalities. Thus, implementing policies that offer financial benefits to the municipality (for example, in the form of tax revenues or by pooling systems for distribution of profits) could incentivize interest in projects. Third, early information is essential. However, there needs to be a balance between informing early and having enough information to share. Additionally, the setting of the information event also plays a role. Fourth, the 10H rule was mentioned in all case studies as a burden. Consequently, the regulatory framework should be adapted. Finally, to promote fair and inclusive decision-making processes, decisions could be taken by the public through referenda.

While this study is based on a rich qualitative sample that involves four case studies, we note here some limitations that can spur further research. Firstly, our focus was on the impact of the mayors, while social norms that shape local responses are implicit determinants of relevance to the study. Based on conceptual frameworks that argue that social norms are a significant factor in acceptance, our approach identifies local responses as norms, instead of approaching them using standardized measurements. Moreover, all the mayors in our case studies were elected by the locals. In cases when mayors are selected as representatives from the local council, the results might differ. A

second limitation was our difficulty to reach local community representatives for interviews. Through snowballing sampling, we identified key spokespersons in each case study who had either raised their concerns or supported the project, but we managed to speak to only few of them. Even though this is a common challenge in social acceptance research, COVID-19 pandemic affected our data collection. Field research with participant observation could create further insights into the norms of the opposition groups. Third, our case studies indicate that local opposition seems to react differently to male and female local leaders in similar circumstances. However, the sample size is too small to draw any conclusions about this factor. Future research could identify whether there is a correlation between female political figures and oppositional groups (i.e., if the latter target them more aggressively than male leaders). Research into these issues would benefit from more attention and help achieve a more just and inclusive energy transition.

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Appendix

Interview No.	Role or Title	Date of Interview	Format	Duration
1	Mayor of CS4	07.12.2021	Video Call	38 Min.
2	Local Council Member 2 of CS1	08.12.2021	Video Call	31 Min.
3	First Mayor of CS3	09.12.2021	Video Call	42 Min.
4	Mayor of CS2	09.12.2021	Video Call	32 Min.
5	Local Council Member 3 of CS1	09.12.2021	Video Call	26 Min.
6	First Mayor of CS1	10.12.2021	Video Call	36 Min.
7	Project Manager of CS2	13.12.2021	Video Call	28 Min.
8	Local Council Member 1 of CS1	14.12.2021	Video Call	33 Min.
9	Project Developer of CS3	21.12.2021	Video Call	31 Min.
10	Project Planner of CS2	22.12.2021	Video Call	35 Min.
11	Local Council Member 2 of CS4	23.12.2021	Video Call	39 Min.
12	Project Developer of CS1	17.01.2022	Video Call	34 Min.
13	Local Council Member 1 of CS4	20.01.2022	Video call	18 Min.
14	Community Member of CS1	11.05.2022	Phone Call	20 Min
15	Third Mayor and Local Council Member 2 of CS3	26.05.2022	Video Call	60 Min
16	Community Member of CS2	01.06.2022	Video Call	25 Min.
17	Local Council Member of CS2	09.06.2022	Video Call	20 Min.
18	Local Council Member 1 of CS3	10.06.2022	Video Call	60 Min.

A: Interview participants list

Curriculum Vitae

Nina Schneider

Work Experience

09/2018 – until now	**Research Assistant – University of St. Gallen** MISTRAL Co-creator of MaCS (Managing Climate Solutions Certificate) REMforum Program Manager 2020
04/2017 – 07/2019	**Research Assistant – University of Applied Sciences Vorarlberg** Interreg Alpine Space Project Supervision of student project (Projektwerkstatt)

Education

09/2018 – until now	**University of St. Gallen** International Affairs and Political Economy (PhD) Doctoral Thesis – Dynamics of community acceptance
09/2014 –10/2016	**Vienna University of Economics and Business** Master in Socio-Ecological Economics and Policy with distinction Specialization in *Environmental Change and Policy* und *Globalization and Multi-level Policy* Master Thesis - Critical Assessment of 'New Conservationism': An Austrian Case Study
09/2009 - 11/2013	**Vienna University of Economics and Business** International Business Administration Specialization in Management and Organizational Behavior and Advertising and Brand Management Thesis – Identifiability and Singularity as determinants of value
08/2012 – 12/2012	**North Carolina State University in Raleigh, North Carolina** Exchange Semester
06/2012 – 08/2012	**Miami University, Oxford, Ohio** Summer University

Conferences

06/2022	**3rd International Conference on Energy Research and Social Science, Manchester** The mayor said so: The impact of local political figures and social norms on local responses to wind energy projects
09/2018	**WES Conference, Belfast** Critical Assessment of Social Impact Bonds
09/2017	**AlpSib Forum, Nice** Risks and Benefits of Social Impact Bonds

Publications

Cousse J., Wüstenhagen, R.; Schneider, N. (2020) Mixed feelings on wind energy: Affective imagery and local concern driving social acceptance in Switzerland. *Energy Research and Social Science*, Volume 70, p. 101676