



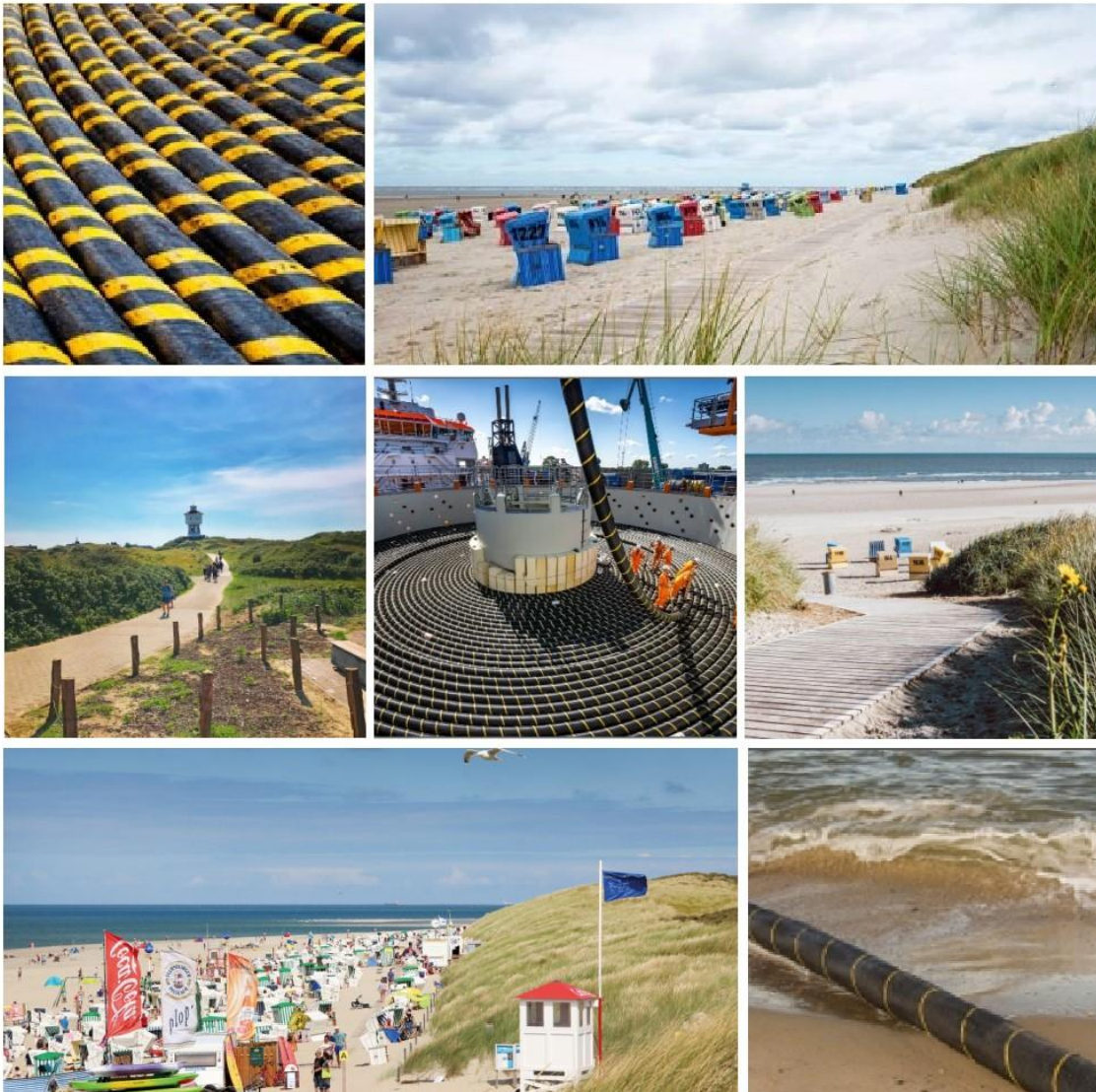
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Energy Justice in Offshore Grid Connection Planning Processes

A Case Study on the 'Seetrassen 2030'



Colophon

Title: Energy Justice in Offshore Grid Connection Planning Processes

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Abstract

This master thesis delves into the concept of energy justice in the context of offshore grid connection system planning. The connection is made in response to growing resistance movements in the field of offshore grid connections, which hinders the rapid implementation of renewable energy systems. By utilizing the concept of energy justice, the aim is to ascertain how community acceptance of offshore grid connection planning can be enhanced. Furthermore, the thesis determines to what extent the concept of justice can lead to a deeper understanding of social acceptance. To explore this research question, a literature review was conducted, along with the adoption of a case study approach and media analysis. Within the framework of the case study approach and media analysis, the Spatial Planning Procedure (ROV) 'Seetrassen 2030' project in Germany was examined. The results show that the consideration of procedural justice and distributive justice aspects can contribute not only in theoretical terms to increased acceptance but are also crucial in practical terms, influencing the perception of fairness and, consequently, project acceptance. Concerning procedural justice, it has been found that open and direct communication can foster acceptance. Information should be made readily available to the general public in a planning process, and the use of technocratic language should be avoided. Moreover, individuals affected by the planning should be allowed to participate, and local knowledge should be leveraged. However, it should be noted that procedural justice cannot be uniformly characterized but must be seen nuanced and context dependent. With respect to distributive justice, it has been observed that the costs associated with offshore grid connection systems in Germany are unevenly distributed due to geographical factors, with the burdens primarily located in the northern part of the country. It has also been found that community benefits and ownership can contribute to increased acceptance, whereas individual financial compensation is viewed as less effective. The ongoing exploration of energy justice in the context of offshore cable systems is crucial in this regard to prevent project impediments.

Keywords: **Climate Change; Community Acceptance; Distributive Justice; Energy Transition Infrastructure Planning; Offshore Grid Connection; Procedural Justice; Renewable Energy**

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List of Abbreviations

Table 1: List of Abbreviations

Abbreviation	Term
AC	Alternating Current
DC	Direct Current
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EU	European Union
GW	Giga Watt
kV	kilo Volt
NGO	Non-Governmental Organization
OWEI	Operational Offshore Wind Energy Installations
RET	Renewable Energy Technology
TSO	Transmission System Operator
TWh	Terra Watt-hour
HDD	Horizontal Directional Drilling
HVAC	High-Voltage Alternating Current
HVDC	High-Voltage Direct Current

List of Translations

Table 2: List of Translations

Term	Translation	Abbreviation
Amt für regionale Landesentwicklung Weser-Ems	Office for Regional Development Weser-Ems	ArL
Bundesnetzagentur	Federal Network Agency	BNetzA
Bundesamt für Seeschifffahrt und Hydrographie	Federal Maritime and Hydrographic Agency	BSH
Bundesnaturschutzgesetz	German Federal Nature Conservation Act	BNatschG
Energiewirtschaftsgesetz	Energy Industry Act	EnWG
Flächenentwicklungsplan	Area Development Plan	FEP
Landschaftspflegerischer Begleitplan	evaluation of the environmental impacts	-
Niedersächsisches Raumordnungsgesetz	Lower Saxony Regional Planning Act	-
Norddeutscher Rundfunk	North German Broadcasting	NDR
Netzentwicklungsplan	Network Development Plan	NEP
Niedersächsische Landesbehörde für Straßenbau und Verkehr	Lower Saxony State Agency for Road Construction and Transport	NLStbV
Niedersächsischer Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz	Lower Saxony State Agency for Water Management, Coastal Protection, and Nature Conservation	NLWKN
Niedersächsisches Raumordnungsgesetz	Lower Saxony Regional Planning Act	NROG
Oldenburgisch-Ostfriesischer Wasserverband	Oldenburg-East Frisian Water Association	OOVW
Planfeststellungsverfahren	Official Approval Procedure	-
Raumordnungsverfahren	Spatial Planning Procedure	ROV
'Seetrassen 2030'	Sea Routes 2030	-
Umweltfachliche Baubegleitung	monitoring during construction	-
Windenergie auf See Gesetz	Offshore Wind Energy Act	WindSeeG

Chapter 1: Introduction

In the following chapter, the background of the research problem is presented first, followed by the presentation of the research aim and the research questions. Subsequently, the relevance of the study is highlighted, and a brief overview is provided of the structure of the work in the form of a reading guide.

1.1. Background Research Problem

In December 2015, a landmark event unfolded as 196 nations came together to sign the Paris Climate Agreement. This historic treaty represents a collective commitment to curtail global warming, with the primary objective being to limit the rise in global temperatures to well below 2 degrees Celsius, ideally targeting an even more ambitious goal of 1.5 degrees Celsius, as measured against pre-industrial levels (United Nations, 2023). The attainment of this critical objective necessitates prompt and concerted efforts by governments across the globe. The German government also signed the Paris Climate Agreement on April 22, 2016, committing to significant emissions reductions (Cornaló, 2021). To achieve this objective, the German government has increasingly focused on generating electricity from renewable energy sources. The government therefore launched a program for the energy transition called the 'Energiewende' with the aim to drastically reduce emissions by 2050 and establish an economically viable, secure, and environmentally friendly energy supply. The overall aim is for renewable energy to account for 80% of Germany's electricity supply by 2050 (BMBF, 2023; Galvin, 2018).

Offshore wind energy plays a crucial role in realizing this goal (BMWK, 2022a). By 2030, Germany aims to generate 30 gigawatts (GW) of electricity from offshore wind, with a minimum target of 40 GW by 2035, and at least 70 GW by 2045 (Die Bundesregierung, 2023). However, achieving these energy targets requires more than just planning and installing additional wind farms. It also necessitates the appropriate infrastructure, including cables to transmit the electricity generated in offshore wind parks to the mainland and integrate it into the power grid (BMWK, 2022b; Tennet, 2023c).

In the planning and implementation of wind farms, there is a growing resistance among the population, which is sometimes manifested in the formation of opposition groups. This resistance hampers the expansion of energy systems and delays the achievement of energy goals (Mohaupt & Watzke, 2020; Tuler et al., 2014). According to Segreto et al. (2020), a lack of societal acceptance is one of the key limiting factors that regularly impede the installation and operation of renewable energy systems. This resistance, which has been so far directed mainly towards onshore wind farms, is now also being directed towards offshore wind energy infrastructure, particularly concerning the laying of cables that

connect offshore wind farms to the mainland. Local stakeholder express concerns, and resistance movements are emerging (Langeoog News, 2021; Omrop Fryslân, 2021). To adequately address these resistances, it is essential to understand the underlying causes that prompt affected communities and individuals to express complaints or engage in protests.

1.2. Research Aim and Research Questions

Velasco-Herrejon & Bauwens (2020) underscore that resistance towards projects in the realm of renewable energy technology (RET) is frequently accompanied by a sense of justice. They propose that incorporating the notion of 'energy justice' could ameliorate project acceptability. Correspondingly, Kluskens et al. (2019) lend support to this standpoint, indicating that accounting for perceptions of justice in the planning of renewable energy projects can foster acceptance. Similarly, Sovacool et al. (2017) concur and further posit that the concept of energy justice can serve as a decision tool for planners, cultivating an understanding of attitude formation and problem-solving within the context of projects.

As mentioned earlier, citizen protests against offshore wind farm infrastructure are becoming more and more frequent. Velasco-Herrejon & Bauwens (2020) particularly emphasize the significance of investigating community acceptance, suggesting that an appreciation of how justice-related aspects can be enhanced for the community could lead to heightened acceptance rates. Similarly, Mundaca et al. (2018) employ the energy justice approach in the context of community acceptance. They explore how the successful implementation of a renewable energy project within a community can be achieved and identify the importance of the energy justice concept in the course of their research.

As previously indicated, there exists a relationship between the acceptance of communities affected by a renewable energy project and the concept of justice. Consequently, this is employed in the study. The primary objective of the research is to identify potential solutions for enhancing acceptance within affected communities regarding the planning of offshore grid connections by applying the framework of energy justice. Specifically, the research question investigates strategies for improving community acceptance of offshore grid connection planning and examines the role of justice principles in deepening our understanding of community sentiment, including the causes of protests and grievances (SQ I) (see Table 3)

Table 3: Primary and Secondary Research Questions

	Primary Research Question	Category
SQ I	How can the community acceptance of offshore grid connection planning be improved and how can justice concepts offer a deeper comprehension of this acceptance?	Theoretical Conceptualisation
	Secondary Research Questions	Category
SQ II	What are the fundamental tenets of energy justice, and how do these principles intersect with the planning of offshore grid connections?	Empirical
SQ III	How is the planning of offshore grid connections planning organized in Germany?	Empirical
SQ IV	To what extent are the concepts of distributional and procedural justice reflected in German offshore grid planning practice, particularly in the case of the 'Seetrassen 2030' project?	Reflective
SQ V	To what extent do energy justice concepts help create an understanding of problems surrounding offshore grid connection projects?	Reflective

To comprehensively address this inquiry, various dimensions are explored. Community acceptance is intricately linked with the principles of energy justice, notably distributive and procedural justice (Velasco-Herrejon & Bauwens, 2020). In this study, this correlation is harnessed to pinpoint and analyse factors that influence community acceptance, thus elucidating their relevance to grid connections. The identification of these factors is intended to inspire ideas for optimizing future planning processes to garner greater community support (SQ II). To examine the concept of energy justice within a real-world context, a case study approach is adopted (Yin & Davis, 2007). The case study focuses on the planning of an offshore grid connection system in Germany referred to as 'Seetrassen 2030' (Sea Routes 2030). To understand how acceptance can be improved in the planning of offshore grids, this study analyses the organizational structure of offshore grid connection planning in Germany. Additionally, it explores the degree to which the principles of energy justice, including distributive and procedural justice, are manifested in the practices of German offshore grid planning (SQ III; SQ IV). Lastly, recognizing the foundational significance of research in the field of offshore grid connection planning and energy justice, the study contemplates the potential of energy justice concepts in elucidating issues about offshore grid connection projects (SQ V). The secondary research questions (SQ II, SQ III, SQ IV, SQ V) are also listed in Table 3.

1.3. Relevance of the Study

This study makes contributions in two distinct ways. Firstly, it adds to the scholarly discourse. Currently, research on energy justice within the context of RETs as indicated above, remains at a nascent stage. Particularly, concerning projects in the offshore wind sector like wind farms, there is limited research. Even scarcer are studies focusing on the infrastructure that connects these wind farms to the mainland. For this reason, this study represents an initial effort to advance research in this domain, specifically examining and operationalizing aspects of distributive and procedural justice about offshore grid connections.

Secondly, this study holds practical relevance. To attain the ambitious energy targets set by the European Union (EU) and its member states, the swift and effective execution of renewable energy projects is imperative (Cohen et al., 2014) as resistance already causes delays and project failures (European Environment Agency, 2010). Consequently, comprehending the reasons for resistance to grid connection planning is of high importance. Through the investigation of the sense of justice among local stakeholders, this research aims to identify the causes that evoke a sense of injustice. The identification of injustices in planning procedures is expected to facilitate the adaptation of future planning processes, thus mitigating, and minimizing delays in project implementation.

1.4. Reading Guide

The master's thesis is structured into various subchapters. Chapter 1 of the introduction provides an overview of the research background, research objectives, research questions to be addressed, and the significance of the work for both academia and practice. Additionally, it outlines the structure of the thesis. Chapter 2 introduces the theoretical framework, which engages with the subject of energy justice, social acceptance, and the associated concepts of distributive and procedural justice. Furthermore, at the conclusion of the chapter, the conceptual model is presented. Chapter 3 presents the methodology, wherein the research strategy and design, research method and data collection technique, as well as data analysis and interpretation, limitations, and ethical considerations are outlined. Chapter 4 delves into the topic of offshore grid connections, initially providing information about the German energy targets, followed by an introduction to the German legal frameworks, the German planning system, and details regarding operational and technical data as well as instruction on the project 'Seetrassen 2030' is given with the project background and the planning procedure. Chapter 5 then presents the results, with the structure aligning with the theoretical part of this thesis. Subsequently, in chapter 6 a discussion and reflection of the results is provided, followed by a conclusion in chapter 7.

Chapter 2: Theoretical Framework

The following chapter introduces and discusses, the concept of energy justice. The relationship between energy justice and the topic of community acceptance is examined. Furthermore, the fundamental principles of energy justice, namely procedural justice, and distributive justice, are presented. The chapter concludes with the presentation of the conceptual model.

2.1. The Concept of Energy Justice

The expansion of onshore wind energy often encounters delays or obstacles due to protests (Olbrich & Fünfgeld, 2023). However, this challenge is not exclusive to onshore projects as offshore wind initiatives also face similar hurdles, as highlighted by Goldener (2023). Moreover, recent cases involving the planning of crucial grid expansion projects to connect wind turbines have met with opposition (Langeoog News, 2021; Omrop Fryslân, 2021). These instances collectively underscore the pervasive impact of public protests on wind energy projects, both onshore and offshore, as well as the associated grid expansion efforts. The transition to sustainable energy sources necessitates addressing not only technological aspects but also social ones (Rohracher, 2018). In the context of energy, the topic of energy justice is currently being widely discussed to better understand the causes of resistance.



Figure 2: Protest against Offshore Grid Infrastructure on Schiermonnikoog (Omrop Fryslân, 2021)

The definition of the term 'energy justice' varies depending on the context. Enhancing the understanding of the concept is facilitated by exploring its historical origins. The inception of the discourse on justice can be traced back to the year 1979 in the United States. During this period, a proposal emerged for the establishment of a landfill for toxic waste in Houston, precisely within the community of Northwood Manor, predominantly inhabited by African Americans. The residents protested against the project, arguing that it constituted environmental racism (Weis & Naumann, 2015). A study by Bullard in 1983 substantiated this claim, revealing that toxic waste landfills were primarily located in neighbourhoods inhabited by African Americans. This gave rise to the term "environmental justice" and became associated with social movements confronted with an unequal distribution of the costs and benefits of negative environmental impacts (Bullard, 1983).

Since its emergence in the 1980s, the concept of environmental justice has undergone geographical and thematic expansion and evolution. The term is now being deliberated in Germany and the EU (Laurent, 2011), and its usage is increasingly observed within the context of energy-related matters (Brady & Monani, 2012; Mulvaney, 2013). Particularly over the last decade, the concept of energy justice has garnered heightened attention, with its first significant appearance in the literature occurring in 2013. During this juncture, scholars began formulating definitions of the term and crafting a framework (Heffron & McCauley, 2017).

According to Sovacool & Dworkin (2015), the concept of energy justice constitutes an essential tool for researchers engaged in energy-related subjects, enabling an understanding of how values are integrated into energy systems and how challenges associated with energy can be resolved. In essence, energy justice seeks to apply principles and concepts of social equity to the global energy system (Sovacool et al., 2017). Furthermore, building upon the insights of Bickerstaff et al. (2013), Sovacool (2014, p. 15) asserts that "energy justice [...] is pre-eminently a concern for any society that aspires to be fair." Sovacool et al. (2017) stated further that the conceptual framework of energy justice comprises three pivotal dimensions. The dimension of burdens addresses the extent to which hazards, costs, and adverse consequences of energy systems are distributed within society. The dimension of benefits examines the extent to which access to energy sources and services is distributed across society. Additionally, the dimension of procedures investigates the degree to which legitimate procedural processes are ensured and individuals are lawfully engaged in energy-related decision making (Sovacool et al., 2017).

According to Weis & Naumann (2015), the concept of energy justice does not rely on a narrow and fixed definition. Instead, it emphasizes the assessment that issues of justice in energy research have been previously overlooked (Eames & Hunt, 2013). Rather than prescribing a specific definition, the term seeks to underscore that the energy sector must be regarded as a socio-technical realm wherein justice considerations should be considered. Social, ethical, and equitable aspects must be viewed in connection with energy production, distribution, and utilization (Weis & Naumann, 2015; Kluskens et al., 2019).

Therefore, as asserted by Weis & Naumann (2015), it is essential that costs and benefits are distributed fairly and that societal groups are adequately involved in political and entrepreneurial decision-making processes. This perspective encompasses principles of distributional and procedural justice. In this regard, the following guiding questions are formulated (Weis & Naumann, 2015):

Distributional justice: *How are the benefits and costs of energy provision distributed across various societal groups and geographical regions? Which population groups or regions are privileged, and which are disadvantaged?*

Procedural justice: *Which societal groups have access to political and entrepreneurial decision-making processes in the energy domain? Which groups are excluded from the decision-making process?*

McCauley et al. (2013) introduce a third form of justice, recognition justice. In connection with procedural and distributional justice, they refer to it as the three tenets of energy justice, emphasizing the inclusion of marginalized groups. Jenkins et al. (2016) provide an example in this context. For instance, a recognition justice issue would involve the non-recognition of the energy needs of individuals, some of whom require higher indoor temperatures due to health reasons. Recognition of justice is sometimes also considered a component of procedural justice (Jenkins et al., 2016).

According to Heffron & McCauley (2017), alongside the tenet framework, there exists a second foundational framework that defines the concept of energy justice. The energy justice decision-making framework developed by Sovacool et al. (2016) comprises the eight core principles: availability, affordability, due process, transparency and accountability, sustainability, intra-generational equity, inter-generational equity, and responsibility. This framework primarily engages with poor and vulnerable population groups, examining procedural and distributional justice aspects through cosmopolitan interpretations of equality and fairness. It specifically examines inequalities between countries in the global south and industrialized nations in terms of access to electricity (Sovacool et al., 2016).

To ensuring and continuously advancing the conceptual framework within the academic realm, external normative objectives beyond academia must be pursued. Questions such as "How do we solve problems?" (distributive justice) or "What new processes are necessary?" (procedural justice) are crucial (see Table 4). This implies that policy formulation in the energy sector should be conducted with consideration for the framework, emphasizing the necessity for the framework to be aligned with practical applications and founded on a robust literature base (Heffron & McCauley, 2017). This is crucial because the concept of energy justice can serve as a vital instrument for energy planners to make informed decisions (Sovacool & Dworkin, 2015). To alleviate a sense of injustice, it is necessary to recognize who is affected and understand the concerns and fears of those affected (distributional justice), and then formulate strategies to address issues or allay concerns (procedural justice) (Jenkins et al., 2016). In this way, evaluative insights that engage with questions regarding distributional justice such as "Where are the injustices?" or questions of procedural justice such as "Is there a fair process?" can serve as the foundation for normative actions (see Table 4). These actions involve addressing how to resolve distributive injustices or how to alter or renew processes to enhance perceptions of fairness (Jenkins et al., 2016).

Table 4: The Evaluative and Normative Perspective of the Tenets of Energy Justice (Jenkins et al., 2016)

Tenets of Energy Justice	Evaluative	Normative
Distributive Justice	Where are the injustices?	How should we solve them?
Procedural Justice	Is there a fair process?	Which new processes are needed?

As highlighted in the preceding text, procedural and distributional justice are of particular significance in the discourse on energy justice. These two aspects of energy justice play a pivotal role in facilitating equitable developments both in research and practical measures within the energy sector (Heffron & McCauley, 2017). Consequently, these two tenets are employed in this study due to their dual relevance: first (1), their prominence in academic discourse, and second (2), their practical applicability. Additionally, a third dimension is introduced (3), one that has not been previously explored concerning energy justice within the context of offshore grid connection planning. This study seeks to examine the extent to which these justice dimensions can be applied within academic discourse and practical implementation. While procedural and distributional justice are the primary focus, other dimensions, such as recognitional Justice, as mentioned earlier, are not addressed in this work. Recognitional Justice is particularly concerned with marginalized groups (see Jenkins et al., 2016), which are not directly represented in the 'Seetrassen 2030' project. A more detailed elucidation and operationalization of the concepts of procedural and distributional justice are provided in chapter 2.3. Furthermore, a graphic illustrating the conceptual model (Figure 5) can be found in chapter 2.4.

2.2. The Relation between the Concept of Energy Justice and Social Acceptance

The topic of energy justice is increasingly being explored in conjunction with the scientific concept of acceptance. A linkage between these two concepts is established, stemming from the recognition that the concept of societal acceptance is valuable for comprehending the factors that could influence perceptions of energy justice (Setyawati, 2023). For example, scholarly research examines how measures such as financial compensation in projects can increase project acceptance and enhance the perceived sense of justice (Olbrich & Fünfgeld, 2023). Consequently, the issue of acceptance becomes entwined with a profound underpinning of justice. Conversely, the lack of acceptance toward a given project may be correlated with a pronounced sense of injustice. Various factors like gender, age, ethnicity, social class, or the location of the project can lead to a feeling of injustice (Velasco-Herrejon & Bauwens, 2020). Research indicates that considering perceptions of justice can also enhance acceptance in the planning of renewable energy projects (Klusens et al., 2019).

The concept of social acceptance is largely an approach to understanding resistance to planning projects. There are various definitions of social acceptance. One commonly used definition is that acceptance of a project is considered to exist when there is no opposition or resistance to it (Cohen et al., 2014). However, Cohen et al. (2014) criticize this definition as it allows for numerous interpretations of the word 'opposition'. According to Cohen et al. (2014), acceptance exists when the welfare-enhancing aspects outweigh or compensate for the welfare-reducing aspects. Welfare-reducing aspects are perceived negatively by residents, such as noise or pollution. Welfare-enhancing aspects are those perceived as positive, such as economic or environmental benefits. According to Cohen et al. (2014), indifference among stakeholders toward a project, or ideally a supportive attitude, must be achieved. Kraeusel & Möst (2012) offer a different definition of social acceptance. They go a step further and define it as a positive attitude of the stakeholders, which can be manifested in approving behaviour.

Langer et al. (2018) identify nine different forms of acceptance, ranging from 'active opponents' falling within the realm of active non-acceptance to 'enthusiastically engaged' falling under active acceptance. These different modes of acceptance are influenced by various factors, including personal characteristics, technical and geographical considerations, perceived side effects, and process-related variables (see Figure 2). In addition to the aspects previously outlined, it is also important to consider the social context in planning processes. The interaction among individuals within the neighbourhood is a crucial element that needs to be understood, as it is pivotal for the success or failure of a project. In this context, the terms 'Social Cohesion' or 'Social Capital' are employed. With strong cohesion, it

becomes easier to reach different social groups or foster discussions among neighbours (Bouw et al., 2022).

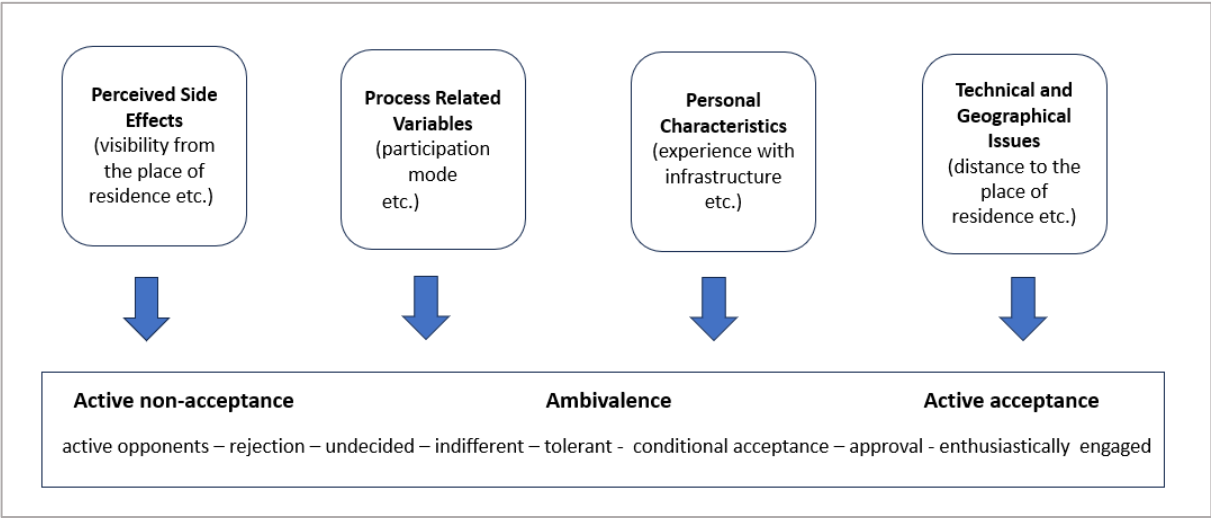


Figure 2: Modes of Acceptance (Own elaboration based on (Langer et al., 2018; Bouw et al., 2022)

Wüstenhagen et al. (2007) further distinguish three subtypes of social acceptance: socio-political acceptance, market acceptance, and community acceptance. Socio-political acceptance deals with the overall societal acceptance of a technology or innovation in the broadest sense (Wüstenhagen et al., 2007). On the other hand, community acceptance is a concept that focuses on spatial decisions, specifically related to the acceptance of people living in proximity to a renewable energy project. This facet involves obtaining specific acceptance from local interest groups, particularly residents and local government officials, and delves into their attitudes and behaviours towards such technologies and innovations (Wüstenhagen et al., 2007; Dütschke et al., 2019). Gaining the approval of these local stakeholders is crucial for the successful implementation and construction of wind energy projects; hence, community acceptance takes on central importance (Velasco-Herrejon & Bauwens, 2020). Based on this, the concept of community acceptance is also utilized in this study.

Figure 3 is based on the conceptual framework of acceptance of Wüstenhagen et al. (2007). It illustrates the three forms of acceptance. While socio-political and market acceptance are important, this study focuses on community acceptance. This form of acceptance is analysed in conjunction with the concepts of distributinal justice and procedural justice. These two tenets have been empirically correlated with community acceptance of local energy infrastructure developments. When the process (Procedural justice) or the allocation of outcomes or resources (Distributinal justice) is perceived as equitable and fair, it typically leads to greater community acceptance (Setyawati, 2023). In the scope of this study, an exploration is conducted into how these two dimensions of justice specifically influence the acceptance process concerning offshore grid connection systems. Additionally, an inquiry

is undertaken to assess the suitability of these justice concepts in providing deeper insights into the reasons behind community acceptance or rejection of such systems.

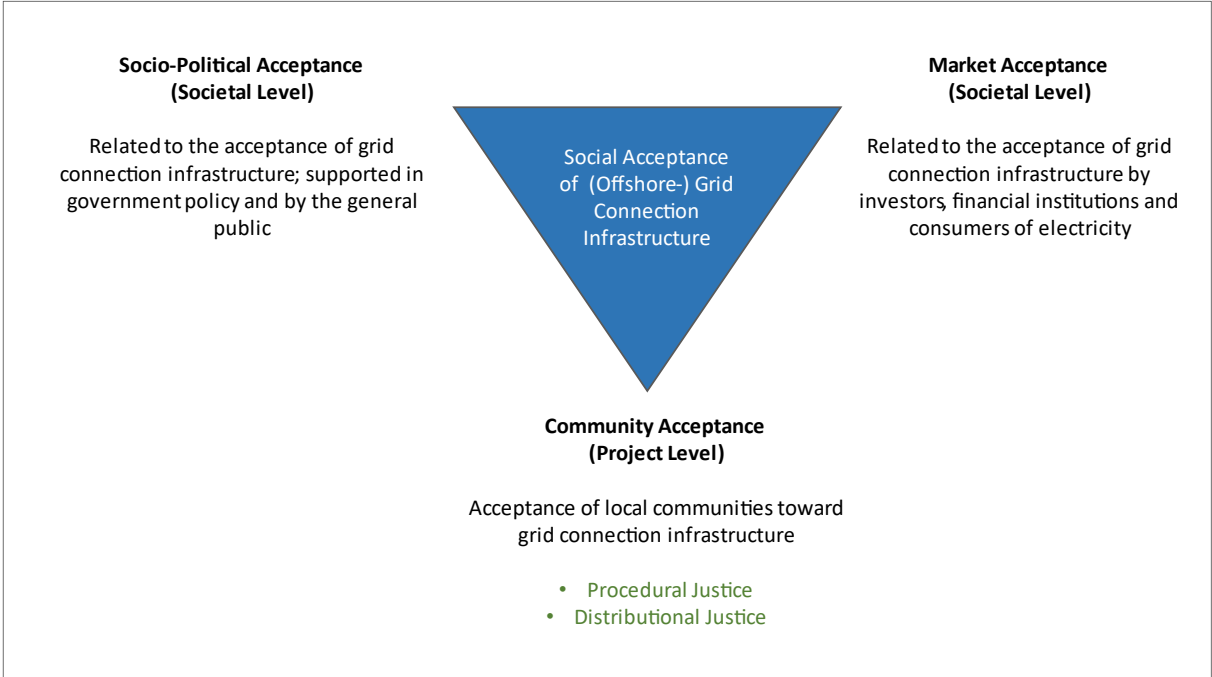


Figure 3: Social Acceptance of Offshore Grid Connection Planning (Own elaboration based on The International Energy Agency, 2023; Welstead, 2014)

2.3. The Tenets of Energy Justice

Chapter 2.3 delves more deeply into the concepts of procedural justice and distributive justice. It elucidates how community acceptance can be augmented in planning projects. The concepts are operationalized to investigate their applicability to offshore grid infrastructure in Chapters 5 and 6.

2.3.1. Procedural Justice

According to Kluskens et al. (2019), procedural justice is focused on comprehending how the involvement and conduct of diverse stakeholder groups in processes can facilitate the acceptance of projects. This entails addressing essential inquiries, such as ‘who participates in a planning project?’, ‘to what extent?’, ‘when?’, and ‘how often?’ (Kluskens et al., 2019). As also emphasized by Jenkins et al. (2016), procedural justice focuses on the extent to which and how communities are involved in planning processes. Wüstenhagen (2007) adds to the debate that meaningful integration of stakeholders is necessary. Schlosberg (2007) underscores that procedural justice concerns the capacity of individuals and communities affected by location decisions or other environmental policy measures to equally participate in the decision-making process while addressing the need to eliminate power inequalities (Schlosberg, 2007). Additionally, according to Schlosberg (2007), the legitimacy of

community members' participation must be recognized, and their contributions respected as significant and relevant to the decision-making process.

Furthermore, Ottinger et al. (2014) argue that the community must have the opportunity to influence the outcome of a decision. Warren & McFadyen (2010) add that the nature of interaction with affected communities is crucial. Deliberative processes, in which participants learn from each other and have the chance to engage with other participants and decision-makers in discussions, are considered fairer than pluralistic processes. Jenkins et al. (2016) emphasize that a direct dialogue can utilize local knowledge, which could be valuable for planning projects. Jenkins et al. (2016) further assert that information must be fully disclosed by the government and industry, and impartiality must be maintained. In the latter, the concerns of influential stakeholders and those fluent in technical language (such as scientists and engineers) tend to dominate, often overshadowing the voices of less knowledgeable societal groups (Ottinger et al., 2014).

In Figure 4, the aspects mentioned in the text have been graphically represented. They are utilized in the study as indicators to assess the presence of procedural justice in the case study, with a critical examination of these indicators. The indicators 1.-5. should be part of deliberative planning processes, where power imbalances are addressed, and equal participation is sought. The application of these indicators, under reservation, is expected to result in increased acceptance of a specific project.

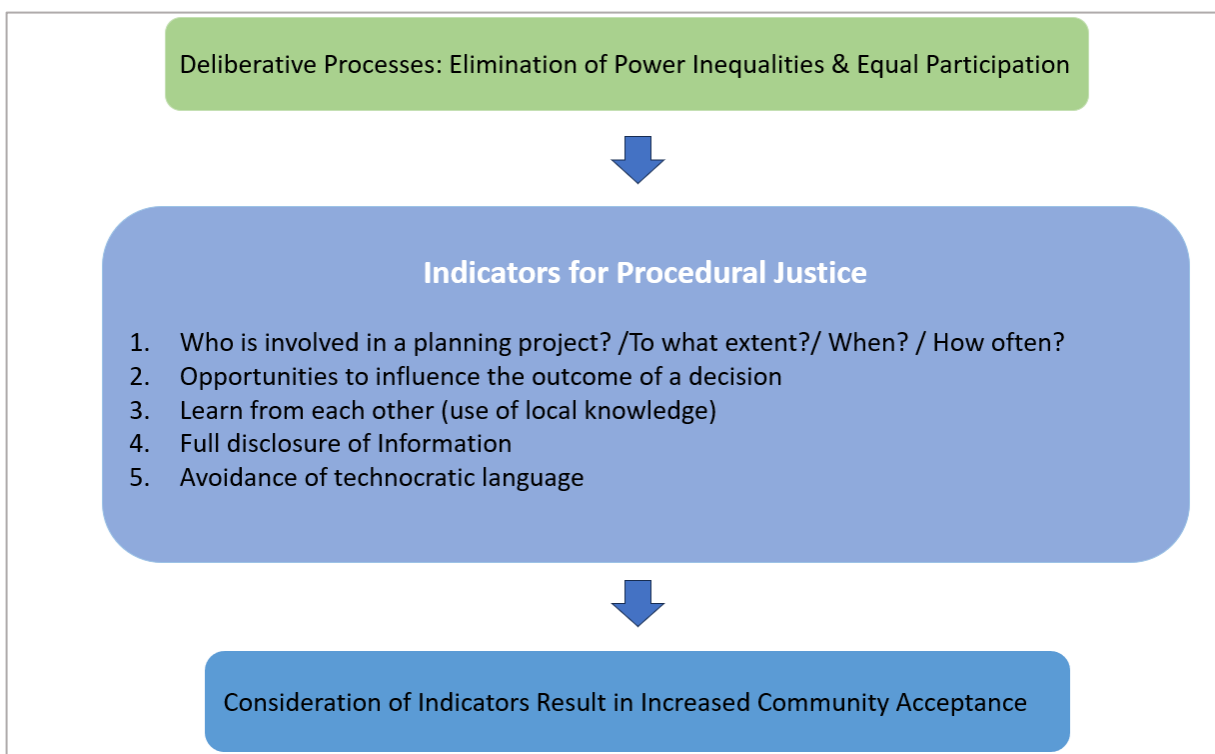


Figure 4: Indicators of Procedural Justice (Own elaboration based on Schlosberg, 2007; Ottinger et al., 2014; Jenkins et al., 2016; Warren & McFadyen, 2010; Kluskens et al., 2019)

According to Kluskens et al. (2019), based on Arnstein's ladder, citizen participation can be divided into eight different modes (see Table 5). However, only the modes (6) partnership, (7) delegated power, and (8) citizen control can be considered genuine citizen participation. Whereas (3), (4), and (5) are seen as "Tokenism". Tokenism refers according to Arnstein (1969) to a form of citizen participation where citizens are symbolically given the opportunity to express themselves or participate in decision-making processes but without being granted real power or influence. It represents superficial involvement where control over decisions remains in the hands of those who are in charge of power. Arnstein criticizes tokenism as an inadequate form of participation where the genuine involvement of citizens is not properly ensured. Steps (1) and (2) are seen as non-participation. "Non-participation" refers to the complete absence or exclusion of citizens from decision-making or policy-shaping processes. Citizens have no opportunity to express their preferences, views or concerns, and they hold no influence or power over the decisions that affect them. Non-participation represents the most passive and marginalized level of citizen engagement. Citizens are essentially ignored or excluded from governance and decision-making structures (Kluskens et al., 2019; Arnstein, 1969).

Table 5: Different Modes of Participation (Own elaboration based on (Klusens et al., 2019))

Form of Participation	Definition
1. Manipulation	<ul style="list-style-type: none"> ➔ People have no legitimacy or power in the process but are presented with a finished result.
2. Therapy	<ul style="list-style-type: none"> ➔ This form of participation emphasizes the conviction of the participating individuals in their ideas. ➔ The goal is to align the disagreements expressed by the citizens.
3. Informing	<ul style="list-style-type: none"> ➔ Citizens are informed of their rights, obligations, and options. ➔ They can ask questions, but it is a one-way flow from the decision-maker to the citizens.
4. Consultation	<ul style="list-style-type: none"> ➔ Citizens are asked for their opinions, but these are not necessarily considered. ➔ Political options are not available - only a consultation based on one option takes place. ➔ There are no mechanisms to ensure that opinions are considered.
5. Placation	<ul style="list-style-type: none"> ➔ There is a flow of information. The scope of political options is not limited in advance. ➔ The powerful are in charge of making the final decision.
6. Partnership	<ul style="list-style-type: none"> ➔ Power is redistributed between power holders and citizens. ➔ Planning and decision-making responsibilities are divided. ➔ Citizens can initiate plans, participate in planning, and review plans.
7. Delegated Power	<ul style="list-style-type: none"> ➔ Citizens are in a position of power and are responsible for the project. ➔ They have the opportunity to put things on the agenda.
8. Citizen Control	<ul style="list-style-type: none"> ➔ Citizens are in control and are responsible for the process and solutions. ➔ They are responsible for both political and administrative solutions.

2.3.2. Distributive Justice

Distributive justice, within the framework of energy justice, focuses on the equitable distribution of costs and benefits of energy technologies among all members of society, without favouring or disadvantaging specific social groups (Jenkins et al., 2016). It establishes a connection between the desirability of technology and its location (Owens & Driffill, 2008; Todd & Zografos, 2005). Simply put, it concerns the spatial distribution of technology and the distribution of its outcomes (McCauley et al., 2019). When considering wind energy as a reference, society is often aware of the need for it to improve air quality on a global scale and reduce greenhouse gas emissions. However, during the implementation of a project, the net benefits may not be recognized, leading to opposition and a sense of injustice. This sense of injustice can arise because the effects are initially visible only at the global and national levels, with no immediate local benefits apparent (Langer et al., 2018; Lienhoop, 2018; Olsen, 2016). Jenkins et al. (2016) add that distributive justice is a subjective perception of fairness. Olsen (2016) suggests three measures that have the potential to increase acceptance among local stakeholders regarding the distributional justice aspect: compensation, community benefits, and ownership. These concepts are primarily employed in wind energy projects. A detailed description of each measure can be found in the table provided below (Table 6). Distribution justice is a central concept of energy justice, but it requires other complementary concepts, such as procedural justice (Velasco-Herrejon & Bauwens, 2020).

Table 6: Approaches to Increase Community Acceptance (Own elaboration based on (Kluskens et al., 2019)

Measures	Explanation	Examples
Compensation Measures	<ul style="list-style-type: none"> ○ Compensation measures are intended to mitigate the negative impacts on the affected parties. ○ However, caution must be exercised with this measure, as it can quickly be perceived as bribery (Kluskens et al., 2019). ○ If this is the case, trust in the involved parties is quickly lost (García et al., 2016; Olsen, 2016). 	<ul style="list-style-type: none"> ○ Direct financial compensation for property devaluation (Olsen, 2016). ○ Agreements that guarantee citizens the ability to sell their property at its current market value (Olsen, 2016).
Community Benefits	<ul style="list-style-type: none"> ○ Community benefits do not refer to an individual, but rather to a compensation measure for the entire group (all affected members are compensated equally) (Langer et al., 2018). 	<ul style="list-style-type: none"> ○ Reduced electricity tariff (wind energy) (Lienhoop, 2018) ○ Annual compensation payments that flow into a shared fund (Lienhoop, 2018; Olsen, 2016).
Ownership	<ul style="list-style-type: none"> ○ Affected individuals/communities are directly involved (Kluskens et al., 2019) 	<ul style="list-style-type: none"> ○ Individuals receive shares: The community is allocated an entire wind turbine (Olsen, 2016).

2.4. Conceptual Model

Figure 5 depicts the conceptual model of this study, which has been designed to provide a visual representation of the research framework. The model offers a simplified illustration of the concepts employed in the study and how they interact with each other. Firstly, the concept of energy justice is introduced. This concept encompasses the two tenets of energy justice: distributive and procedural justice. The concept of energy justice is increasingly being considered in conjunction with the scholarly notion of acceptance. This association is deemed meaningful in order to comprehend how acceptance toward a project can be enhanced, ultimately influencing the perception of energy justice. Three distinct forms of acceptance exist. In this study, community acceptance is under scrutiny, while the other two forms remain beyond the scope of this investigation. Furthermore, particular attention is directed towards distributive justice and procedural justice, as these two concepts facilitate the understanding of potential injustices within processes and whether these stem from procedural factors. The primary objective of this study is to comprehend how societal acceptance can be augmented and to what extent the concept of energy justice can contribute to this regard. To explore this, a case study approach is adopted; a more detailed exposition of the methodology can be found in Chapter 3.

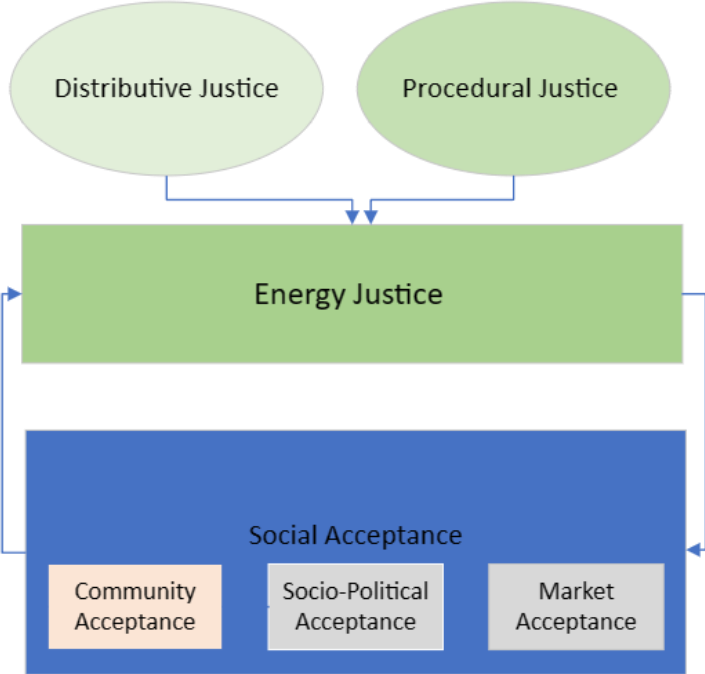


Figure 5: Conceptual Model (Own elaboration)

Chapter 3: Methodology

This chapter begins with an exposition of the research strategy and research design employed in this study. Subsequently, a detailed overview of the research methodology and the techniques used for data collection is presented. Finally, the chapter addresses the limitations and ethical considerations of the case study.

3.1. Research Strategy and Design

For this study, a qualitative research method in the form of an in-depth case study approach was selected. This research strategy was chosen because a case study constitutes a contemporary empirical inquiry that examines a phenomenon in its authentic setting. Furthermore, a qualitative case study design allows the researcher to gain a profound understanding of a specific process, as it enables in-depth insights and fosters an understanding of the contextual circumstances for the researcher (Yin & Davis, 2007). This is particularly relevant for this study, as it involves a specific planning project within its natural environment. The 'Seetrassen 2030' project under investigation is characterized by intricate interconnections involving a multitude of stakeholders, making the planning process a complex endeavour. In a case study approach, it is imperative to define the unit of analysis, a determination influenced by spatial boundaries and the theoretical framework (Yin, 2003). For this particular case study, the spatial boundaries have been delineated to encompass the islands of Baltrum and Langeoog, aligning precisely with the planning project area. The concept of justice is a central focus in this thesis. Furthermore, it is worth noting that case studies are inherently bound by both time and activity, as underscored by Mateusz (2019). Interviews were conducted between June 15, 2023, and July 31, 2023. The findings draw from participants' perceptions and experiences prior to and during this specific time frame. The timeframe for this master's thesis extends from November 2022 to October 2023.

In addition to the research strategy, the research design is also important because it constitutes the plan for how evidence is collected and analysed to address the research question (Yin & Davis, 2007). Thus, the research design encompasses the data collection method, participant selection, and the analysis approach (Creswell & Creswell, 2018). For data collection, three steps were conducted: a literature review, conducting semi-structured interviews, and performing media analysis. A more detailed description is provided in chapter 3.2. The participants for the interviews were selected based on the criteria described in Section 3.2.2 for the case study. The data obtained from the interviews and media analysis were analysed with the assistance of the analytical tool 'Atlas.ti', as elaborated in Section 3.4.

3.2. Research Method and Data Collection Techniques

In this study, the research design of triangulation was adopted. Triangulation is a research methodology that involves utilizing multiple data sources or perspectives to achieve a higher level of validity and reliability of research outcomes. This approach aims to provide a more comprehensive understanding for the researcher by incorporating various data sources, thereby minimizing errors and biases that could arise from relying solely on a single data source. Triangulation enhances the credibility of the research findings (Noble & Heale, 2019). Within the scope of this research, three distinct data collection techniques were employed. Firstly, an extensive literature review was conducted, encompassing contemporary scholarly publications, legal texts, and project planning documents. Building upon this foundation, interview guidelines were formulated for the conduct of semi-structured interviews. This method was chosen because interviews can be conducted more flexibly, allowing space for individual verbal expressions. The interviewer can adapt to the respondent's answers and pose follow-up questions to delve deeper into specific topics (Kallio et al., 2016). Additionally, a media analysis was conducted, delving into the case study at hand. This analysis was intended to offer a more comprehensive perspective and to capture concerns and statements from individuals who could not be queried through interview sessions. All data were gathered in a case study database, which includes raw data, analysis results, and the referenced literature. Additionally, a chain of evidence was established to ensure transparency for the reader regarding the steps taken to arrive at the conclusions and findings of this study.

3.2.1. Literature Research

The study commences with an extensive literature review, focusing specifically on the concept of energy justice. It delves into the origins of the concept, provides conceptual definitions from various authors, and elucidates the interrelationship of the concept with the topic of acceptance. The study also operationalizes the two key aspects of energy justice, namely distributive and procedural justice. The results of this research can be found in Chapter 2, which constitutes the theoretical framework of the study. In particular, the tenets of energy justice are clarified for subsequent application in Chapters 5 and 6 to the case study and research questions. These chapters aim to examine the influence of social acceptance in an offshore grid connection planning project and how energy justice can be enhanced.

It should be noted that the literature on energy justice primarily pertains to projects related to renewable energies. This literature was employed due to limited research on energy infrastructure projects. The literature review draws from diverse sources, including articles and books accessible through the websites of scholarly journals and Google Scholar. The literature search encompassed the use of various keywords such as "energy justice," "societal acceptance of infrastructure projects," "procedural and distributive justice," and "offshore grid connection systems".

In addition to the literature review on energy justice, a literature review on offshore grid connections was also conducted. The principal objective of this review was to provide an overview of the subject, contributing to a deeper understanding of the project context. Thus, Chapter 4 expounds on the necessity of grid connection systems, provides insights into legal parameters and the planning procedure, and presents the technical specifics of the systems. In this investigation, apart from scholarly articles, books, and websites, legal texts addressing the legal background of the topic were consulted, as well as planning documents related to the specific spatial planning procedure encompassing the case study. It has been important to gather and include that information in the study in order to develop an understanding of the topic of planning and construction of offshore grid connections in Germany.

3.2.2. Semi-Structured Interviews

As part of this investigation, semi-structured interviews were conducted. First of all, the selection of interview participants was carried out based on a prior stakeholder analysis. This analysis proceeded through several steps: firstly, (1) relevant stakeholders involved in the 'Seetrassen 2030' project and those who had a media presence were identified. Subsequently, in a second step, (2) their significance was categorized, followed by (3) an exploration of their interests and needs to understand their role in the process. Thereafter, (4) an examination of their influence in the process ensued to ascertain their representativeness for the interview discussions, leading to (5) the selection of appropriate interviewees. Additionally, one interviewee was identified through the snowball sampling method, which means that this individual was recommended by another participant (Oregon State University, 2023).

Before the interviews, an interview guide was prepared to conduct the interviews in a structured manner and to enable participants to prepare for the interviews (the interview guide can be found in Appendix A). It is worth mentioning that the interview guides were customized for each respective interviewee. The interview guide can be categorized into several sections. Firstly, there are general questions about the individuals and their roles within the 2030 project. Subsequently, there were questions specific to each stakeholder, aiming to gain further insights related to the project, which could not be covered in the literature review. Moreover, there were questions related to the concepts of energy justice, particularly focusing on procedural and distributive justice, as elaborated in the Theoretical Framework section (see Chapter 2). A total of six interview conversations were conducted. These conversations encompassed dialogues with both governmental bodies (P1) and energy providers [P2; P3; P3(2); P5]. It should be noted that P3 and P3(2) participated in a single interview conversation. In addition to these exchanges, discussions were also held with representatives from the islands Baltrum (P4) and Langeoog (P6), each holding multiple positions as evident in Table 7. Alongside

the Field of Expertise, Table 7 also presents the respective dates on which the interview conversations occurred, as well as the encryption denoted by the Alias. Five out of the six conversations were conducted in German [P1; P2; P3; P3(2), P4; P6]. This decision was made because the research area is located in Germany, and to achieve the most accurate results, the national language was selected for the interviews. Only interviewee P5 was interviewed in English, due to Dutch being their native language.

Table 7: Interview Participants of the Case Study Searoutes 2030

Order of Interviews	Field of Expertise	Alias	Date
1.	Contact Person Searoutes 2030 (Office for Regional Development Weser-Ems)	P1	15.06.2023
2.	Project Spokesmen (Amprion)	P2	19.06.2023
3.	Project Lead Licensing BalWin1 (Tennet Germany)	P3	27.06.2023
3.	Public Relations (Tennet Germany)	P3(2)	27.06.2023
4.	<ul style="list-style-type: none"> ○ Resident of the island of Baltrum ○ Owner of Touristic Facility ○ Member of the Tidenhusiverein* 	P4	27.06.2023
5.	Asset Management/Grid Strategy (Tennet Netherlands)	P5	21.06.2023
6.	<ul style="list-style-type: none"> ○ Resident of the Island of Langeoog ○ Local Politician** ○ Councilwoman holding the chairmanship in the committees of Nature, Landscape, Sustainability, and Economics and Finance 	P6	31.07.2023

* Association responsible for the financial promotion of landscape, nature, and environmental conservation, primarily in collaboration with the Baltrum Tidal House

** Spokespersons of the Langeooger Bündnis 90/Die Grünen Kreisverband Wittmund

3.2.3. Media analysis

Additionally, a media analysis was undertaken. The media analysis specifically focused on the case study. Newspaper articles addressing the ‘Seetrassen 2030’ project were identified. The objective, as outlined in section 3.3, was to gather supplementary information to complement the interview data, thereby attaining a more comprehensive overview of the subject matter. The database Lexis Nexis was utilized to identify the articles. The search terms used included “Baltrum”, “Langeoog”, “Seetrassen 2030”, “Concerns regarding the Seetrassen 2030 project”, “Resistance to the Seetrassen 2030 project on the islands of Baltrum and Langeoog”, “Islanders' concerns regarding the ROV Seetrassen 2030”. Furthermore, an independent media search was conducted, yielding articles not retrievable through the software. For this additional research, the Google search engine was utilized. Here, the previously mentioned search terms that had already been entered in the Lexis Nexis database were used once again. In total, 13 articles were compiled for the media analysis. The collected media materials were analysed by the detailed description provided in section 3.4.

Table 8: Documents of the Media Analysis

#	Title	Published by	Date
1.	Insel soll für Trasse durchbohrt werden; Nordsee Geplantes Bau-Projekt betrifft Baltrum Variante bietet insgesamt weniger Konflikte	NWZ	19.10.2021
2.	Inselgemeinde nicht begeistert von Bohrvorhaben; Umwelt Netzbetreiber plant Offshore-Netzausbau unterhalb der Insel Bewohner sind um Trinkwasser besorgt	NWZ	20.04.2023
3.	Inseln in Sorge um Trinkwasser; Stromtrassen Das sind die Befürchtungen der Bürgermeister	NWZ	29.04.2021
4.	Stellungnahme zu Offshore Anbindungsleitungen, ‘Seetrassen 2030’	Bündnis 90/Die Grünen Kreisverband Wittmund	16.03.2021
5.	‘Seetrassen 2030’...gibt es einen weiteren Korridor über Langeoog und ein entsprechendes neues Raumordnungsverfahren? Und was bedeutet das für Langeoogs Süßwasserlinse?	Redaktionsteam Langeoog- Spiekeroog	19.02.2022
6.	Langeooger informieren sich über die Anbindung der Offshore Windparks ans Festlandnetz	Redaktionsteam KüstenGrün	09.10.2020
7.	Windkraft darf nicht gegen das Wattenmeer ausgespielt werden	Redaktionsteam KüstenGrün	21.08.2020
8.	Inseln fürchten um ihr Trinkwasser	Hamburger Morgenpost	24./25.04. 2021

9.	Tennet will die Insel Baltrum unterbohren	NWZ	20.04.2023
10.	Inselgemeinden nicht begeistert von Bohrvorhaben	NWZ	20.04.2023
11.	Stromtrassen	Baltrum Online	11.03.2021
12.	Sorge ums Wasser: Kabel-Korridor soll über Baltrum verlaufen	NDR	18.10.2021
13.	Bohrungen für Windenergieparks: Nordseeinseln fürchten um ihr Trinkwasser	Hamburger Morgenpost	23.04.2021

3.4. Data Analysis and Interpretation

The collected data were analysed by coding that was conducted with the help of the program Atlas.ti. To implement successful coding, in the first step, the interviews had to be transcribed. The step of transcription is essential to gain an overview of all the collected data (Universität Leipzig, 2023). Colloquial language and sensitive content that requires encryption have been removed from the transcripts. In a subsequent step, the transcripts of the six interviews were imported into Atlas.ti, alongside the 13 articles identified through the utilization of Lexis Nexis and individual research activities on Google.com. Through Lexis Nexis, three newspaper articles relevant to the study were identified, and through individual research, ten additional documents were found, including eight newspaper articles/online articles, one statement, and one press release. For the analysis of the articles, primarily a deductive coding approach was employed, with occasional induction of new categories during coding. Deductive coding is an approach in qualitative research where pre-established categories or theoretical concepts are used to analyse and code data. It relies on existing theories or hypotheses whereas inductive coding is a data-driven approach in which categories and patterns are derived directly from the data itself. It allows for the discovery of new insights and categories that are present in the data but were not originally anticipated (Atlas.ti, 2023). Applied to this research that means that initially, code groups were created based on the theoretical framework (Chapter 2). The identified articles and interview transcripts were then reviewed, and statements were categorized into the respective code groups. In addition to deductive coding, interesting statements were selectively extracted, and inductively new code groups were established. The codebook is attached in Appendix D. The statements collected within each code group were then imported into Microsoft Excel and analysed in accordance with the theoretical framework concept.

3.5. Limitations

This study has several limitations. Firstly, due to a predetermined time frame and university constraints, a limited number of interview conversations were conducted. To achieve higher representativeness, a larger number of interview sessions would have been necessary. Additionally, recruiting willing participants from the affected communities posed a challenge.

Furthermore, it's important to note that there is a scarcity of existing literature on the topic of energy justice in the context of offshore grid connection systems. This may be attributed to the relatively recent developments in offshore wind energy and its corresponding infrastructure. Consequently, this study relies on foundational research and references literature primarily focused on wind energy projects and other energy and infrastructure projects.

Another consideration is that this study is based on a case study conducted in Germany. The findings and data obtained within this specific context, including attitudes towards the project, may not be directly transferable to other countries or projects. Moreover, it's crucial to acknowledge that Germany operates under a different planning system than other countries. Therefore, a direct comparison with other countries may be insufficient, although it can serve as a point of reference.

Additionally, the study focuses on two islands, and information on the same topics for both islands is not always equally available. Instead, the emphasis is on understanding where dissatisfaction existed in the planning process, how it can be improved, and to what extent these issues are related to the concept of energy justice.

3.6. Ethical Considerations

Before conducting the interviews, the participants were sent the interview guides. This was done for both research-related purposes, allowing the participants to prepare and contribute as much as possible during the interviews, and to ensure the comfort of the participants during the interviews. Additionally, sending the interview guides in advance allowed the participants to align the questions with their respective company ethics. As a result, the interviewees could clearly state which questions they preferred not to answer, or which data should be subject to encryption. Due to data privacy considerations; the transcripts are not publicly accessible in the Appendix. Moreover, some interview partners were acquired through referrals. Before the interview conversations were conducted, consent forms from the Research Ethics Committee were sent to the interview participants (see Appendices B & C). These forms sought consent for audio recording and the use of their names. Due to variations in participants' preferences regarding the anonymity of their identity, it was decided to use gender-neutral letters with numbering (P1-P6).

Chapter 4: Technical Background Offshore Grid Connection Systems

This chapter begins with an introduction to the energy goals of the federal government and emphasizes the importance of grid expansion. Subsequently, legal regulations concerning offshore grid connections and operators are presented. Additionally, an overview of the process of offshore grid planning in Germany is provided, including technical and operational details. Towards the end of the chapter, the case study 'Seetrassen 2030' is introduced. To achieve this, the project's background is initially presented, followed by an outline of the procedural steps within the planning process involving relevant stakeholders. The purpose of this subchapter is to facilitate an understanding of the case study, allowing for the contextualization of the findings and information related to procedural and distributive justice.

4.1. Energy Targets and Production

The amendment to the Offshore Wind Energy Act (WindSeeG), which came into effect on January 1, 2023, has introduced new ambitious wind energy targets by the German government (Deutsche Windguard, 2023). According to the law, the expansion goals have been increased to at least 30 GW by 2030, 40 GW by 2035, and 70 GW by 2045. Previously, the targets were significantly lower at 20 GW for 2030 and 40 GW by 2040 (see Figure 6) (BMWK, 2022b). By comparing these goals with the current level of offshore wind energy generation, it becomes evident that wind turbines and grid connections must be rapidly expanded to achieve these targets.

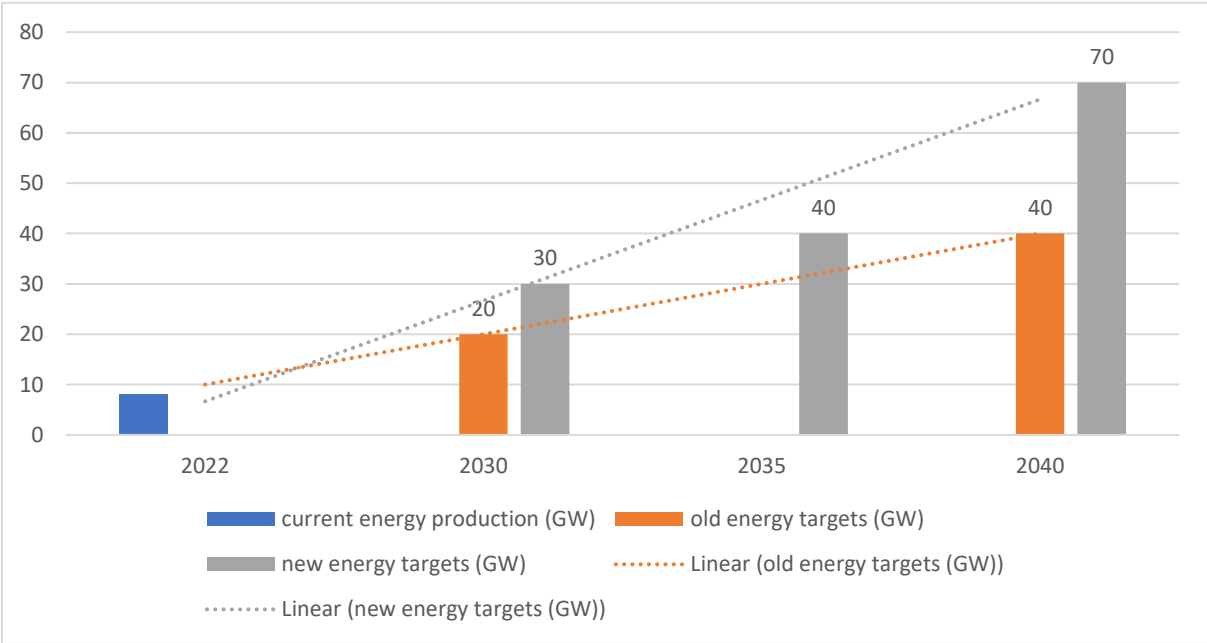


Figure 6: Offshore Wind Energy Targets from the Federal Government, from 2022 till 2040 BMWK 2022b; Deutsche Windguard, 2023)

As of December 31, 2022, there were 1,539 operational offshore wind energy installations (OWEI) in Germany, producing a capacity of 8.1 GW. Right now, twelve grid connections are responsible for integrating 7 GW, the majority of offshore-generated electricity in Germany, from the North Sea into the grid. In contrast, a comparatively lower capacity of 1.1 GW is currently generated in the Baltic Sea. Among these installations, 7.8 GW of capacity is generated in the Exclusive Economic Zone (EEZ). The OWEI are mostly located at a minimum distance of 40 km from the coast, with some being as far as 120 km away. Additionally, upcoming projects planned until 2027 are expected to be primarily situated within the EEZ (Deutsche Windguard, 2023). When comparing Germany to other European countries, in 2022, Germany ranked fourth with 342 MW of OWEI, behind the United Kingdom, the Netherlands, and France (Wind Europe, 2023). The new offshore installations in terms of their MW generation in Europe are also illustrated in Figure 7.

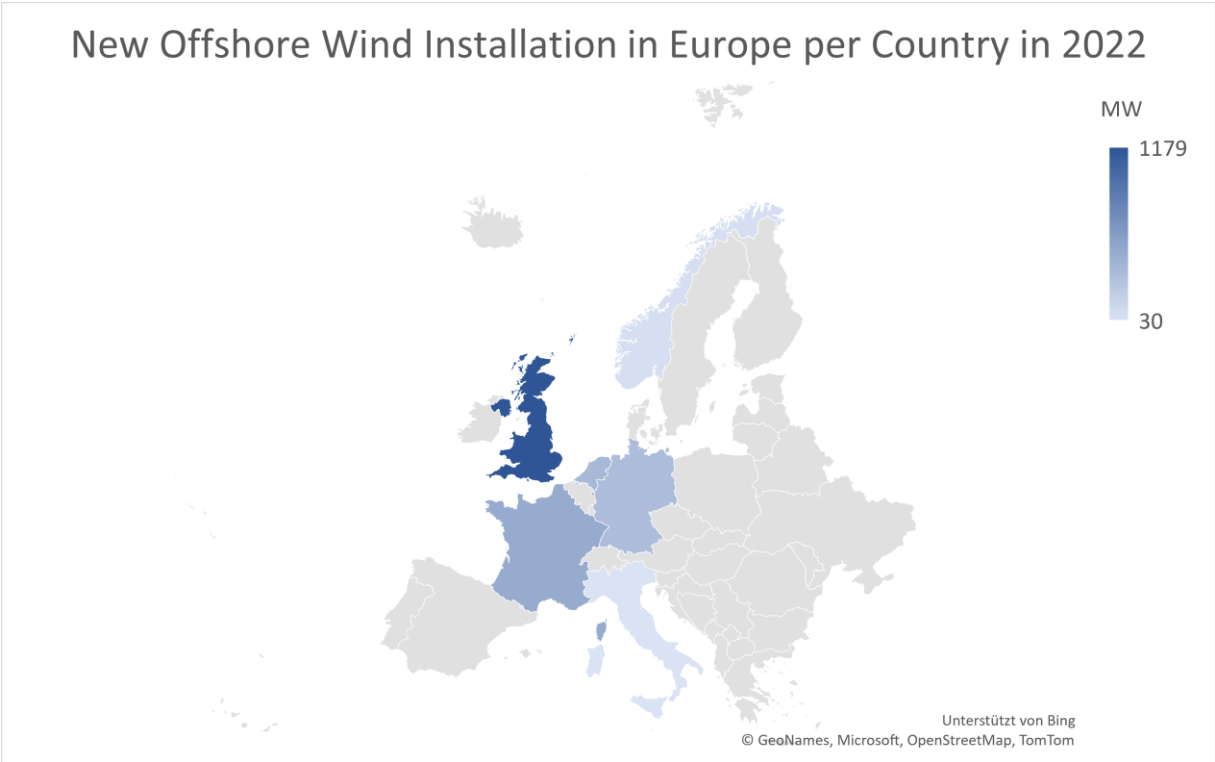


Figure 7: New Offshore Wind Installation in Europe per Country in 2022 in MW (Wind Europe, 2023)

4.2. Legal Framework

To integrate the energy generated by offshore wind farms into the grid in the future, it is necessary not only to construct wind farms but also to determine routes for power lines where cables can be laid to connect the wind farms to the mainland and ensure the electricity can be fed into the grid (BMWK, 2023; Tennet, 2023c). The determination of cable routes in Germany is the responsibility of Transition System Operators (TSOs) (Amprion GmbH et al., 2023). According to § 17d (1) of the Energy Industry Act (EnWG), these TSOs are obligated to "construct and operate offshore connection lines by the legal provisions [...] specified in § 5 of the WindSeeG" (Bundesministerium der Justiz, 2023). Specifically, according to § 17d of the EnWG, the TSOs are responsible for implementing the entire connection system from the substation to the offshore wind farm, to which an offshore system is connected (Amprion, 2023a). According to § 12b of the EnWG, TSOs with responsibility for control zones in Germany are required to prepare a network development plan (NEP) every two years and submit it to the Federal Network Agency (BNetzA) for confirmation. The NEP includes "measures for optimizing, reinforcing, and expanding the German electricity transmission grid, as well as the offshore connection lines in the EEZ and the coastal sea, including the onshore grid connection points, by the legal provisions of the EnWG" (Amprion GmbH et al., 2023, p.8). In Germany, there are four TSOs with control zone responsibility, namely 50Hertz, Amprion, TenneT, and TransnetBW (Amprion GmbH et al., 2023). In Figure 8, the territorial jurisdiction areas of individual TSOs in Germany are depicted.

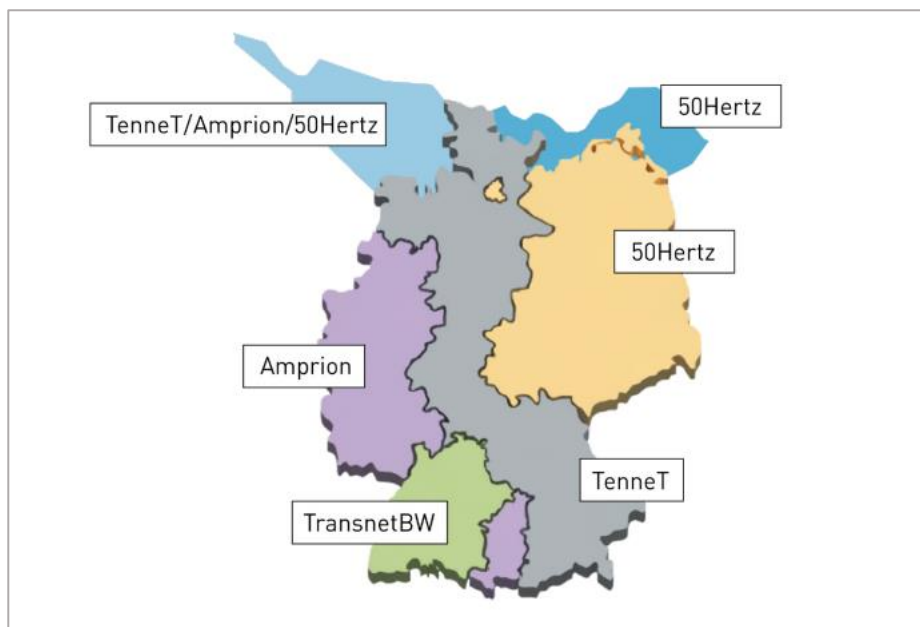


Figure 8: Territorial Jurisdiction Areas of the Individual TSO's (Amprion GmbH et al., 2023)

4.3. Planning System

Offshore wind cable systems demand less space in contrast to offshore wind farms, yet their planning and installation necessitate meticulous consideration. They wield substantial influence over the siting of prospective wind farms (Interreg, 2023a). Moreover, it is a costly endeavour. The production of cables, identification and assessment of the route, transportation of cable laying equipment, cable installation using ships, and the necessary testing and protective measures for each cable incur substantial expenses (Wind & Waterworks, 2023). They also serve as the interface between land and sea, connecting the marine and terrestrial environments. This means that not only offshore processes must be considered but also onshore. Suitable grid connection points and converter station locations need to be identified in the planning phase to ensure efficient cable installation (Interreg, 2023a).

One of the challenges is the limited space available in certain areas due to multiple uses. In the North Sea, cable bundling of grid connection cables is already being undertaken due to this spatial pressure (Interreg, 2023a). Additionally, a significant challenge arises from the fact that wind farms are often located far offshore, which complicates route planning and increases the planning effort. It also leads to higher costs associated with these projects (BMWK, 2022a). Another crucial consideration is the ecological aspect. Cables or cable routes in the North Sea need to traverse the Wadden Sea, which is the largest tidal system in the world, stretching along the coasts of Germany, the Netherlands, and Denmark. Due to its unique ecology and geology, the Wadden Sea is particularly vulnerable to landscape interventions (Waddensea Secreteriat, 2023).

Due to numerous competing land-uses and their impacts on the environment, large infrastructure projects undergo a spatial planning procedure called a spatial planning process (ROV) if they have significant spatial implications (§ 15 Spatial Planning Act). This includes the examination of alternative routes when there are multiple options within a project. In this context, ‘significant spatial implications’ refer to ‘plans and other measures that utilize the land or influence the spatial development or function of an area’. The purpose of an ROV is to investigate the extent to which a project aligns with the objectives, principles, and requirements of spatial planning, and how such plans can be harmonized from a spatial planning perspective (Niedersächsisches Ministerium für Ernährung, Landwirtschaft und Verbraucherschutz, 2023). Furthermore, the ROV aims to involve public stakeholders, such as municipalities, associations, and specialized authorities, in the planning process. It also ensures that the public receives early information and has an opportunity to provide input (Amprion, 2023b). An integral part of any ROV is the Environmental Impact Assessment (EIA), which identifies, describes, and evaluates the project's environmental impacts at an early stage (Bayerisches Staatsministerium für Umwelt und Verbraucherschutz, 2023). This process aims to ensure that interventions in protected

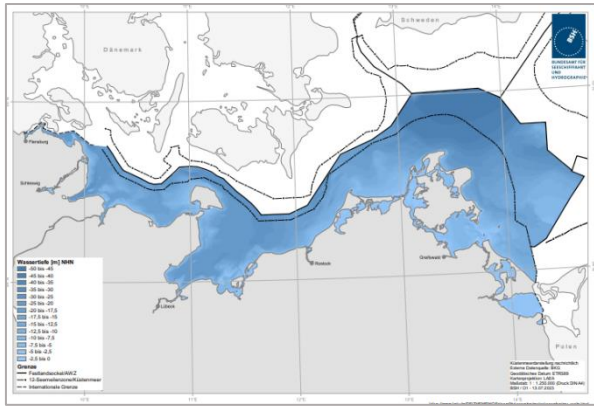


Figure 10: Territorial Sea and Exclusive Economic Zone - Baltic Sea Germany (BSH, 2020b)

regions designated for the establishment and operation of offshore wind farms (BMWK, 2022b; BSH, 2023). The BSH is entrusted with overseeing the development and preliminary assessment of these areas to ensure the realization of the goals for expanding offshore wind energy, as stipulated by the WindSeeG (BWO, 2023b).

Moreover, an official planning approval procedure conducted by the BSH is imperative.

This authority grants approval for the construction and operation of cable connections and converter platforms within the EEZ. For projects situated in the coastal sea region, the respective federal state assumes responsibility. All significant projects are incorporated into the Network Development Plan (NEP) (Amprion GmbH et al., 2023; BWO, 2023b). Figures 9 and 10 depict the territorial sea and the EEZ of the North Sea and the Baltic Sea.

4.4. Operation & Technical Data

Currently, most wind farms are connected to the power grid using either alternating current (AC) or direct current (DC) cables. Wind farms located near the coast are typically connected to the mainland using AC cables, also known as HVAC (High-Voltage Alternating Current) cables. However, as mentioned earlier, many wind farms are located far from the coastline. These offshore wind farms are usually connected to the mainland using high-voltage direct current (HVDC) cables, which can transport electricity over long distances with minimal transmission losses (Incore Cables, 2023; Tennet, 2023b; Tennet, 2023d). A HVDC can transport up to 900 MW, and in exceptional cases, up to 980 MW. In the future, 525kV cables will be used, which can provide a transmission capacity of up to 2 GW (Tennet, 2023b).

In Germany, the grid connection for offshore wind farms in the North Sea and Baltic Sea is implemented differently. In the North Sea, combined AC and DC systems are used, while in the Baltic Sea, currently only AC systems are employed due to the low number of offshore wind farms and their proximity to the shore. However, it is expected that this will change in the future, and DC systems will also be utilized in the Baltic Sea (Bundesamt für Naturschutz, 2023).

The electricity generated by offshore wind farms in the EEZ is currently collected in high-voltage transformer stations and then transported via a three-phase cable to a converter platform, where the voltage level is transformed, and the three-phase AC is converted into direct current (Incore Cables, 2023; Interreg, 2023b; Tennet, 2023a). This converter consists of various components such as diodes,

transistors, coils, and capacitors. To protect the converters from the North Sea climate, they are located on platforms (Amprion, 2023c). From the converter stations, the electricity is transmitted via an export submarine cable to the mainland and then further transported via a land cable to another converter station, where it is converted back to AC. From there, the electricity is fed into the grid (Tennet, 2023a; Wind & Waterworks, 2023). The systems in the North Sea and the Baltic Sea are depicted in Figure 11.

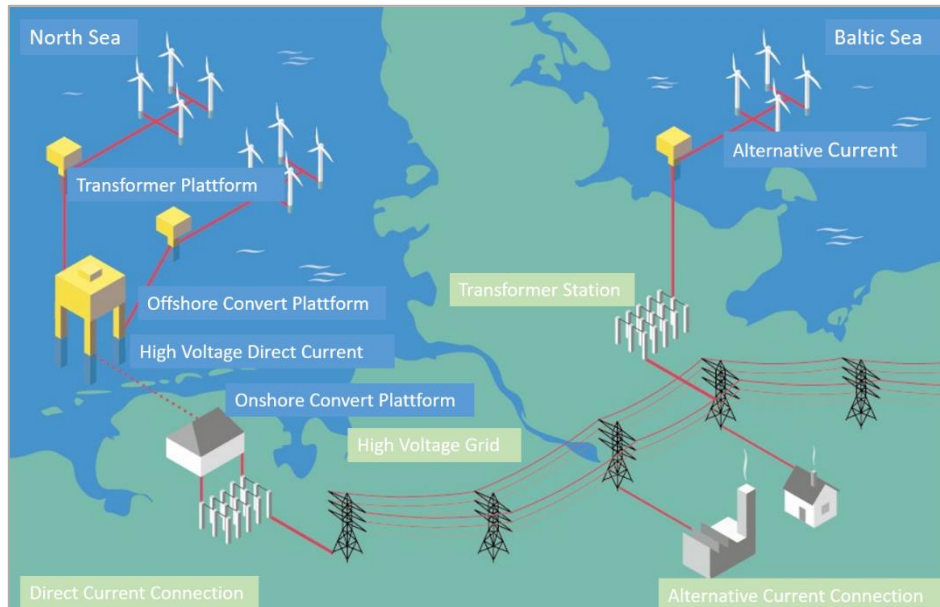


Figure 11: Function of Offshore Windparks in the German North and Baltic Sea (Own elaboration based on BWO, 2023a)

There are three different types of cables: land cables, inter-array cables, and export cables. Inter-array and export cables are coated with plastic and consist of a copper conductor and polyethylene insulation. Additionally, they are reinforced with galvanized barbed wire, which protects them from mechanical damage (Tennet, 2023b). The cables vary in diameter and weight. They can have a diameter of up to 25 cm and weigh 100 kilograms per meter (Prozess Technik, 2017). Submarine cables have a lifespan of 30 years, while land cables have a lifespan of up to 40 years (Tennet, 2023b). There are different drilling methods used for the installation of cables, depending on whether they are installed on land or in seabed conditions. One method currently employed by TSO Tennet in the North Sea and planned for future projects is the Horizontal Directional Drilling (HDD) method. This method is particularly suitable for sensitive natural areas and areas where the embankment needs protection. It involves conducting a trenchless borehole beneath the embankment, foreshore, or protective dunes. The borehole can reach a length of up to 1,300 meters. Cable protection conduits are inserted into the borehole, and the cables are later pulled through these conduits. The cables are then connected to the land or inter-array cables using joints and subsequently brought to the desired depth (Tennet, 2020).

4.5. 'Seetrassen 2030' (Searoutes 2030)

4.5.1. Project Background

In the pursuit of the energy objectives set forth by the German government, the expansion of wind farms and grid connection systems is deemed imperative (Tennet, 2023c). These ambitious energy objectives also constitute a central focus of the NEP. The TSOs have undertaken comprehensive studies to enable the realization of the projected generation capacity in the North and Baltic Seas. According to the latest iteration of the NEP, dated June 12, 2023, a planned offshore wind capacity of 58.5 GW is envisioned for Germany by the year 2037. To achieve this capacity, the responsible TSOs in Germany have developed a scenario plan outlining three distinct scenarios for grid expansion. These scenarios encompass various forms of energy, all with the overarching goal of achieving climate neutrality within the German electricity sector. Detailed insights into the formulation of these scenarios can be found within the NEP. This plan provides more precise descriptions and explanations regarding the development of the diverse scenarios and the inclusion of underlying assumptions and factors in the planning process (Amprion GmbH et al., 2023).

In Scenario A, designated for offshore grid expansion, a projection was made for an offshore grid length of approximately 6,600 kilometres, with an expected transmission capacity of around 36 GW. Conversely, for Scenarios B and C, earmarked for the year 2037, a more expansive offshore grid extending approximately 9,300 kilometres was forecasted, accompanied by an augmented transmission capacity of approximately 44 GW. It is noteworthy that the estimated investment volume for Scenario A stands at approximately 77 billion euros, while for Scenarios B and C, it reaches approximately 103.5 billion euros, encompassing grid costs (Amprion GmbH et al., 2023).

4.5.2. Planning Procedure

Currently, there are already high-voltage direct current connections from offshore wind farms in the EEZ to Lower Saxony via the N-I and N-II border corridors (Amprion, 2023b). Ten cable systems are passing through the island of Norderney, and by the year 2030, two more systems are planned to be added (Amprion, 2023b). Due to changes in energy goals (WindSeeG amendment) and the already utilized corridors from spatial and technical perspectives over Norderney, additional corridors in the North Sea are needed (Amprion, 2023b; Amprion & Tennet, 2020). To identify new cable corridors the project 'Seetrassen 2030' was launched in 2019 to develop new corridor routes for future offshore grid connection systems in the Lower Saxony coastal waters. Since these systems fall within the transmission grids of both Amprion and Tennet, the two TSOs decided to jointly apply for a spatial planning process for the project (Amprion, 2023b; Amprion & Tennet, 2020). The focus of the process

was to identify potential corridor routes within the 12-mile zone. The routing of the corridors in the EEZ and their continuation on land were not part of the procedure (Amprion & Tennet, 2020).

The planning process for the 'Seetrassen 2030' project commenced with an application conference in November 2019. Before this conference, Amprion and Tennet conducted a desktop study in which numerous corridor alternatives for the entire German Bight were developed. These alternatives underwent an assessment of their spatial and environmental compatibility, as well as their technical and economic factors. During the application conference, the corridor alternatives were discussed with relevant authorities, associations, and organizations (Amprion, 2023b). As a result, an investigation framework was established, specifying which variants required closer examination and determining the necessary application documents for the ROV. It was decided that four corridor variants should be subject to further scrutiny in the spatial planning process. Two of the identified potential corridor routes were planned to pass through the island of Langeoog, while two others were designated for the neighbouring island of Baltrum. The municipalities of Dornum and Neuharlengersiel were selected as the landing areas (see Figure 12). In the Figure, the colour red indicates the study areas, while purple highlights the preferred options (Amprion, 2023b). On January 11, 2021, the ROV was initiated by the Office for Regional Development Weser-Ems (ArL) (Amprion, 2023b). The ROV was conducted by the ArL because the coastal sea area (the 12-mile zone) falls under the jurisdiction of the state of Lower Saxony, specifically the ArL, in terms of permitting [P1].



Figure 12: Potential Cable Corridors (Tennet, 2023c)

According to § 10 para. 5 of the Lower Saxony Regional Planning Act (NROG), application documents are to be made available to the public. The ArL made a public announcement in the Lower Saxony Ministerial Gazette on January 20, 2021 (Amt für regionale Landesentwicklung Weser-Ems, 2021). The application documents for the ROV were then made available for public viewing from January 28, 2021, until March 1, 2021 (Amprion, 2023b). The documents were accessible in Baltrum, Langeoog, Dornum, and Esens. Due to the COVID-19 pandemic, viewing of the documents was by appointment only (Amprion, 2023b; Redaktionsteam KüstenGrün, 2021). Additionally, the documents were accessible online at the website: <https://www.arl-we.niedersachsen.de/Seetrassen-2030/seetrassen-2030-181711.html>, and a press release was issued by the Office for Regional Development Weser-Ems (Amt für regionale Landesentwicklung Weser-Ems, 2021).

Until April 1, 2021, it was possible to submit statements concerning the project to the Office for Regional Development Weser-Ems (ArL) (Amprion, 2023b; Redaktionsteam KüstenGrün, 2021). The submitted statements and the concerns regarding the project were then discussed in a deliberation meeting held in person on July 14 in Oldenburg and on July 15, 2021, through a video conference. In the deliberation meeting the public was not present but later on the minutes of the deliberation meeting and the presentation were made available on the Internet (Amprion, 2023b; Amt für regionale Landesentwicklung Weser-Ems, 2021). In Figures 13 and 14 a short description of the respected Islands can be found.



Figure 13: Island Description Langeoog (Langeoog-Tourismus Service, 2017; NDR, 2023)



Figure 14: Island Description Baltrum (Baltrum, 2023)

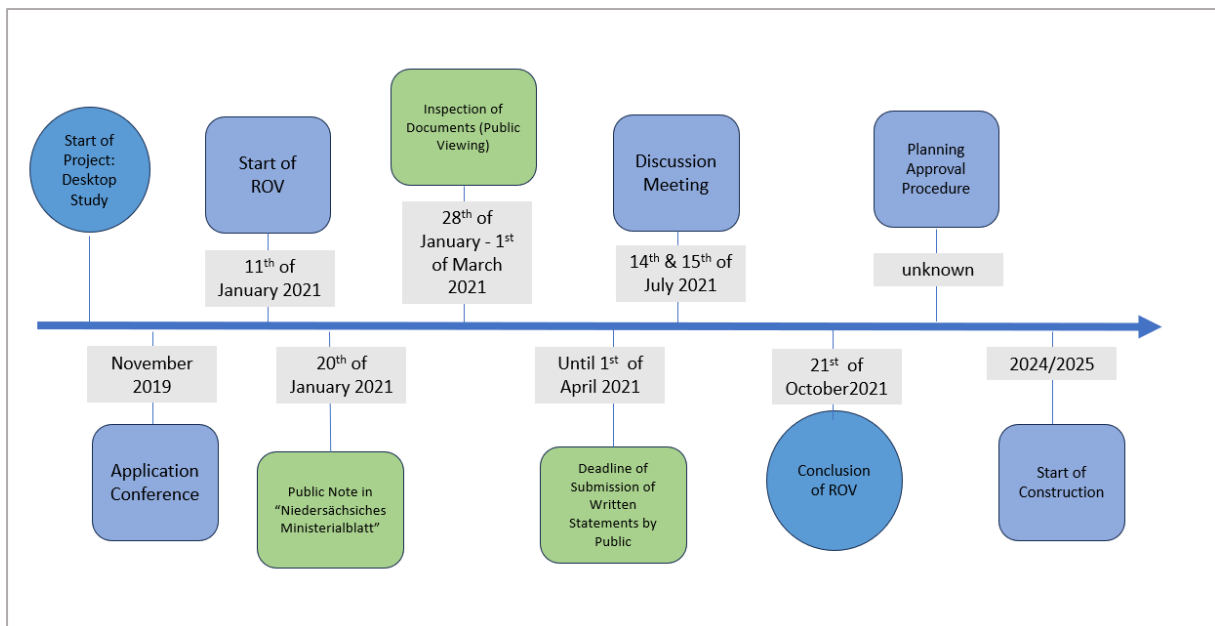


Figure 15: Project Flow (Own elaboration)

On October 18, 2021, the ROV was officially concluded with the Regional Planning Determination (Amprion, 2023b). Upon the conclusion of the ROV, the collaborative effort between Amprion and Tennet also came to an end. This is because, within specific offshore grid projects, only one transmission system operator in Germany is responsible [P2]. Figure 15 depicts the process flow. Items in green indicate instances where the community has been involved in the planning procedure. As part of the assessment, the Office for Regional Land Development Weser-Ems determined that a corridor should be established from the 12-nautical-mile boundary, passing through Baltrum Island, and extending to the landing area west of Dornumersiel (see Figure 16). The cable corridor through Baltrum is intended to connect the offshore wind parks located more than 100 km away in the EEZ with the mainland (Amprion, 2023b). However, the proposal for a corridor passing through Langeoog Island was rejected by the state planning authorities. According to the Office for Regional Land Development, the corridor via Baltrum was considered to be less conflict-prone in terms of water management, drinking water supply, coastal protection, and the protection of animal and plant species, biodiversity, soil, and cultural heritage compared to the corridor over Langeoog [P1].

Initially, it was decided to implement a dual-cable system through Baltrum (Amprion, 2023b). Subsequently, two independent official approval procedures were initiated for the two cables. As mentioned earlier in Chapter 4, an official approval procedure is required after each spatial planning procedure. In this procedure, all specific approvals such as dyke permits, electricity and navigation

permits, police clearances, and others are then required [P1]. This procedure then needed to be successfully concluded by the Niedersächsische Landesbehörde für Straßenbau und Verkehr (Lower Saxony State Agency for Road Construction and Transport) (NLStbV, 2023). The project's construction activities are to be planned for the years 2024/2025 (Amprion, 2023b). A time frame of two years has been allocated for the horizontal drilling procedure [P3].

The proposed corridor was intended to cross north of Baltrum, intersecting with the Euro-Pipe 2 gas pipeline and running parallel to it. To achieve this, the corridor was planned to traverse the eastern side of the island, necessitating the island to be undermined from the tidal side to the northern beach. The cable corridor was then intended to be connected to the mainland at Dornumergröde, situated between the towns of Neßmersiel and Dornumsiel [P1]. Each of the two systems was designed with a capacity of 2 GW, and to realize this, ± 525 kV high-voltage direct current (HVDC) systems were planned for implementation (Amt für regionale Landesentwicklung Weser-Ems, 2021).

In the procedure, the HDD method, briefly described in Chapter 4, is intended to be employed. The drilling operations will take place on the seaward side of Baltrum due to the island's status as a car-free island, rendering roads inaccessible to construction vehicles [P2]. A time-limited framework, known as a 'construction time window', has been established for the drilling operations. This window had to be agreed upon with the National Park Administration of Lower Saxony Wadden Sea prior to the official approval procedure. The construction time window aims to minimize disturbances to the natural environment and landscape, particularly in bird breeding areas and seal banks. For the construction site located on the inland side of the dike, coordination with the Lower Nature Conservation Authority in the Aurich district was required. Additionally, the coastal protection authorities had to be involved due to the crossing of the island and the dike. More Over, environmental monitoring during construction (Umweltfachliche Baubegleitung) must be implemented (Amt für regionale Landesentwicklung Weser-Ems, 2021).

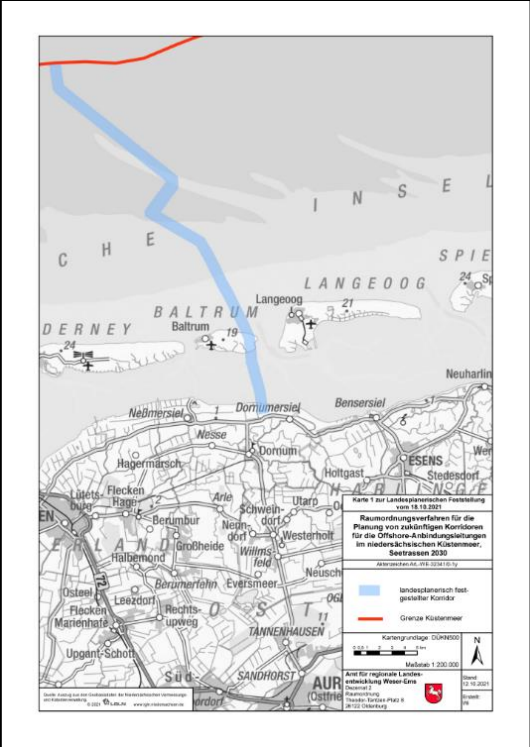


Figure 16: Cable Corridor Baltrum (ROV) (Amprion, 2023b)

Due to the new grid development plan and the consequent elevated energy targets, the Tennet Offshore GmbH aimed to route 5 systems through Baltrum, in contrast to the initially planned 2 systems [P1]. To support this decision, the TSO prepared an expert opinion on October 28, 2022. This opinion was required to demonstrate to the Office for Regional Land Development Weser-Ems, by § 15 Abs. 5 Satz 2 ROG (Spatial Planning Act), that no further ROV was necessary for the additional cables. After reviewing the expert opinion, the Office for Regional Land Development Weser-Ems confirmed that an additional ROV was not required (Tennet Offshore GmbH, 2022; Amt für regionale Landesentwicklung Weser-Ems, 2023). Furthermore, the discussion regarding the island of Langeoog and a potential crossing of the corridor has been reopened. This comes in the context of the federal government's increasing energy goals and limited alternative routes for power lines in the North Sea (P1; P2; Amprion, 2023b).

Chapter 5: Results

In this chapter of the thesis, the results of the study are presented. Firstly, the concerns expressed by residents are introduced, as well as the responses to these concerns from both the relevant authorities and energy providers. The concerns and responses are categorized according to the model proposed by Langer et al. (2018). Subsequently, the statements and findings derived from the interviews and media analysis in the context of procedural justice and distributive justice considerations are examined. This investigation serves the dual purpose of (1) ascertaining the extent to which these forms of justice have been applied in Project ‘Seetrassen 2030’ and (2) assessing the applicability of the justice concept in the context of offshore grid connection.

5.1. Concerns & Responses of the Project

In the interview discussions, various concerns related to Project ‘Seetrassen 2030’ were voiced. Concerns regarding the project were also identified in the media analysis. These concerns were expressed by various stakeholder groups and encompassed a wide range of topics. During the interviews, it was determined that these concerns had been communicated to the relevant planning authority, the Regional Development Office (ArL), as well as to the energy providers. For instance, the ArL received approximately a dozen statements from authorities and around 200 statements from private individuals. These statements expressed concerns about the potential impacts of the drilling process on the island communities [P1]. Concerns were also raised with the energy providers [P2; P3; P3 (2)]. The concerns that contributed to non-acceptance or ambivalence towards the project can be categorized into different categories. These categories include technical and geographical issues, perceived side effects, process-related variables, and personal characteristics (see Figure 17).

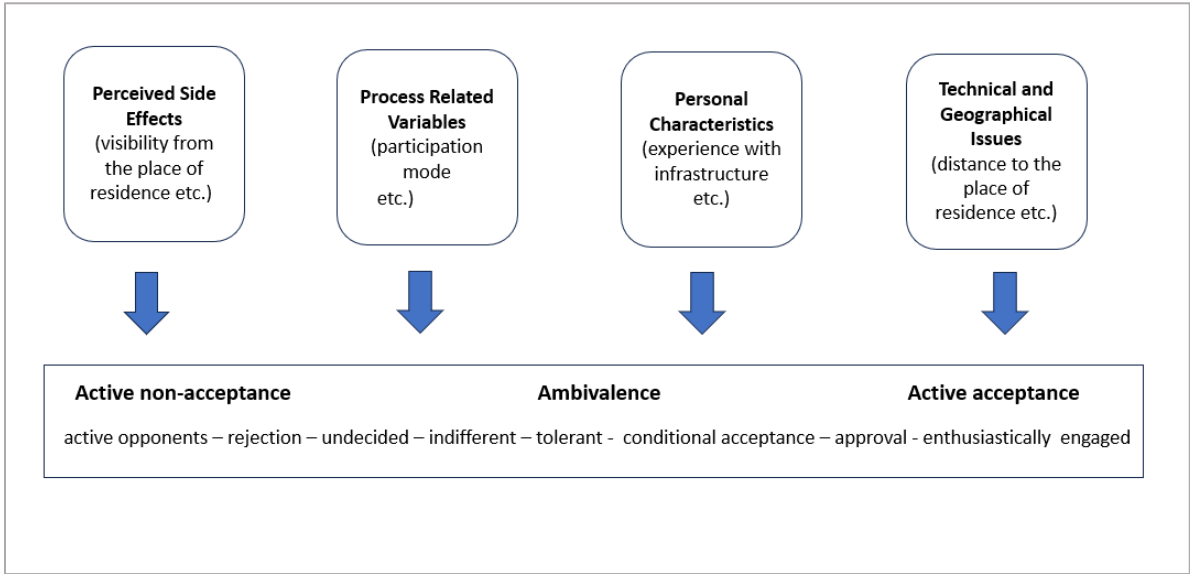


Figure 17: Modes of Acceptance (Own elaboration based on (Langer et al., 2018; Bouw et al., 2022))

Additionally, the responses to the concerns from the relevant authority (ArL) and the responses from the energy providers to these concerns will also be presented. The responses primarily pertain to the concerns raised by stakeholders in Baltrum, since the drilling activities have already been approved. For clarity, the statements from the stakeholders will be denoted with (A), while statements regarding the concerns of the authorities and energy providers will be denoted with (B).

A: Concerning **technical and geographical aspects**, residents from both Baltrum and Langeoog expressed various concerns. They were worried that the drilling required for the power cables could potentially damage the freshwater lenses of their respective islands, with the consequence of jeopardizing local drinking water supplies. It should be noted, however, that the two islands had different starting situations. While Baltrum is supplied with drinking water from the mainland and only needs to rely on the freshwater lens for drinking water in emergencies, Langeoog obtains its drinking water from its own freshwater lens. Nevertheless, concerns were voiced on both islands. On Langeoog, concerns were raised by the political group 'die Grünen'. They expressed their concerns as follows: "It concerns our most important resource, our drinking water, which is a basic necessity, an extremely valuable asset." (Redaktionsteam KüstenGrün, 2022). On Baltrum, concerns were voiced by the independent mayor Harm Olchers, who stated, "We also have strong concerns regarding the freshwater lens." (Hamburger Morgenpost, 2021). He also pointed out that Langeoog had a complete cross-sectional model of the island, enabling precise localization of the freshwater lens, whereas for Baltrum, the exact size of the freshwater lens is unknown (October 19, 2021) (NWZ, 2021). He further expressed, "The freshwater lenses on the island are irreplaceable." (Baltrum-Online.de, 2021). He stated that any interference with them would be one too many, as the lens is vital for the entire length of the island (Baltrum-Online.de, 2021). He informed the Norddeutscher Rundfunk (NDR) that the islanders were not opposed to transitioning to renewable energy, but they insisted that Tennet conducts thorough investigations to ensure the freshwater lens is not compromised (NDR, 2021).

B: Regarding concerns about the impact on the freshwater lens (**technical and geographical issues**), P3 and P3(2) argued that the concerns on Baltrum were unfounded. They stated that ongoing investigations were being conducted to ensure that no adverse effects would occur. P3 acknowledged that according to experts, even if the lens was affected, no significant negative consequences were expected.

A: In addition to technical and geographical concerns, stakeholders expressed concerns regarding potential **perceived side effects**. Residents were particularly worried about the impact on nature caused by the drilling process. Interviewee P4 explained: "Any nature reserve that needs to be traversed or crossed by the corridors will be affected in some way." P4 added, "Especially on such a small island, the density of different landscapes is so high that this complex nature is particularly sensitive and vulnerable." Baltrum is home to significant breeding grounds for endangered birds and a plant system with rare orchid species, making it particularly deserving of protection [P4]. P6, an island resident and regional politician, also expressed concerns about the impact on nature. The drilling process would constitute a significant intervention in the Wadden Sea, and experts estimate that the affected area's regeneration time could be between 10 and 15 years. The political party 'Die Grünen' also stated in a statement that the drilling has an impact on Natura 2000 and FFH conservation areas, with a focus on the biodiversity of the Lower Saxony Wadden Sea National Park. They emphasize: "We can only consider the energy transition in conjunction with species protection." (Bündnis 90/Die Grünen Kreisverband Wittmund, 2021).

B: In the context of the interviews, representatives of the authorities also expressed their views on **perceived side effects**. Concerning the impact on nature, it is mentioned that the project involves an intervention in nature, but compared to previous projects, it would be minimally invasive due to the accumulated experience and the selected drilling method [P1]. It is acknowledged that the drilling will have an impact on wildlife. For this reason, a construction schedule would be established in coordination with the National Park Administration of the Lower Saxony Wadden Sea to protect bird breeding and resting areas as well as seal banks [P3(2)].

A: Furthermore, concerns regarding the project's impact on island life and tourism (**perceived side effects**) were raised. Interviewee P4 mentioned that it is customary on Baltrum to go on an island walk once a week. However, this would no longer be possible during the construction period. P4 explained, "Because Baltrum is so small, this means that we simply won't have a big hike anymore." [P4]. A politician expressed, "Tourism must not be affected by disruptions – it is our main source of income." (Redaktionsteam KüstenGrün, 2020). Baltrum's mayor, Harm Olchers, also expressed concerns and worries about the potential impact of the project on tourism (Hamburger Morgenpost, 2021). Interviewee P4, an owner of tourist accommodation, expressed concerns from various perspectives. P4 said, "Our fear is somehow that this construction site is incredibly large and so incredibly close." P4 also communicated the concern that night time construction work could disturb guests and negatively impact their vacation experience. Additionally, P4 voiced concerns about the guests who come for mudflat hiking. According to P4 the mudflat hiking route between Baltrum and the mainland is the most frequently travelled route. The cables would be laid in the mudflats, which would affect the

mudflat hikes taking place there. Interviewee P6 from Langeoog Island remarked, "Perhaps tourists would have been interested in the construction work, as it's not an everyday thing, but maybe they would have been bothered by the noise." Furthermore, not just the island residents raised concerns. According to information from the ArL, mainland communities affected by the project due to the landing of the energy cables have also expressed concerns. Their main concern is that the multitude of cable systems that should be laid could lead to a construction site lasting several years, impacting tourism, including adjacent campsites and bicycle paths [P1]. In addition to the previously mentioned negative aspects, P4, based on personal experience (**personal characteristics**), suggested that the drilling might also have a positive impact on tourism: "I know that construction sites have always been interesting points in the past."

B: An employee of the energy company P3 expressed the belief that the project would not have any major negative impacts on tourism and the islanders. P3 stated that there would likely be no significant disruptions to the islanders and tourism, with only a visual disturbance caused by the empty conduit lying on the beach. P3 mentioned that noise disturbance for people is not expected because the project would be far enough from the island's residents, and the drilling would take place on the seaside. P3 referred, based on his personal experience, to a similar project on Norderney Island. However, P3 conceded that Baltrum might be more affected due to its size. Nevertheless, the goal is to ensure that individuals' well-being is not compromised [P3]. P1 added that it was common practice to conduct noise impact assessments, and efforts would be made to minimize noise as much as possible. P2 explained that the construction sites can coexist with tourism and the protection of the Lower Saxony Wadden Sea National Park. P2 also mentioned the Norderney project and noted that the construction site would be far from the main tourist areas on Baltrum. However, he acknowledged that there might be people who would feel disturbed when passing by the construction site. P2 stated that on Norderney Island, there is currently a 10-meter-high sound barrier wall to address the issue of noise disturbance. Table 9 provides a brief summary of the previously mentioned contents.

Additionally, there was a mention of **procedural considerations**, which will be discussed in more detail in the following subsection 5.2.

Table 9: Concerns & Responses 'Seetrassen 2030' (Own elaboration)

Category	Concerns	Responses
Freshwater (Technical & Geographical Issues)	<ul style="list-style-type: none"> ○ Fear that drilling could potentially damage freshwater lenses (jeopardizing local drinking water supply) 	<ul style="list-style-type: none"> ○ Ongoing investigations ○ No significant harm even if the freshwater lens is affected
Nature (Perceived Side Effects)	<ul style="list-style-type: none"> ○ Nature is particularly sensitive and vulnerable on the islands ○ Endangered Birds on the island ○ Endangered Plants (e.g., Orchids) ○ Negative effect on the Waddensea, FFH conservation areas and Natura 2000 areas 	<ul style="list-style-type: none"> ○ Acknowledgement of the effect on nature ○ Minimal Invasive Drilling Procedure & Construction Schedule to protect nature and wildlife
Island Life & Tourism (Perceived Side Effects)	<ul style="list-style-type: none"> ○ Tourists feel disturbed through construction work (Tourism is the main source of Income) ○ Impact on the Mudflat Hike ○ Weekly Hikes around the Island are not possible anymore 	<ul style="list-style-type: none"> ○ Acknowledgement of the visual disturbance caused by the empty conduit lying on the beach ○ Through Noise Impact Assessment and Noise Barrier Disturbance should be kept as low as possible ○ Construction Area far away from touristic area
Tourism (Personal Characteristics)	<ul style="list-style-type: none"> ○ Construction Side as an attraction for tourism 	-
Procedural Considerations (See 5.2.)		

5.2. Procedural Justice

The following analysis examines the factors influencing procedural justice in the 'Seetrassen 2030' project. To assess the extent to which procedural justice was ensured within the spatial planning process, essential components of procedural justice, as identified within the theoretical framework, are employed. These components are then juxtaposed with the findings derived from interviews and data obtained through media analysis.

1) Deliberative processes, particularly **equitable participation**, and the **elimination of power inequalities**, are instrumental in ensuring procedural justice (Schlosberg, 2007). In the context of procedural justice, it is crucial to initially examine **who is involved** in a planning process and **to what extent**. Public participation, in particular, plays a pivotal role in determining project acceptance, as meaningful engagement is essential for enhancing perceptions of justice and consequently increasing overall project acceptance (Klusens et al., 2019).

The data from interviews revealed the necessity to differentiate between the involvement of relevant authorities and the general public in an ROV process [P3 and P3(2)]. Relevant authorities, such as government agencies, were actively integrated into the planning process. For example, in September 2019, communities affected by the project were informed, and meetings were held with respective mayors to present proposed measures. Additionally, special discussions were organized in response to concerns raised by the mayor of Langeoog (for a more detailed explanation, see Section 5.1.2). In contrast, the general public was only marginally involved, as ROV processes typically have limited public participation, as noted by a staff member from the Regional Development Office [P1]. P2 further elaborated on this issue, stating that active engagement of the general public would only occur once a concrete plan and project were in place, at which point various formats for public participation would be organized. Otherwise, there would be more questions from the public than could be adequately addressed. P3 and P3(2) added that active public involvement would primarily occur during the formal planning approval process (Planfeststellungsverfahren). They noted that, in general, ROV processes in Germany do not encompass broad public participation; consequently, communication in this regard remained minimal. In this context, the question arises to what extent we can speak of equal participation and, above all, the elimination of power inequalities.

2) According to Ottinger et al. (2014), procedural justice also entails granting community members the **opportunity to influence the outcome**. This consideration raises the question of **how much influence community members have** on the project and **when** and **how** often they have opportunities for participation (Klusens et al., 2019).

Despite the previously described limited public participation in the ROV and the information measures that were undertaken, the general public had the opportunity to voice concerns about the 'Seetrassen 2030' project. Citizens were able to submit comments to the Regional Development Office (ArL) until April 1st. These comments were then assessed for their validity and relevance to the project, as indicated by P1. The assessments were conducted regardless of the source of the comments. P1 also mentioned that the number of complaints did not play a significant role in the decision-making process.

Tennet Germany added that comments would be carefully reviewed, and if they were well-founded and reasonable in the context of the ROV, appropriate adjustments would be made [P3]. Despite the opportunity for participation, P1 noted that there was a specific framework within the ROV, and not everyone could be satisfied. P2 mentioned that many people have the expectation that participating in an approval process gives them the ability to choose the route of transmission lines. However, this is not the case; certain planning principles and a framework of planning rights must be adhered to. Within this framework, there is flexibility, but its boundaries must be clarified [P2]. Additionally, P2 noted that the authority may occasionally make decisions that are perceived critically by the public but are legally or technically justifiable. Here, too, the question arises of whether we can speak of genuine participation, as the authority has the final say when it comes to decisions.

3) Furthermore, communication plays a pivotal role in a deliberative process. Participants should have the opportunity to **engage in discussions** with other participants (Warren & McFadyen, 2010) and decision-makers and **learn from one another**, leveraging local knowledge (Jenkins et al., 2016). As previously outlined, in an ROV, communication between the ArL, transmission grid operators, and relevant authorities is of significant importance.

For instance, in the ROV, an online roundtable was initiated by the Langeooger political party 'die Grünen' on March 10, 2021. This roundtable saw the participation of key figures such as the Lower Saxony Minister of the Environment, the mayor of Wittmund, experts, and representatives from the political and executing companies Amprion and TenneT (Baltrum-Online, 2021). The roundtable was convened because the 'Langeooger Grünen' wanted to express their concerns and questions. They also aimed to highlight potential weaknesses and inadequately described processes in advance and draw attention to an alternative drilling method. They recognized that their questions might be more relevant to the formal planning approval process but wanted to address them in advance due to the

extraordinary spatial significance of the planning process (Bündnis 90/Die Grünen Kreisverband Wittmund, 2021). The alternative drilling method was rejected because it was not feasible [P6]. The responsible Minister of the Environment commended the 'Langeooger Grünen' initiative for dialogue, noting that at such an early stage of planning, topics like the freshwater lens could still receive sufficient attention (Baltrum-Online, 2021). In addition to the roundtable, a specialist discussion on water management was conducted on Langeoog, for example. The participants included the NLWKN, ELBEK, the drinking water supplier OOWV, transmission grid operators Amprion and Tennet, as well as the ArL and Langeoog's mayor, Heike Horn. This discussion also revolved around the freshwater lens of the island. Interviewee P1 emphasized the importance of the mayor's participation in this dialogue to demonstrate that the concerns were taken seriously. According to P1, the voice of a municipality carries more weight than that of a private property owner, as the municipality represents all citizens. In this regard, it can be observed that the concerns of the public stakeholders have been taken seriously.

4) To ensure procedural justice, according to Jenkins et al. (2016), it is recommended to have a **direct dialogue** between the planning and governmental authorities and the affected community. Verbal communication took place between the community and various entities, including communication between community members and the Regional Development Office (ArL), between regional politicians and the community, and between energy providers and community members.

The communication with the ArL was perceived as positive by interviewed stakeholders P4 and P6. For instance, P4 mentioned that the ArL had always been responsive to their inquiries, showing a willingness to address their questions. However, P4 expressed dissatisfaction with communication with the regional politician. They observed that communication had been limited and remained so. Council meetings occurred only about every three months, and while these meetings provided updates on the current situation, there was a lack of information about future developments. P4 expressed a desire for better communication and receiving more detailed information so they could relay these details to their guests in advance. This was deemed important because, as P4 stated, "That's the worst-case scenario when guests arrive here and realize it's a construction site and not what they had in mind." P4 also mentioned that the information they had mainly came from newspapers and directly from the energy providers, Amprion and Tennet. In contrast, P4 found communication with the transmission grid operators Amprion and Tennet to be positive. However, P6 expressed dissatisfaction with communication with the energy providers. They felt that their concerns had not been adequately heard by the energy providers and wished that the transmission grid operators had engaged more with the alternative drilling proposal put forth by the Langeooger Grünen'. P6 mentioned that the transmission grid operators had rejected the alternative proposal and challenged its feasibility.

Additionally, P2 added to the discussion on communication: "I believe public participation and information are absolutely essential. What we need to achieve is targeted and proactive communication." Transparency should be maintained from the outset, and those affected by the project should be kept informed continuously while maintaining credibility. In this context, it can be stated that the involved stakeholders perceived communication differently. For instance, communication from the regional authorities on Baltrum was criticized, and a regional politician also criticized the level of satisfaction found with the energy providers [P4; P6].

5) According to Jenkins et al. (2016), it is also important for procedural justice that all **information is fully disclosed by the government and industry**, and that this information is **comprehensible to everyone**. Therefore, **avoiding technocratic language** is advisable.

In the ROV, the energy providers Tennet and Amprion utilized communication channels to inform the general public about the procedure. Tennet, for instance, created a website with frequently asked questions (FAQs) and also published reports and studies commissioned for the project. Amprion likewise published a website with information about the ROV. The information provided on the Amprion website was identical to that on Tennet's website [P3; P3(2)]. In addition to the creation of websites, further efforts were made to address concerns that had arisen among the general public. For instance, when concerns from island residents regarding drilling's impact on the drinking water supply emerged (for a more detailed explanation, see Section 5.1), updates were made to the website, and additional information was provided to address these concerns [P3; P3(2)]. One island resident, P4, expressed that the information provided by the energy providers was well-prepared, and that P4 had obtained most of the information about the planning process from the energy providers themselves. P3(2) explained that once a specific project is confirmed by Tennet, it would then be communicated to the broader public on a larger scale. Various communication methods would be employed, including information sheets, maps, flyers, brochures, and dedicated websites for each project. Events would be organized, and open house events would be held in the regions affected by the project. Additionally, a mobile information unit has recently been introduced. P3(2) also mentioned the initiation of construction site tours and cited the Norderney project as an example. After the project began, guided tours of the construction site were offered to local hoteliers. It is worth noting that this offer was not widely accepted on the island. It can be observed that the content was presented in a way that was understandable to everyone, avoiding technical jargon. Additionally, once a specific project was finalized, further efforts were made to provide clarification and information.

5.3. Distributive Justice

In addition to considerations of procedural justice, aspects of distributive justice are also crucial for acting in an energy-just manner and establishing higher project acceptance. In the following, we examine important aspects that have been identified in the theoretical framework in the context of the 'Seetrassen 2030' project.

As previously mentioned in the theoretical conceptual framework, it is essential for distributive justice that the **costs and benefits** of energy technology are **evenly distributed among the members of society**. Interviewee P2, a spokesperson for an energy company, responded to the aspect of distributive justice as follows: "Yes, there are certainly regions in Germany that are more affected than others. Especially when it comes to offshore wind. Northern Germany is more affected by the infrastructure." He added that generation structures are a political decision, and energy providers are only responsible for the necessary grid planning [P2]. P3 also expressed similar sentiments, stating, "If we want offshore wind energy, we must bear the costs."

Furthermore, as noted by Jenkins et al. (2016), it should be mentioned that perceptions of distribution are intertwined with **subjective notions of fairness**. During the interviews, participants were asked whether they perceived the implementation of cable systems as unfair. Interviewee [P4] shared thoughts despite the concerns expressed earlier about the project: "I don't find it unfair that this is happening here and not on Langeoog or somewhere else (...) It has nothing to do with fairness (...)." However, P4 added, "It would be nice if electricity could be generated where it is needed, and these long transmission lines could be avoided." P4 refers to the idea that electricity should be produced locally and not transported over long distances, as is the case in Germany right now [P4].

Owens & Driffill (2008) and Todd & Zografos (2005) also point out that distributive justice concerns itself with the **desirability of a technology at a particular location**. Interviewee P3, the project spokesperson for the energy company Tennet, stated that in his opinion, some places or communities are more willing to bear burdens than others. P5 also mentioned, "When we need to find a route, we have to make decisions, and you never find a route that is suitable for everyone." P5 further added that people generally prefer to have infrastructure elsewhere rather than in their immediate vicinity, and this is inherent in human nature. P2 added that he often encounters people who initially oppose what the energy provider is doing, even if it's just about mapping or data collection in a survey area or on their property.

P2 also said, "So, I will never achieve universal satisfaction, certainly not because we plan infrastructure, and it always happens on people's properties, and most people don't like what we do there, at least when it happens on their property." P2 added furthermore, that encountering skepticism in the work of a transmission system operator is a natural part of the process and is understandable, as it involves people's homes. Therefore, it is reasonable to initially adopt a critical stance. He noted that infrastructure projects such as highway construction are more understood by people because the direct benefits are visible, unlike projects in the electricity infrastructure sector. P1 also mentioned that communities might derive more benefits from infrastructure projects like highways, as they could create new industrial areas with new exits. Table 10 provides a brief summary of the previously mentioned contents.

Table 10: Notion of Distributive Justice (Own elaboration based on Interviews & Media analysis)

Notion of Distributive Justice	Statements
Costs and benefits of energy technology are evenly distributed	<i>"Yes, there are certainly regions in Germany that are more affected than others. Especially when it comes to offshore wind. Northern Germany is more affected by the infrastructure. "[P2]</i>
Notion of fairness	<i>"I don't find it unfair that this is happening here and not on Langeoog or somewhere else (...) It has nothing to do with fairness (...). "[P4]</i> <i>"It would be nice if electricity could be generated where it is needed, and these long transmission lines could be avoided. "[P4]</i>
Desirability of a technology at a particular location	<i>"When we need to find a route, we have to make decisions, and you never find a route that is suitable for everyone. "[P5]</i> <i>"So, I will never achieve universal satisfaction, certainly not because we plan infrastructure, and it always happens on people's properties, and most people don't like what we do there, at least when it happens on their property. "[P2]</i>

5.3.1. Realkompensation (Real Compensation)

Various measures related to distributive justice concerning wind energy have been identified that can contribute to perceiving actions as fairer. In the following, the extent to which these measures can be applied to the cable systems of offshore wind farms is investigated as how they can contribute to a higher sense of justice. Compensations, including individual compensation measures, community benefits, and ownership, are expected to enhance acceptance.

However, before delving into the discussion of the three compensation measures, it should be noted that in Germany, there exists the concept of 'Realkompensation' (real compensation). This is a legally regulated compensation according to §13/15 of the Federal Nature Conservation Act in connection with landscape interventions. In principle, significant landscape impairments are to be avoided, and if this is not possible, compensation must take the form of compensatory measures or a purpose-bound payment (BMUV, 2023). This is intended to protect the functionality of the natural balance and the landscape in Germany (Tennet, 2023e). It should be noted that spatial planning only prepares interventions in nature and does not carry them out immediately. Therefore, there is an obligation to prepare for compensation. The spatial planning must demonstrate that preparatory interventions are compensable by designating potentially suitable areas for compensatory measures (Deutscher Bundestag, 2018).

Interviewees also expressed their views on the topic of Realkompensation. For example, P3 stated that Realkompensation must take place. This can be achieved, for instance, by improving or creating habitats that were not suitable before. P3(2) added that the topic of Realkompensation is of great importance to Tennet and that the measures taken can be viewed online by anyone at <https://www.tennet.eu/de/grid/green-map>. The website notes that these measures are not only implemented because they are legally required but also because Tennet aims to contribute to environmental and climate protection (Tennet, 2023e). The political party 'Die Langeoger Grünen' also commented on the issue, demanding during the process, before the ROV was completed, that it must be clear in advance which compensatory measures will be implemented for the project (Bündnis 90/Die Grünen Kreisverband Wittmund, 2021). Interviewee P6 also mentioned that compensatory measures would probably not take place on the island but on the mainland. P6 cited moorland restoration as an example of Realkompensation. As shown, the interviewees have pointed out that Germany already has the measure of Realkompensation in place when landscape interventions occur. However, a question that arises is to what extent does this lead to an increased sense of justice. For this reason, the stakeholders were questioned about additional measures that go beyond the legal requirements.

5.3.2. Compensation Measure

Initially, the stakeholders were questioned about the topic of individual compensation. Interviewee P1 expressed the belief that this could achieve a lot in terms of acceptance. However, P1 acknowledged that it might not be practical in practice, as determining where to start and where to stop could be challenging. Interviewee P3 shared his thoughts on this topic as follows: "I consider compensation measures to be very important. However, it's not just about implementing them financially. There should be management plans behind them that outline how you approach the interventions or what measures you plan to take in connection with the interventions." He referred back to the concept of Realkompensation.

P2 added, " It's different whether the wind farm operator makes money from it on their own initiative every year or whether we plan infrastructure under a legal mandate that is essential for the functioning of this country." P2 also mentioned that it is challenging to determine where to start and where to stop with multi-year compensation payments. P2 said, "These are really thousands and ten thousand of people affected in our offshore projects and also in onshore projects when it comes to several hundred kilometers of transmission lines. It becomes economically inefficient to introduce financial compensation beyond what the owners already receive."

Furthermore, interviewee P6 was asked about the extent to which financial compensation can be seen as a useful tool. P6 expressed the belief that it would not lead to an increase in acceptance.

It appears that both from the perspective of energy providers, the ArL, and a resident and regional politician, individual compensation payments are not seen as very meaningful. However, the question remains open as to whether other individuals in the community view them as meaningful. Within the interviews, it was particularly found that island residents especially desire a community benefit. Table 11 provides a brief summary of the previously mentioned contents.

Table 11: Individual Compensation (Own elaboration based on Interviews & Media analysis)

Measure	Statements
Individual Compensation	<i>"I consider compensation measures to be very important. However, it's not just about implementing them financially. There should be management plans behind them that outline how you approach the interventions or what measures you plan to take in connection with the interventions. "[P3]</i>
	<i>"It's different whether the wind farm operator makes money from it on their own initiative every year or whether we plan infrastructure under legal mandate that is essential for the functioning of this country. "[P2]</i>
	<i>P1 suggested that financial compensation might enhance acceptance.</i>
	<i>P6 conveyed the belief that it does not enhance acceptance.</i>

5.3.3. Community Benefit

Interviewee P4 expressed her belief that the project's acceptance would be significantly higher if the island directly benefited from the project or the connected wind farm. P4 said, "We don't directly benefit from the connection, not economically. Then the acceptance would probably be very different." P4 pointed out that on other islands, people benefit economically from connected wind farms by providing job opportunities, such as for construction workers and engineers. If in Baltrum residents also would get job opportunities, societal acceptance would likely be different.

The mayor of Baltrum also wishes for benefits for his community, but he refers to natural compensatory measures rather than economic ones. He expressed to the newspaper NWZ that he would like to obtain permission to use the plant remains ("Teek") washed up on the beach to reinforce hiking and walking paths. Currently, these plant remains are collected from Baltrum's beaches and transported to the mainland for incineration (NWZ, 2023).

In addition to the islanders, interviewee P1 from the ArL also commented on this issue. P1 understands that the islanders feel that they bear only the costs or burdens without seeing direct benefits from the project. Therefore, P1 stated the wish from the community for benefits, such as improvements of the local kindergarten or playgrounds. However, P1 also acknowledged that transmission system operators are limited in compensating communities in that regard, as they must adhere to existing laws and cannot submit invoices to the Federal Network Agency that are not directly related to the project. P1 stated, "And that's why I understand that transmission system operators are relatively limited in doing good for the islands" [P1].

P5, a Dutch representative from Tennet, also commented on this issue. P5 stated that communities with limited financial resources would wish for financial compensation in such projects. P5 furthermore mentioned that if the community is satisfied, it would lead to fewer protests related to power lines. P5 added, "Sometimes we feel obliged to accept some compensations even if we don't believe they have anything to do with the overhead line because we need their cooperation."

It can be observed that greater significance is attributed to community benefits in terms of increasing acceptance; however, the question remains open as to the extent to which legal foundations and financial resources stand in opposition to feasibility. Table 12 provides a brief summary of the previously mentioned contents.

Table 12: Community Benefit (Own elaboration based on Interviews & Media analysis)

Measure	Statements
Community Benefit	<p><i>"We don't directly benefit from the connection, not economically. Then the acceptance would probably be very different. "[P4]</i></p> <p><i>P1 understands that the islanders feel that they bear only the costs or burdens without seeing direct benefits from the project.</i></p> <p><i>P5 mentioned that if the community is satisfied, it would lead to fewer protests related to power lines.</i></p> <p><i>"Sometimes we feel obliged to accept some compensations even if we don't believe they have anything to do with the overhead line because we need their cooperation. "[P5]</i></p>

5.3.4. Ownership

It has also been determined that the islanders would like to have access to some of the generated electricity. The question arises as to whether this falls under 'Community Benefits' or 'Ownership'. In the context of this study, it is classified under 'Ownership', because the islanders are demanding usage rights to the electricity and asserting a claim to ownership rights.

The mayor of Baltrum expressed the wish, for the benefit of the island's residents, to be able to use the electricity grid that would pass through the island. However, he pointed out that the island residents cannot directly use the electricity from the grid without a substation. Such a substation, he emphasized, would be too large for the small North Sea Island of Baltrum and would also not be aesthetically appealing. His statement suggests that if the possibility existed to access the electricity, it would be used (NWZ, 2023). Interviewee P4 shares this view as well, acknowledging the challenges:

"Of course, it would be our preference if we could simply access some of this electricity. But, of course, it's not as simple as it sounds." In this respect, the question of feasibility arises.

Interviewee P5 expressed his opinion on whether he considers it appropriate for the communities affected by offshore wind energy to propose receiving a portion of the electricity as follows: "When we build a new overhead line or subsea cables to the mainland or connect wind farms onshore, it's not for individual persons. It's a national goal. It serves to protect our environment. It serves to maintain and increase biodiversity. It serves to properly supply all schools and hospitals with electricity. And that benefits everyone."

P5 has raised an interesting point here: should we compensate individuals, or must we as a community bear the costs of our actions without further benefiting? P5 furthermore emphasizes the importance of infrastructure acceptance and mentions that similar issues need to be addressed by every country in Europe. He underscores the need to understand how infrastructure acceptance works, as people need to be informed about the reasons and benefits of these projects. "Increasing acceptance is very necessary, especially these days, as there is a high pressure to change facilities from fossil fuels." Table 13 provides a brief summary of the previously mentioned contents.

Table 13: Ownership (Own elaboration based on Interviews & Media analysis)

Measure	Statements
Ownership	<p><i>The Mayor of Baltrum expressed the wish, for the benefit of the island's residents, to be able to use the electricity grid that would pass through the island. However, it also acknowledged that he knows this is not feasible.</i></p> <p><i>"Of course, it would be our preference if we could simply access some of this electricity. But, of course, it's not as simple as it sounds." [P4]</i></p> <p><i>"When we build a new overhead line or subsea cables to the mainland or connect wind farms onshore, it's not for individual persons. It's a national goal. It serves to protect our environment. It serves to maintain and increase biodiversity. It serves to properly supply all schools and hospitals with electricity.[P5]</i></p>

Chapter 6: Discussion and Reflection

6.1. Procedural Justice

As highlighted in the theoretical framework, various authors emphasize different characteristics that define procedural justice. Consequently, operationalizing the concept is not straightforward, with statements being rather vague. For instance, Wüstenhagen et al. (2007) suggest that meaningful integration of involved stakeholders is necessary, raising the question of what constitutes meaningful participation in this context. Jenkins et al. (2016) provide more concrete but still somewhat vague recommendations. For instance, information must be fully disclosed by the government, but the question that arises in this context is at what stage in the planning process should this occur? On the other hand, other authors like Warren & McFadyen (2010) offer more specific guidance, proposing that planning processes should involve deliberative procedures where participants engage with each other and decision-makers and have the opportunity to learn from each other. Schlosberg (2007) also provides partly more specific recommendations, that Individuals and the community should have the opportunity to participate on equal terms in processes, and power imbalances should be eliminated.

Taking a closer look at the case study and comparing it with the self-constructed indicators listed earlier, which were created based on the literature, it becomes apparent that the stakeholders in the ROV 'Seetrassen 2030' had the opportunity to participate, but compared to public stakeholders, the general public had limited involvement. They had the opportunity to voice concerns through submissions, however, the final approval decision rested with the competent authority. Communication primarily took place among the community representatives, energy providers, and the relevant authorities. Nonetheless, communication efforts with the community did occur; however, these were primarily indirect in nature. The content was presented in an easily understandable manner, avoiding technocratic language. Satisfaction with communication varied among stakeholders, with some expressing contentment with communication with energy providers, while others felt their voices were not adequately heard. Due to the size of the study, making conclusive assessments in this regard is challenging, and further interviews with a representative sample would be needed. Moreover, the study found that communication by regional politicians was considered in need of improvement. One community member expressed the desire for more information regarding future developments related to the project. In this context, the question arises to what extent local authorities have access to this information and whether communication in this regard needs to be improved.

Due to the various interpretations of procedural justice by different authors, it is challenging to make a clear statement about whether procedural justice was realized in the 'Seetrassen 2030' project. Although efforts were made to operationalize the concept within the theoretical framework, it remains a challenge to definitively state the presence of procedural justice. As previously discussed, the authors' statements are quite vague. This vagueness is also evident when considering who should be involved in the processes. Wüstenhagen et al. (2007) mention stakeholder involvement, Schlosberg (2007) talks about involving the community and individuals, Ottinger et al. (2014) emphasize community involvement, Warren & McFadyen (2010) discuss involving community members, and Jenkins et al. (2016) highlight direct dialogue with the affected parties. The question that arises is, who should actually be involved? This question becomes particularly evident when examining the 'Seetrassen 2030' project. Public interest holders were actively engaged, while the general public had limited participation. In a democratic system like Germany, elected political representatives are expected to represent the interests of the public. These representatives found a voice in the 'Seetrassen 2030' project. Is this sufficient, and can we, therefore, speak of community involvement? Or does it require more extensive collaboration with individuals, such as through direct dialogue as proposed by Jenkins et al. (2016)?

A challenge in this context is whether comprehensive community involvement in planning processes would lead to project delays due to the multitude of involved stakeholders. Can our society afford such delays in the context of the energy transition, where rapid action is necessary? Additionally, there arises the inquiry as to whether equitable participation may potentially result in the rejection of the project, as it is worth considering the reluctance of individuals to have an energy cable in close proximity to their residences. Nevertheless, it is worth noting that citizens often possess a significant reservoir of information based on their experiences and knowledge of local conditions (Roo & Porter, 2007). Especially when considering unique areas like the Wadden Sea, which is exceptional in its biodiversity and flora and fauna, it is important to listen to the local people and protect this unique landscape.

The difficulty in operationalizing procedural justice becomes evident as well when considering Arnstein's ladder (1969) as revised by Kluskens et al. (2019). According to their definition, participation in the 'Seetrassen 2030' project can be categorized as Category 5, 'Placation', signifying a flow of information to the public, unhindered options, but final decisions resting with those in power. According to Arnstein (1969), this category corresponds to Tokenism, where citizens experience symbolic participation but lack substantial influence. Real participation, falling under levels 6.-8., involves citizens having equal involvement in decision-making processes. It is essential to note that this categorization oversimplifies the intricate and project-specific contexts within the domain of energy

justice. Instead, considering the context and embrace a spectrum of procedural justice might provide a more comprehensive perspective (Slotterback & Lauria, 2019).

6.2. Distributive Justice

In the context of distributive justice, it was observed that the expansion of offshore grid infrastructure has varying impacts on different regions in Germany. As Germany has a coastline only in the north, offshore cables are laid there to connect offshore wind farms to the mainland. The affected communities in the north bear the costs even though direct benefits may not be immediately apparent. This raises questions about the fairness of individual communities bearing burdens for the benefit of all. An energy provider argued that offshore infrastructure is an infrastructure from which society as a whole benefit, and, as such, the costs should be borne collectively as a society. This argument is supported by Langer et al. (2018), Lienhoop (2018), and Olsen (2016). The direct net benefits of wind energy utilization are not immediately visible at the local level. In the context of cable installation, recognizing the net benefits might be even more challenging because, when wind turbines are built, people are aware of the direct benefits, as is the case with roads and highways. However, in the case of cables, an intangible good is being transported, which is not tangible to people. It would be interesting for future research to examine to what extent acceptance of cable infrastructure differs from the acceptance of, for example, a wind farm or other infrastructure projects.

Within the scope of the study, it was examined, following Jenkins et al. (2016), to what extent residents perceive the installation of cables on their island as fair. An island resident expressed a perspective that did not view the grid access planning as unfair but proposed that society should reevaluate the entire energy system. Currently, electricity generated in the North Sea is transported through power lines across Germany, requiring additional infrastructure measures that also affect mainland communities. To address this issue, the energy supply could be made more decentralized, generating electricity where it is consumed and utilizing local resources. The feasibility of this approach, however, is influenced by regional conditions and politics. For example, offshore wind energy can only be generated in the northern part of Germany, limiting the potential for regional adaptation.

The topic of acceptance towards wind turbines is a growing area of research, and authors such as Olsen (2016), Kluskens et al. (2019), García et al. (2016), and Lienhoop (2018) address measures aimed at increasing acceptance of wind turbines in their publications.

In this work, the three most common forms of measures to increase community acceptance were examined in relation to offshore cable infrastructure. In the 'Seetrassen 2030' project, it was found that the issue of individual compensation is considered difficult because it raises the question of where compensation payments should begin and end. Olsen (2016) particularly mentions compensation

measures for property owners in this context. In the 'Seetrassen 2030' project, the cable is planned to be laid through an uninhabited part of the island. Another question that arises if compensation payments were to be considered is who would be responsible for covering these costs. Currently, Tennet Germany is a Dutch state-owned company, but there are plans for the German subsidiary of Tennet to be sold to the German government (Stratmann & Schütze, 2023). If this transition occurs, taxpayers would be responsible for financing the compensation. It's worth noting that even an island resident and a regional politician admitted that they did not believe financial compensation would significantly contribute to increased acceptance. Further research on the effectiveness of financial compensation is required, although its practicality remains questionable due to the factors mentioned earlier.

However, in the interviews and media analysis, it became particularly evident that community benefits could contribute to increased acceptance, especially from the community's perspective. For instance, an island resident expressed a desire for economic benefits related to the construction of cable infrastructure, such as job creation. Similarly, a regional politician advocated implementing measures that would benefit the local community as compensation. Energy providers and the relevant authorities acknowledged the legitimacy of the demand for community benefits and mentioned potential options such as playground renovations or support for local kindergartens. This form of compensation may be considered practical as it operates within a manageable financial framework, provides advantages to the community, and has the potential to improve the project's acceptability. However, questions remain about the practical implementation of this approach, ensuring that certain communities do not feel disadvantaged and determining which projects should be subsidized and where boundaries should be set. Further research is required in this regard.

As a final measure to increase acceptance, ownership was considered. The community expressed a desire to receive access to the electricity transmitted through the cables laid on their islands. However, questions arise about the feasibility of such an undertaking. Additional construction work was necessary for the construction of the infrastructure required for access to electricity, which would involve further interventions in nature and potential impacts on people. Therefore, the feasibility and meaningfulness of such an undertaking remain questionable. Further research is also needed regarding ownership.

When assessing whether distributive justice prevails in the 'Seetrassen 2030' project, there is no definitive answer. People perceive processes as varying in terms of fairness, and the intangibility of the electricity issue exacerbates the challenge of acceptance. The central question, as discussed earlier, revolves around whether we, as a society, have a choice. Humanity is responsible for anthropogenic climate change, and to mitigate its effects, a transition from fossil fuels to renewable energy sources

is imperative. In this context, offshore wind energy, particularly its utilization of the vast North Sea, presents an attractive and promising green energy source until new innovations are developed. However, it is evident that measures such as community benefits can enhance acceptance within a project. Therefore, further research in this direction is warranted to mitigate potential implementation delays and foster increased acceptance.

6.3. Reflection

As previously highlighted, both procedural justice and distributive justice are of significance concerning the community acceptance of offshore cable infrastructure. This study has observed that the concept of energy justice has an impact on social acceptance. Nevertheless, it is worth noting that transparency and communication play a pivotal role, according to the interviewed stakeholders and media analysis, particularly in the context of procedural and distributive justice. It should be noted that further research is essential regarding this research. The study was limited in its scope, focusing solely on the ROV process within the German planning system, with the official approval procedure excluded. More extensive, large-scale studies involving a more diverse participant pool may offer intriguing avenues for research, increasing representativeness and yielding further valuable insights.

Additionally, it is crucial for future research to delve into the realm of social cohesion or social capital. The cohesion among individuals within a community or among individuals is a critical element that necessitates thorough understanding, as it can significantly determine the success or failure of a project. Strong social cohesion can contribute to reaching diverse social groups and fostering neighbourhood discussions, positively impacting the acceptance and implementation of energy and infrastructure projects (Bouw et al., 2022).

Comparative analyses of practices and experiences across different countries might prove to be a valuable direction for future research. Countries possess distinct planning processes and institutional structures. Offshore and transmission line projects transcend national borders and necessitate collaboration. Through such cooperation, individual strengths and weaknesses can be considered in planning and the opportunity to learn from each other is opened up.

Within the realm of energy justice, the seamless integration of theory and practice is essential, given that it addresses tangible, context-specific issues. Energy infrastructure projects have far-reaching impacts, involving individuals from diverse social and cultural backgrounds (Ruotsalainen et al., 2017). This diversity makes it particularly challenging to formulate universally applicable principles concerning energy justice and the augmentation of acceptance. Hence, achieving a harmonious balance between the technical and social dimensions is of utmost importance when confronting these intricate challenges.

Chapter 7: Conclusion

Offshore grids in Germany need to be rapidly expanded to connect wind farms and achieve energy goals, thereby advancing decarbonization as quickly as possible. For this reason, it is essential to consider not only technical aspects but also social aspects in the energy sector and to view the planning and implementation of offshore grid connection planning projects as socio-technical systems. Therefore, conducting social science research is indispensable. It is necessary to understand how acceptance of a project can be increased or resistance reduced. In this work, the approach chosen was to use the concept of energy justice. This concept has often been used in the context of renewable energy technologies, as seen in works by authors such as Kluskens et al. (2019), Dütschke et al. (2019), and Velasco-Herrejon & Bauwens (2020), but has not yet been applied in the context of offshore grid connection systems, according to the current state of knowledge. **The study examined how community acceptance of offshore grid connection planning can be improved and how the concept of energy justice can contribute to this understanding** (SQ I). In order to address the primary research question, various subsidiary inquiries were formulated, each of which was deemed crucial in establishing a comprehensive comprehension of the main research question.

First of all, the secondary research question (SQII): **"What are the fundamental tenets of energy justice, and how do these principles intersect with the planning of offshore grid connections?"** was posed. In reference to this question, the literature review revealed the existence of two core tenets of energy justice: procedural and distributive justice. It was ascertained that it is meaningful to consider these two tenets of energy justice in the context of offshore grid planning, as doing so allows for an understanding of which aspects within project planning can influence perceptions of justice. By considering these procedural and distributive aspects, perceptions of justice can be influenced, potentially leading to greater acceptance. Key authors who have shaped this understanding, particularly with respect to procedural justice, include Langer et al. (2018), Jenkins et al. (2016), Schlosberg (2007), Wüstenhagen et al. (2007), Ottinger et al. (2014), and Kluskens et al. (2019). In the context of distributive justice, the research has been influenced by authors such as Jenkins et al. (2016), McCauley et al. (2019), Langer et al. (2018), Olsen (2016), and Lienhoop (2018).

In addressing the second subsidiary research question (SQIII), **"How is the planning of offshore grid connections organized in Germany?"** it was discerned that the planning process in Germany for offshore grid connections adheres to well-defined frameworks, encompassing two pivotal procedural phases: the spatial planning procedure (ROV) and the official approval procedure (Planfeststellungsverfahren). While this study focused on the ROV, the official approval procedure was

not explored in depth due to the limitations of the research scope. In this regard, it is advisable to conduct further research in the future.

The third secondary research question (SQIV), "**To what extent are the concepts of distributional and procedural justice reflected in German offshore grid planning practice, particularly in the case of the 'Seetrassen 2030' project?**" was investigated. Within the framework of the 'Seetrassen 2030' planning process, it was observed that both procedural and distributional justice are pivotal components. Considering the concept of energy justice in the context of planning offshore cable infrastructure proves to be meaningful. Through interviews and media analysis, it was ascertained that the involvement of local residents played a substantial role in garnering acceptance for the project. Notably, open and direct communication from authorities, energy providers, and regional politicians is indispensable for facilitating public comprehension of the rationale behind specific actions and the timing of their implementation. It is advisable to present information related to the process in an accessible manner, avoiding overly technical language. Furthermore, to act in accordance with procedural justice principles, it is recommended that the community has the opportunity to actively engage in processes and have their voices heard. This approach is sensible because communities often possess knowledge that planners may lack. Regarding the question of whether procedural justice was present in the 'Seetrassen 2030' project, the answer is not clear-cut. Depending on the definitions used by various authors, some aspects align with procedural justice while others do not. According to Arnstein's participation ladder (1969), the level achieved in the ROV can be seen not as active citizen participation but more as a form of tokenism, falling short of genuine involvement. The inclusion of the wider community in 'real' distributional justice often leads to discussions about how feasible and to what extent these representatives truly reflect the interests of citizens in a democratic system. It might be more meaningful to consider procedural justice as a spectrum rather than rigid classifications since this approach is relevant, given that each planning context varies.

Distributional justice also plays a vital role in energy justice and project acceptance. It is important to note that, especially in the context of infrastructure projects, people tend to see more burdens than direct benefits, exacerbated in the case of offshore cable systems due to green energy being an intangible good (Balmaceda, 2019). Additionally, the perception of distributional justice varies from person to person, as it is linked to subjective feelings of fairness. It was observed that measures like community benefits and ownership can lead to higher project acceptance, while financial compensation was viewed as more difficult. Determining whether distributional justice was evident in the 'Seetrassen 2030' project is equally complex, given the subjective nature of distributional justice. Due to Germany's geography, it is a fact that burdens related to offshore cable systems are distributed unevenly. However, it is worth noting that the stakeholders involved have expressed an awareness of

the need for renewable energy, implying that they also see the project's benefits. Nevertheless, it has been suggested that it is worth considering a reevaluation of the current energy system and a return to a decentralized energy system.

Finally, the last research question (SQ V) addressed the following question: **To what extent do energy justice concepts help in understanding the issues related to offshore grid connection projects?**

Considering justice aspects in offshore grid connection planning projects can lead to the perception of a fairer process and more project acceptance. This is supported by both the literature and the conducted case study. Using justice aspects also contributes to a more comprehensive understanding of acceptance. However, adjustments to the concept of justice are necessary. In summary, the topic of energy justice concerning cable systems must continue to be explored. This is particularly essential because we need to rapidly implement renewable energy projects to mitigate human-induced climate change. Only by integrating theory and practice can we find solutions that are practical in real-life situations.

In summary, it can be stated that enhancing the acceptance of offshore grid connection planning within the community necessitates a strategic focus on transparent communication, active community engagement, and the dissemination of easily understandable information. The incorporation of justice concepts in planning processes, particularly the tenets of procedural and distributive justice, can provide a more profound comprehension of the topic of community acceptance, and can also contribute to its enhancement. However, it is essential to acknowledge that achieving acceptance is a complex endeavour, and it may require the adaptation of justice concepts to the unique project context. This recognition underscores the influence of local dynamics, project-specific factors, and the diverse expectations of stakeholders in shaping the path to acceptance.

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Appendices

Appendix A: Interview Guidelines

P1 Contact Person 'Seetrassen 2030' (Office for Regional Development Weser-Ems)

1.	What is/was your role in the process of the offshore grid connection project 'Seetrassen 2030' (with a specific focus on Baltrum)?
2.	Can you provide some insight into the corridor route and the process of spatial planning in Baltrum?
3.	At what point have you been you involved in the process?
4.	How did the collaboration between you and the TSO Tennet unfold?
5.	Why was the planning process approved for Baltrum and rejected for Langeoog?
6.	How was the environmental impact assessment conducted for the project in Baltrum?
7.	To what extent do you believe this project has or will have an impact on the community and the island itself?
8.	There has been some public resistance to the project. When and how did you come into contact with the concerns of the island residents?
9.	How did you respond/react to the concerns of the island residents?
10.	In your view, what constitutes a fair/just planning process regarding wind energy infrastructure?
11.	To what extent do you consider the planning process (and/or the distribution of benefits and costs) to be fair/just?
12.	From your perspective, how essential is the acceptance of local interest groups for such projects?
13.	To what degree do you believe that measures such as financial compensations for individuals or the community, or ownership stakes, could enhance the acceptance of such projects?
14.	I noticed that three additional grid connections are planned to pass through Baltrum without undergoing further spatial planning procedures. Could you briefly explain why?
15.	What does the future hold for the 'Seetrassen 2030' project? Will there be a need for additional corridor routes through the East Frisian Islands in the future?

P2 Project Spokesmen (Amprion)

1.	What is/was your role in the process of the offshore grid connection project 'Seetrassen 2030'?
2.	Could you provide insights into the spatial planning process / overall process?
3.	How does the collaboration between you and the TSO Tennet regarding the development of new corridor routes occur?
4.	How did the collaboration with the Regional Development Authority Weser-Ems unfold and how did you experience it?
5.	What does a desktop study entail?
6.	At what point in the process did you "withdraw" from the coastal area project?
7.	When were public interest groups involved in the process?
8.	Have you, as Amprion, engaged in awareness-raising efforts as part of the project or to what extent do you engage in public awareness campaigns about projects in general?
9.	In your opinion, to what extent does this project impact the community and the island itself?
10.	There were some resistances against the project from the public, particularly in Langeoog. To what extent did Amprion come into contact with these concerns?
11.	How could overall satisfaction be increased in this planning process or in planning processes like this in general?
12.	To what extent do you consider public participation in ongoing projects to be meaningful?
13.	How do you view compensation measures in projects like these?
14.	In your view, are the costs and benefits regarding offshore wind energy infrastructure distributed fairly in Germany?
15.	Would you make any changes in future planning projects?
16.	The alternatives for corridor routes are limited, which means that options might have to be chosen that face public resistance. How do you intend to address this?
17.	The cables must land along the coastal strip. To what extent do you see potential conflicts (resistance from residents) in this aspect, and how do you intend to manage it?

P3 &P3(2) Project Lead Licensing BalWin1 (Tennet Germany) & Public Relations (Tennet Germany)

1.	What is your role in the process of the offshore grid connection project 'Seetrassen 2030'?
2.	Could you provide information about the overall process/spatial planning process?
3.	How did the collaboration between you and the TSO Amprion unfold regarding the development of new corridor routes in the 'Seetrassen 2030' project?
4.	How did your collaboration with the Regional Development Authority Weser-Ems take place?
5.	Technical question: Could you provide details about the drilling procedure planned for Baltrum?
6.	Technical question: What decibel level is generated by this procedure? To what extent does this impact humans and the environment?
7.	Technical question: To what extent do you foresee conflicts arising from the use of 525-kV systems?
8.	At what point in the process were public interest groups involved?
9.	Have you, as Tennet, conducted awareness-raising efforts as part of the project or in general, and to what extent do you engage in such efforts about projects?
10.	In your opinion, to what extent does this project impact the community and the island itself?
11.	There were some resistances against the project from the public, particularly in Langeoog. To what extent has Tennet been in contact with these concerns?
12.	How could overall satisfaction be increased in this planning process or in planning processes like this in general?
13.	To what extent do you consider public participation in ongoing projects to be meaningful?
14.	To what extent do you view compensation measures in projects like these as meaningful?
15.	To what extent do you have authority over compensation measures?
16.	Do you see the federal level as responsible for providing financial resources in this regard?
17.	To what extent do you consider the costs and benefits regarding offshore wind energy infrastructure to be fairly distributed in the 'Seetrassen 2030' project?
18.	The alternatives for corridor routes are limited, potentially necessitating options that face public resistance. How do you plan to address this?
19.	Would you make any changes in future planning projects?

P4 Resident of the Island of Baltrum/ Owner of Touristic Facility / Member of the Tidenhusiverein

1.	Could you briefly introduce yourself and explain why you submitted a statement regarding the 'Seetrassen 2030' project?
2.	To what extent do you believe the project influences tourism on the island?
3.	How does the project impact flora and fauna/birds, etc.?
4.	To what extent do you personally feel affected by the project?
5.	When did you become aware of the planning process?
6.	Do you think you have had sufficient voice in the process?
7.	Why do you believe the resistance has been minimal (only one statement)?
8.	Did you perceive the process as transparent?
9.	What does justice mean to you in a planning process like this?
10.	From your perspective, what is the alternative to implementing the project on Baltrum?
11.	How could your satisfaction have been increased?
12.	To what extent can compensation measures lead to acceptance of the project on your part?

P5 Asset Management/Grid Strategy (Tennet Netherlands)

1.	Can you briefly introduce yourself and your field of expertise?
2.	To what extent do you see an urgency to deal with the acceptance of (offshore) renewable energy projects?
3.	What does energy justice mean to you?
4.	How does offshore wind energy infrastructure differ from onshore infrastructure in terms of acceptance?
5.	To what extent does Tennet ensure that the interests of public stakeholders are sufficiently considered in wind energy planning projects?
6.	How can overall satisfaction be guaranteed/increased in a planning process in general?
7.	To what extent do you consider public participation in ongoing offshore wind energy projects to be useful?
8.	To what extent do you see compensation measures in this regard as useful?
9.	To what extent does Tennet have a handle on compensation measures?
10.	Do you think that the state has a responsibility to pay for compensation to affected stakeholders/communities?
11.	Do you think that the concepts of distributive and procedural justice can be applied to offshore wind energy infrastructure?
12.	To what extent do you see the costs and benefits, as far as offshore wind energy infrastructure is concerned, as fairly distributed in Germany/Netherlands?
13.	The alternatives of the route corridors are limited, which means that variants may have to be chosen that meet public resistance, how do you want to deal with this?
14.	Do you think the achievement of the energy goals is feasible?

P6 Resident of the Island of Langeoog/ Local Politician/ Councilwoman

1.	Could you briefly introduce yourself and explain the role you have on Langeoog Island?
2.	Can you explain why you are critical of the 'Seetrassen 2030' project or why the project has caused your concern?
3.	In what ways do you believe the project could impact tourism on the island?
4.	To what extent do/did you personally feel affected by the project as a resident of the island?
5.	When did you become aware of the planning process/project?
6.	Do you feel that you have been given sufficient opportunity to express your views in the process?
7.	Did you perceive the process as transparent?
8.	What does justice mean to you in a planning process like this?
9.	How could your satisfaction have been increased?
10.	Regarding compensation measures, to what extent do you think they can lead to your acceptance of the project?



Zustimmung zur Teilnahme - Research Ethics Committee (REC)

Masterprogramm: Environmental and Infrastructure Planning & Water and Coastal Management

Titel: Energy Justice in Offshore Grid Connection Planning Processes

Untertitel: A Case Study on the "Sea Routes 2030"

Forschungszeck: Diese Masterarbeit beschäftigt sich mit dem Thema Akzeptanz gegenüber Energieinfrastruktur. Bisher gibt es sehr viel Forschung zu der Akzeptanz von Onshore Windparks, allerdings sehr wenig zu Offshore Windparks und so gut wie gar keine Forschung zu der Akzeptanz der nötigen Infrastruktur. Im Rahmen dieser Arbeit werden im speziellen die Konzepte der Verteilungs- und Verfahrensgerechtigkeit (distributive & procedural justice) betrachtet. Dazu werde Akteure auf den Inseln Baltrum und Langeoog befragt, die von Windfarm Infrastrukturplanungsprojekten betroffen sind. Zudem werden Interviews geführt mit Instanzen, die in den Planungsprozess involviert sind/waren.

- Ich habe das Informationsblatt zu diesem Forschungsprojekt gelesen und verstanden.
- Ich hatte die Möglichkeit, über diese Studie zu diskutieren. Ich bin mit den Antworten, die ich erhalten habe, zufrieden.
- Mir ist bekannt, dass die Teilnahme an dieser Studie freiwillig ist und dass ich das Recht habe, bis zum Zeitpunkt der Veröffentlichung der Studie von der Studie zurückzutreten und die Beantwortung einzelner Fragen der Studie abzulehnen.
- Mir ist bekannt, dass meine Teilnahme an dieser Studie vertraulich ist. Ohne meine vorherige Zustimmung wird kein Material, (das mich identifizieren könnte), in Berichten verwendet, die aus dieser Studie hervorgehen.
- Mir ist bekannt, dass diese Daten auch in Artikeln, Buchkapiteln, veröffentlichten und unveröffentlichten Arbeiten und Präsentationen verwendet werden können.
- Mir ist bekannt, dass alle von mir gemachten Angaben entweder in einer verschlossenen Einrichtung oder als passwortgeschützte verschlüsselte Datei auf einem passwortgeschützten Computer vertraulich behandelt werden.

Bitte kreuzen Sie zu jedem der folgenden Punkte JA oder NEIN an:

Ich bin damit einverstanden, dass mein Interview aufgezeichnet wird **JA / NEIN**

Ich möchte eine Kopie der Interviewnotizen erhalten **JA / NEIN**

Ich möchte für diese Untersuchung anonym bleiben **JA / NEIN**

Falls JA

Kann mein Vorname für diese Untersuchung verwendet werden **JA / NEIN**

ODER

Ein selbst gewähltes Pseudonym kann verwendet werden **JA / NEIN**

"Ich bin mit der Teilnahme an diesem Einzelinterview einverstanden und bestätige den Erhalt einer Kopie dieser Einverständniserklärung und Informationen zum Forschungsprojekt."

Unterschrift des Teilnehmers: _____ Date: _____

"Ich erkläre mich bereit, die im Informationsblatt genannten Bedingungen einzuhalten, und versichere, dass keinem Teilnehmer während dieser Untersuchung Schaden zugefügt wird."

Unterschrift des Forschers: _____ Date: _____



Agreement to participate - Research Ethics Committee (REC)

Master program: Environmental and Infrastructure Planning & Water and Coastal Management
Title: Energy Justice in Offshore Grid Connection Planning Processes
Subtitle: A Case Study on the "Sea Routes 2030"

This thesis deals with the topic of energy justice and in particular with the acceptance of energy infrastructure. So far, there is a lot of research on the acceptance of onshore wind farms, but very little on offshore wind farms and almost no research on the acceptance of the necessary infrastructure for them. The aim of this work is to understand how acceptance can be increased in offshore energy infrastructure planning projects. For this purpose, the concepts of procedural and distributive justice are considered in particular. To answer the research question, semi-structured interviews are conducted with stakeholders on the islands of Baltrum and Langeoog who are affected by an infrastructure planning project "Searoutes 2030" as well as with the responsible authorities involved in the planning process as well as with experts in the field.

- I have read and I understand the information sheet of this present research project.
- I have had the opportunity to discuss this study. I am satisfied with the answers I have been given.
- I understand that taking part in this study is voluntary and that I have the right to withdraw from the study until the moment that the study has been published, and to decline to answer any individual questions in the study.
- I understand that my participation in this study is confidential. Without my prior consent, no material, which could identify me will be used in any reports generated from this study.
- I understand that this data may also be used in articles, book chapters, published and unpublished work, and presentations.
- I understand that all information I provide will be kept confidential either in a locked facility or as a password-protected encrypted file on a password-protected computer.

Please circle YES or NO to each of the following:

I consent to my interview being audio-recorded YES / NO

I wish to remain anonymous for this research YES / NO

If YES

My first name can be used for this research YES / NO

OR

A pseudonym of my own choosing can be used in this research YES / NO

"I agree to participate in this individual interview and acknowledge receipt of a copy of this consent form and the research project information sheet."

Signature of participant: _____ Date: _____

"I agree to abide by the conditions set out in the information sheet and I ensure no harm will be done to any participant during this research."

Signature of researcher: _____ Date: _____

Appendix D: Codebook

Main Code	Sub Code	Explanation	Research Design
Concerns		This aspect encompasses the concerns of the islanders; individual categorization by the islands is not applied.	
	<i>Technical and Geographical Aspects</i>	This aspect encompasses the concerns of the islanders regarding the technical and geographical aspects of the project for the islands.	deductive
	<i>Perceived Side effects</i>	This aspect encompasses the concerns of the islanders regarding the perceived side effects arising from the project.	deductive
	<i>Personal Characteristics</i>	This aspect encompasses the concerns of the islanders regarding personal characteristics.	deductive
	<i>Procedural concerns</i>	This aspect encompasses procedural concerns, which, however, are addressed in a separate chapter (refer to Main Code Procedural Justice).	deductive
Responses		This aspect encompasses the responses from the government body as well as the energy providers; individual categorization by the islands is not applied.	
	<i>Technical and Geographical Aspects</i>	This aspect encompasses the responses from the government body and energy providers regarding the technical and geographical aspects.	deductive
	<i>Perceived Side Effects</i>	This aspect encompasses the responses from the government body and energy providers regarding the perceived side effects.	deductive
	<i>Personal Characteristics</i>	This aspect encompasses the responses from the government body and energy providers regarding personal characteristics.	deductive
	<i>Procedural Concerns</i>	This aspect encompasses the responses from the government body and energy providers regarding procedural concerns; however, it is discussed in a separate chapter (refer to Main Code Procedural Justice).	deductive
Procedural Justice		The aspects sought in this code encompass equitable participation, the elimination of power inequalities, considerations of who is involved and to what extent, influence on the community's outcome (including when and how often), opportunities for engaging in discussions, mutual learning, direct dialogue, full disclosure of information by both the government and the industry, and the avoidance of technocratic language.	deductive
Distributive Justice		This aspect encompasses the category of distributive justice. Within this category, considerations were made regarding the equitable distribution of costs and benefits, an examination of fairness, and the desirability of a technology in a particular location.	deductive
	<i>Real Compensation</i>	This category addresses the topic of real compensation, and it was inductively derived as it was identified as a relevant category during the interviews.	inductive
	<i>Compensation</i>	This category deals with compensation for individuals.	deductive
	<i>Community Benefits</i>	This category deals with compensation for the community.	deductive
	<i>Ownership</i>	This category deals with the ownership approach.	deductive