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Wind power expansion and social acceptance

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Summary

The expansion of wind power in Sweden is a necessary condition to reach the national set emission targets by 2045. Today, industry and domestic transport account for about one-third each of Sweden's total emissions. Reducing the emissions from these sectors requires extensive electrification. Even though it seems like Sweden has good chances to become world-leading in the transition to a low-carbon economy the process to expand wind power production is not as thriving as one may think. One strong reason behind this is the lack of social acceptance. Although the public support is relatively high, experiences show that the energy transition is causing various consequences for local communities and socioeconomic groups where the development takes place. In this paper we therefore examine factors affecting as well as increasing social acceptance to highlight the social context of the energy transition.

Social acceptance is influenced by a wide and complex set of factors between individuals, communities, wind energy operators, and regulatory regimes at a variety of geographical scales. Besides the municipal veto, which is the most common reason why wind power projects are rejected, social acceptance depends on justice issues, democratic participation, sound annoyance, visual aspects, and environmental concerns. Considering justice issues, the gap between cost and benefits is more decisive than the “not in my backyard” attitude. When community concerns are removed rather than addressed the interaction gets less meaningful. Visual and sound annoyance is often based on deeper senses of identity and connections, and environmental concerns could both be an expression of support and scepticism. In sum, all these factors are context-specific and should neither be understood as universal nor complete.

To increase social acceptance of wind power expansion decision-makers must consider planning processes, compensation measures, and ownership structures. First of all, trust is key in the process of wind power expansion. For a planning process to become meaningful, openness and opportunity for participants to define the processes, as well as outcomes, are required. In this sense, decision-makers cannot assume that certain participants are wrong or less legitimate. Secondly, with more systematic financial compensation, the gap between those who benefit and those who get affected by the wind power expansion can be reduced. This is especially important in the Swedish context where a rise of populist movements can be seen. Lastly, there is a need to examine possible ways to reform ownership structures of wind power. This is something that has been proven fruitful in other countries where wind power expansion has been successful.

Sammanfattning

Utbyggnaden av vindkraft i Sverige är en nödvändig förutsättning för att nå de nationellt uppsatta utsläppsmålen till 2045. Idag står industri och inrikes transporter för cirka en tredjedel vardera av Sveriges totala utsläpp. Att minska utsläppen från dessa sektorer kräver omfattande elektrifiering. Även om det verkar som att Sverige har goda chanser att vara världsledande i klimatomställningen så har vindkraftsutbyggnaden inte varit så framgångsrikt som man skulle kunna tro. En stark orsak till detta är bristen på social acceptans. Även om stödet för vindkraft är relativt högt visar erfarenheter att energiomställningen påverkar lokalsamhällen och socioekonomiska grupper på flera sätt. I denna rapport lyfter vi därför fram de sociala utmaningarna i energiomställningen genom att undersöka vilka faktorer som påverkar social acceptans. Därefter ger vi ett par förslag på hur social acceptans kan uppnås i högre utsträckning.

Social acceptans påverkas av en bred och komplex uppsättning av faktorer mellan individer, samhällen, vindkraftsoperatörer och lagar på flera nivåer. Förutom det kommunala vetot, som är den vanligaste anledningen till att vindkraftsprojekt avvisas, beror social acceptans på rättvisaspekter, demokratisk förankring, ljudstörningar, visuella aspekter och miljöhänsyn. Med tanke på rättvisaspekterna är klyftan mellan kostnader och vinster för vindkraftsutbyggnad en mer avgörande förklaring än attityden "inte på min bakgård". När oro från lokalsamhällen trycks undan snarare än adresseras blir dialogen i planeringsprocessen mindre verkningsfull. Visuella störningar och ljudstörning bygger ofta på djupare känslor kopplade till identitet och samhörighet, och miljöhänsyn kan både vara ett uttryck för stöd och skepsis. Sammanfattningsvis är alla dessa faktorer kontextspecifika och bör varken förstås som universella eller fullständiga.

För att möjliggöra social acceptans av vindkraftsutbyggnad måste beslutsfattare överväga att förändra planeringsprocesser, kompensationsåtgärder och ägarstrukturer. För det första är tillit och förtroende avgörande i processen för vindkraftsutbyggnad. För att en planeringsprocess ska bli meningsfull krävs öppenhet men också möjlighet för deltagarna att forma såväl processer som utfall. Därmed kan beslutsfattare inte anta att vissa medborgare har fel eller att deras åsikter är mindre legitima. För det andra kan klyftan mellan de som gynnas och de som drabbas av vindkraftsutbyggnaden minska med en mer systematisk ekonomisk kompensation. Detta är särskilt viktigt i det svenska sammanhanget där vi ser en framväxt av populistiska rörelser. Slutligen finns det ett behov av att undersöka möjliga sätt att reformera vindkraftens ägarstrukturer. Detta är något som har visat sig fruktbart i andra länder där vindkraftsutbyggnaden varit framgångsrik.

Introduction

Sweden has set a target to reach net zero carbon emissions by 2045. Today, industry and domestic transport account for about one-third each of Sweden's total emissions (Naturvårdsverket n.d.). Reducing the emissions from these sectors requires extensive electrification. According to the Swedish Energy Agency, the best potential to transform the emission-intensive sectors and thus achieving the climate target is to expand wind power production (Energimyndigheten 2023). In 2021 the Swedish Environmental Protection Agency and Energy Agency identified an expansion need of 100 TWh of wind power, of which 80 TWh on land and 20 TWh offshore¹. As the typical land-use for land-based wind power is 50-100 km²/TWh (Lindblom & Malmaeus 2022), it is expected that 4000-8000 km² of land is required to for 80 TWh of land-based wind power². In 2022, the previous government set an ambition to expand offshore wind power with 120 TWh. At the same time, the Swedish Energy Agency and eight other authorities were given the task of enabling an additional 90 TWh of offshore wind power. This means that Swedish authorities must enable 200 TWh of wind power in total, which is seven times as much as the wind power produced in 2021 (Johnsson et al. 2022).

The International Energy Agency highlights Sweden as one of the world's leading countries when it comes to transitioning to a low-carbon economy. With its long coast and relatively small population density, Sweden still has plenty of space remaining for wind turbines and is therefore also likely to become world-leading in the wind market (Enevoldsen & Permien 2018; Bjurulf 2022). Even though the support for wind power has decreased in the last years the Swedish public expresses a positive attitude towards wind power in general. Only solar power and hydropower obtain higher public support. According to the SOM Institute 58 percent want to invest more in wind power than today, 21 percent want to invest the same amount as today and only 13 percent want to invest less than today (Göteborgs universitet 2022).

Nevertheless, experiences show that the energy transition is causing various consequences for local communities and socioeconomic groups where the development takes place (Bolin et al. 2021). Sweden has been criticized for failing to comply with the UN declaration on the rights of

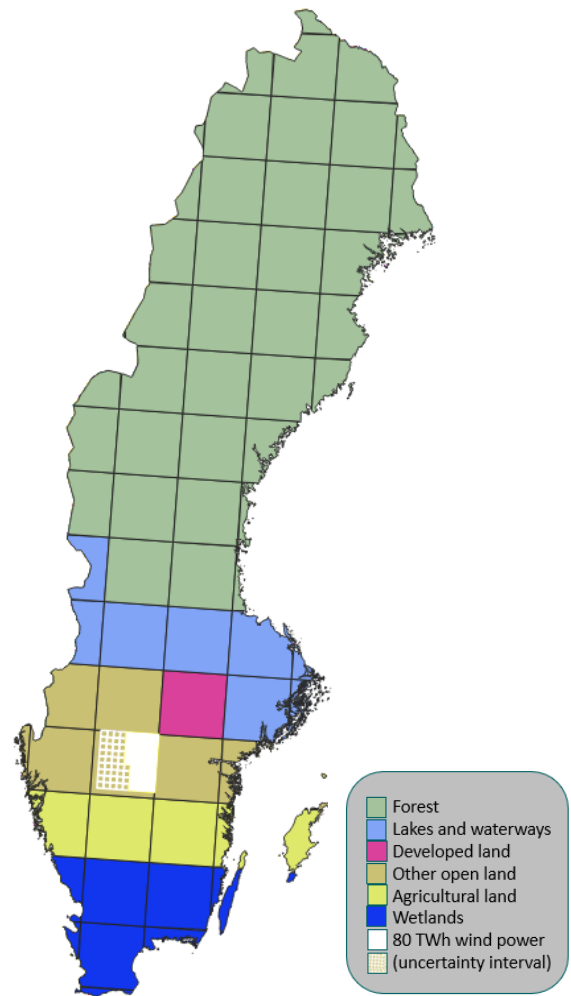


Figure 1. Estimated spatial needs for 80 TWh land-based wind power added to figure representing current shares of land use categories in Sweden.

¹ New scenarios from the Swedish Energy Agency indicate that wind power on land needs to reach 106, 108, or 117 TWh and 21, 21, or 57 TWh offshore (Energimyndigheten 2023)(Energimyndigheten 2023).

² The current shares of land-use of different categories have been summarized and visualised for this project using GIS software and land-use data from the Swedish Environmental Protection Agency. The expected land-use for 80 TWh has been added to visualize spatial demand in relation to other land-use categories.

indigenous people and to protect the Sami land rights in the permit processes (Ramasar et al. 2022) Yet, Sweden has not ratified the ILO Convention 169 which recognizes indigenous peoples' right to self-determination within a nation-state, while setting standards for national governments regarding indigenous peoples' economic, socio-cultural, and political rights, including the right to land use (Sametinget 2023). As municipalities have legal veto for developing wind power there is a variation of rejections and approvals. According to Liljenfeldt & Pettersson (2017), more than a quarter of the wind energy proposals were rejected in the south of Sweden from 2002 to 2015, but only slightly more than one percent were rejected in the north during the same period.³

To be able to achieve the large and necessary expansion of wind power, social acceptance is of critical importance (Utfasningsutredningen 2021). Social acceptance could be defined as an outcome of a collective judgment or opinion of a project, plan, or policy. It may be positive or negative and often emerges at the local or regional level (Gouvernement du Québec 2023). As Ramasar et al. (2022) note “[w]ithout understanding the underlying inequalities in a society, it is possible to treat society as uniform and misrepresent certain recognition justice issues as simple procedural failings. This can be highly problematic and reinforce inequalities in the energy transition”.

To better understand resistance as well as possible ways to handle conflicts in the energy transition, there is a need to move beyond a narrow techno-ecological focus on wind power expansion. In this report, we will therefore discover factors that affect social acceptance of wind power expansion. Then we will examine possible measures to increase social acceptance. Lastly, we will discuss the results in a broader context of social justice.

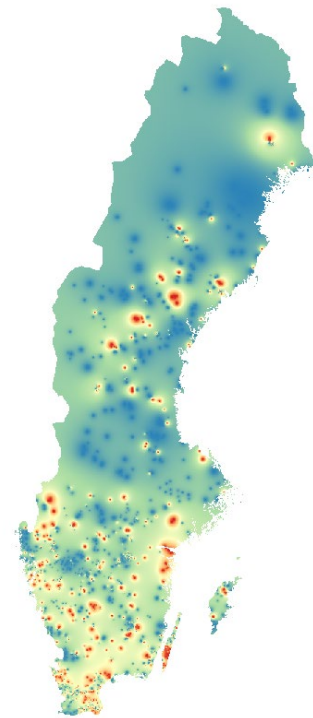


Figure 2. Heat map of historically accepted/rejected wind power projects in Sweden. Red represents rejections and blue represents accepted project.

³ To visualize the historically accepted/rejected wind power projects in Sweden and their spatial distribution, data from Vindbrukskollen on previous applications and their outcome (accepted/rejected) has been visualised in GIS software using inverse distance weighted (IDW) interpolation.

Factors affecting social acceptance

Social acceptance of wind power expansion is influenced by a wide and complex set of factors between individuals, communities, wind energy operators and regulatory regimes at a variety of geographical scales. Social acceptance could therefore be understood as a broad set of relationships in the transition to a carbon low economy. Across Europe the opposition for local wind energy projects is increasing, which affects costs and delays but also increases the risk of not meeting the climate targets (Geraint & Gianluca 2016). Although there is some potential for improving the prospects for wind power expansion in some specific cases, social acceptance cannot be addressed through simple fixes. In this report, the goal is therefore to give an overview of multiple factors affecting social acceptance in the Swedish context. Below is a summary of the section.

- Municipal veto is the most common reason why wind power projects are rejected
- Armed force more often opposes wind power offshore than on land
- Gap between cost and benefits is a better explanation than the “not in my backyard” attitude
- When community concerns are *removed* rather than *addressed* in the planning process, the interaction gets less meaningful
- Visual and sound annoyance is often based on deeper senses of identity and connections

1. Municipal and armed force veto

To understand factors that affect social acceptance in Sweden, the legal context must be considered. Municipalities play a decisive role in permitting wind power projects and their veto is the most common reason why projects are rejected (Darpö 2020). Wind power projects that include either two or more wind turbines 150 meters high, or seven or more wind turbines 120 meters high, require a permit according to the Environmental Code which is permitted by the County Environmental Appeal Delegation. To permit a project, formal approval must be given by the municipality and there is no formal requirement for municipalities to motivate their decision (Wretling et al. 2022).

The municipal veto was introduced in 2009 to ensure municipalities’ control over land use (Darpö 2020). The veto has been criticized for being discriminatory against wind power and thereby hindering the energy transition. Critics argue that local opinions get too much influence on land use, but also that municipalities can switch opinions during the permit process and take advantage of their veto to ensure financial compensation. Moreover, some argue that the veto is used very differently among municipalities and therefore is unpredictable and not legally secure (Ibid.). During 2020 and 2021 municipalities in southern Sweden rejected 30 of 40 projects, which is 75 percent. Municipalities in the north rejected 9 of 19 projects, which is 47 percent (Johnsson et al. 2022).

Lindgren et al. (2013) have shown that the relationship between the wind power industry and the military historically has been characterized by conflicts rather than dialogue. However, recently the Swedish Armed Forces were instructed to enhance their capacity for cooperation in relation to wind power expansion and make suggestions for how national defence and wind power can co-exist (Government of Sweden 2020). This has successfully been adopted in Denmark and Germany (Wretling et al. 2022). Today the Swedish Armed Forces rarely oppose submitted applications for wind power on land. They usually respond to between 200-400 wind power proposals per year

and approximately 93 percent of all proposals are accepted (Försvarsmakten 2021). Between 2014 and 2021 only seven of 276 applications were stopped by the Swedish Armed Forces. However, during the period from January 2017 to February 2022, they rejected nine of ten offshore wind turbine projects (Johnsson et al. 2022).

2. Distributional justice issues

One of the most common ways to describe opposition to wind power expansion is the “not in my backyard” attitude (often called NIMBY). The term refers to the tension between the widespread support for wind power expansion as a common good, and reluctance to accept local proposals due to individual self-interest (Boyle et al. 2019). In other words, it refers to individuals who recognize the greater benefits of a facility but exhibit protectionist attitudes when a facility is proposed in their neighbourhood. However, many scholars have criticized the NIMBY explanation as simplistic and unhelpful to understand public attitudes regarding wind power expansion (Rand & Hoen 2017). While local residents experience a range of impacts due to the expansion of wind power, the benefits are shared on a national or global basis as the greenhouse gas emissions reduce. Residents may feel exploited by urban, multinational, and corporate project developers seeking profit over public welfare (Ibid.). As Devlin (2005) points out, the focus should therefore rather be on spatial differences between costs and benefits.

When it comes to property value impacts, price effects tend to vary during different stages of the development process of wind power expansion (Boyle et al. 2019). The Swedish Environmental Protection Agency (2022) shows that within two kilometers of a wind turbine property prices are approximately 20 percent lower than properties located more than two kilometers away from a turbine. The price is not affected if a property is located eight kilometres from a wind turbine. Moreover, Boyle et al. (2019) show that offshore wind turbines do not affect property prices when they are located at least nine kilometers away from properties.

Wind power expansion has opened up a new arena for conflicts between the Saami and the Swedish state embedded in historical conflicts over ownership of land in the North. As Lawrence (2014, p. 1049) points out, the internal colonial situation builds on perceptions that “reindeer herding must necessarily ‘give way’ to progress and other (read ‘civilised’) forms of land use”. According to Ramasar et al. (2022), wind power expansion in northern Sweden is an expression of violated distributional justices. The indigenous land is not only exploited but Sápmi communities are also left empty-handed with little or no aim for a leveled approach towards more balance in the burdens and benefits of the wind power expansion in their territory. Moreover, as Sami people are not seen as legitimate landowners, they are sometimes not even invited to the meetings of process planning. In contrast to the municipal veto, the misrecognition of Sápmi communities, therefore, implies that their compensation claims are not taken seriously. As wind power has expanded, Sápmi communities have sought to bypass state permitting processes and exercise a Saami right to self-determination by engaging proponents in direct negotiations (Lawrence 2014). However, between 2014 and 2021, only twelve projects have been rejected due to this conflict (Johnsson et al. 2022).

3. Democratic participation

Another important factor affecting social acceptance is the planning process of wind power expansion. When interaction between communities, municipalities, and wind power operators is

based on an intention to *remove*, rather than *address* concerns from locals who are affected, it is unlikely that decision-makers gain sufficient trust in the planning process (Aitken 2010). People might get a perception that governmental and corporative decision-making is disconnected from the community that will be directly affected. The perception of injustice tends to be particularly severe among already disadvantaged communities and groups. When there is a lack of opportunity for local residents to engage meaningfully in the planning process there is thus a tendency that support reduces, and local conflicts increase (Rand & Hoen 2017).

In Sweden, municipalities have no formal responsibility for the country's or the municipality's energy supply. As the decision ultimately is a political commitment, a continued expansion therefore presupposes significant local acceptance (Liljeberg 2023). Liljenfeldt (2014) argues that there often exists a tension between democratic legitimacy and efficiency in land use planning processes. When it comes to wind power expansion this tension could be understood as a balance between the need to ensure local self-determination and the urgency to mitigate climate change. In this sense, Liljenfeldt (2014) has identified a shift in Sweden, Finland, and Norway from a bottom-up to a top-down approach which implies a move from input legitimacy to output efficiency. In other words, there has been a shift from a government “of” the people with an emphasis on territory to a government “for” the people with an emphasis on gaining results.

4. Sound annoyance and visual aspects

Sound annoyance, visual impacts, and landscape change frequently correlate with reduced support for wind power expansion as well as negative attitudes towards existing wind facilities. The concerns tend to relate to the desire of communities to protect landscape quality and the local identity (Rand & Hoen 2017). Although wind power can have impacts on noise, Pedersen and Waye (2004) show that the level of sound annoyance in fact strongly is influenced by the level of annoyance with visual impacts. In a study from Canada, wind turbine noise reached a maximum of 46 dBA and a mean of 35,6 dBA for 1238 residents living between 0,25-11,22 kilometres from a wind turbine (Rand & Hoen 2017). In Sweden's national guidelines, 40 dBA is set as a maximum recommendation outside of homes during night hours (Wretling et al. 2022) which can be compared with the sound of a quiet office or library (Rand & Hoen 2017). In some planned areas for holiday homes in Sweden, the restrictions are set to a level of 35 dBA (Wretling et al. 2022).

When it comes to visual aspects, landscape impacts usually extend beyond aesthetics into identities, connections, and meanings that individuals attach to a particular location (Devine-Wright 2009). Some studies show how impacts from wind facilities are cumulative – increasing with the size of turbines, the number of visible turbines, and the clustering of turbines (Petrova 2013). Additionally, while some studies indicate that those living nearest wind turbines have negative attitudes towards expansion, such as shadowing effects (Wretling et al. 2022), other studies indicate the opposite (Rand & Hoen 2017). One reason could be that those with more positive attitudes move closer to wind turbines, while those with more negative attitudes move away (Krohn & Damborg, 1999). There are also scholars as Olson-Hazboun et al. (2016) who have not found any significant relationship between distance and attitudes toward the wind power facility. However, they did find that residents who see wind turbines more frequently were less likely to express positive attitudes toward the facility.

5. Environmental concerns

Environmental concerns could both be an expression of support and scepticism to wind power expansion. The tension between local environmental harm, such as wildlife disturbance and landscape change on the one hand, and global benefit as climate change mitigation and air pollution reduction on the other hand, is here of relevance (Rand & Hoen 2017). Rejections due to the protection of threatened species are not very common in Sweden. Between 2014 and 2018 eight to eleven percent of the rejections were caused by this reason (Darpö 2020). In 2019 and 2020 the rejections decreased but reached higher levels again in 2021 (Johnsson et al. 2022).

According to Anshelm (2013) environmental opinion against wind power in Sweden is a resistance that may play a bigger role on the local level but does not have any broader popular support. Some argue that rules regarding the protection of threatened species have been problematic for landowners and companies because of their unpredictable and vague character. The harm to wildlife, where birds and bats are particularly affected, tends to reduce support for wind power expansion. However, as Sovacool (2013) estimates, wind power kills approximately 13 times fewer birds than fossil fuel power plants per kilowatt-hour of generated electricity. This is due to climate change which alters weather patterns and destroys birds' habitats.

Measures to increase social acceptance

Addressing the long-term challenge of social acceptance and the prospects for the wider energy transition seems to imply a substantial transformation of both institutions and regulations but also ways of engaging with local communities (Geraint & Gianluca 2016). In April 2023 a Swedish governmental official report (SOU 2023:18) was presented with a set of proposals to increase social acceptance of wind power expansion. The first proposal was that owners of neighbouring properties should be able to request a compulsory purchase of their property by the wind farm's licence holder within one year of the start of operations. Secondly, local residents should be entitled to a certain percentage of the turbine's revenue each year during its lifetime. Thirdly, in cases where local communities are concerned, municipalities should be allowed to make their decision on the condition that a wind farm supports the local community financially. Lastly, when municipalities are concerned, revenues should be offered. In turn, such revenue, if it is to be financed by the operator, can only be realised through taxation. Otherwise, government funding is required (Liljeberg 2023). Below is a summary of measures to increase social acceptance.

- Ensuring clearly defined participation in the planning process enables transparency, trust, and meaningful inclusion
- The outcome of a participatory process can only truly represent the interests of the community if they were allowed to lead and control the process
- Reducing the gap between those who benefit and those who get affected through compensation is an important instrument
- Financial compensation must take into consideration local characteristics to meet the needs of the specific site
- Reformed ownership structures have been proven successful in other countries

1. Enhanced participatory planning process

One commonly mentioned measure to enhance social acceptance is to increase a more participatory and collaborative planning process (Rand & Hoen 2017). Many cases of opposition to wind power expansion arise because of detrimental or non-existent interactions with central actors in the planning process (Aitken 2010). Sometimes participation serves a cosmetic purpose of legitimizing decisions which have already been decided. Participants then “become a ghostly presence within the planning process—visible, heard even, but ultimately only there because their involvement lends credibility and legitimacy to decisions that have already been made” (Hildyard et al. 2001, p. 59).

Regional dialogue with key actors, such as the Swedish Armed Forces, Sami representatives, and wind power operators, could resolve internal municipal disputes (Wretling et al. 2022). In this sense, active participation by residents and interest groups is a necessary component to reach social acceptance. Ensuring clearly defined participation in the planning process would allow communities to have a longer timeframe to accept wind power projects and thus reduce the unwanted “surprises”. Moreover, it would enable more transparency and available information for

more actors in the process (Devlin 2005). When the two-way dialogue gets the character of one-way information trust is not built (Aitken 2010). As Aitken (2010) notes, the outcome of a deliberative planning process within a local community can only truly be said to represent the interests of the community if they were allowed to lead and control the process. Otherwise, the decision-makers, being in a position of power, are able to shape the process and interpret the results according to their own interests consciously or unconsciously.

Enabling a more deliberative, transparent, and collaborative planning process is also something Boverket (2012) points out as an important factor to achieve social acceptance for wind power expansion. In interviews with municipal officials in Sweden, it was found that municipalities often wait to inform their community about the planning process until they can present a proposal to the consultation council. Consequently, wind power operators have in some cases been in contact with landowners before the municipality. This has increased the risks of misunderstandings and conflicts. At the same time, the situation is difficult to avoid as the operators first must find an appropriate location before they can proceed with a proposal to the municipality and inform nearby residents. Nevertheless, Boverket (2012) argues that it is of critical importance that the municipality transparently inform their community about the planning process of wind power expansion in an early phase.

Besides enabling early involvement of residents in the community, Rand and Hoen (2017) argue that it is important to be available, proactive, and present. As Aitken (2010) also emphasizes, building relationship and trust with the local community is necessary to increase social acceptance. If a planning process is recognized as just there is a greater chance that the outcome reaches tolerance, even though residents do not feel fully satisfied. In other words, individuals and groups may tolerate an outcome of a local wind power project if they perceive it as fair, even if they did not get exactly what they wanted in the first place (Firestone et al. 2012). Related to this, meaningful participation requires openness but also the opportunity for participants to determine the processes and the outcomes. Participation cannot be undertaken with the assumption that certain participants are wrong or less legitimate (Aitken 2010). Trust is therefore key in the planning process of wind power expansion.

2. Financial redistribution

To increase social acceptance of wind power expansion there is a need to reduce the gap between those who benefit and those who get affected by the expansion (Knauf 2022; Leer Jørgensen et al. 2020). To close this gap community compensation is often mentioned as an important instrument. It could take the form of payments, energy efficiency retrofits, visual and sound mitigation measures, investments in public spaces, or offsetting electricity costs. According to Rand and Hoen (2017) even though community compensation may be correlated with acceptance, it also risks creating community conflicts and exacerbating inequalities. Moreover, any kind of financial compensation could create the impression that wind power operators are attempting to “buy consent” which might cause a bribery situation rather than encourage support (Aitken 2010). To meet this challenge, levels of financial gain must take into consideration local characteristics and needs. Additionally, the economic base must be designed in a way that meets the needs and demands of the specific site (Devlin 2005).

The current state of wind power expansion raises questions regarding the legitimacy of municipal decision-making. As Wretling et al. (2022) point out, to achieve social acceptance, formalized financial compensation and strategic initiatives are important measures. Financial compensation

can be conceptualized as a mechanism for reaching fairness by distributing benefits to the people negatively affected by the local impacts. In Norway, this approach is more formally regulated through a property tax that goes to the concerned municipality. It has been identified as a key motivator for creating municipal support. In Sweden, Wretling et al. (2022) argue, the institutional capacity of municipalities to address current social and environmental challenges in planning and decision-making is often insufficient. Therefore, financial support and other sort of assistance, such as national guidelines and common practices in the planning and permitting process, are necessary.

Even though local communities in Sweden can receive a small amount of money per wind turbine (called *Bygdemedel*), there is a need for more systematic financial compensation. As Darpö (2020) emphasizes, this is especially important due to the rise of populist movements that mobilize on the discontent with the “elite”. It could be seen as an expression of the increasing gap between rural and urban areas. As an attempt to handle the discontent, there have been proposals to transfer the property taxes on wind turbines to municipalities, rather than the state which is the case today. For a project with twenty wind turbines, about 0.5–1 million SEK per year could be transferred to the concerned municipality. However, as the measure affects the state's budget management this is seen as difficult to implement. Several political proposals with this type of compensation have therefore been rejected by the Swedish parliament (Energimyndigheten 2021).

3. Reformed ownership structures

Another potential instrument to increase social acceptance is to enable local co-ownership of wind power. Cooperative ownership is a form of co-ownership where an economic association owns wind turbines themselves. As a member, you may have access to a certain amount of electricity corresponding to the number of shares in the association, and the price per kWh is normally lower than what is offered on the regular electricity market (Wretling et al. 2022). In Germany and Denmark where this has been adopted, farmers and residents often mobilize the local opinion in favour of wind power expansion (Toke 2005).

Cooperative ownership was an important part of the earlier wind power expansion in Sweden (Wizelius 2010). Today this exists but is relatively uncommon compared to Denmark and Germany. According to the Energy Agency, one possibility would be to legislate co-ownership in a similar way as the *Køberetsordningen* in Denmark, where local residents have the right to buy a share which corresponds to 20% of a local wind power project at cost price. The advantage of this would be that local residents get the opportunity to involve in the wind power expansion, which could increase social acceptance. The disadvantage however is that the right to shared ownership today may entail financial risks for those who are interested to become co-owners (Energimyndigheten 2021). As wind turbines today are higher and thus more costly than before, this risk may even increase. How this could be dealt with in the Swedish context needs to be examined in more detail.

Conclusion

A large expansion of wind power is a necessary condition to reach net zero carbon emissions in Sweden by 2045. Even though it seems like Sweden has a good chance to become world-leading in the transition to a low-carbon economy, the process to expand wind power production is not as thriving as one may think. One strong reason behind this is the lack of social acceptance. The research summarized in this paper shows that social acceptance is influenced by a wide and complex set of factors between individuals, communities, wind energy operators, and regulatory regimes at a variety of geographical scales. It implies that it cannot be addressed through simple fixes. Besides the municipal and armed force veto, social acceptance depends on justice issues, democratic participation, sound annoyance, visual aspects, and environmental concerns. All these factors are context-specific and should neither be understood as universal nor complete.

In order to increase social acceptance for wind power expansion we identify three main themes in the literature. First, the planning process needs to become meaningful which requires openness but also the opportunity for participants to determine the processes and the outcomes. Decision-makers cannot assume that certain participants are wrong or less legitimate. Trust is therefore key in the planning process of wind power expansion. Second, more systematic financial compensation is needed to reduce the gap between those who benefit and those who get affected by the wind power expansion. This is especially important due to the rise of populist movements in Sweden. Third, there is a need to examine possible ways to reform ownership structures of wind power. This is something that has been proven fruitful in other countries where wind power expansion has been successful.

In sum, although it is crucial to expand wind power as fast as possible to meet the emission targets, this paper has shown that local knowledge and viewpoints should be engaged with and taken into account in the planning process. Public attitudes to wind power should not be examined solely to mitigate potential future opposition, but rather it is important to understand social acceptance in order to fully understand the social context of the energy transition. Therefore, we identify a need to abandon the assumption that decision-makers know who is “right” and instead engage with the possibility that oppositions to wind power are not always “wrong”. Otherwise, we may misunderstand certain recognition justice issues and reinforce inequalities in the energy transition which in the long run risks further delaying the climate transition.

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