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Preface

This master's thesis is the outcome of a two-year full-time International Master of Science in Risk Analysis and Governance. For both of us, this is the second master's degree: Kseniia completed Railway Engineering in 2015, and Liana did Petroleum Engineering in 2016.

We're genuinely grateful for being given the opportunity to study Risk Science at the University of Stavanger and being taught by world-leading specialists in this field. We express our profound gratitude to our mentor Professor Frederic Boudier for the effort that he put into helping us with this paper. Professor Boudier has always been there when we were seeking support; we have had meetings in his office and online calls from different parts of the world. He challenged our ideas and thoughts, paving the way for the thesis' structure and its subsequent completion. We highly appreciate that we had the privilege to work with our supervisor Professor Frederic Boudier.

The main motivation for studying Risk Science was to extend and enhance already existing knowledge, applying it to our professional work lives. It's astonishing that the knowledge that we have acquired during our experience in this program is truly universal. We have employed this knowledge from the very beginning of our studies and used it not only in our professions but in our daily life as well, giving plenty of insights about the society we live in, the underlying causes of why governments around the world hire one or another policy to communicate risks with stakeholders, and reasons why they succeed or fail.

Combining full-time studying with a full-time job was a serious challenge. During these 2 years, the world has undergone significant changes, stimulating in-depth discussions with our teachers and classmates. COVID-19 gave us a unique experience, the first time we were studying online and taking exams remotely. A milestone has been passed during our studying: in October 2022 Liana's first baby was born, and already in November of the same year, Liana was sitting in one of the UiS auditoriums, taking the exam in Technical Safety. Being at the very end of this journey and looking back, we can doubtlessly say that it was challenging, but it was definitely worth it. We gained an unrivaled experience and the results of the programme surpassed even our wildest expectations. Acquiring knowledge in social science in addition to our engineering backgrounds extraordinarily enriched our education, truly broadened our horizons and aroused curiosity in social science fields.

“What we learn with pleasure we never forget.”

Alfred Mercier

Executive Summary

This Master Thesis has explored the relationship between risk communication regarding onshore wind energy in Norway and external circumstances. Land-based wind turbines are a highly polarized topic among the citizens, and the development of this renewable energy has encountered substantial opposition throughout the nation. One faction comprises the governing bodies advocating for reducing fossil fuel usage and increasing the adoption of renewable energy sources. Conversely, the local inhabitants and other groups express concerns that installing wind turbines adversely impacts the natural environment. However, a chain of events including prohibitive electricity prices in Norway, unprecedented energy demand in Europe, and the Russian invasion of Ukraine, has led to looking at windmills from a different angle.

Based on the research question “*How the changed geopolitical situation could have affected the risk communication and public debate regarding renewable energy in Norway?*”, 3 hypotheses were formulated:

- 1) The effectiveness of a bottom-up inclusive approach to risk communication regarding onshore wind turbines in Norway surpasses that of a top-down approach.
- 2) Minimal involvement of interest groups in risk communication contributes to achieving successful outcomes of that communication.
- 3) A potential shortage of energy sources within the country, resulting from external factors, may contribute to a rise in the willingness to accept risks.

A combination of two methods has been employed to conduct the research. In 2019, Norwegian Water Resources and Energy Directorate issued a proposal for a nationwide framework on onshore wind power, which played a pivotal role in stimulating intense debates and protests in Norway. Therefore, we recognized the significance of conducting a content analysis to examine the fundamental factors that trigger such a strong societal reaction. To monitor and evaluate changes in risk communication among key stakeholders as well as shape their narrative, discourse analysis is chosen as the most suitable approach.

The results of this research provide compelling evidence indicating that a bottom-up inclusive approach to risk communication regarding onshore wind energy in Norway has proven to be much more effective, despite the fact that traditionally the Norwegian government uses top-down risk communication. Among other findings is that minimal involvement of interest groups in risk communication doesn't contribute to positive results. On the contrary, in certain circumstances it can lead to societal radicalization, and heightened tension between stakeholders, thus jeopardizing the whole risk communication. The interplay between rising prices and the increasing impact of the Eastern region on energy demand in Europe has noticeably affected how people perceive risks associated with alternative energy sources. Specifically, the public's viewpoint regarding the development of onshore wind farms has shifted from strong disagreement to somewhat agreement.

1. Introduction	1
2. Theoretical framework	4
2.1. Risk and Concept of Risk	4
2.2. Risk perception	5
2.2.1. Perception of climate change and environment-related risks	7
2.2.2. Differences between risk perceptions of experts and the public	7
2.2.3. Perception of involved stakeholders	8
2.3. Media and Risk	9
2.4. Concept of risk communication	9
2.4.1. Objectives of risk communication	10
2.4.1.1. Criteria of quality of risk communication	11
2.4.2. Risk communication in the energy sector	13
2.4.3. Government Involvement in public debates	13
2.5. Approach to risk communication and relation with trust	14
2.6. Engaging risk communication	15
2.7. Hypothesis	17
3. Methods	18
3.1. Content analysis	18
3.2. Discourse analysis	19
3.3. Research Timeframe	20
3.4. Stakeholders	21
3.5. Data sources	22
4. Results	23
4.1. Content analysis	23
4.2. Discourse analysis	31
4.2.1. Government	31
4.2.2. Norwegian Public	36
4.2.3. Sami	42
4.2.4. Norwegian experts	46
4.2.4.1. Experts' feedback on NVE report	49
5. Discussion	51
6. Conclusion	62
References	65

1. Introduction

Wind power demonstrates a remarkable level of durability and has the most rapid rate of growth of any form of electricity generation in the world (International Energy Agency, 2019). Its resource potential is large. Many countries have wind capacity that could serve as a significant energy source. Most of these countries had set ambitious goals for wind power development as it helps move towards reducing carbon emissions and promoting sustainable energy production (Archer & Jacobson, 2005). Presently, wind energy constitutes approximately 2% of the worldwide electricity provision, while within the confines of the European Union, wind power accounted for 11.4% of electricity usage in 2015 (EWEA, 2014a).

Norway has significant potential for wind energy, particularly in coastal areas and high-altitude mountain regions. Norway's ambitious climate goals and desire to diversify its energy mix have driven a growing interest in wind energy in the country. The Norwegian government has set a target of generating 67.5 TWh (terawatt-hours) of electricity from renewable energy sources by 2025, with wind energy expected to play a significant role in meeting this goal. Also, Norway has committed to reducing its national greenhouse gas emissions by 50-55% from 1990 levels by 2030 and reaching net zero by 2050, as part of the Paris Agreement (The Paris Agreement, 2015).

Last year, while Russia reduced its natural gas exports, Norway increased its exports and has become the primary supplier of natural gas to Europe (Norwegianpetroleum, 2023). Additionally, Russian oil and gas are banned due to a full-scale war with Ukraine. These circumstances had led to place Europe in a position of experiencing an energy demand, with electricity and gas prices skyrocketing. Given this situation, wind power is considered as one of the primary options for increasing Norway's electricity production.

There is a division of opinions among Norwegians about the country's dependence on fossil fuels; the issue of climate change and the expansion of petroleum exploration were key points of contention during the last national election held in 2021 (The New York Times, 2021). This situation put Norway in quite a peculiar position. The current world energy demand made Norway reconsider compromising its petroleum resource management policy and question its place in the energy market. In their attempt to seek quick relief from soaring energy prices within the country and to fulfill the skyrocketed need for energy in Europe, the authorities have been devising ways to increase electricity production based on renewable energy sources, which deviated from the initial green energy transition plan (International Energy Agency, 2022). Options for increasing electricity production are tightly bound. One is to step up hydropower production, however, it is heavily limited. The rest is to unfold setting up onshore and offshore wind farms and solar panels. In addition, even though there is a positive attitude towards wind power on a national level, opposition to it is increasing at the local level in Norway. The government's efforts to encourage the country's reliance on renewable energy and achieve its climate change mitigation goals continue.

Such a deeply perplexing situation demands balancing possible risks and benefits and, consequently, requires first-order risk communication, which is one of the key components to engaging with the public by government authorities in most sectors, including energy. Proper risk communication helps to intervene with the promotion of acceptance of the proposed measures, compliance, and policy support. According to the International Risk Governance Council (referred to as IRGC hereafter) (2017), risk communication is delineated as the act of disseminating data, information, and knowledge concerning risks among diverse stakeholder groups, encompassing scientists, regulatory bodies, industry experts, consumers, and the general populace. The IRGC believes that effective risk governance depends heavily on this process and emphasizes its significance. The organization argues that risk communication is essential for successful management of risks. Establishing long-term trust in risk management, particularly in situations where risks are viewed as complex, uncertain, or ambiguous, depends on timely and efficient communication. The principal objective of this thesis centers on highlighting the significance of proficient and timely communication in attaining enduring trust within the realm of risk management.

In this paper, we consider how, in light of changing circumstances, the Norwegian government handles public discussion on renewable energy sources. In particular: How the changed geopolitical situation could have affected the risk communication and public debate regarding renewable energy in Norway?

Since we are not able to cover all types of energy sources due to the work limitation, we focus on onshore windmills which is the less popular method of energy production causing fierce debate among the general public and experts due to the possible risks (TNP, 2019). Moreover, onshore wind farms are not a sufficiently reliable energy source and the cost of setting them up and maintaining them is high. This source of energy involves plenty of risks; if technical ones are manageable, then others are tough to mitigate. Among them are wildlife (such as birds, wild reindeer, bats, etc), negative impacts on human health due to the noise they generate, crippling effects on real estate prices, and destroying landscapes (NVE, 2019).

Using risk science and risk communication literature we define key elements and a best-practice approach needed for handling public discussion from the perspective of risk communication to achieve positive outcomes. In this paper, applying the method of discourse analysis, we describe the narratives of main stakeholders on onshore wind turbines matter; track how the Norwegian government has changed its approach to communication over several years by outlining factors that could have led to the mishandling of risk communication as well as the most successful approach. Furthermore, we look at the public discussion on wind energy in Norway through the glasses of the rapidly changing geopolitical situation and how it could be interwoven to affect the debate on onshore wind farms.

Concerning the topic of augmenting energy capacity through onshore wind farms in Norway, substantial efforts were undertaken by The Norwegian Water Resources and Energy Directorate

(referred to as NVE hereafter), leading to the formulation of a comprehensive proposal for a nationwide framework on onshore wind power in 2019. This framework contains 21 thematic reports on how wind turbines can affect the environment and society and in which parts of the country wind turbines are supposed to be deployed. More than 5000 consultation responses were collected and the vast majority of them were negative. This triggered a determined opposition from municipalities and fierce debate in the parliament. A content analysis of the NVE reports is carried out to help us identify the main stakeholders on this matter and which risks were articulated by NVE and consultancy bodies. Through a media review, we analyze the main stakeholders and their narratives as well as how the authorities communicate risks related to onshore wind farms with the critical actors and make an evaluation of the quality of communication.

2. Theoretical framework

This paper will explore how the changed geopolitical situation could have affected the public debate regarding renewable energy in Norway, in particular onshore windmills. We would like to understand better which risks onshore windmills poses, were these risks communicated efficiently to all stakeholders, and what is the most effective way of risk communication in the context of the current energy demand challenge in Europe. Public reaction to authorities' decisions and related debates is linked the risk perception, level of trust, and potential benefits. The risk perception of the general public's and experts' could be different. Thus, two of these perspectives will be covered in the literature review. Subsequently, we will review literature related to risk communication, particularly what scholars are saying about how risk communication could be engaged in a successful manner. The theoretical foundation for this thesis is based on different sources: articles, books, and publications related to risk communication, trust, and perception.

2.1. Risk and Concept of Risk

To engage in a critical examination of risk and risk communication, it is imperative to possess a comprehensive understanding of the underlying risk concept. The domain of risk research has a broad and interdisciplinary scope, encompassing diverse theoretical frameworks and philosophical perspectives. There is no specific philosophy of science doctrine in risk research, and it involves a diversity of fields. The concept of risk is quite multidimensional and there is no one universal definition of it. If we Google the term risk or if we check the Glossary made by the Society of Risk Analysis, we will see that there are several definitions of Risk (SRA, 2015). The following are the most common:

- Risk is the possibility of an unfortunate occurrence.
- Risk pertains to the outcomes resulting from a particular undertaking and the accompanying elements of uncertainty.
- Risk entails the deviation from a predefined reference value, accompanied by inherent uncertainties and other related factors.

The notation A, C, U is commonly used to describe the risk, where A stands for an event, C refers to the consequences of the occurrence of event A, and U is uncertainties. In general speaking, it is a potential for undesirable consequences of the activity (Aven & Renn, 2009). Event A refers to a risk source, which can be a hazard, threat, or opportunity.

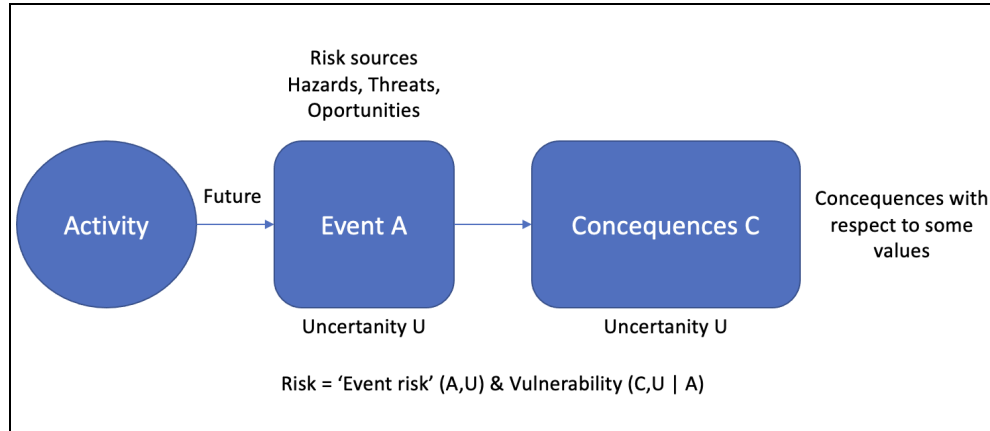


Figure 1 - The basic features of the risk concept (based on Aven and Thekdi, 2020)

We have to be careful to describe risk merely in probability-based expression, which is abstract and essentially separates the concept and description. Risk as a concept may exist without introducing probabilities. We face a risk when we cross the street, and no probabilities are required to come for the outcome. The way we measure or describe risk depends on the particular situation which we take into consideration.

Climate change has been a central topic in public discussion for many years, posing risks related to planet temperature rise, societal destruction, social integrity, and economic indicators and associated uncertainties (Aven, 2021). Onshore wind in this context is considered as one of the measures that can mitigate the consequences of these risks. However, the climate change issue is extremely complicated, and onshore wind turbines, by all means, are not a panacea, since in addition to the benefits, they also pose a huge number of risks that must be taken into account, balanced, and mitigated. Some risks caused by wind power are considered and described as manageable, for example, hazards related to transportation, installation, operation, and maintenance of wind turbines, electronic communication, and aviation (Mustafa & Al-Mahadin, 2020) whereas other types of risks are not easily mitigated. Among them is the fact that onshore windmills seriously endanger wildlife starting from bats, which die due to lung bursting as a result of pressure variations in the air masses induced by the rotor blades, and continuing with reindeer, whose access to parts of their habitat can be ultimately limited (Skarin et al., 2018).

2.2. Risk perception

For successful risk communication among all involved stakeholders, understanding risk perception and its forms is vital. Thus, in the context of this work, we have to give a notion of how the Norwegian population subjectively judges and appraises risks related to wind farms. At the same time, when we refer to the general public risk perception, we should bear in mind that society is heterogeneous, and for an adequate understanding of people's risk perception, groups

defined on some basis shall be singled out. Notably, risk perception may be affected by the level of trust which the population has towards the government authorities and the belief that government can make a careful decision by taking into account all pros and cons of the situation (Renn & Aven, 2010).

People's risk perception is formed by many factors, and the primarily are (Slovic, 1987):

1. Individual factors and cognitive heuristics (trust, knowledge about risks, affect emotions, perceived benefits, perceived fairness).
2. Social and cultural factors.
3. Characteristics of the hazards or risk source; two risk characteristics that have a major impact on risk perception are dread and familiarity (psychometric paradigm, Slovic, 1987). Other factors which amplify risk perception are involuntary exposure and lack of personal control over the risk.
4. Biases related to how the human brain works.

In past decades an enormous amount of research has been made in relation to risk communication and risk perception. It is worth mentioning that risks such as climate change, natural hazards (flooding, earthquake, etc.), nanotechnology, and nuclear power have received the most interest among researchers (Balog-Way et al. 2020). Onshore windmills are considered a tool to combat the consequences of global climate change and mitigate related risks. However, as we mentioned above, turbines themselves pose a set of various risks. To understand how people can perceive risks associated with wind energy, we should look at these risks in light of the factors which shape people's risk perception. We focus on characteristics of the risk source, namely familiarity, and dread. Onshore wind turbines are not something typical for Norway. If we compare 2 territorial similar countries Norway and Germany (Norway is 385 207 square kilometers and Germany is 357 021 square kilometers), then we see that onshore wind energy capacity in Germany in 2022 was approximately 60 000 megawatts, whereas in Norway in the same period, it was 12 times less - around 5 000 megawatts (Statista, 2023). Thus, for Norway, which currently has 43 operational wind power plants with 237.5 full-time workers (NRK, 2020), onshore wind is not something common; consequently, we can consider people's familiarity with the risk resource as relatively low. Dread associated with the hazard can be fairly high since one of the biggest citizens' concerns is that onshore wind turbines irrevocably destroy fragile Norwegian nature and landscape and it is impossible to turn back, which makes the consequence large (Dagsavisen, 2019, Facebook group, 2020, NRK, 2020, E24, 2020, E24, 2021). Thus, these hazard characteristics increase the large public risk perception regarding onshore wind energy.

2.2.1. Perception of climate change and environment-related risks

Climate change and environmental concerns represent significant obstacles to human society, encompassing a range of hazards that adversely affect public health, global food security, economic progress, and the natural environment (Zakarya et al., 2015). Combating climate change and its associated impacts lies at the core of the 17 Sustainable Development Goals (referred to as SDGs) agenda, established by the United Nations (UN's Goals, 2015). Mitigating risks involves addressing the factors that drive these risks, such as ineffective land management, unsustainable exploitation of natural resources, and the deterioration of ecosystems (UN's goals, 2015). The extent of perceived risk and overall environmental values can be influenced by environmental education and awareness of the general public, which has the potential to amplify or diminish the perceived magnitude of these risks (O'Connor et al., 1999).

According to various studies, climate change is generally regarded as a global problem, and the specific impacts at the regional level are not always a subject of intense contention (Jaeger et al., 2001). Nonetheless, the population acknowledges the significance of focusing on the regional consequences of climate change (Schlumpf, 2001). Norway is at the forefront of the fight against climate change and aims to significantly reduce its CO₂ footprint, and windmills are a useful tool for that. However, wind energy poses risks to local nature and wildlife, which is why it would be interesting to understand if, despite these risks, the Norwegian public believes that onshore wind turbines should be deployed in the country to combat the global issue of climate change or if they are more focused on internal issues and are unprepared to sacrifice some parts of the land to achieve the global goal. The result of the research is in section 4.2.2. of this work.

2.2.2. Differences between risk perceptions of experts and the public

Subject matter experts are one of the stakeholders in the debates related to the onshore windmills in Norway. As there is a possibility that experts' risk perception could differ from the public's, the academic publications related to this matter will be elaborated further.

A distinction exists between the public's perception and the scientific assessment of risk (Sjöberg, 2000). Public risk perception often diverges from the scientific assessment, primarily because non-experts consider additional factors when forming risk judgments. These factors include voluntariness, controllability, catastrophic potential, scientific comprehension, effects on future generations, and the sense of dread. (Slovic, 1987, 1999, 2000). The existence of diverse perceptions and responses to risk within various societal groups inevitably gives rise to conflicts between the viewpoints of experts and the general public regarding the same situation. (Covello et al 1984).

Individuals commonly hold the belief that events characterized by negative outcomes are more likely to occur to others rather than to themselves (Gurmankin et al., 2004; Salmon et al., 2003). People's risk assessments are not solely based on their cognitive evaluations of a specific risk but

also on their affective responses toward it (Slovic 2004). Individuals judge risk lower if they feel positive about it and higher if they have a negative feeling about it. Loewenstein (2001) proposes that risk-as-feelings give an explanation for gender and age-related differences in risk responses.

Also, there is a possibility that levels of risk perception may vary even among the experts, due to their expertise in a specific area, individual biases, and main experiences. Their personal experiences and beliefs influence their risk perception. The disagreement among experts can cause confusion and distraction in the public mind about the validity of risk assessments (Covello et al., 1984, Morgan & Henrion, 1990). It is also important to take into account that experts may communicate risk assessments to the general public in different ways. The way in which this information is presented can affect how they will perceive this risk. While going through the “natural” hazards risk perception literature, Wachinger, Renn, Begg, and Kuhlicke (2013) discuss the role of experts in shaping public perceptions. They point out that trust in authorities and experts has a very big impact on public risk perceptions.

Overall, the differences between public and experts' risk perception demonstrate that effective communication and collaboration between experts and the public is necessary in order to promote informed decision-making and risk management" (Wildavsky, 1990). Understanding that the difference in risk perception between experts and the general public can affect risk communication helps us to identify stakeholders and track their interaction and influence.

2.2.3. Perception of involved stakeholders

The way we perceive things can significantly impact our level of trust. Our perception shapes how we view the messenger, which is the regulator in this case. If our perception of the situation differs from that of the regulator, then we are likely to lose trust in the regulator. Conversely, if our perception is in line with the regulator's, trust in them grows or remains stable, as noted by Löfstedt (2005). In several instances, interest groups will attempt to generate public skepticism toward regulators, which can result in the risk management process's failure.

The involvement of interest groups can be precarious as they are likely to advance their interests by manipulating public opinion. Creating distrust in regulators is a particularly effective strategy for interested groups to achieve their goals. Therefore, Löfstedt suggests that minimal involvement of interest groups is preferable in most cases to achieve successful outcomes of proposed strategies. In the case of onshore wind energy, there is a range of interest groups, and we investigate how their involvement or, on the contrary, their absence, has affected risk communication.

2.3. Media and Risk

The onshore windmill development is seen as an important part of Norway's renewable energy strategy. However, the development of onshore wind power has faced stiff opposition from local communities and environmental groups, who have raised concerns about the impact of wind turbines on the landscape, wildlife, and local communities. In recent years, there have been debates and discussions in Norway's media about the benefits and drawbacks of onshore wind power, the potential for expanding wind power capacity, and the government's policies and incentives to support renewable energy development. Given the country's focus on renewable energy and the ongoing discussions about the development of wind power, the onshore windmills have been covered in the Norwegian media significantly.

In recent years, the vast majority of risk communication takes place through mass media (af Wahlberg & Sjöberg, 2000). Media coverage can be selective for risks and risk events, and this selectivity determines whether a risk will be socially amplified or attenuated in society's processing and disposition of the risk. Scholars show that the media has a significant role in risk communication and its interpretation (Jin, Liu, & Austin, 2014). Media creates the source of most of the public's information regarding what's happening locally and abroad, including risks and risk events (Kasperson & Kasperson., 2003). As typically individuals don't have direct experience with the risks, they form their opinion through different channels, including mass media (television, newspapers, journals, etc.) (Kasperson & Kasperson., 2003). Gross et al. (2003) studied predictors of fear of being a victim of a crime and found that personal experience was a stronger predictor than television-watching habits.

In fact, the literature review over the last decade is consistent with the assumption that media coverage creates a societal level of risk judgments, rather than personal (Wahlberg & Sjöberg, 2000). It is curious that most of the people who are involved in creating content of mass-media risk information believe that others are victims of risk and not themselves (Morton & Duck, 2001).

According to studies, even though people recognize that mass media affects how they perceive health risks, they mostly rely on talking to others to assess their own chances of getting sick. (Petts & Niemeyer, 2004; Scherer & Cho, 2003). Notably, studies suggest that it is quite often that mass media reports a lack of important specific information, which is supposed to help individuals evaluate the risk (Rowe et al., 2000). Also, in contrast, the media could intentionally use specific data to attract the public's attention to selected topics (Prue et al., 2003).

2.4. Concept of risk communication

As mentioned earlier, it is important to grasp how people see risks because risk communication aims to do more than just provide information about potential dangers. The publication "Pharmaceutical Benefit–Risk Communication Tools: A Review of the Literature," written by

Dominic Way, Hortense Blazsin, Ragnar Löfstedt, and Frederic Boudier, outlines a range of aims that are crucial for communicating benefit and risk information to patients and healthcare providers effectively. These aims involve delivering accurate and balanced information, utilizing straightforward language, personalizing information to meet patients' specific requirements, utilizing visual aids to enhance comprehension, addressing patient apprehensions, and encouraging patient engagement in the decision-making process.

For describing effective risk communication there is a need to become familiar with the concept of risk communication itself and which features and characteristics it has. Risk communication is a reciprocal process to manage the understanding of the risks, in order to make convenient judgments and decisions accordingly (Arvai 2014, Renn 2014). Risk communication involves sharing and exchanging risk-related knowledge between target groups, such as regulators, policymakers, stakeholders, politicians, media, and the general public (Renn, 2010). There are several approaches to risk communication that will be detailed and considered further in this paper. These approaches can be used to achieve a desirable result, depending on the complexities of an issue, including those relevant to our work and the level of trust in society.

The risk communication research field has been developing considerably in past decades, mainly due to its role in public consideration in the governance and policy-making processes (Petts & Niemeyer, 2004). The necessity of public discourse and reciprocal risk communication became obvious in the late 1980s when studies indicated that the classic “top-down” communication model was not efficient anymore (National Research Council, 1989). The main failure point was poor risk communication between experts and their condescending response to public opinion. Obviously, the dialogue-based type of communication was attractive to industry regulators and policymakers. In Europe, for instance, dialogue-based communication was established during the crisis such as in Brent Spar oil storage buoy (Adam Vaughan, 2017), the scandal related to BSE, contaminated blood, and dioxin in Belgian and French chicken. Historically, Norway has used a top-down approach to risk communication due to the population’s trust in the government (GLH & Svendsen, 2015). However, in the context of the current preposterous prices for electricity and the high demand for electricity in Europe there is definitely an opportunity to improve risk communication, and other approaches could have been more effective. Risk communication based on the level of trust is discussed in section 2.5 of this paper as well as different approaches to risk communication.

2.4.1. Objectives of risk communication

Risk communication science makes a bridge between the public and regulators so the pressure in public perception and subject matter experts’ risk judgment become aligned. It could be suggested that the most obvious way of this bridging is to educate nonprofessionals about the risk. Then the public will understand, get engaged easily enough to release their tension, and trust the experts more. However, the professional risk community found out that not everyone

wishes to be “educated” but rather more willingly select alternative positions in risk management (Plough & Krinsky, 1987). Considering that it’s not enough just to explain possible risks to the general public, the goals and objectives of risk communication ought to be introduced (Renn & Levine, 1991). The relevant list for this thesis paper:

1. Awareness objective - to promote risk understanding among target groups
2. Right-to-know function - to acknowledge risk-related information for a potentially exposed population
3. Attitude adjustment objective - to support risk-related decisions, advance the acceptance of specific risk sources, or object to the decision
4. Rightful function - to give a description and countenance risk management process and to obtain trust in the competency of management decisions
5. Behavioral changes objective
6. Participation objective - to assist and support in moderating conflict situations about risk-related disputes

Thus, for the main actor, the Norwegian government, it is necessary to understand what functions and objectives are measures of success regarding onshore wind turbines. A decent message for one group of the population may be ineffective and insufficient for another.

2.4.1.1. Criteria of quality of risk communication

Numerous compelling studies have surfaced in the field of risk communication, providing valuable insights and contributing to the body of knowledge in this area. In order to identify the criteria for the quality of risk communication, we invoke the work of several scholars. For example, Fischhoff et al. (2011) and Fischhoff (1995) refer to stages of development of risk communication observed over the last years, beginning with numbers (probabilities, historical data) and moving on to explanations, context, and obligation:

- All we have to do is get the numbers right
- All we have to do is tell them the numbers
- All we have to do is explain what we mean by these numbers
- All we have to do is show them that they have accepted similar risks
- All we have to do is show them that it is a good deal for them
- All we have to do is treat them nice
- All we have to do is make them partners
- All of the above

Risk communication could lead to agreement or disagreement. The collaboration of diverse actors and stakeholders necessitates a comprehensive understanding of the extent of their differences, particularly when these differences have the potential to intensify conflicts (Borstrom et al. 2018).

Risk communication is necessary throughout the whole risk-managing process, including issue categorization to review the impact of decisions that have been made. This communication needs to ensure that those who are involved in risk management understand well what is happening, what is their involvement and what are their responsibilities. This is the internal part of risk communication. The external part of risk communication involves those who are not directly involved in the risk-managing process but who are affected. These affected parties need to be informed and actively engaged.

Many factors affect risk communication, including the communicators themselves, the audiences, the issues or events, the environmental situation, the culture, the economics, and other aspects. The communities, venues, and issues all inform risk communication approaches, methods, and tools (Burger et. all, 2022).

Fulfilling these criteria, objectives of risk communication can be achieved.

- since the public pressure on risk regulators has been increasing due to digitalization, globalization, and sustainability, a proactive plan grounded in risk analysis is essential and implemented with periodic training exercises (Greenberg, 2020). It allows regulating bodies who are involved in risk communication have the most relevant knowledge about the field and avoid possible slips, miscommunication and misunderstanding with other stakeholders
- need to base effective risk communication on up-to-date risk-science-based information because all fields have been evolving, and the most recent credible science is essential (Burger, Greenberg, Lowrie, 2022)
- communication should be consistent over time, and U-turns are avoided if possible (Warren & Lofsted, 2022)
- solidarity ought to be promoted and measures to avoid trust-destroying incidents must be taken (Warren & Lofsted, 2022)
- bottom-up communication should be implemented to some extent depending on the level of trust in society, public values, perceptions, and situation (Warren & Lofsted, 2022)
- pre-test communications campaigns beforehand and evaluate them afterward to increase effectiveness and avoid potential unexpected outcomes (Warren & Lofsted, 2022)
- trust and transparency need to be developed or improved throughout the risk communication (Burger, Greenberg, Lowrie, 2022)
- the needs of the audiences have to be addressed (Burger, Greenberg, Lowrie, 2022)

- all actors and stakeholders, such as governmental agencies, nongovernmental organisations, and interested and affected parties, should communicate and collaborate with each other (Burger, Greenberg, Lowrie, 2022)
- during risk communication, discipline-based scientists should be involved in the discussion of risk communication and media relations (Burger, Greenberg, Lowrie, 2022).

Depending on whether the goals of risk communication are met, communication can be considered successful or fail.

2.4.2. Risk communication in the energy sector

Risk communication is a vital part of the energy sector due to the fact that it is associated with the involvement of dealing with hazardous materials and potentially risky situations. Effective risk communication in the energy sector as in most other sectors of different industries helps in identifying, assessing, and mitigating the risks associated with energy operations.

There is a significant body of literature on risk communication in the energy sector. Several publications have been reviewed related to nuclear energy, such as "Risk communication and public engagement in CCS (carbon capture and storage) projects: the foundations of public acceptability" by William Leiss and Patricia Larkin (2019) and "Public Reaction to Nuclear Waste" by Dunlap et al. (1993). Notably, these papers have similar insights in exploring the challenges of risk communication and public engagement in the nuclear sector. The authors of both published works argue that the public's perception of nuclear waste and the nuclear sector is shaped by factors such as risk perception, trust in government and industry, and perceptions of the benefits and costs of nuclear energy. They note that effective risk communication will be difficult to achieve without transparency, stakeholder engagement, and the use of multiple communication channels.

Together with public risk perception as well as trust in authorities and their decisions, clear and concise messaging is an essential part of desirable risk communication (A. Corner & N. Pidgeon, 2014).

2.4.3. Government Involvement in public debates

Handling public discussions by government authorities can be a complex and nuanced process. Effective handling of public debates by government authorities can lead to a more informed, engaged, and trusting public as well as better decision-making and greater accountability (Vliegthart, R. et.al, 2022). There are many research papers that have been published related to examples of how authorities have mishandled public discussions in various contexts and the consequences of it. For instance, "The Fukushima Disaster and Japan's Nuclear Plant

Vulnerability in Comparative Perspective" by Adam Garfinkle, was published in *The Washington Quarterly* in 2011. This article discusses how the Japanese government mishandled the public discussion following the Fukushima nuclear disaster by providing inconsistent and inaccurate information and failing to engage in open dialogue with the public. Also, government representatives can damage a reputation by ignoring or dismissing concerns from affected communities and failing to provide transparent and accurate information.

At the same time, there are many challenges and opportunities associated with energy transition and public debates. The literature related to discussions in societies with the involvement of government authorities highlights the importance of social acceptance, public engagement, and policy and regulatory frameworks in achieving a successful energy transition (McCauley et al, 2019). The literature emphasizes the need for clear communication, education and training, partnership building, and contingency planning to ensure that the energy transition is implemented effectively and with broad support from the public (Wolbarst A., 2001).

2.5. Approach to risk communication and relation with trust

Social trust is “the willingness to rely on those who have the responsibility for making decisions and taking actions related to the management of technology, the environment, medicine, or other realms of public health and safety” (Siegrist, Cvetkovich, & Roth, 2000, p. 354). The public relies more and more on someone else’s expertise and the credibility of those who communicate their message about the risk (Löfstedt, 2003, 2005; Breakwell, 2007). Therefore, trust is vital and plays a major role in risk communication.

The level of trust in society has a profound effect on risk regulators. Many situations can be observed when a low level of public trust, or even distrust, sabotages risk communication and management. As a rule of thumb, societies with a high level of trust cope easier and more efficiently with unpredictable challenges. Their governments don't need to relocate limited resources to combat the results of public distrust (Balog-Way et al. 2020). Due to the importance of the concept of trust, different risk communication and management approaches to risk were developed. In his work “Risk Management in Post-Trust Societies” (2005), Löfstedt argues that primarily, risk management strategy ought to be based on the presence or absence of public trust in a regulatory body. In case the large public expresses trust in the government, risk regulators shouldn't call on stakeholders or other parties concerned for deliberation in policymaking. Moreover, he points out that changing a type of communication could alert the large public and raise concerns because they do not have experience in risk discussion on the governmental level. Besides, interest groups' involvement could lead to the discrediting of government agencies by them and advancing their own interests. As a result, this can jeopardize the public trust in risk regulators that was so difficult to gain.

Obviously, not all scientists are unanimous that risk communication and management should be based on the concept of trust. In his work *Risk Governance* (2008), Renn claims that to choose a risk management strategy, first and foremost, the type of a problem must be characterized. Linear (simple) risk problems can be solved by agency staff. As an issue becomes more complex, third-party experts may be involved. In case of large uncertainties, stakeholders such as industries and groups that are directly affected can be engaged. And only in case of high ambiguity, the general public can be brought into the discussion, having a voice, contribution, and influence in the process.

Observing the Norwegian government, it can be concluded that a top-down risk communication approach was used; the government commissioned NVE to prepare a proposal for the national framework for onshore wind power and only the finished document was sent out for consultation to the various stakeholders. Although, the recent COVID-19 pandemic gives us many valuable “lessons learned”, and one of the outcomes is new research on risk communication written by Jamie K. Wardman, who opposes top-down communication and supports the inclusive approach. In his article “Recalibrating pandemic risk leadership: Thirteen crisis-ready strategies for COVID-19” (2020), he argues that the attitude of “leader - followers” with unconditional execution of orders doesn't work anymore. With the development of democracy and raising the level of education, people now understand leadership differently, as a mutual process to achieve common goals. As a result, inclusive partnership functions much better, showing how a hazard could threaten all members of society and what each person is capable of doing to tackle risk in a way that benefits society. With this approach, people are more willing to shoulder and share responsibility.

In Norway, social trust is generally high, and this can contribute to the acceptance of renewable energy projects such as onshore windmills (Marc Hooghe et al., 2013). When there is a high level of social trust, people may be more willing to accept and support renewable energy projects that benefit the wider community, even if there are some costs or drawbacks associated with them. However, while social trust is an important factor in the acceptance of onshore windmills in Norway, it is only one of many factors that shape public opinion and decision-making around renewable energy projects. The results described in section number 4 of this paper is shown if the top-down risk communication was effective in Norwegian society, which is well known for its high level of trust (GLH & Svendsen, 2015).

2.6. Engaging risk communication

Several persuasive research arguments have been made in past decades related to risk communication. This research has been reviewed and evaluated recently in the published work Balog-Way et al. (2020). These research areas uphold pragmatic risk communication function as a key part of formal risk analysis: messengers, message attributes, and audience.

Messengers

“Messengers are the individuals, groups, and organizations purposefully engaging in risk communication” (Balog-Way et al 2020). A wide range of works has been published related to risk communication in the last decade. In most of these research papers, trust was highlighted as a key component for the messengers. The audience builds their confidence in a credible source of information (Siegrist, 2019; Tuler et al., 2014). What is curious is that research demonstrates that there is no “one-size-fits-all” solution for framing and enduring trust in messengers (Tuler et al., 2014). It is suggested that the trust level has to be timely tested for the baseline (Balog-Way & Löfstedt; Way et al., 2017). This trusted baseline can be built with local leaders, media representatives, and other influencers. They can assist in building structured risk communication for collaboration and interaction with the public sector. Most of the messengers place extreme value in transparency in the trust-building process (Carpenter, 2017; Dixon et al., 2016; Dudley and Wegrich, 2016; Löfstedt et al., 2014; O’Connor, 2016). This transparency helps to communicate and inform the public in a better way, while blurred messengers can be recognized as untrustful (Löfstedt & Boudier, 2014; Way, 2017).

The evolution of social media including its content such as video, photos, and live streams gives an opportunity for messengers to reach out to their audience faster and deliver messages more broadly (Rains et al., 2014; Schultz et al., 2011). Such an opportunity gives a chance to participate in “multiway” risk communication. At the same time, it brings quite a challenge to the messengers, such as attracting the attention of the audience. This could lead to a generation of fake news and, as a result, to misleading and spreading disinformation of the public (Del Vicario et al., 2016; Mayorga et al., 2020; Wardle & Dearthsham, 2017).

Message attributes

“Message attributes are the qualities and inherent characteristics of verbal, written, or recorded risk communication” (Balog-Way et al 2020). Message attributes are shaped both deliberately and perceptively when messages are created (Nisbet 2015). The author creates frames in a sociological manner, a storyline that can communicate why some particular issues can cause a problem, what should be done about it, and whose responsibility it is. For this purpose, a type of different content is being used.

Several studies have been conducted in relation to understanding how the usage of framing techniques forms the psychological distance of climate change. The results show that the public can perceive climate change issues as more personally relevant and therefore can be enthusiastic about reducing energy use (Spence et al., 2012) and consider changing their behavior to support mitigation measures (Broomell et al., 2015). However, other researchers were quite sceptical in these conclusions (e.g., Manning et al., 2018) and suggested that it’s a challenge to keep the information updated with such fast-changing nature of media.

Audiences

“Audiences stand to various intended message recipients and incorporate engagement through multiway dialogue” (Pidgeon, 2020). That’s why messengers must deeply understand their audience when they interact with it. Risk communication messages are always being filtered by the public through individuals’ personal risk perceptions. The factors which shape public risk perception are described in section 2.2. It’s known that Norway is an egalitarian society, however, the population is heterogeneous, which means that some groups of people may hold hierarchic and individualistic cultural directions while significantly disagreeing with those who have egalitarian viewpoints (Kahan et al., 2010; Kahan et al., 2009; Kahan et al., 2012).

Surveys of “risk-as-feelings,” containing the role of effect and emotions, were disputably the most substantial risk perception research development over the last decade (Skagerlund et al., 2020; Slovic, 2010; Tompkins, Bjälkebring, & Peters, 2018; Västfjäll et al., 2014). The study on emotional responses to the 2008 financial crisis, for instance, discovered that, over the process of hedonic adjustment, negative emotional responses to the crisis subsided after some time and were extremely prognostic of intensified risk perception (Burns et al., 2012).

2.7. Hypothesis

This thesis will center on Norway and its citizens' perspectives regarding the risks posed by onshore wind energy and risk communication strategies employed by the Norwegian authorities from 2019 to the current stage. The objective is to explore how altering risk communication impacts public acceptance of onshore windmills in Norway, a polarized topic, after being heavily criticized and in light of the changed geopolitical situation in Europe.

Based on the previously listed scientific foundation in the literature section, we put forward 3 hypotheses that will be refuted or confirmed depending on the results of our research and presented in the discussion section.

1. The bottom-up inclusive type of risk communication on the matter of onshore wind turbines in Norway is more effective than the top-down type.
2. Minimal involvement of interest groups (in the case of this work, this is Sami people) contributes to achieving successful outcomes of risk communication.
3. A potential deficit in energy sources in the country caused by external circumstances could lead to an increase in risk acceptance.

3. Methods

To analyze how the changed geopolitical situation could have affected the public debate regarding onshore wind in Norway, we can apply a range of qualitative methods, like an interview, focus groups, or content analysis. To track changes in risk communication between the main stakeholders, we concluded that the most suitable method is discourse analysis. Its obvious advantage over the interview or focus groups method is that it allows us not only a contemporary picture of people's opinions but also to trace views' fluctuation throughout the timeframe and draw connections between key events and messages and how actors responded to them. Thus, discourse analysis is a tool that helps us to assess the effectiveness of risk communication on the windmill matter as well as reflect on its shifts.

As we mentioned in the Introduction section, the proposal for the national framework for onshore wind power prepared by NVE in 2019 served as a trigger for the start of intense debates and even protests in Norway. Since it was a turning point in the public discussion of onshore turbines, there is a need for an in-depth understanding of the reasons which spark such a strong reaction in society: if it was due to the scarce analysis or if the quality of the proposal was decent but some other factor caused the strong reaction among actors. Content analysis is suited for this purpose. The advantages and drawbacks of the chosen methods are explained in the two following subsections.

3.1. Content analysis

In 2019 NVE carried out considerable work and prepared a proposal for the national framework for onshore wind power. On the official webpage (NVE.no) 21 thematic reports can be found on how wind turbines can affect the environment and society. Nine of the thematic reports have been prepared by the Norwegian Environment Agency and the Directorate of Cultural Heritage, while NVE worked on the rest in coordination with other authorities. Some consultant reports were commissioned as a basis for several thematic reports. NVE engaged local and regional authorities to keep them updated about the ongoing work. The county governor's offices and county authorities were directly involved in analyzing the thematic areas concerning the natural environment, cultural heritage, and reindeer husbandry. Throughout the project period, the directorate has had a dialogue with Sami stakeholders, including through consultations with the Sami Parliament and the Norwegian Reindeer Herders' Association (NRL). In addition, nature and outdoor life organizations were invited to participate in the dialogue. Since the proposal for a national framework for onshore wind power was heavily criticized by most municipalities and triggered intensive debate in the Parliament, a content analysis of these reports was conducted.

Content analysis is a flexible tool which makes it applicable to different types of content, however, the method is not without drawbacks. First of all, it could be extremely time-consuming, as it demands extensive reading and accuracy. Another issue is that the focus on

the frequency of words (codes) in a text could lead to losing important nuances in context. The lack of a clear and precise definition and procedures makes content analysis a limited tool for application (Hsieh & Shannon, 2005). To avoid missing essential details and to frame a holistic picture of the documents, we apply the summative content analysis. It is one of three given approaches that content analysis offers which involves keyword counting, comparison of context, and further content interpretation.

With content analysis, we outline a pattern, the main concerns, and ripple effects regarding onshore wind farms given in 21 reports prepared by NVE (Updated knowledge base - NVE). Using the summative content analysis, we identify which risks and benefits are most frequently described in a proposal for the national framework for onshore wind power by grouping the text into codes and summarising them into categories. This approach is applied to each of the 21 thematic reports. To spot risks related to wind turbines we use the following keywords: hazard, threat, risk, jeopardy, peril, danger, pitfall, problem, and issue; for benefits: profit, advantage, gain, benefit, favor, and profit. Later, the findings and results are compared with the risks and benefits related to wind farms which were described and expressed by experts who haven't been involved in the preparation of the proposal for a national framework for onshore wind power, showing sides which are aligned as well as aspects which are inconsistent. Also, it will help us to identify the main actors on the matter of wind energy in Norway and conduct further media coverage, focusing on key players.

3.2. Discourse analysis

For this paper, the framework for discourse analysis developed by Hajer was selected because of its argumentative approach that combines social-interactive discourse theory from authors like Billig and Harre with the fundamentals of Foucault's discourse analysis (Hajer, 1995). Hajer's argumentative approach employs the concept of storylines to simplify complex issues and facilitate discourse. Storylines emerge as various actors vie for dominance in the discourse, with trust, acceptability, and credibility being key factors in this contest of argumentation. Moreover, Hajer notes that as different actors compete for discourse hegemony, they will form discourse coalitions that consist of a set of storylines, the actors who utter these storylines, and the practices on which this discursive activity is based (Hajer, 1995, p. 65). In this text, we identify dominating storylines and discourse coalitions as different actors try to define how risks related to wind farms are understood and interpreted by the main stakeholders.

According to Kern & Rogge, discourse analysis has shown great potential in researching transitions, especially when it comes to politics in transition processes and how actors position themselves within them (2018). However, discourse analysis has also been criticized by Kern & Rogge for not sufficiently augmenting policy processes or focusing enough on the extended institutional context from which policies are created (2018). Nonetheless, as this paper reflects

how first-order risk regarding onshore wind power is communicated between the government and principal actors, we found Hajer's discourse analysis helpful.

3.3. Research Timeframe

This paper focuses on media coverage from October 1st, 2019, through the end of the first quarter of 2023. This period of time has been chosen due to the fact that on the 1st of April, 2019, NVE presented a proposal for a national framework for onshore wind power, which was requested by the Ministry of Petroleum and Energy. The proposal is composed of two parts: 21 thematic reports on how wind turbines can affect the environment and society, and a map of the 13 areas in which, according to NVE, onshore wind turbines ought to be deployed. The deadline for consultation on the NVE's national framework plan was outlined by October 2019. More than 5000 consultation responses had been submitted, among them were responses from 49 municipalities. The majority of those replies were distinctly negative and only 3 municipalities were neutral or positive. It triggered political and public debate, including protests (NRK.no, 2019).

If 2019 and 2020 were quite stable years for Norway, then in 2021 problems with energy resources in Europe became aggravated. Dry summer, little wind, and rising tension between Russia and Ukraine roughly pushed up prices for electricity, oil, and, especially, natural gas (Reggjeringen, 2020). We look through this timeline and track how the debate about onshore wind power has been fluctuating in Norway due to the rapidly changing geopolitical situation. In addition, on October 1st, 2021, two new cables were inaugurated, linking South Norway to Germany and the United Kingdom. These cables are mainly used to export electricity from Norway and contribute to driving up prices in the southern part of the country where the cables originate as well as depleting reservoirs (Delebekk, 2022).

- Nordlink, which is connected to Germany, recorded 79.3% of its usage as exports and 20.7% as imports in 2021 (Kumar, 2021), (NVE, 2022).
- North Sea Link, which is connected to England, recorded 97.2% of exports and 2.8% of imports in 2021 (NVE, 2022).

Thus, in the autumn of 2021, Norway found itself in a puzzling situation. On one hand, there was a public outcry within the country due to prohibitive prices for electricity which always used to be cheap. On the other hand, Europe was desperate for help due to the urgent need for energy. On top of this, there was a transition period to green energy, Norway's responsibility on this matter, and the population who didn't want to deploy onshore wind turbines as an additional energy source. To illustrate which consequences of these turbulent times led to, we could have a look at changes in electricity prices. According to official Norwegian statistics, throughout 2012 - 2022 (Statistisk sentralbyrå) electricity prices in 2022 increased 7 times in comparison to 2020.

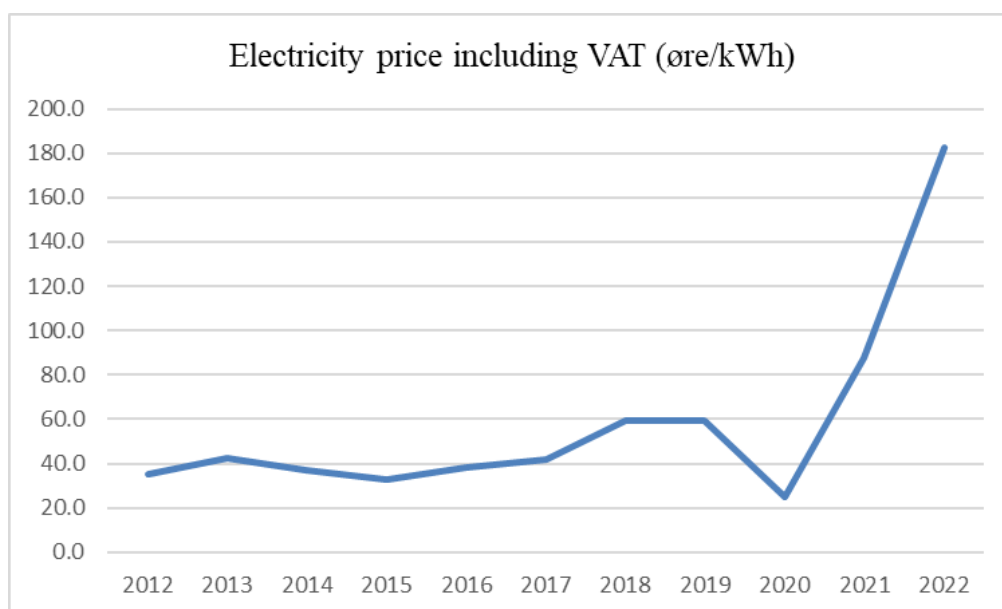


Figure 2 - Electricity price fluctuation throughout 2012 - 2022 in Norway (based on Statistisk sentralbyrå, 2022).

Thus, the chosen timeframe helps us track public debate on the matter of onshore wind farms in the context of the rapidly changing geopolitical and economic situation in the world as a whole and particularly in Norway.

3.4. Stakeholders

Four main stakeholders have been identified on the matter of public debates about onshore wind farms:

- The Norwegian government, requested the preparation of the proposal for a national framework for onshore wind power by NVE. Being the key player in public debate, the authorities frame the policy and approach on how to communicate with other actors.
- The large public, who is affected by setting up wind turbines, is involved in the discussion and responding to messages sent by the authorities.
- Sami are allocated in a separate group since they have their Sami Parliament, also they are recognized as indigenous people of Norway, and their rights are protected under Article 27 of the United Nations (U.N.) International Covenant on Civil and Political Rights of 1966 (ICCPR) and the Norwegian Constitution, which article 108 claim their right to “preserve and develop their language, culture, and way of life”.. Reindeer husbandry serves as both a cultural manifestation and a customary livelihood for the Sami community in Norway. Therefore, the

Sami community has a cultural entitlement to practice reindeer husbandry under Article 27 of ICCPR. The reason why the Sami community is recognized as a stakeholder is that wind farms adversely affect reindeer and violate their grazing areas.

- Experts, who give an independent scientific assessment of risks and benefits associated with onshore windmills and have given comments on the proposal for a national framework for onshore wind power prepared by NVE.

3.5. Data sources

Since we focus on stakeholder analysis rather than the media, search with terms such as “vindparker på land regjering” (onshore wind farms government) and “vindparker på land stortinget” (onshore wind farms Parliament), “vindparker på land Sami” (onshore wind farms Sami), “vindparker på land folke/ mennesker” (onshore wind farms public), “vindparker på land eksperter” (onshore wind farms experts) are used in the given timeframe on the google search engine.

To conduct discourse analysis are reviewed media content in newspapers Nettavisen, E24, Teknisk Ukeblad, the Stavanger Aftenblad, Aftenposten, Gudbrandsdølen Dagingen, Friluftsglede, Kommunal Rapport, Klima og Energi, Firda, Forskeforum, forksning.no, Motvind Norge, Norsk Industri, VG, High North News, Bergens Tidende, NRK.no, the Facebook group “Nei til vindkraft - Motvind Norge”, the official pages of the energy supplier Statkraft, the service company strøm.no, the energy company Ørsted, seller and installer of farm windmills Scanwatt company and the official page of the Norwegian government. To outline experts’ opinions on this matter we look through scientific literature (references throughout the chapter “Results”) and use the newspaper mentioned above.

4. Results

4.1. Content analysis

Content analysis of 21 thematic reports about onshore wind power in Norway shows that the main benefits of wind turbines described in the NVE's national framework plan are:

- contribution to cutting greenhouse gas emissions
- clean/green energy for Norway and Europe
- climate-friendly industrial production
- local and regional salutary ripple effects such as increased employment during the construction phase and some jobs during the operation phase. The construction, operation, and maintenance of wind power plants will also generate a higher demand for goods and services locally and regionally.

To clearly illustrate risks related to onshore windmills described in NVE's reports we compile them into a table below.

Table 1 - Risks related to onshore windmills according to NVE's thematic reports.

<i>No</i>	<i>The report name</i>	<i>Prepared by</i>	<i>Associated risks</i>
1	Landscape (NVE.no)	Norwegian Environment Agency and Directorate for Cultural Heritage	Wind turbines necessitate significant land areas and are frequently situated in open areas in the terrain, which will have an impact on the visual aspect of the landscape.
2	Other wildlife (NVE.no)	Norwegian Environment Agency	Wind power has the potential to cause permanent fragmentation and habitat loss for mammal species, such as wild reindeer and bats. The impact on wildlife from human activity disturbances will likely be greater than the effect of the terrain alteration and infrastructure development. This is especially important for species that are vulnerable to human presence, including the wolf, bear, lynx, and wolverine, which generally avoid areas frequently used by humans.
3	Bats (NVE.no)	Norwegian Environment Agency	Studies from other countries have shown that both migratory and stationary bats are impacted by wind power. There are documented cases worldwide of bats dying due to pressure changes in the air caused by rotor blades or direct collisions with them. Wind turbines could also interfere with migration routes, as well as the loss of grazing and breeding sites for bats. Bats that migrate past wind turbines are especially vulnerable, but even stationary populations are at risk during short movements. There is also the possibility of swarms of insects occurring under wind turbines, which can attract bats in search of food.
4	Outdoor activities (NVE.no)	Norwegian Environment Agency	The effect of wind power on outdoor activities is mainly associated with the alteration of land use caused by land encroachment, as well as the visual disturbance and noise pollution created by wind turbines.

<i>No</i>	<i>The report name</i>	<i>Prepared by</i>	<i>Associated risks</i>
5	Birds (NVE.no)	Norwegian Environment Agency	The installation of wind turbines can pose risks to birds in terms of collisions, displacement, and disturbances. The degree of conflict will vary depending on the specific species' life cycles, behavior, and habitat use. In Norway, there are significant variations in the level of conflict between licensed wind power projects, but generally, there is a high level of conflict with birds.
6	Nature types (NVE.no)	Norwegian Environment Agency	Wind power development can impact various nature types to different extents, with the most significant impacts likely to occur on terrestrial ecosystems. Nature types that are more dependent on larger contiguous areas and have significant variations in type, such as some coastal heaths and bogs, may face the greatest challenges.
7	Connected natural areas (NVE.no)	Norwegian Environment Agency	Broad wind power deployment can result in a significant dwindling in natural areas on the stamp of natural processes and little human influence.
8	Wild reindeer (NVE.no)	Norwegian Environment Agency	The introduction of wind turbines and their supporting infrastructure is likely to have an impact on the way reindeer use the land, including their grazing habits and ability to migrate. These facilities may cause the reindeer to avoid certain areas and could have negative effects on their well-being and ability to reproduce. In addition, if wind power facilities are built within the natural habitats of wild reindeer, it could lead to disruption and displacement of the animals due to construction and development activity, ultimately limiting their access to parts of their habitat.

<i>No</i>	<i>The report name</i>	<i>Prepared by</i>	<i>Associated risks</i>
9	Agriculture, mineral resources and other topics (NVE.no)	NVE	<p>Among various sports, aerial sports are believed to be the most vulnerable to the impact of wind power plants.</p> <p>The installation of wind turbines may cause a decrease in energy production and increased wear and tear on turbines, which can affect other turbines as well. Furthermore, measures may need to be implemented to mitigate noise levels.</p> <p>Due to the complexity of wind turbines and the large number of components involved, there is always a risk of unwanted incidents occurring, although the occurrence of injuries is infrequent based on available experience, albeit there is limited data and literature on this subject.</p>
10	Drinking water and pollution (NVE.no)	NVE	Being near sources of drinking water does not automatically imply an unacceptable risk of pollution.
11	Electronic communication (NVE.no)	NVE	Wind turbines can impact radio signals through near-field effects, diffraction, and reflection/scattering. Nevertheless, developers can prevent most potential negative effects on radio communication by adjusting the design of the wind turbines accordingly.
12	The Norwegian Armed Forces (NVE.no)	NVE	The electronic infrastructure of the Norwegian Armed Forces, including stationary primary radars like control and warning radars and coastal radars, as well as mobile weapon systems with their own radars, passive sensors, and radio lines, can be negatively impacted by wind turbines.
13	Ice throw (NVE.no)	NVE	When wind turbines in Norwegian wind power plants accumulate ice, there is a possibility of ice being hurled from the turbines, which could endanger people

<i>No</i>	<i>The report name</i>	<i>Prepared by</i>	<i>Associated risks</i>
			moving around in the power plant. Although the likelihood of being struck by ice is generally low, the potential outcomes are so significant that the risk should be regarded as a serious concern.
14	Climate footprint and life cycle analysis (NVE.no)	NVE	The primary sources of emissions associated with wind power plants are related to the transportation of the turbines and the production of concrete for their foundations. Research that has been examined indicates that the duration of time it takes for a wind turbine to generate the same quantity of energy used to manufacture it varies between 3-7 months. However, due to advancements in technology, such as greater installed power, more extensive rotor blades, and improved control systems, it is probable that modern wind turbines will not exceed an energy payback time of 3-5 months.
15	Local and regional business development (NVE.no)	NVE	Although there has been limited research on the impact of wind power on the cabin industry, available evidence and impact assessments suggest that the industry could be influenced. In the event that wind power plants have a significant negative impact on the areas where cabins are located, it could lead to reduced business operations and a reduction in employment opportunities in the locality.
16	Neighbouring effects (NVE.no)	NVE	Wind turbines have the potential to impact neighboring communities in terms of visibility, noise levels, shadow casting, and aviation light marking. Previous studies have demonstrated a negative association between visible wind turbines and the sale price of nearby houses and vacation homes. Noise from wind power plants can be disturbing to some neighbors. The Norwegian Institute of Public Health (FHI) has noted that certain reports indicate a correlation between noise levels and sleep quality. Additionally, the FHI has explored the possibility of

<i>No</i>	<i>The report name</i>	<i>Prepared by</i>	<i>Associated risks</i>
			wind turbines affecting mental health, quality of life, and cardiovascular disease but has found little support for these cause-and-effect relationships in the research literature.
17	Reindeer husbandry and other Sami use of uncultivated land (NVE.no)	NVE	Following an analysis of studies examining the impact of wind power plants on reindeer in Norway and Sweden, NVE has observed that there is a significant disparity in the findings, particularly with regard to the operational period. There is a general consensus that construction activities, human presence, and roadways can influence the land usage of reindeer. However, there is a divergence of opinions on how an operational wind power plant could affect the land usage or behavior of reindeer.
18	Tourism (NVE.no)	NVE	None of the studies reviewed indicates that the existing development of wind power has had a detrimental impact on the tourism industry. However, it has been noted that certain types of tourist destinations are highly susceptible to the impact of wind power projects. This is particularly true for locations where scenic landscapes in pristine natural environments are crucial to the visitor experience. Several of the studies also suggest that any significant expansion of wind power in Norway could have significant repercussions for the tourism industry.
19	Civil aviation (NVE.no)	NVE	In the area of the sky, the presence of wind turbines can create hazards for aircraft, potentially leading to collisions. Additionally, they may cause issues with the signals used for navigation, monitoring, and communication systems, negatively impacting the overall quality of air traffic and navigation services.
20	Weather radars	NVE	If wind turbines are positioned in a way that disrupts the radar signal, they can affect the accuracy of weather radars. This can result in varying degrees of

<i>No</i>	<i>The report name</i>	<i>Prepared by</i>	<i>Associated risks</i>
	(NVE.no)		impairment to the quality of weather observations and services, with the impact depending on the intended purpose and recipient of the weather information.
21	Cultural heritage and cultural environments (NVE.no)	The Directorate for Cultural Heritage	The construction of wind turbines, including any necessary roadways and staging areas, can have a negative impact on cultural landmarks and environments. This impact can be both direct and indirect. Direct effects may occur when physical interventions are made to the cultural heritage or environment, such as building a wind turbine near a historical site or constructing a road through a conservation-worthy farming area. Indirect effects can be either physical or visual. Examples of indirect physical effects include changes to the microclimate or water flow that can affect conservation conditions. Indirect visual effects occur when the wind turbines are visible from cultural heritage sites and alter the perception and understanding of the surrounding landscape.

It can be seen that there is inconsistency in these reports. The document “Wild Reindeer” prepared by the Norwegian Environment Agency outlines substantial risks for reindeer. This statement is confirmed by extensive research conducted by Anna Skarin and many other specialists in this field (Skarin et al., 2018). In contrast, NVE in their analogue report “Reindeer husbandry and other Sami use of uncultivated land” claims it’s not so obvious and there is no aligned conclusion in research on the matter of how an operating wind power plant affects reindeer's land use or behavior.

None of the NVE reports indicated that there could be negative impacts if new wind turbines are built on or near peat bogs, referencing that the specialists who prepared the reports are not aware of any studies examining greenhouse gas emissions resulting from soil processing during the construction of wind power projects. Thus, the fact that bogs and wetlands contain massive amounts of carbon in soil wasn’t taken into consideration. In the case that peat bogs are disturbed during construction, this would lead to the release of a huge amount of carbon dioxide into the atmosphere, and wind energy will cease to be eco-friendly (Aftenposten, 2019). The detected inconsistency of the NVE reports indicates the lack of necessary scientific knowledge regarding the reindeer and peat bogs. Experts’ opinion on this matter is considered in section 4.2.4.1.

As mentioned at the beginning of this section, one of the benefits of on-land wind turbines for society is the positive ripple effect, namely, the creation of new jobs. It’s doubtful to what extent this should be considered a benefit given the fact that the current 43 operational wind power plants in Norway have just 237.5 full-time workers for the whole country (NRK, 2020). Even rapidly unfolding onshore wind turbines and doubling or tripling their numbers and capacity won’t lead to a significant increase of employees in this field, especially taking into account risks related to wind power.

The table below represents a summary of risks posed by the onshore windmills according to reviewed reports.

Table 2 - The summary of risks posed by the onshore wind turbines.

<i>Risk type</i>	<i>Description</i>
Infrastructure	Less activity and fewer jobs in the relevant municipality
Health	<ul style="list-style-type: none"> ● Noise ● Ice can be thrown from the wind turbines, which can pose a risk to people travelling around the wind power plant ● Effect on drinking water
Landscape and wildlife	<ul style="list-style-type: none"> ● Changing ski slopes and hiking trails ● Bats, birds, reindeer
Agriculture	Mineral resources

<i>Risk type</i>	<i>Description</i>
Climate change	Climate footprint and life cycle
Communication	<ul style="list-style-type: none"> ● Aviation ● Civil radars ● Electronic communication

Experts’ opinion on the NVE thematic reports is considered in section 4.2.4.1.

4.2. Discourse analysis

Because onshore wind energy has a potential impact on the environment, wildlife, and local communities, people have raised their concerns, making wind farms a topic of debate and controversy in Norway for many years. We use discourse analysis to present the research findings that highlight the evolution of public debate concerning risk communication related to onshore windmills in Norway over the years.

4.2.1. Government

2019

On the first of April 2019, Minister of Petroleum and Energy Kjell-Børge Freiberg received the proposal for a national framework for onshore wind prepared by NVE. The document was circulated for consultation for 6 months including several regional input meetings in Lillestrøm, Kristiansand, Bergen, Trondheim, and Hammerfest. Among consultative bodies were all ministries, municipalities, county governors, the Sami Parliament, 13 tourist associations, 10 Norwegian Nature Conservancies, 13 Forums for nature and outdoor life, Avinor (airports owner), Norwegian Directorate for Mineral Management, Norwegian Directorate for Civil Protection and Emergency Planning, Norwegian Institute of Public Health, Greenpeace Norway, Norwegian Mapping Authority, Norwegian Directorate of Agriculture, Norwegian Food Safety Authority, Norwegian Meteorological Institute, Norwegian Environment Agency, Norwegian Communications Authority, Norwegian Association of Hunters and Fishermen, Norwegian Environmental Protection Association, Norwegian Farmers' and Smallholders' Association, Norwegian Ornithological Society, National Association of Norwegian Reindeer Herders, National Association of Norwegian Sami, Directorate for Cultural Heritage, WWF, and many other stakeholders (Reggjeringen, 2019).

By the 1st of October 2019, more than 5000 consultation responses had been submitted, of which 49 municipalities had responded and most were negative. The vast majority of municipality representatives referred to the fact that potential harm from onshore wind turbines, such as negative consequences for the landscape, untouched nature, reindeer herding, and outdoor interests, is incomparably high. This sparked vigorous debates on all levels of society. After the government faced vehement opposition, the decision about scrapping the framework was made within 2 weeks. In addition to abandoning the plan, the authorities put issuing licenses for windmills on hold until the licensing system can be thoroughly reviewed. "It was supposed to be a conflict mitigation measure, it hasn't been with the responses we're seeing. Therefore, we intend to abandon this national framework and say that we will not have a national framework for wind power in the future", said former Prime Minister Erna Solberg (NRK, 2019).

Many politicians pointed out that the government's top-down initiative about the national framework for onshore wind led to a rise in tension between local (municipalities) and national governments. At that moment, the leader of the Labour Party Jonas Gahr Støre claimed that the situation was handled poorly. "The government is stumbling on its own feet. For many weeks, great uncertainty has been spread in 13 different areas of Norway, where locals fear they will be overrun. It is a completely unnecessary uncertainty that the government has created and it is good that they put this aside," Støre said (NRK, 2019). The Energy and Environment Committee representative Sandra Borch criticized the government's approach to risk communication as well. "It shows that the government has a slap on the fingers since the process has been far too poor. It was not going to be dealt with politically and the municipalities have not been heard. This is a victory for local democracy," she says (NRK, 2019).

2020

In the middle of March 2020, the Solberg government announced that before the summer it will present a paper on the licensing system for onshore wind power. As had been promised on the 19th of June 2020, Stortinget presented the paper 'Wind power on land – Changes in licensing procedures', where they proposed tightening the processing of wind power licenses and strengthening local and regional anchoring (Stortinget, 2020). "A strengthened local anchoring where the municipalities have a greater role in the licensing process is important in the future. We will strengthen the requirements for environmental assessments so that landscape and nature are given more emphasis. I still believe that there should be room for further development, but we must reduce the pace of development," says Minister of Petroleum and Energy Tina Bru (Regjerinen).

The revised licensing process involves a more inclusive approach, which allows municipalities to provide their input and impact the decision-making process. Prior to these modifications, NVE would grant licenses to entrepreneurs to install onshore wind turbines without consulting the local authorities about where the wind farms would be located. Additionally, the updated process

features tighter deadlines with more rigorous time constraints as well as stricter regulations regarding the maximum height of turbines and minimum distance requirements. The changes also mandate the involvement of reindeer husbandry and include provisions for local compensation (Reggjeringen). In October 2020, hearings were held by the Norwegian government, and in December of the same year, the new procedure was approved and adopted by Parliament (Stortinget). Shortly after the opposition's efforts, the Storting passed a resolution that will grant municipalities significantly more power in matters pertaining to wind power. This will be achieved through amendments to the Planning and Building Act. The legislative work on this matter continued throughout 2021 and ended only in 2022 (Aftenposten, 2022).

2021

Almost until the end of 2021, wind power and energy policy was one of the hottest topics in the public debate of the election campaign and was discussed extensively, however, the government didn't take any further action toward changing the license system or the national framework for onshore wind power (Motvind, 2021). The leader of the Labour Party Jonas Gahr Støre, who won the election in 2021 and became a Prime Minister, had a quite modest position towards onshore wind power in his Party Program 2021 - 2025, "We solve the big tasks best together", having just made several statements including that no new licenses for wind power are granted until the Storting has dealt with changes to license processing for onshore wind turbines (Labour Party Program 2021-2025).

Many politicians had opposing views on onshore wind, some of them endorsed deploying onshore wind turbines, while others argued that it would destroy Norwegian nature and polarize society. Climate and Environment Minister Espen Barth Eide said, "We will develop more energy. Water, sun, and wind. In that order. On land and at sea. We can't get away from any more wind." Subsequently, he was asked to defend his statement as the report presented by Motvind, an organization in Norway that opposes the aggressive expansion of wind power throughout the country, argued that Norway has the capacity to generate a surplus of renewable energy without requiring the installation of any new wind turbines (Dagavisen, 2021). Rødt party has taken a clear stance against the implementation of land- and sea-based wind power. They have justified their position by invoking the precautionary principle and emphasizing the need to ensure that resource management policies prioritize the interests of local communities rather than large corporations and the European Union. Rødt's statement was supported by the Norwegian Environmental Protection Association, Motvind, the Norwegian Ornithological Society, and several University representatives (Harvestmagazine, 2021).

However, since the two newest cables, which connect South Norway to Germany, and the United Kingdom became operational and greatly affected electricity prices in the Bergen region, Rogaland, South, and Eastern Norway, the focus had shifted from onshore wind farms to skyrocketed electricity prices in densely populated areas of the country (E24, 2021). Media

coverage of this burning issue began in October, focusing on the government's efforts to defend its decision to establish international electricity networks, claiming that extremely high electricity prices are beneficial for the country since it contributes to the state budget. Even more, attention was paid to the authorities' attempts to address the problem by providing direct subsidies to affected households and reassuring the population that they retained control of the situation. In retrospect, Storting's efforts to address the exorbitant electricity prices through financial means served as more of a temporary solution rather than a long-term fix.

2022

Norway entered 2022 with demonstrations against extraordinarily expensive electricity across the country, strong opposition to onshore wind power within Norway, high demand for power from the European Union, and ever-rising tension between Russia and Ukraine. At the beginning of 2022, politicians started articulating the need for energy policy reconsideration to decrease electricity prices for consumers, households, and businesses, especially considering that in the coming years, Norway's electricity consumption is expected to increase more than its energy supply. Consequently, there is a need for Norway to increase its energy production to achieve a power surplus. One of the central themes of the debates was the exploration of the potential for socio-economically beneficial forms of energy production, including solar, hydro, and wind power, while ensuring that it is socially acceptable. Norway was presented with a significant dilemma: either increase power and grid production, which may be detrimental to certain stakeholders due to the associated risks and harms, or abandon its commitments to the Paris climate accord (E24, 2022). Shaping the government narrative that the country needs much more energy, Kjetil Lund, the director of NVE, presented an analysis suggesting that if Norway is able to obtain an excess of power, then the electricity prices in the country will decrease (NVE, 2022).

The Russian invasion of Ukraine, starting on the 24th of February, changed the usual order of things, and the geopolitical situation in the world, and challenged many countries' economies, including the energy sector. Already in March, certain political parties were urging the government to expedite the process of changing the laws related to licensing procedures so that the construction of new land-based wind turbines can commence as early as the following year. This would entail Parliament passing an amendment to the Planning and Building Act that grants municipalities the authority to decide whether or not to allow the deployment of wind turbines in their respective areas, with the NVE being authorized to consider license applications only after receiving local consent. Among the speakers was Nikolai Astrup, energy policy spokesperson for the Conservative Party, "We know that we need more power in Norway. Onshore wind power is the cheapest and fastest way to achieve this" (Aftenposten, 2022).

In April 2022, Minister of Petroleum and Energy Terje Aasland presented a supplementary paper showing the Government's energy policy for work, restructuring, and security in turbulent times. He said, "The situation in the energy markets is critical. This winter, we have seen sky-high

energy prices both in Norway and in the rest of Europe, and Russia's military invasion of Ukraine has further exacerbated the situation. This underlines the importance of pursuing an energy policy that promotes employment, restructuring, and security in turbulent times. That is why we are proposing several measures for a secure and forward-looking energy policy in turbulent times” (Regjeringen). With this message, the Minister has sent a letter to NVE asking them to resume processing new wind power projects in municipalities that want this. Thus, the government reopened the licensing process for onshore wind power after a three-year hiatus. If the municipalities that will be hosting wind power projects give their approval, NVE may take into account new reports on the matter. The role of these municipalities has become more robust, with stricter requirements for licensing procedures that are grounded on an updated knowledge base (Regjeringen). The announcement has elicited varied reactions, with Energi Norge, an employer organization for the renewable energy sector representing firms involved in generating, transmitting, and selling electricity and heat, expressing support for the news while others have expressed discontent. "Aasland is going to war against people and nature when he now asks the NVE to take up the licensing process for wind power," says Sofie Marhaug, Member of Parliament for Rødt and deputy chair of the energy and environment committee, in an email to Nettavisen. "The municipalities should be on board," he says, but with a production tax on wind power going to the municipalities, he is pressuring poor municipalities to accept nature destruction. We cannot accept this," she said. The Socialist Left Party's climate policy spokesperson, Lars Haltbrekken, also reacted. "If we are to have onshore wind power development, it must be done in a completely different way," he told NTB. According to Haltbrekken, it is unacceptable to undertake significant new activities in the Norwegian fragile natural environment without first having an independent assessment of the environmental and ecological impacts (Nettavisen, 2022).

Despite the fact that some actors still remain determined in opposition to the onshore wind power matter, the Norwegian government changed their approach almost upside-down in comparison to 2019 when NVE's national framework for wind power was issued. The Minister of Petroleum and Energy message can confirm it saying “We now reopen licensing proceedings, and do so with a very clear requirement: the host municipalities must consent. Developers must start planning possible projects in dialogue with the municipality. The fact that new wind power projects are being considered does not mean that a license will be granted. This will be decided after thorough and inclusive processes where consideration for the environment and neighbors will be emphasized more strongly than before, and based on a comprehensive, updated knowledge base on the effects of wind power” (Regjeringen).

4.2.2. Norwegian Public

2019-2020

Norway has set ambitious climate goals and aims to become carbon-neutral by 2030. Therefore, the country has been investing in renewable energy, including onshore wind power, to diversify its energy mix and reduce its carbon footprint. However, the reactions to onshore windmills in Norway were complex and varied depending on the specific context and stakeholders involved. Despite the diverse reaction, there was something in common: the main concern of the large public was that onshore wind turbines exert detrimental effects on the environment, particularly, endangering wildlife and Irrevocably destroying the natural landscape.

The Haramsøya municipality is one example of such a complex reaction. Haramsøya, which is outside of Ålesund is one of the places where wind turbines were built. In 2009, a license for the construction of 16 wind turbines was granted to Haram Kraft AS. The people in the municipality had initially said no to the development of this project. However, later on, an agreement was achieved between municipality citizens and the government after the number of turbines was decreased to eight. After the government's message that the campaign of increasing the power plant capacity in 2019 was coming back, the citizens of this municipality started the movement against it (NRK, 2020). The hot protests brought up a situation where a vehicle was used to obstruct the road leading to Haramsfjellet, resulting in the developer being unable to transport equipment up to the facility. "This is not exactly a war, but it is a battle where a lot is at stake", says Birgit Oline Kjerstad, leader of "No to wind turbines on Haramsøy" (E24, 2020).

Similar protest movements took place in Frøya from the end of 2019 to the beginning of 2020 (E24, 2020), which was widely covered by E24. Frøya is a municipality with 5200 inhabitants, where a local activist Hans Anton Grønskag started a Facebook group of people's action "No to wind power on Frøya". Today, the Facebook group has 18,000 members (E24, 2021). Finnskogen is another municipality where the opposition against onshore wind farms was strong (Dagsavisen, 2019). Approximately at the same time, the National Facebook group was created by the activists "Nei til vindkraft - Motvind Norge", which translates to English as "No to windpower" (Facebook group, 2020). They published a report where they explain their reasons for being against wind turbines.

The situation with the opposition didn't get better in 2020 (Den Norske Turistforening, 2020). It can be observed that the opposition towards onshore wind power is notably robust in regions that have undergone substantial development, where individuals have witnessed significant interventions:

- Central Norway, comprising Trøndelag counties and Møre & Romsdal, exhibited the highest level of resistance towards onshore wind power in 2019, with 41% of the population being very or quite unfavorable towards it. As of 2020, the situation remains

unchanged, with Central Norway continuing to hold the highest level of opposition at 44% being very or quite negative.

- The level of opposition towards onshore wind power in Western Norway has witnessed the highest growth, escalating from 28% being very or fairly negative in 2019 to 41% in 2020. A significant portion of 26% is explicitly very negative towards it.
- Similarly, in Northern Norway, the level of opposition towards onshore wind power is also significantly rising, from 20% being very or fairly negative in 2019 to 37% in 2020.

It is worth mentioning that from 2019 till 2020 there were no major changes in the country's economy and no external circumstances which could influence this topic in the arena of public discussion. One of the articles stated that due to Norwegian people being accustomed to low electricity rates, their households tend to consume excess electricity than required (Dagsavisen, 2022).

NRK.no was widely covering the construction development, its costs, government expectations of the continuous ongoings of the project, and the perspective of the public's reaction, including the public movement's agenda and ordinary people's opinions. (NRK, 2019, NRK, 2019). Also, the big Norwegian media source Aftenposten widely covered the development of debates around the onshore wind farms. In 2020, an article was published titled “The climate elite does not understand wind power Resistance” (Aftenposten, 2020). The article highlights that the urban climate elite advocates misunderstand, either knowingly or unknowingly, the intentions of the rural opponents of wind energy and wrongly ascribe them to motives that they do not possess. The main message is that the opposition towards wind energy does not stem from opposition to environmental actions but rather from a dedication to preserving natural values, endangered species, pristine wilderness, outdoor recreation, and the well-being of the public.

2021

2021 brought up changes in the energy sector of Norway. As was highlighted previously, the autumn of that year was a dry season in addition to new cables to Europe, which placed the hydropower sector under undue pressure and led to skyrocketed electricity prices (NVE, 2021, E24, 2021). To diversify energy resources within the country, the government put effort into deploying wind turbines around the land. Thus, Norway's onshore wind power capacity has grown steadily, reaching around 4,644 megawatts in 2021, up from 4,028 megawatts the previous year (Statista, 2023).

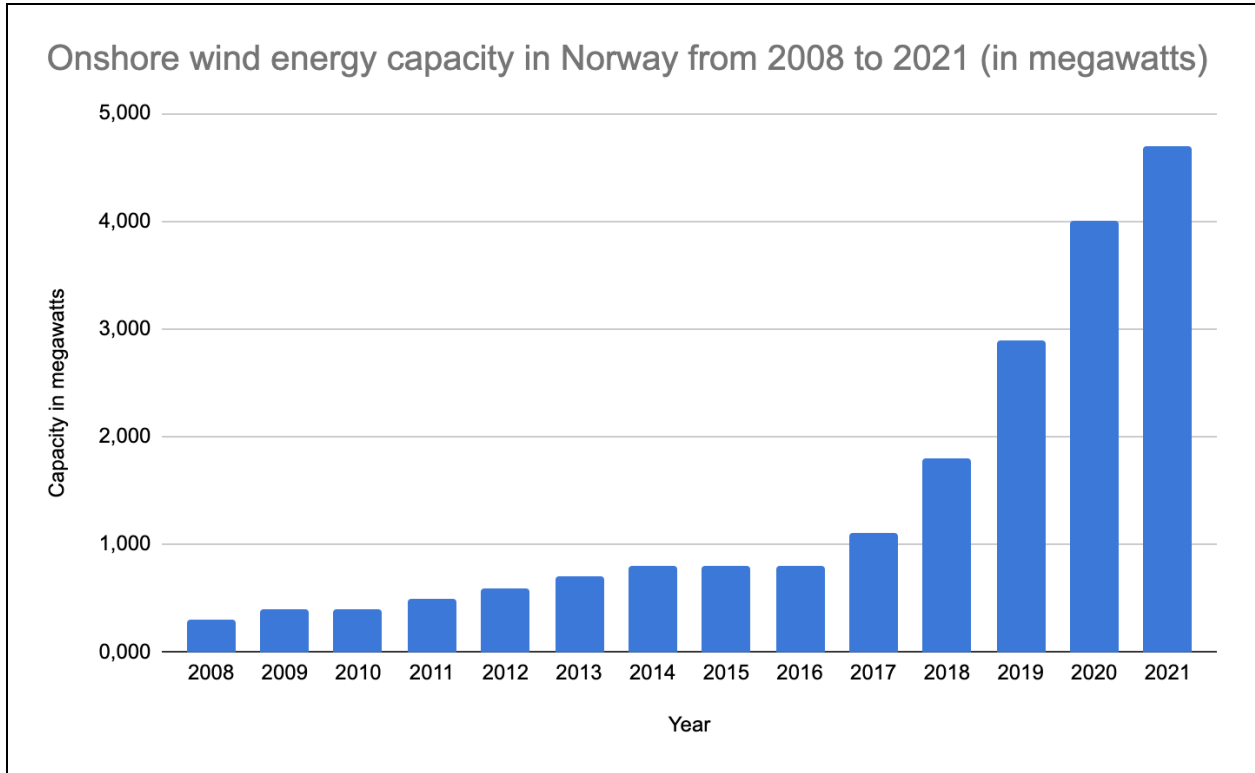


Figure 3 - Onshore wind energy capacity in Norway from 2008 to 2021 (based on Statista, 2023).

In September 2021, public opinion in Norway about onshore windmills was mixed. At one point around this time, articles started to circulate in the news media related to raised electricity prices. NRK published an article with the opinion that onshore wind power can contribute to cheaper electricity costs for the citizens (NRK, 2021). Another article, published at nearly the same time, was saying that due to the limited use of wind power, the burden of generating electricity has fallen heavily on costlier alternatives such as coal power (NRK, 2021).

On the one hand, there were people who supported the use of wind power as a renewable energy source to combat climate change and reduce Norway's reliance on fossil fuels. Some also saw it as an opportunity to create jobs and economic growth in rural areas (Stavanger Aftenblad, 2021). According to a survey conducted by NRK, there are a total of 43 operational wind power plants in Norway, employing 237.5 full-time workers. The data were collected from wind turbine companies as well as mayors and municipalities (NRK, 2020).

The University of Bergen has a Norwegian citizens' panel where public opinion on different matters is studied and published. The development of attitudes to onshore and offshore wind power from 2014 to 2022 was explored by this panel (UiB, 2023). The survey was conducted in relation to “What do people think about onshore and offshore wind power?”. One of the questions asked was “How has public opinion about onshore wind power gone from acceptance to polarization?” The presented report shows that the curve on the graph for 2021 appears to be

less steep than the others. From Figure 4 we can see that in 2021 responses were more evenly distributed between "strongly agree" and "strongly disagree".

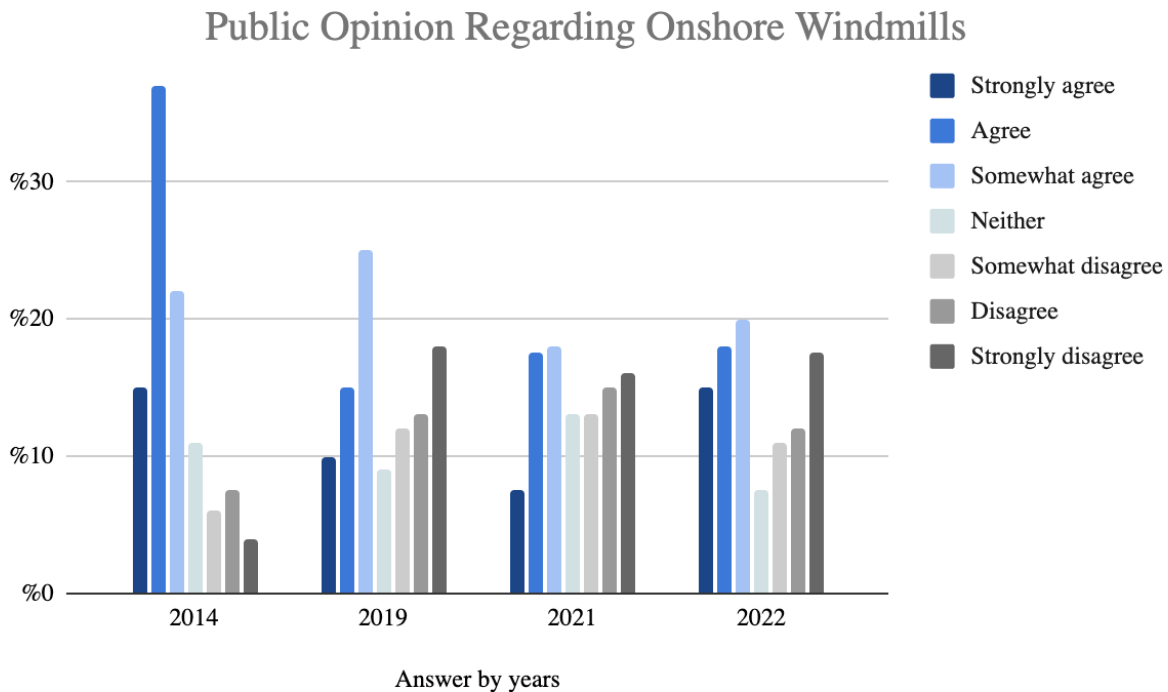


Figure 4 - What do people think about onshore wind power? (based on University of Bergen, 2023).

The report suggests that this could be because electricity prices were exceptionally high prior to November 2021, reaching over NOK 1/kWh after starting at 50-60 øre in the first half of the year. The causes were low reservoir levels and Russian energy policies, making wind power to be perceived as a viable solution to reduce electricity costs in Norway.

Overall, it can be said that there was no clear consensus on onshore windmills in Norway in 2021, and the topic remained a subject of debate and discussion among the general public and policymakers alike.

2022

The year 2022 started with significant geopolitical changes. Despite not being a member of the European Union, Norway is still closely tied to the EU's energy market through its participation in the European Economic Area (EEA), and it is a significant energy producer in Europe. Thus, any changes to the EU's energy policies and regulations in response to the conflict in Ukraine have an indirect impact on Norway's energy sector.

Shortly after the global shock of the war in Europe, NRK published an article with different people's reactions to the news that the onshore wind power development is set to resume after being on pause (NRK, 2022). The article covered positive and negative public reactions. Below some of them are listed.

- “It is positive that the municipalities can decide. Then it is urgent to get more power in place and power wind must be the first priority there. Locally, we believe that the Hywind Tampen area must be invested in on a much larger scale than the 11 turbines that will be installed this year”, says Ola Teigen, Kinn municipality, (NRK, 2022).
- “If we get an extended knowledge of the advantages and disadvantages of the environment and housing plus that it does not create much resistance in the municipalities that have their own area, then wind power is a resource that we must not write off. Perhaps we should have had a state wind company in the same way that Statoil took control of the oil in its day. Then the state and municipality can have control over development and income” says Gunnar Silden, Stad municipality, (NRK, 2022).
- “I’m a bit wait-and-see. I see that the municipalities have received more than they should have said, but I still think that onshore wind will be difficult to achieve good processes for. There has been an enormous change in public opinion about wind power, and whether you manage to turn this around despite record high electricity prices is not easy”, says Ole Andre Klausen, Askvoll municipality, (NRK, 2022).

At the beginning of October 2022, NRK published an article about public opinion related to onshore windmills, which was named “New survey: Several Norwegians are positive about wind power” (NRK, 2022). The article presents data from another survey conducted by the University of Bergen and Cicero (Cicero, 2022). The main question of the survey is “Skal vi bygge fleire vindturbinar på norsk jord?” which translates to English as “Should we build more wind turbines on Norwegian land?”. one thousand and two people were asked. According to this recent survey, 37% of respondents expressed a favorable view toward the development of onshore wind power.

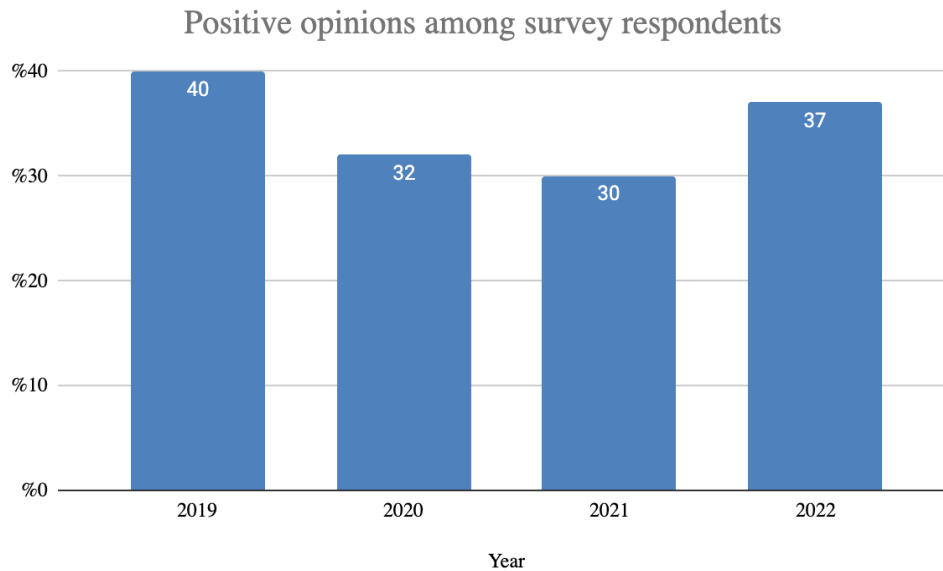


Figure 5 - Support of onshore windfarms among Norwegian citizens (based on NRK, 2022).

Kristin Guldbrandsen Frøysa, who serves as the subject director at the University of Bergen, suggests that the shift in opinion regarding onshore wind power may be due to the belief that there is a need for more electricity and that it can be easily obtained through this source. The article also points out that, despite an increase of seven percentage points from last year, the majority of people still oppose onshore wind power, with 40% reporting a negative view of it. According to this survey, significant regional disparities exist with regard to public opinion on onshore wind power, with people in Western Norway, Trøndelag, and the northern regions displaying the most skepticism towards this form of energy. Another curious result from a study by Kantar is the fact that 38% of customers stated that paying a low electricity price is more important than meeting climate targets (Livgard, 2022). Also, in late October 2022, NRK published an article saying that “people see it in light of the renewables shortage in Europe”. The head of communications in Norway, Robert Kippe, is optimistic about the latest surveys saying, “I think the explanation is that Norway needs wind power and that people see it early in light of the renewables shortage in Europe. In addition, opposition to wind power has been heard and led to sensible changes in the concession system” (E24, 2022).

The survey of the University of Bergen shows that the reasons behind people's opposition to wind power are multifaceted. Some individuals disagree with how the energy is utilized or how it impinges on the environment, while others protest due to a lack of confidence in the development processes or insufficient engagement with the local community. Additionally, some people feel that the revenue generated from the facilities is not distributed fairly between the investors and the local community. For some individuals, it may be a combination of all these factors that contributes to their opposition.

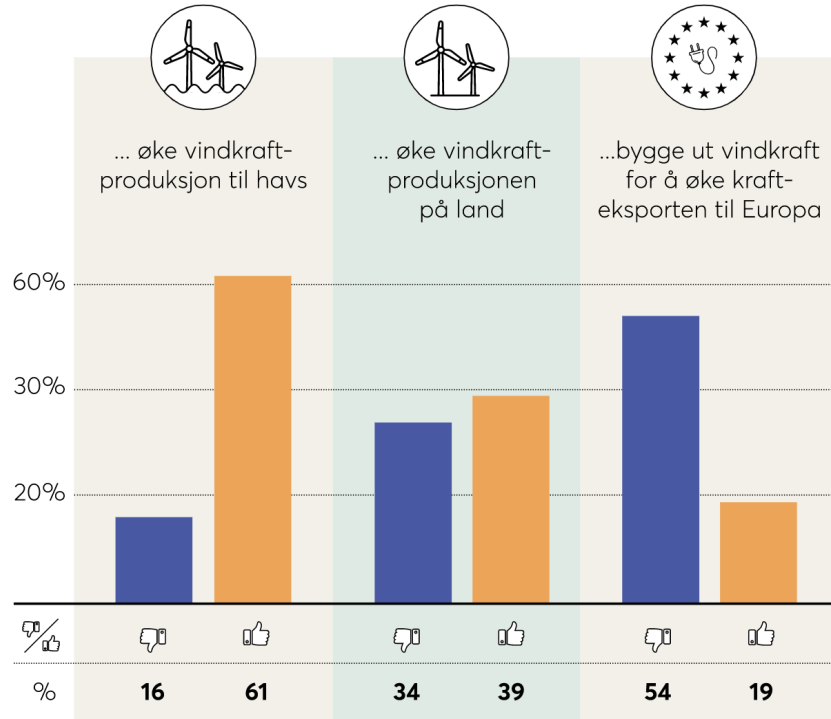


Figure 6 - Norwegian citizen relation to onshore windmills (from Cicero, 2022).

The graphs above show that more people are positive about land windmills however quite negative to expanding wind power for export outside of Norway.

4.2.3. Sami

According to the NVE thematic report, Norway is the only country in Europe that still has undamaged high-mountain ecosystems with original populations of wild European reindeer. These reindeer require vast and undisturbed mountainous regions to maintain a healthy population. Reindeer husbandry occurs in 140 municipalities across Norway, spanning about 40% of the country's land area, from Finnmark in the north to Hedmark in the south. Studies show that wild reindeer are shy and sensitive to human activity, which makes them vulnerable to development, traffic, and other disturbances. The construction of wind power facilities can have negative effects on reindeer grazing, migration patterns, and land use, potentially leading to displacement and disturbance by construction and development activities, and in the worst-case scenario, cutting off parts of their habitat. In light of this, NVE proposed that wind power development in the ten approved national reindeer areas is incompatible with the conditions necessary for these areas and should not be considered for licensing. In addition, any potential conflicts with reindeer in other reindeer areas should be given significant attention (NVE Report, Wild Reindeer). However, some pieces of land outlined by NVE for onshore wind power deployment still overlap with reindeer grazing areas, namely, Finnmark and Trøndelag

(Wind-watch.org, 2019). Moreover, before 2019 NVE had issued licenses for building wind turbines in reindeer grazing areas.

2019-2020

On the 1st of April 2019, NVE director Kjetil Lund presented for further consultation “The proposal for a national framework for onshore wind power” commissioned by The Ministry of Petroleum and Energy. On the very next day, the Sami Parliament released a statement expressing their inability to support the current version of the framework proposed by NVE. According to the Sami Parliament, NVE's proposal includes new projects in areas that are already vulnerable to reindeer grazing and have faced extensive land encroachments. Sami Councillor Silje Karine Muotka, said "Wind power development comes in addition to other planned interventions in grazing areas, such as the development of roads, railways, power lines, and cabin construction, to name a few. In the South Sami area, reindeer herding is already under strong pressure due to land encroachment, and this is a major and serious threat to the South Sami language and culture," (Wind-watch, 2019). In September 2019, Nature Conservation Association in Finnmark sent an official response to NVE's “National Framework for onshore wind Power” claiming that Area 44 West Finnmark must be removed due to biodiversity protection including the natural basis for Sami culture (Naturvernforbundet Finnmark, 2019). During the video conference hearing on the matter of onshore wind power at Stortinget, the organization Sami's Faith and Worldview made a statement regarding wind power. They clearly claimed that they don't want development and encroachment on Sami's sacred lands and water areas. They referred to the Article 27 of the United Nations International Covenant on Civil and Political Rights of 1966 on indigenous peoples' rights, which protects and allows them to live in the way they have traditionally done (Stortinget, 2020).

Starting in 2020, a number of legal cases were initiated by the Sami people in an effort to prevent the building of wind turbines on their lands and to argue that the licenses issued by NVE are invalid and illegal due to the fact that the deployment of wind turbines violates the rights of the Sami people. As a result, in the summer of 2020, the Jillen-Njaarke Reindeer Grazing District applied for a preliminary injunction to the court, demanding an immediate stop to construction work on Øyfjellet (E24, 2020). The license application for these 72 turbines was submitted and approved by NVE in 2014, and two years later, the government gave its permission. The expected annual wind farm production is around 1200 GWh, power enough for 75,000 households (NRK, 2021). In October 2020 the ruling came in Oslo District Court, and it was the developers, Eolus Vind Norway Holding AS and Øyfjellet Wind AS, behind the Øyfjellet windfarm who prevailed. The court also sentenced the Jillen-Njaarke reindeer grazing district to pay a total of NOK 1.76 million in legal costs to the opposing parties of developers. In addition, the reindeer grazing district itself had expenses of about NOK 670,000, excluding VAT to litigate the case, according to the judgment (E24, 2020).

2021-2022

The Fosen case marks a significant change in how wind turbines are being established in Sami areas. Since 2008, the Sami community has opposed the construction of one of the largest onshore wind farms in Trøndelag. Likewise in 2019, the Socialist Left Party urged the government to stop wind turbine development on mountain Storheia since it became obvious that this violated Sami's rights. However, County Mayor Tore O. Sandvik rejected their proposal saying, "There are some trains that have been running now. The encroachments on nature have been made, the construction roads have been built. Only installing the turbines remains. The costs of stopping the work will be very high for the developers. The county municipality has a duty to be a predictable administrative actor in this matter" (NRK, 2019). Despite the fact that the proposal was supported by the Red Party, the Green Party, the Liberal Party, the Pensioners' Party, and a minority of the Labor Party, it was voted down by an 18-50 vote, and the wind farm on Storheia was commissioned. This would lead to a stalemate between the government and Sami in 2023, which will be described below.

Storheia Reindeer herders have taken legal action, arguing that the development of wind power has violated the rights of indigenous peoples by taking away their traditional winter grazing areas. In October 2021, the Supreme Court ruled unanimously in the Grand Chamber that Sami's rights had been violated during the construction of wind farms at Fosen, and as a result, the concession and expropriation permits were invalid. The Supreme Court stated that reindeer herding is a protected cultural practice and ordered Fosen Vind to pay over NOK 5 million in legal costs to the Sør-Fosen and Nord-Fosen districts, while Statnett was ordered to pay around NOK 80,000 in legal fees (NRK, 2021).

This historic victory was a milestone for reindeer owner Sør-Fosen. Leif Arne Jåma, the leader of reindeer owners in this region says, "There is great joy among all of us who are affected. Our rights have been recognized by Norway's highest court" (NRK, 2021). It is clear that various parties, including politicians, expected the Fosen case to influence all wind power projects in Sami areas. As a result, Lars Haltbrekken, a member of the Socialist Left Party who has been actively engaged in wind power matters, suggested that planned projects should be reevaluated in light of the Supreme Court's ruling (NRK, 2021).

Additionally, are many conflict areas between the Sami reindeer herders and wind power companies. One of such conflict area is the Jillen-Njaarke reindeer grazing district which was struggling in the winter of 2022 due to the fact that reindeer were not allowed to move through the wind farm at Øyfjellet, preventing them from getting to winter pastures out on the coast and causing them to starve (NRK, 2022). The situation caused a lot of frustration and miscommunication from all sides: the government, reindeer owners, and the wind power company.

Some government representatives' statements also aggravate an already perilous situation. During one of the political debates, parliamentary politician Nikolai Astrup (of the Conservative Party) used the Øyfjellet wind farm as an example of where they had succeeded locally, saying "A few days ago I visited Øyfjellet wind farm in Mosjøen. 72 wind turbines and very little local conflict" (NRK, 2022). This caused reindeer owners in this area feel invisible and gives the impression that the government doesn't take their rights and voices seriously and, moreover, that the authorities are not aware of the issues or even neglect them. "Just because there are few people, you should be able to expand nature and overrun the local population. It is a mockery to make Sami and the Sami rights struggle invisible in this way," says Sami Parliament councillor Maja Kristine Jåma (NRK, 2022).

2023

Despite the Supreme Court's decision in October 2021 that called for the tearing down of wind turbines on the Fosen peninsula and for compensation to be paid, these turbines were still operating at the time of finishing this work in June 2023. It took eleven months after the verdict for the Ministry of Petroleum and Energy to produce a draft assessment program to find mitigating measures or a solution for the Fosen case. On February 27, 2023, activists from Nature and Youth and the Norwegian Sami National Association Nuorat blocked the entrances to the Ministry of Petroleum and Energy in Oslo, demanding the demolition of the 150 wind turbines, as more than 500 days have passed since the Supreme Court unanimously ruled that two wind farms at Fosen were established in violation of the indigenous rights of the Sami (VG, 2023). The protest went on for more than one week, however, the wind farm at Fosen is still spinning due to the fact that the government believes turbine demolition and replenishment will cost approximately 1 to 2 million kroner per turbine, depending on the restoration needs of the area and this is astronomically expensive. This is why the authorities have kept a dialogue with the Sami Parliament to agree upon other solutions to the issue but not the turbine removal (NRK, 2023). The Sami official representatives had three meetings with the Ministry of Petroleum and Energy, but they have now stopped communication due to their disagreement with the content of the investigation program and the proposed solution for the Fosen case. The President of the Sami Parliament Silje Karine Muotka said, "This is very serious. We have provided several inputs and suggestions on both people and formulations for the assessment program. We have not been heard despite the fact that we have had three consultation meetings" (NRK, 2023).

The Fosen case has given more legal support to reindeer herders, and one more trial was anticipated in May 2023. The reindeer herders in Sør-Helgeland are currently battling against Øyfjellet Wind AS, which has been authorized to build 72 wind turbines, and the production process has already started. Reindeer breeder Ole Henrik Kappfjell says, "The most offensive thing is that construction has begun before it is clarified with reindeer herding what kind of mitigation measures could have gotten, in consultation with the operation" (NRK, 2023). Thus,

looking at how the situation has been unfolding, it can be concluded that Sami's attitude towards onshore wind farms hasn't improved; on the contrary, the Court acknowledge the violation of their rights, exclusion from the discussion and decision-making process on the matter of building wind turbines at their areas led to radicalization and subsequent major protests in 2023.

4.2.4. Norwegian experts

The subject of onshore wind turbines has been a matter of discussion in Norway not only among the population but also among subject-matter experts. If certain specialists and ecological groups endorse wind power growth as a way to decrease greenhouse gas emissions and encourage a shift to more eco-friendly energy options, others are worried about the possible consequences of onshore wind turbines on the environment, such as the impact on wildlife and the visual impact on landscapes. The debate mainly centers on the benefits and drawbacks of onshore wind power and its potential impact on the environment and local communities.

On one hand, proponents of onshore wind power argue that it is a key component of Norway's transition towards a more sustainable energy system and can help reduce greenhouse gas emissions. It has also been pointed out that wind power has the potential to positively influence skyrocketing electricity prices and make them cheaper. For instance, Magnus Korpås, Professor of the Norwegian University of Science and Technology (hereinafter NTNU) Department of Electrical Energy, in his article to Stavanger Aftenblad, says "building out wind power on land is guaranteed to result in a drop in electricity prices, and is an effective long-term measure" (Stavanger Aftenblad, 2022).

Professor Korpås is also one of the authors of the article, which states that "More renewable energy, including wind power, to meet the climate targets" (UA, 2021). This article was published in a university newspaper with co-authoring of four more professors from the same NTNU university. In this publication, they refer to a study, which NMBU (Norwegian University of Life Sciences) researchers conducted to analyze the potential development of the power grid in the Nordic region (Chen et al., 2021). According to the study, the expected electricity prices are higher than the energy cost of wind power, which means that factors unrelated to the market will limit the estimated quantities of wind power. The study also suggests that Norway could have more than 12 GW of installed wind power by 2040. To put this into perspective, the installation capacity at the beginning of 2021 was only 4 GW. The article also references a 2020 system analysis which showed that low social acceptance of onshore wind in the Nordic region may cause electricity costs for customers to rise by 12% (Bolwig et al., 2020). With extensive electrification, electricity consumption will increase significantly, and, without new renewable power generation, this will cause electricity prices to rise over time. Wind power is a well-documented way to decrease electricity prices as its marginal cost is close to zero. Furthermore, wind power complements hydropower since it is statistically windier during the winter months when many water reservoirs are frozen.

It is also compelling to mention that Professor Korpås, together with his colleague and co-author of the earlier above-mentioned article Asgeir Tomasgard, published an article in *Aftenposten* on June 13, 2022, titled: “Solar and wind power are absolutely essential for us to be able to reach the climate targets“. This article refers to another article by their colleague from NTNU, Professor Jonas Kristiansen Nøland and Professor Jan Emblemsvåg, which was also published in *Aftenposten* just days earlier (*Aftenposten*, 2022). Professor Korpås and Professor Tomasgard heavily criticize their colleagues’ writing, arguing that “Solar and wind power are not cost-effective“. In their article, it says “It is very well documented (Holtinen et al., 2021) that both wind and solar energy have characteristics both in terms of cost (NVE) and availability (Jafari et al., 2020) that make them central to the energy supply now and in the future. It is completely at odds with the claims of Nøland and Emblemsvåg“. Also it is pointed out that “In short, all analyses of how we can achieve climate targets show that wind and solar power are crucial”.

A Supreme Court ruling in October 2021, which declared that the wind power facility violates Sami people's human rights and must be torn down, triggered a reaction of experts as well. According to Magnus Korpås, there will be implications for power generation in Trøndelag: “The wind power plants produce around 2 terawatt hours a year. It is probably close to all of Trondheim's electricity consumption. If you take away a wind power plant that has been built, you in principle take away electricity production that can cover the whole of Trondheim municipality” (E24, 2023).

However, not all experts are standing together with Mr. Korpås. Torstein Bye, who previously served as technical director and currently works as a special advisor at Statistics Norway (SSB), has been expressing reservations about the construction of the plant since it was in the application phase. Along with Professor Steinar Strøm from the University of Oslo (UIO), they both determined that the project was not financially viable (E24, 2023). “The expensive electricity is due to the sum of many political decisions in Norway and outside Europe”, says Professor Steinar Strøm (E24, 2023). He highlights that the market for greenhouse gas emission quotas in the EU is continually becoming more stringent. The volume of allowances is being reduced, the cost of allowances is increasing, and emitting greenhouse gases is progressively becoming more costly (Stavanger *Aftenblad*, 2021).

On the other hand, opponents of onshore wind power raise concerns about the visual impact of wind turbines on the landscape, potential harm to wildlife, and the impact on local communities. Some also argue that the development of onshore wind power may not be the most cost-effective or efficient way to achieve Norway's renewable energy targets. Earlier in 2021, Professor Jan Emblemsvåg (who was criticized by Magnus Korpås and mentioned in a discussion above) posted an article in *Finansavisen* stating that “Wind power is a bad investment for society” (*Finansavisen*, 2021). He points out that it is a known fact (Welt, 2021) that several wind turbines are decommissioned when their subsidies expire, and it is not feasible to retrofit them due to factors such as the height of the newer turbines, their proximity to residences, etc. While some of

them are replaced with more efficient turbines, the process is typically done in the same manner. As an example, the notion of revitalizing the German wind power sector through "repowering" is now outdated after years of minimal new construction and redundancies. Although repowering would increase capacity, it would, unfortunately, result in only a minor boost to system production.

Professor Jan Emblemståg opposing (Aftenposten, 2022) published a study titled "The role of transmission and energy storage in European decarbonization towards 2050" in January 2022 (Golombek et al., 2022). This study shows that solar and wind power may become the predominant power technologies in Europe, even in the absence of an assertive climate policy. The figure below demonstrates this likelihood, with the left panel indicating the power technology composition in Europe in 2050 if the EU achieves its climate neutrality objective, and the right panel displaying the corresponding composition in the absence of any climate policy.

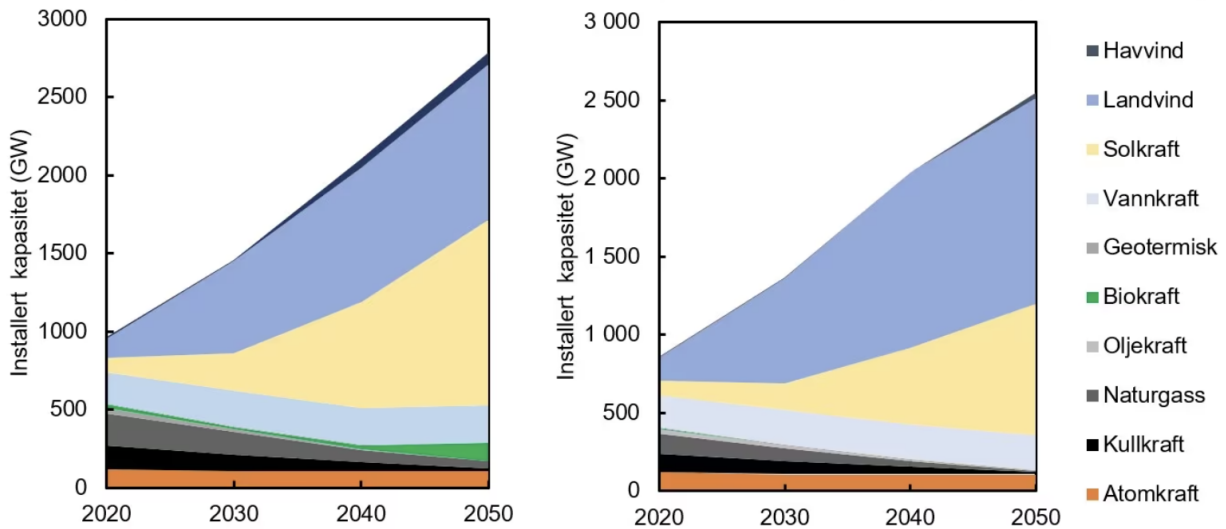


Photo: Department of Energy Technology

Figure 7 - Installed electricity generation capacity for the model cases 'Green' (left) and 'No target' (right), (based on Golombek, 2022).

The slight variance between the two scenarios suggests that nearly all specialists anticipate solar and wind power to become affordable energy sources in the coming years.

The authors of the article refer to expert projects, stating that "Based on our cost projections, the focus of development should be on onshore wind power rather than offshore wind power. The reason for this is that offshore wind power has much higher capacity utilization than onshore wind power. However, the cost estimates provided by experts suggest that even by 2050, onshore wind power may be more cost-effective than offshore wind power" (Aftenposten, 2022).

Jonas Kristiansen Nøland and Martin Hjelmeland are two professors from NTNU who do not stand together with the experts who support the onshore windmills. They were quoted in Altinget as arguing that “Hydro and wind power are not enough” (Altinget, 2023). Nøland and Hjelmeland also argue that “Some people may think that Norway is self-sufficient with adjustable hydropower resources and that it can therefore manage to develop only wind power”. “This year, with little inflow into the reservoirs, there is also little wind. This will go beyond Norway in so-called dry years. Norway thus risks a lack of electricity when it is most needed”. It is worth mentioning that Jonas Kristiansen Nøland and Martin Hjelmeland encourage the idea of nuclear power in Norway (Europower, 2023; Nordnorsk Debatt, 2023).

4.2.4.1. Experts’ feedback on NVE report

The May 2019 Aftenposten article is one example of experts' reactions to the NVE report (Aftenposten, 2019). Anders Lyngstad and Hans K. Stenøien, experts in the field of ecology, wrote an article titled “Wind power development in peat bogs can have a negative climate effect”. The development of wind power in peat boggy regions results in significant climate emissions due to the release of carbon that occurs when the bog is drained. Lyngstad and Stenøien explain that “The Norwegian Directorate of Water Resources and Energy (NVE) has recently published its national framework for wind power. Here they write that ‘the effects of all the parts in a wind power plant are assessed’, not just the effects of the turbines themselves, but also construction workers, cable trenches, access roads, and the like. But this is not a correct representation. NVE has not assessed the climate-related consequences of interventions in habitat types containing a lot of carbon in the soil, such as bogs and wetlands. If land-based wind power is to be climate positive, this carbon must remain in the soil”, (Aftenposten, 2019).

Experts point out that according to NVE's thematic report on climate footprint, which serves as the foundation for the national framework, the destruction of certain types of soil through land use changes is likely to result in greenhouse gas emissions. However, NVE notes that they are not aware of any studies examining greenhouse gas emissions resulting from soil processing during the construction of wind power projects. Lyngstad and Stenøien say that “This last point is startling. The consequences of bog destruction in the wake of wind power development have been studied for many years. British wind power developers have estimated carbon emissions for their projects for a long time, based on openly available statistical models” (Aftenposten, 2019). Also, they describe peat as a valuable resource for climate conservation. The peat found in bogs works like a sponge, capable of absorbing large quantities of water. It is made up of 90% water and 10% organic material, with half of the dry matter being carbon. These bogs have been generating peat since the ice age, and they contain seven times more carbon per square meter than other natural environments in Norway (Aftenposten, 2019).

Snorre Stener, a senior advisor at the Norwegian Environment Agency, has contributed to the development of the national framework for wind power by providing his expertise (Kraftfylka,

2019). He explains that the agency suggested removing several large wetland systems with significant ecological importance when the Norwegian Water Resources and Energy Directorate (NVE) was choosing locations for the framework. “The areas with different nature types will often be too small to be assessed in a review that covers the whole country. Therefore, there will be marshlands with great value within the designated areas. It is important to take these types of nature into account in the licensing process and detailed plans. In addition, it can be a theme in any regional plans”, says Stener (Kraftfylka, 2019).

Norway has made substantial investments in wind power, despite the potential adverse impacts on biodiversity and cultural heritage. The primary justification for these investments is often based on climate change, with wind power being promoted as a component of the country's shift towards sustainability. “Nonetheless, the limitations of the national framework for wind power are notable, and it is challenging to determine the overall impact of land-based wind power on the climate without considering the peat in the bogs”, says Lyngstad and Stenøien (Aftenposten, 2019).

Mikaela Vasstrøm, associate professor at the University of Agder's Department of Global Development and Planning, was interviewed about the NVE framework related to land-based wind power. Vasstrøm explains that the subject of onshore wind power has generated significant controversy in Norway in recent years. This polarization is due to various factors that have contributed to the issue's contentious nature. Mikaela Vasstrøm suggests that to engage in productive dialogue about wind power, it is necessary to begin by involving local communities. Political leaders need to overcome their hesitations and reservations to address the issue comprehensively (Energi og Klima, 2020).

Professor Vasstrøm doesn't believe that NVE paid less attention to municipalities; however, issues arose during the development phase, as municipalities lacked the authority to halt the projects. This power rests with the NVE, which was less responsive during this phase. It is noteworthy in Norway that the existing dominant energy sectors, such as hydropower and petroleum, have a comprehensive regulatory framework that has played a significant role in building the country's welfare state. However, such perspectives are rarely considered when discussing wind energy, which is often viewed exclusively through the lens of climate policy, rather than energy policy. The absence of a similar regulatory framework for wind energy is striking, especially considering the potential impact it could have on Norway's energy landscape.

Professor Mikaela Vasstrøm says: “Locally, the conflicts will always be very dependent on the context. There you have to talk together in the local communities. But at the national level, we must try to avoid the radicalization we see tendencies towards. Death threats, vandalism, and so on. There, I think national politicians must gather courage and dare to discuss this more openly and clearly. They must start from the knowledge base we have, and say where we should govern. Why should we have wind power? Should we produce for export, should we use it to electrify the transport sector, or for the industry? How much should we build out?”.

5. Discussion

The previous section of this thesis work presented the responses of four stakeholders associated with the development of onshore wind farms in Norway, beginning in 2019. This section is structured by focusing on the 3 hypotheses formulated in section 2.7 to show whether they were confirmed or refuted. To present a cohesive overview of changing risk communication, we concentrate on key events and developments from 2019 until the start of 2023, taking into account the actions and outcomes of the stakeholders. The discussion will explore the evolving external circumstances and their impact on the public's perception and acceptance of onshore wind farms in Norway. Besides the hypotheses, we present other findings based on the results and assess to what extent risk communication on the matter of onshore wind power was effective.

“Risk communication helps companies, governments, and institutions minimize disputes, resolve issues and anticipate problems before they result in an irreversible communication breakdown “.

Ragnar E. Løfstedt (*Risk Management in Post Trust Societies*, 2005)

The first hypothesis

To test the first hypothesis, that bottom-up inclusive type of risk communication on the matter of onshore wind turbines in Norway is more effective than top-down type, we come back to 2019, when the Norwegian government introduced its initial communication regarding the development framework for onshore windmills in Norway. It was a time when no significant shifts in the national economy were observed, and no external factors were identified that could have impacted the subject matter under consideration within the public discourse. The Paris Agreement was signed and the country's authorities were working towards achieving its climate goals. One of the tools which can be used for achieving the green energy shift is onshore wind turbines. However, wind energy is not black and white and some trade-offs ought to be made, so some risks can be mitigated and some have to be taken.

The perception of risk among individuals can be influenced by their trust in government authorities and their confidence in the government's ability to make informed decisions by considering the various merits and drawbacks of a given situation (Renn, 2010). Norway is renowned for its notably high level of trust in the government among its citizens (GLH & Svendsen, 2015). In the book titled "Risk Management in Post-Trust Societies" (2005), Løfstedt points out that top-down risk communication is preferable in communities with a high level of trust in government and institutions. Based on an analysis of the Norwegian government's strategy, it can be inferred that a top-down approach to risk communication was employed during the initial stages of the framework's establishment in early 2019. This involved the government tasking NVE with the preparation of a proposal for the national onshore wind power framework, which was subsequently presented to the public. Notably, the communication process entailed sharing only the finalized version of the document exclusively for consultation with diverse

stakeholders. However, this mode of communication proved unsuccessful, leading to the suspension of the framework's progress for an indefinite period, without any subsequent advancements. The communication dynamics between the government and the general public have, to some extent, demonstrated these top-down approach characteristics. There has been limited involvement of municipalities or other relevant stakeholders in the discourse pertaining to the framework. Furthermore, in its assessment report, NVE did not engage in consultations with local communities. Consequently, the unveiling of the onshore windmill plan led to substantial opposition movements among the population, resulting in protest campaigns emerging across various regions of the country. In May 2020, the protests escalated to the level where work at the site had to be halted. Protesters resorted to pitching tents and strategically parking vehicles along a road specifically constructed for the transportation of turbine components, with the intention of impeding the construction process. Law enforcement priorities had to intervene to address the situation.

In light of the events surrounding fervent protests against the onshore windmill project in 2020, governmental officials exhibited a learned response. In June of that year, the government publicly acknowledged the need for potential alterations in the licensing procedure. These modifications encompassed proposals to fortify the scrutiny and authorization process for permits pertaining to onshore wind power, while concurrently emphasizing a greater level of engagement from local and regional stakeholders. The amended licensing procedure incorporates a more comprehensive methodology, enabling municipalities to actively contribute their perspectives and exert influence on the decision-making process. As a result, we see that risk communication has started to change from a top-down approach to a more inclusive type.

Starting from the authority's risk communication on the matter of wind turbines, we see that necessary steps towards an inclusive approach started in 2020 and continued expanding in the following year. Contrary to Løfstedt's (2005) point, the changed type of communication didn't alert the large public nor raise concerns. Moreover, this switch was encouraged by many politicians and the large public, claiming that it was a victory for local democracy. For the whole of 2021, the government carried out the legislative work on the licensing process, and with the opposition efforts, the license-issuing procedure changed fundamentally and was presented at the beginning of 2022. The process became not only tighter, but more substantially, it is stated that municipalities ought to decide if they want new wind farms on their land or not, giving them the statutory right to decide. Moreover, now the decision-making process must involve reindeer husbandry for calculating local compensation (Reggjeringen, 2020). This complete switch in risk communication was absolutely necessary due to the fact that the previous attempt to introduce the proposal for a national framework for onshore wind power using the conservative top-down approach failed. This case confirmed Jamie K. Wardman's position; Wardman states in his article "Recalibrating pandemic risk leadership: Thirteen crisis-ready strategies for COVID-19" (2020) that in modern societies with a high level of education and developed democracy, inclusive risk communication works more efficiently than top-down. Wardman continues that the reason for

this is that in recent times people appreciate a partnership approach more than directives from authorities since the large public has enough knowledge and experience to be able to independently assess risks, discuss and choose the most appropriate for society way how to tackle hazards as well as share responsibility. Thus, our hypothesis that the bottom-up inclusive type of risk communication on the matter of onshore wind turbines in Norway is more effective than the top-down type has been confirmed.

The second hypothesis

Our second hypothesis proposes that minimal involvement of interest groups, namely Sami people, contributes to achieving successful outcomes of risk communication. It was put forward based on Löfstedt's research where he asserts that when the foundation of effective risk management strategy lies in the level of public trust in regulatory institutions, risk regulators are not required to engage stakeholders or other relevant parties in policy deliberations. Consequently, he recommends that, in order to achieve successful outcomes in proposed strategies, it is generally preferable to limit the involvement of interest groups. To some extent, we can see that Sami, which were identified in this thesis as a distinct stakeholder, were put aside by the government while developing the framework despite the fact that the national framework proposed Sami's land be used to deploy wind turbines. As a result, substantial resistance to the proposal emerged from the Sami community. The Sami Parliament released a statement expressing their inability to support the current version of the framework proposed by NVE. According to the Sami Parliament, NVE's proposal introduces new projects in reindeer grazing areas that are already vulnerable and have faced extensive encroachment on Sami lands.

Löfstedt demonstrates a preference for the top-down model of risk communication, a choice that was adopted by the Norwegian authorities. However, it ought to be highlighted that Löfstedt says that prior to implementing the top-down approach, the level of trust should be tested since this model has proven itself effective when a group of people trusts a regulatory body. It's not possible to state that the Sami community expresses a high level of trust in the matter of land-based wind. They have been fighting against wind turbines since 2008 claiming that this activity is destroying their grazing lands, and displacing reindeer. Their statements are well-founded and confirmed by extensive research (Skarin et al., 2018). Thus, the long-standing controversy between the regulatory bodies and Sami makes the indigenous people a stakeholder who has an obviously lower level of trust in the authorities in comparison to other groups. The combination of the top-down strategy and insufficient involvement in developing the national framework proved ineffective in achieving successful risk communication about onshore wind energy matters, as it triggered vehement public protests, heightened polarization in public debates, and ultimately resulted in the government's abandonment of the framework implementation.

Contrary to Löfstedt's perspective, the publication "Public Reaction to Nuclear Waste" by Dunlap et al. (1993) highlights that government officials risk compromising their reputation when they ignore or dismiss concerns raised by affected communities and fail to provide transparent and accurate information. The communication approach employed by the government in conveying this initiative was underscored by several political figures as a significant factor in escalating tensions between local municipalities and the central government. It is unsurprising that neglecting the opposition expressed by the Sami community and excluding them from the discourse could potentially undermine the government's decision-making process.

Potentially, if the government had adopted the strategy proposed by Renn in his book *Risk Governance* (2008), better results in risk communication would have been achieved. Since risks related to onshore wind turbines involve ambiguity and require solutions with some trade-offs, Renn claims that not only agency staff (NVE) and third-party experts should have been involved in the discussion, but also industries, directly affected groups (Sami and local communities) and the general public, giving these groups a voice, contribution, and influence in the process. In this case, disputes could have been detected and resolved at the very beginning, protests and polarized views could have consequently been mitigated, and the government wouldn't have spent so much precious time on restructuring the risk communication approach.

However, despite the fact that the government made a determined effort towards resetting risk communication on the matter of onshore wind turbines to the more inclusive, their interaction with the Sami community, exemplified by their initiation and subsequent legal victories against windmill construction in October 2021, indicates a lack of improved stakeholder engagement. Wolbarst A., (2001) stresses the necessity of clear communication and contingency planning to garner public support, which is crucial for the effective implementation of the energy transition. Failure to gain support from a significant stakeholder like the Sami community risks damaging the government's reputation in decision-making. The wide coverage of Sami's legal victory in the national Norwegian media further underscores the media's role in risk communication and interpretation (Liu et al., 2019), potentially influencing societal risk perceptions rather than individual ones. This event compelled public attention and showed that the Sami community won the Fosen case and the Supreme Court ruled unanimously that Sami's rights had been violated during the construction of wind farms in that area, and as a result, the concession and expropriation permits were invalid. According to the court decision, all wind turbines must be removed and the reindeer herders must receive compensation (NRK, 2021). Despite the hard-fought victory by Sami, the government didn't rush to execute the court's decision and officially claimed that they need to take a pause for consultation and outline a plan for mitigation measures or a solution for the Fosen case. Eventually, it took the Ministry of Petroleum and Energy 11 months to produce just a draft assessment program. Unsurprisingly, this type of "out of sight, out of mind" approach didn't turn out to be effective, and 500 days after the court decision, protests began (VG, 2023). At the beginning of 2023, the regulatory body mishandled communication by not having an open dialogue with the stakeholder. Since October 2021, the

Sami community has been ignored, not informed, and not engaged in discussion about the progress of the decision-making process. This led to the more-than-one-week protest, which was used by the Sami as a last resort to be heard and to attract attention to the problem. None of these factors contribute to improving risk communication or gaining trust. In contrast, it makes the already complicated situation even more twisted. Many articles and research on energy transition and related public debates highlight the importance of clear communication, partnership building, and contingency planning to ensure effective risk communication (Wolbarst A., (2001). However, it's definitely not the case between the government and Sami, and the far-reaching consequences of miscommunication between the actors can be tracked through the years. Even after the continuing protests and several meetings between the Sami official representatives and the Ministry of Petroleum and Energy, we can't observe substantial improvement. Thus, 2 months after the public outcry, the President of the Sami Parliament Silje Karine Muotka said that despite the fact that they provided several inputs and suggestions on both people and formulations for the assessment program, they haven't been heard and she doesn't see the point of being involved in further discussion with the Ministry of Petroleum and Energy" (NRK, 2023). Fischhoff, in his article "Communicating risks and benefits: An evidence-based user's guide", points out that it is important to treat the public nicely and make them partners. Unfortunately, we don't see such an attitude from the authoritative bodies.

Thus, our hypothesis that the minimal involvement of Sami people contributes to achieving successful outcomes of risk communication has been refuted. We reckon that the ways in which Sami communities have been treated from the beginning in early 2008, not being asked to grant consent for deploying turbines on their land, not being involved in communication and decision-making process and their requests not being heard, exacerbated the already poor communication between the state and the Sami people.

The third hypothesis

To check if our third hypothesis, which suggests that a potential deficit in energy sources in the country caused by external circumstances could lead to an increase in risk acceptance, can be confirmed, we have to go back in the autumn of 2021, which brought hardship. While the Norwegian government was trying to recalibrate their risk communication regarding on-land wind, a chain of events started unfolding in the background, which directly affected the country's energy sector and rapidly spawned attention. In the fall of 2021, a set of unforeseen circumstances led to the fact that Norway faced the ever-highest electricity rates. Among them was the launch of the 2 new electricity cables connecting South Norway and the UK and Germany. Exactly at this period of time, there was a dry season in Norway, a shortage of energy derived from solar panels and wind turbines due to inadequate wind and sun in Europe, and a real probability of a new war in continental Europe, jeopardizing energy carriers' delivery from Russia. All these factors created unprecedented demand for energy, draining the Norwegian

energy system and sharply increasing the county's electricity prices, which never came back to their initial level. Here, it's crucial to point out that Norwegians always used to have cheap electricity and it was a distinct advantage for any type of business in many areas. Thus, before the autumn of 2021, negative attitudes towards onshore windpower were shaped in the light of cheap electricity in the country. Consequently, this series of events can be considered as a milestone in Norwegian energy policy, which triggered a strong reaction from the large public, commerce, and other stakeholders and made the government re-evaluate the existing energy system.

Sky-rocketing electricity prices dragged all attention, starting from mass media and the large public, ending with subject matter experts and high-ranking officials. From that moment, the onshore wind began to be seen not only as a tool to achieve the Paris Agreement but also as a way to drive down electricity prices. We assume that it was one of the ranges of turning points that could have affected the public risk perception on the matter of onshore turbines. As stated in the article "Public Reaction to Nuclear Waste" by Dunlap et al. (1993), one of the elements which shape public risk perception is the potential benefits and costs of energy. We consider the survey results which are given in the section 4.2.2 of this work as one of the indicators that exorbitant prices and the growing threat from the East, which creates an insatiable demand for energy in Europe, affected people's risk perception about alternative energy sources. Moreover, indirect evidence of the fact that people can take more risks if they see obvious advantages is that 38% of customers stated that paying a low electricity price is more important than meeting climate targets (Livgard, 2022). In 2021, only 30% of Norwegians were positive about unfolding onshore wind power, whereas, in 2022, this number rose 7 points and made up 37% of people. Thus, the hypothesis that a potential deficit in energy sources in the country caused by external circumstances could lead to an increase in risk acceptance is confirmed. However, despite the fact that obvious benefits influence people's risk perception, it does not necessarily mean that they are able to completely change a view. The question to what extent it can increase risk acceptance, remains opened. Thereby, the situation with inflated prices, uproar for energy in Europe, and revealed fragile balance in the continent showed additional benefits of onshore wind power that hadn't been seen before. We believe that to receive a holistic picture of changing risk acceptance longer follow-ups are needed. It would be interesting to see the results of a similar survey throughout 2023, 2024, 2025, etc.

The conjunction of the war started in February 2022 and municipalities being granted the required power to decide if they want to set up wind farms on their territory allows looking at the onshore turbines through the lens of the need to increase the robustness of the Norwegian energy system, diversify energy sources and reduce electricity prices. Moreover, despite the ongoing fundamental changes in the geopolitical situation, Norway still has the commitment to reach the Paris Agreement, which can be achieved by unfolding green energy sources, including onshore wind farms. This combination of factors gives the Norwegian government a realistic chance to regain trust, which has been challenged by the Fossen case and inefficient risk communication on

the matter of land-based wind farms. Additionally, the main stakeholders, such as the government, the general public, and experts, can align their risk perception about the onshore wind which, in its turn, will increase trust in the regulatory body. According to Löfstedt (2005), if people's perception is in line with the regulator's, trust in authorities grows or remains stable. As mentioned in the results section, under external circumstances, more experts and politicians started expressing the opinion that wind farms could help bring down prohibitive electricity prices in the country as well as avoid quite realistic energy shortages in the near future. Thus, the nature of public debates on onshore wind turbines switched from positioning this type of green energy as an instrument for achieving the Paris Agreement to a multi-purpose tool.

Other findings of the paper

The evolution of risk communication between the regulatory bodies and the other stakeholders, their debates and actions as well as the changing circumstances throughout the years have been covered extensively in media. In this work, we analyze the major stakeholders through the media but not the mass media itself. Nevertheless, it is doubtless that media affect the large public (Gross et al., 2003) since most of the time individuals don't have direct experience with some of the risks and they form their opinion through the different channels, including mass media (Kasperson & Kasperson., 2003). Bearing in mind that media broadcast events and statements sent by different actors, we assume that media create a societal level of risk judgments, rather than personal ones (Wahlberg and Sjöberg, 2000).

What is remarkable is that most negative attitudes are observed in areas where people have directly experienced the consequences of deploying the land-based wind farm. In Central Norway (Trøndelag, Møre, and Romsdal counties), 44% of the population was very or quite negative in 2020. The level of opposition towards onshore wind power in Western Norway has witnessed the highest growth, escalating from 28% being very or fairly negative in 2019 to 41% in 2020. In Northern Norway, the level of opposition towards onshore wind power is also significantly rising, from 20% being very or fairly negative in 2019 to 37% in 2020. It is evident that areas experiencing significant progress exhibit strong resistance to onshore wind power due to the tangible changes witnessed by the local population. The academic literature emphasizes the importance of social acceptance, public engagement, and the establishment of effective policy and regulatory frameworks for a successful energy transition (McCauley et al., 2019).

In accordance with specific research conducted by Jaeger et al. (2001), the perception of climate change as a global issue frequently leads to a decreased focus on regional consequences, resulting in limited attention and subdued debates. Recognizing climate change risks can significantly impact individuals' perceptions of risk. Observing the public's response characterized by the main concerns of the general public, it becomes evident that Norwegians are cognizant of climate change and acknowledge the necessity of transitioning to renewable energy sources. However, substantial resistance is encountered when it comes to the implementation of

onshore wind turbines, and the gravest concerns are severe consequences for local nature, endangering wildlife, and demolishing landscapes. Public debates on the matter of wind energy have been intense and different actors have expressed polarized opinions.

According to Sjöberg, (2000), there is a difference between the public and scientific assessment of the risk, and even the Norwegian experts related to this matter are not fully united. Some subject matter experts, such as Professors Korpås and Tomasgard, state that all assessments regarding the attainment of climate objectives consistently underscore the pivotal role of wind and solar energy sources. On the other hand, Professors Bye, Strøm and Emblemståg claim that onshore wind energy is not financially beneficial for society. Other experts, namely Kristiansen and Hjelmeland, reckon that hydro and wind power is not enough for Norway if the country aims to have a resilient energy system and that authorities must take a step towards nuclear power. Mikaela Vasstrøm, a professor affiliated with the Department of Global Development and Planning at the University of Agder, recommended that politicians address communication regarding onshore wind energy comprehensively, pointing out that they must overcome their reservations and uncertainties and reach out to community members since the impact on nature and the environment are the key aspects of the debate in Norwegian protests. Many local communities view wind power as an unjust exploitation of their resources; this is why a framework similar to the oil one could help to defuse tension, creating additional value and welfare for people who live in areas where wind turbines operate. For public authorities, it is vital to remember that the divergence of opinions among professionals can lead to a state of perplexity and division within the general public's perception regarding the credibility of risk evaluations (Covello et al.,1984, Morgan & Henrion, 1990). Therefore risk communication in relation to highly debatable topics needs to be selected carefully.

Findings based on criteria of quality of risk communication

To appraise to what extent the risk communication on the matter of onshore wind energy has been effective, we ought to refer to the criteria of quality of risk communication. As was considered in paragraph 2.4.1.1., Fischhoff in his works refers to some stages of development of risk communication which should be followed to achieve good results:

- All we have to do is get the numbers right
- All we have to do is tell them the numbers
- All we have to do is explain what we mean by these numbers
- All we have to do is show them that they have accepted similar risks
- All we have to do is show them that it is a good deal for them
- All we have to do is treat them nice
- All we have to do is make them partners
- All of the above

Based on feedback received from subject matter experts on the NVE national framework for onshore wind power in Norway, we see that not all information about risks related to wind

turbines was correct. As we mentioned before, specialists who prepared the proposal claimed that they are not aware of any reports examining greenhouse gas emissions resulting from soil processing during the construction of wind power projects. Later, other experts emphasized that there are many scientific studies, especially in the UK, which indicate that building up wind turbines on or next to peat bogs will lead to the release of huge amounts of carbon dioxide into the atmosphere since these marshlands naturally have been absorbing carbon dioxide for thousands of years. Besides this, NVE in their analogue report “Reindeer husbandry and other Sami use of uncultivated land” claims it’s not so obvious and there is no aligned conclusion in research on the matter of how an operating wind power plant affects reindeer's land use or behavior. In fact, there is plenty of research confirming that onshore wind farms pose substantial risks for reindeer. In “Talking to the media requires clear, concise, relatable messages”, Burger (2022) claims that authorities need to ground effective risk communication in up-to-date risk-science-based information because all fields have been evolving, and the most recent credible science is essential. As we can observe, not all data used to prepare the national framework for onshore wind power was up-to-date.

Referring to the step when it should be explained to people that they have accepted similar risks before, we see an issue. Onshore wind farms destroy landscapes and nature, and acceptance of such risks is quite low in Norwegian society. At the same time, people didn’t observe the value or considerable benefits which wind energy can provide. At the moment when NVE was introduced, the country used to have cheap electricity based on an eco-friendly resource; most of the electricity in Norway was produced by hydro. Another discrepancy with Fishhoff's stages of development of risk communication is that one of the key stakeholders, the Sami people, hasn’t been treated nicely, which was already covered above. All these factors prevented the risk communication from being effective and successful.

Approaching risk communication from a practical perspective, we refer to the context of formal risk analysis. In this realm, Balog-Way, Katherine McComas, and John Besley's work titled "The Evolving Field of Risk Communication" (2020) sheds light on the crucial role played by messengers, message attributes, and the target audience in ensuring the effective and practical implementation of risk communication. These noteworthy studies in risk communication can offer valuable insights for authorities in managing future instances of complex risk communication scenarios.

Balog-Way identifies “messengers” as encompassing individuals, groups, and organizations that actively and intentionally participate in the process of risk communication. We identify the government and the subject matter experts as the main messengers in this Master Thesis work. Balog-Way emphasizes the significance of trust as a critical element for messengers. It is highlighted that the audience's inclination to place confidence in sources of information is perceived as credible. Interestingly, research findings indicate that there is no universally applicable approach to establishing and sustaining trust in messengers. Therefore, it is recommended that trust levels be periodically assessed as a baseline (Balog-Way et al., 2019;

Löfstedt & Boudier, 2017). As we assumed above, the level of trust towards the messenger (government) from the Sami people is lower in comparison with the rest of the population due to the precedent of violation of their rights (Fossen case).

As it is crucial for building trust, transparency is also immensely valuable for a messenger in the communication process. Transparency not only enhances the effectiveness of communication and public information but also serves as a means of distinguishing trustworthy messengers from those lacking credibility (Löfstedt & Boudier, 2014; Way, 2017, pp. 60–64). Here we should point out that the risk communication on the matter of wind energy is characterized by a high level of transparency since the NVE proposal is available on the official site and anyone can familiarize themselves with 21 thematic reports about onshore wind turbines and which risks they pose. Moreover, throughout the risk communication, both messengers (the authorities and experts) used mass and social media and its diverse content formats, such as videos, photos, and live streams, providing messengers with a faster and wider-reaching platform to connect with their audience. This opportunity has facilitated a more interactive and collaborative form of risk communication, often referred to as "multiway" communication.

Balog-Way asserts that "message attributes" refer to the qualities and intrinsic characteristics of risk communication conveyed through verbal, written, or recorded means. Crafting message attributes is a crucial aspect of risk communication, involving intentional and perceptive construction (Nisbet, 2015). By employing sociological framing techniques, an author creates a narrative that effectively conveys the reasons behind specific issues, recommends appropriate actions, and assigns responsibility. The process of shaping choices within risk communication holds the potential to substantially shape the nature of a risk issue by establishing the context for risk perceptions, discussions, and debates (Boholm, 2009; Nisbet, 2015). Taking into account the fact that the risk of communication about wind energy in Norway is characterized by U-turns from the top-down to a bottom-up approach, many messengers, particularly in the government, have changed their narratives upside-down, which negatively affected the quality of communication.

The last part of the communication chain which we discuss is "audience". Audiences encompass diverse groups of individuals who are the intended recipients of messages and engage in multiway dialogue as part of the communication process. Therefore, messengers must possess a deep understanding of their audience when engaging with them, as risk communication messages are inevitably filtered through the lens of individual risk perceptions held by the public. We refer to the "audience" in this work as the general Norwegian public and Sami. The Norwegian population is characterized by heterogeneity, with certain groups endorsing hierarchical and individualistic cultural orientations and many others holding typical egalitarian viewpoints, resulting in disagreement (Kahan et al, 2009, 2010, 2012). Obviously, the rights violation of the Sami people and the subsequent protests indicate that, as the messenger, the government didn't understand this aspect of the audience and used the wrong approach with them, which led to poor risk communication between the messenger and the audience.

There is extensive research on the matter of effective risk communication and, based on works written by Burger et al., Warren & Lofsted, we add more facts to the list of slips in communication done by the policymakers. Warren & Lofsted in their work “Risk communication and COVID-19 in Europe: lessons for future public health crises” (2022), emphasize that communication should be consistent over time, and U-turns should be avoided if possible. However, we detect exactly the opposite situation, as the communication started as top-down and showed itself inefficient and then over the years became more inclusive, having (or maybe developing?) features of bottom-up communication. The fact that communication became, to some extent, bottom-up definitely increased its effectiveness, however, if the government had tested the level of trust in society, public values, and risk perception regarding the onshore wind, as suggested by Warren & Lofsted, these unnecessary U-turns could have been avoided.

Another point highlighted by Warren & Lofsted is that regulatory bodies should avoid trust-destroying incidents and promote solidarity. The Fossen case and related protests with the following miscommunication between the authorities and Sami representatives don't contribute to increasing trust towards the policymaker. Contrarily, it increases tension between the stakeholders and jeopardizes the whole risk communication process. Thus, it can be concluded that by fulfilling the criteria listed above, the objectives of risk communication could have been achieved. Taking into account that the Norwegian government hasn't succeeded in the following objectives of risk communication: attitude adjustment (to support risk-related decisions, the acceptance of the risk source), rightful function (to obtain trust in the competency of management decisions), participation objective (to assist and support in moderating the conflict situations about risk-related disputes), we can conclude that not all the goals of the risk communication have been met. Consequently, to some extent, the risk communication has been unsuccessful. However, we see that with partnerships and an inclusive approach, it has been improving.

6. Conclusion

Our master's thesis centered on examining the evolution of public perception surrounding onshore wind power, with a specific focus on the transformation from a state of broad consensus to one characterized by polarized viewpoints. The main question that has been asked is “How the changed geopolitical situation could have affected the risk communication and public debate regarding renewable energy in Norway?”

The findings presented in this study suggest that the combination of soaring electricity prices and the escalating Eastern region's impact on energy demand in Europe has had a discernible influence on individuals' risk perception regarding alternative energy sources. The public's opinion has shifted from “strongly disagree” to “somewhat agree” on the matter of onshore wind farm development. Thus, the prevailing external circumstances prompted an increasing number of experts and politicians to articulate the view that wind farms could serve as a viable solution to mitigate the exorbitant electricity prices dominant in the country and address the imminent risk of energy shortages. Consequently, the nature of public discussions surrounding onshore wind turbines underwent a transformation, shifting from positioning this form of green energy solely as a means to achieve the objectives outlined in the Paris Agreement, to recognizing its potential as a versatile tool with multiple purposes.

In our analysis, we contend that the transformation in the public perception can be attributed, in part, to a shift in the government authorities' approach to risk communication. Specifically, there has been a transition from a top-down communication model to a more inclusive approach. The limitations of the top-down model in addressing complex issues necessitate careful consideration by government authorities when selecting an appropriate risk communication strategy. As evidenced by the shift in public response over time towards a "somewhat agree" stance on the continued development of onshore wind farms in Norway, it becomes apparent that an inclusive type of risk communication is preferable in this particular context. Simultaneously, it is essential to acknowledge that the chosen timeframe of our research study may not sufficiently establish beyond any doubt the extent to which external circumstances can impact risk perception. We maintain that future studies would benefit from a more extensive observation period in order to provide a more definitive understanding of this relationship.

Despite the fact that the population's attitude toward onshore wind has been improving, the situation with one of the main stakeholders, the Sami people, remains grave. For many years, they had been excluded from the decision-making process regarding the deployment of wind turbines on lands where they herd reindeer. Later on, the authorities engaged in communication with Sami, but in many cases, it has been done as a formality and hasn't considerably influenced decisions. As was recognized by the Norwegian Supreme Court, Sami's rights have been violated by the development of wind power at Fosen case, taking away their traditional winter grazing areas and preventing them from their cultural practice. These circumstances undermine

trust in the government and aggravate the already thorny issue of grassroots perception of onshore wind farms.

Based on our research and findings, the following recommendations could be offered for risk communicators in order to continue the engagement with the public in relation to onshore windmills development in Norway and improve risk communication:

- Work with the population in the areas which have undergone wind farm deployment, because that they have the most negative attitude towards wind energy. Different ways to tackle the resistance could be considered, from improving risk communication using best practices to offering compensation schemes in the form of shares in local energy companies. The latter might be relevant due to the fact that a perception exists among certain individuals that the allocation of generated revenue from wind turbines is inequitable, with concerns raised about the uneven distribution between the investor and the local community. Social acceptance of energy transition, public engagement, and the establishment of effective policy and regulatory frameworks are crucial in the context of wind power (McCauley et al., 2019).
- To ensure the efficacy of risk communication, it is crucial to rely on contemporary information rooted in risk science. This is imperative due to the continuous evolution occurring across all fields, necessitating the incorporation of the latest credible scientific findings. The scientific-based approach allows authorities to build up more effective, steady, and transparent risk communication, maintaining coherence and reliability over an extended period and avoiding U-turns (Burger et. all, 2022).
- Referring to the case of violation of indigenous people's rights, promoting solidarity should be prioritized. Taking into account the fact that several similar cases have already been brought to court and there is a certain probability that a court's decision will not be in favor of the state, proactive measures should be undertaken to prevent, or at least mitigate, the consequences of these incidents, which erode trust and confidence. Ideally, these situations must be avoided in the future. It is imperative to foster and enhance trust and transparency throughout the process of risk communication. Efforts should be made to improve these fundamental aspects to engage stakeholders and promote informed decision-making effectively (Warren & Lofsted, 2022).
- To enhance effectiveness and mitigate the risk of unforeseen consequences, it is advisable to conduct pre-testing of communication campaigns prior to their implementation and subsequently evaluate their outcomes as well as measure the level of trust among different groups of society, stakeholders, and affected groups of people. This practice enables a proactive approach toward refining the campaigns and maximizing their impact (Warren & Lofsted, 2022). Moreover, it is crucial to cater to the requirements and concerns of the target audience, ensuring their needs are adequately acknowledged and addressed during the course of communication (Burger et al., 2022).

- Effective communication and collaboration among all key actors and stakeholders, including governmental agencies, non-governmental organizations, as well as interested and affected parties, is imperative. Encouraging and facilitating dialogue and cooperation between these entities is crucial to foster comprehensive engagement and achieve mutually beneficial outcomes (Burger et. all, 2022).

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