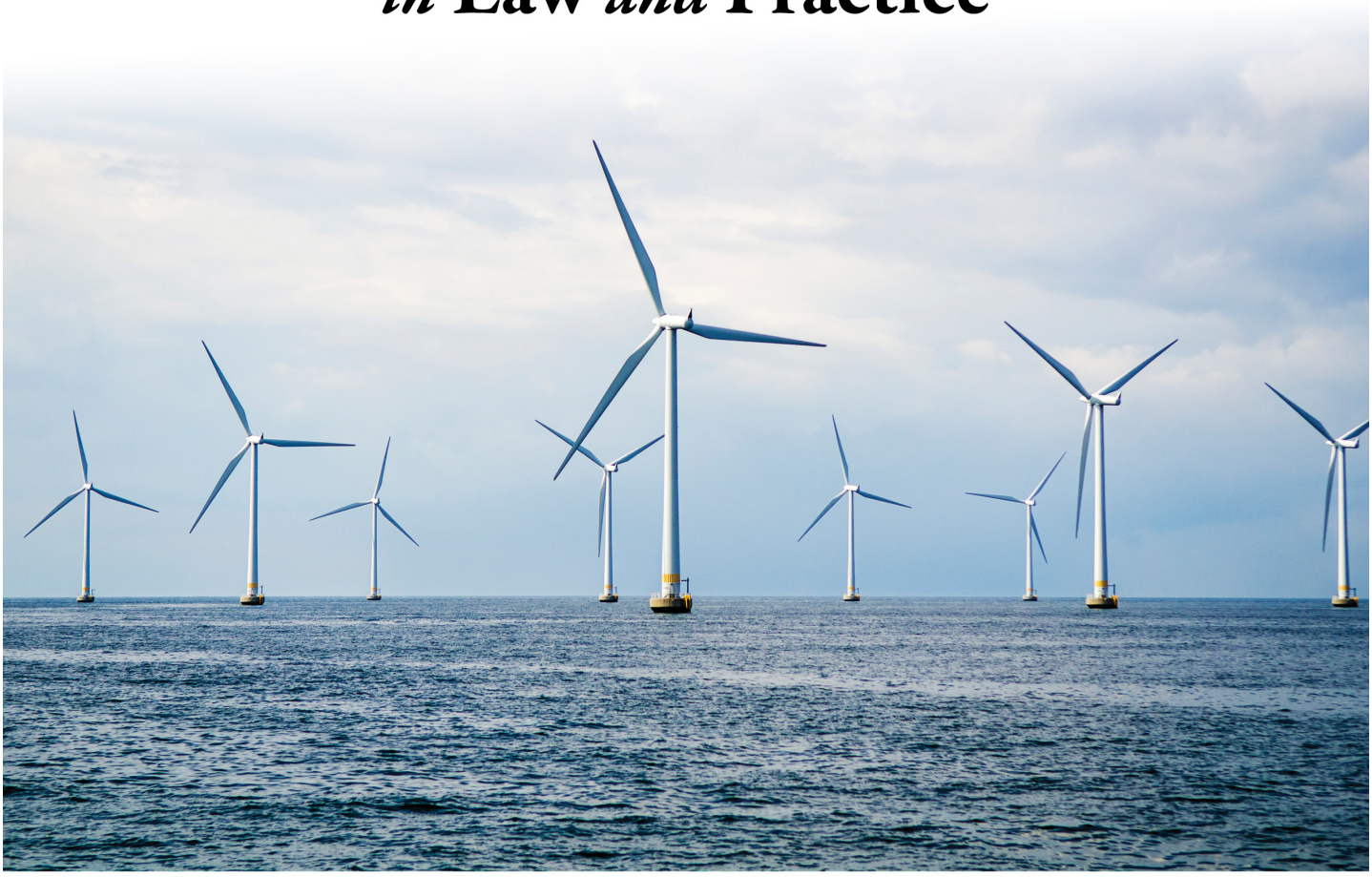
Public Engagement *in* Danish Nearshore Wind Projects *in* Law *and* Practice



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DTU Wind Energy is a department of the Technical University of Denmark with a unique integration of research, education, innovation and public/private sector consulting in the field of wind energy. Our activities develop new opportunities and technology for the global and Danish exploitation of wind energy. Research focuses on key technical-scientific fields, which are central for the development, innovation and use of wind energy and provides the basis for advanced education at the education.

We have more than 240 staff members of which approximately 60 are PhD students. Research is conducted within nine research programmes organized into three main topics: Wind energy systems, Wind turbine technology and Basics for wind energy.

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SECTION 1. Introduction and Statement of the Problem. Denmark has a large amount of wind energy with a share of 42 % of the electricity consumption in 2015. The total capacity of wind turbines in Denmark was 5,070 MW of which 1,269 MW was offshore turbines (as of 2015). The national energy and climate goals in Denmark are based on an overall objective of independency of fossil fuels by 2050. In 2012 the Government made an Energy Agreement with the parties Venstre, Det konservative Folkeparti, Dansk Folkeparti and Enhedslisten in order to advance the Green transition of the Danish energy system towards the intermediate goal of 50 % share of wind energy in electricity consumption by 2020. The objectives included an increase in offshore wind energy by 2020 with 1.000 MW large-scale wind farms as well as 500 MW near shore wind projects. The near shore goal has been reduced in a subsequent political agreement in 2014 to 400 MW, including 50 MWs of test turbines. [1]

This report focuses on the decision-making processes for the near shore projects and explores the public engagement process and the roles of local citizens, commercial developers, and planners (local and national). Important decision making issues are to what extent the publics are engaged in the wind power process to address climate change and if so, how. Public engagement is a well-known challenge for wind energy in particular. Important issues relate as to how publics are involved in decision-making processes. This includes amongst others the site selection, including strategic environmental assessment, and the more specific site and project evaluation, including an environmental impact assessment (EIA). One perspective relates to how the legislation sets out a framework for public engagement as part of the decision-making processes at different levels. Another perspective relates as to how public engagement actually occurs in practice by authorities and with developers.

Offshore wind projects raise a multitude of issues related to siting, consent processes, developers' roles, as well as a spectrum of public concerns and perceptions. The near shore projects moving forward in Denmark present an interesting and different dynamic from the land-based as well as from the offshore projects wind siting that call for further exploration in regard to risk and benefit perceptions and how they enter (or fail to) into the siting decision process.

The legal framework and the different steps in the designation and permitting process are complex and often span a number of years. The legal framework for (siting of) near shore turbines is examined closely with a particular view as to the options for public participation and appeals. It is well understood in the literature that the EIA or environmental review process that drives top-down site selection has only limited and often inadequate opportunities for public engagement strategies beyond public hearings. Therefore, the concept of how "social acceptability" or tolerability of these large construction projects close to shore is addressed is a central question in which this research project explores within the context of the national planning processes.

[1] For further details of the political goals see Sections 2 and 3 below and this link: http://www.energinet.dk/da/anlaeg-og-projekter/Anlaegsprojekter-el/Kystnaere-havmoeller/Sider/default.aspx. It is in Danish only. Appendix 1 provides a complete list of offshore wind projects in the planning and construction phases.

1.1 Key Research Questions and Objectives

- What can be learned from the top-down, national decision making process for siting utility-scale near shore wind projects and is this an effective process in continuing to move towards the green energy transition?
- Given the limited opportunities for public engagement with this top-down process (e.g., public hearings), are the government /developers prepared to address effectively community concerns as well as controversy should they occur?
- Do the three coastal wind case studies undertaken in this research capture the potential conflicts and agreements that could occur given the urgency of achieving climate goals and the processes needed for sustained public participation? If not, what else should be done?

This report focuses on the planning processes of six near shore wind projects (shown in Figure 1) to understand what can be learned about meaningful engagement of local citizens as Denmark continues moving towards a low-carbon energy system. Also the analysis hopes to reach other communities siting offshore wind energy in order to see what can be learned across cultures and other coasts.

Figure 1: Nearshore Wind Project Locations

This research is part of a larger project entitled Wind 2050, supported financially by the Danish Strategic Research Council, that is investigating various case studies related to social acceptability and controversies over wind energy siting and planning (http://www.wind2050.dk/about-wind2050 Accessed 6 October 2016) This multi-disciplinary project is focused primarily on the complexities of land-based wind siting in terms of "social acceptability," public engagement, and mitigation of controversies. These insights are intended to understand better how to fulfil the national climate goals of 50% wind energy on the grid by 2020 and a fossil-free energy system by 2050.

Also this study is part of a US-based research project under Delaware's EPSCoR Research Infrastructure Improvement Program (RII-3) grant. (http://de-epscor.org/science%20/)The Established Program to Stimulate Competitive Research (EPSCoR), is a federal grant program led by the National Science Foundation (NSF) to help states develop their research capabilities and institutions. A central aspect of this bilateral research is to assess potential risks and benefits of offshore wind within a comparative risk framework. The next phase of this work will compare a more advanced energy transition in Denmark with an early-stage case in the Mid-Atlantic region in the U.S.

This report is structured in four additional sections and three appendices outlined below.

Section 2: Theoretical Basis of the Case Studies- Identifies central important issues that serve as the theoretical focus for the case study analysis.

Section 3: The legal framework for planning and permitting of near shore wind farms and the basis for the national decision-making are outlined. It includes the site selection process and the EIA process as well as the special schemes of the Danish Renewable Energy Act – the so-called compensation schemes.

Section 4: This section analyses the planning and decision process in practice with a probing search at the public hearing comments and the views of some members of the community.

Section 5. This section provides conclusions and further research needs.

Appendices: The appendices provide a list of the recently considered offshore and near shore sites in Denmark, a graphic of the formal public decision making process for offshore projects (both tenders and open door), and maps of the two awarded near shore sites.

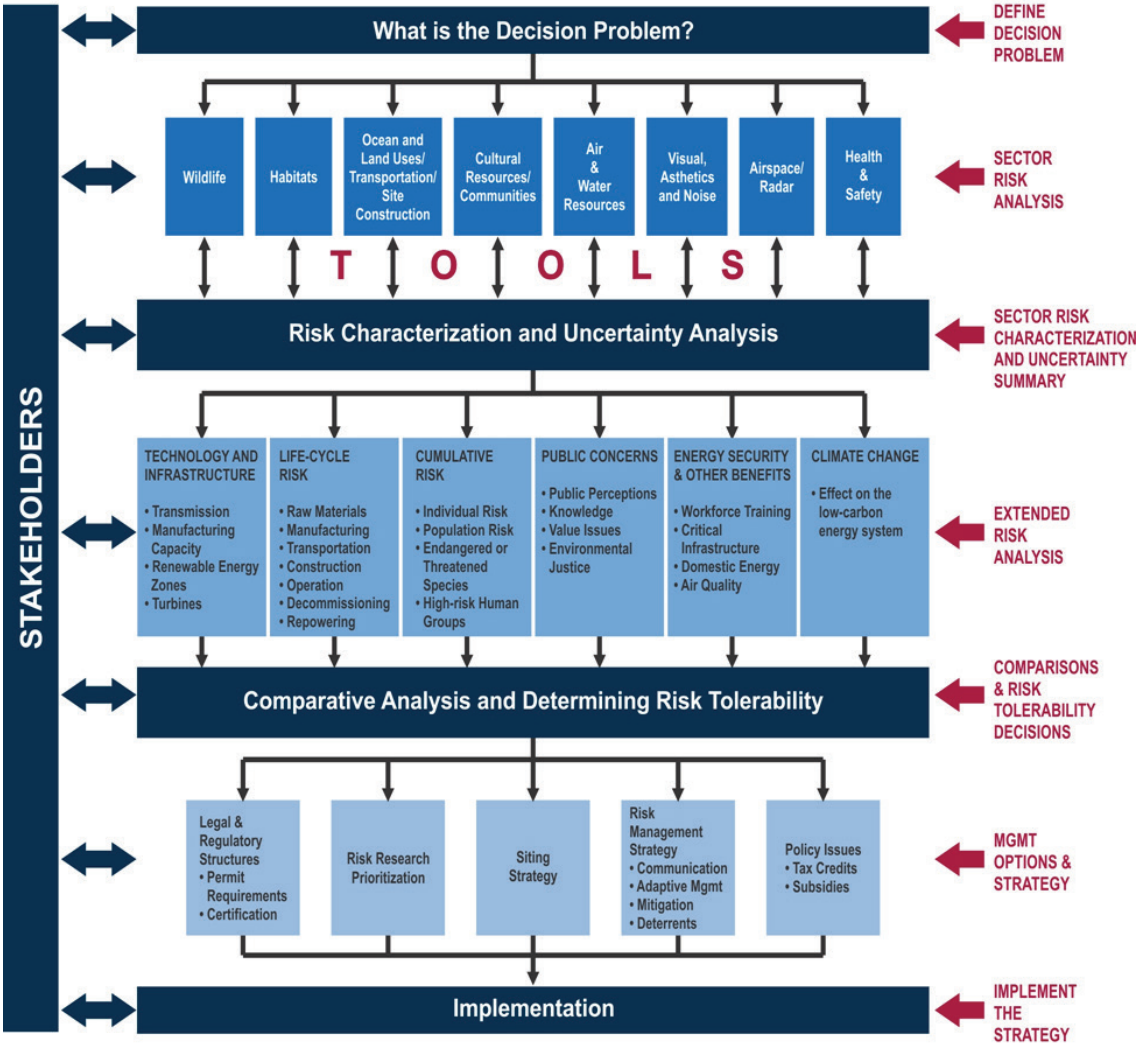
SECTION 2. The Theoretical Basis of the Case Studies.

The objective of this section is to identify important issues from selected scientific literature that resonates with wind planning practices and processes, particularly in relation to government decision makers, publics, and developers. It summarizes an extensive literature review and adds selected topics that are particularly relevant to the near shore case studies. These topics or themes explore some of the principal issues related to public engagement and decision making, risk perception and communication, and offshore wind siting issues. Focusing on our key research questions, as well as a previous research publication from this Wind2050 project (Cronin et al. 2015) and from the US-based National Science Foundation-EPSCoR program, the authors have

identified a range of scientific and theoretical works that inform this current research as well as contribute potentially to a broader dialogue between stakeholders (including developers and local citizens) and national decision makers. The Wind 2050 project report, entitled, 'Public acceptance of wind farm development: Developer practices and review of scientific literature' (Cronin et al.) analyzed the planning processes in different countries and surveys a broad literature relevant to wind siting and planning. It is important to note that there are hundreds of peer reviewed articles and dozens of books on these topics. Thus, for this project report, the authors focus on a number of key issues that are particularly important to wind developments in Denmark.

The US-based EPSCoR research task focuses on offshore wind cases by applying an integrated risk framework (Ram 2011 and Ram 2015). This conceptual framework in Figure 2 below acknowledges the diverse array of risks that wind energy facilities pose for society, the ongoing

Figure 2: A Conceptual Framework for Integrated Risk Analysis for Wind Energy Projects



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stakeholder engagement process that is needed for a good deliberative process, and the risk management options considered carefully by decision makers. This framework also emphasizes the importance of early engagement to define the scope of public concerns and values that usually differ from the experts. The focus on public concerns and the link to the legal decision process is the centerpiece of this Danish near shore case study and the upcoming comparative case study of the Delmarva region in the U.S.

The scientific literature related to "social acceptability" and the planning process for energy technologies involve a myriad of issues ranging from siting strategies to notions of democratic legitimacy to public engagement approaches. These topics intersect with broad notions of how publics define risks and benefits from siting all types of energy facilities, including wind on land and at sea. The research team focused on how decision makers communicated and stakeholders responded to these potential risks and benefits. The literature themes and the case study evidence indicate that near shore projects pose public involvement challenges not anticipated with the earlier offshore projects sited in Denmark – both near shore and farther from shore. A complex web of interrelationships exists, as the framework shows, between national politicians, authorities, developers, local citizens, and other "interested and affected" parties. These can vary significantly in different political cultures, including Denmark (Jasanoff 2005). These relationships need to be well understood if effective energy siting strategies are to move forward and a fossil- free energy infrastructure goal is to be realized by 2050 in Denmark.

2.1 Public Engagement, Risk Communication, and Decisionmaking.

For nearly all offshore energy facilities, there is a standard regulatory process that requires permits and environmental impact assessments, along with public hearings, consultations, and exchanges of information. Effective public engagement must go beyond public hearings and consultations. Robust engagement demands a fully integrated, high quality assessment prepared across a range of issues (i.e., technology, environmental, social, cultural, economic) at candidate sites. These issues present varying levels of risks and benefits to the energy site owners, the host communities, and the politicians. Where there are many risks ---often opaque or ambiguous ---- the host communities are often quagmires of competing risk concerns and uncertain benefits. Some early observers, like Fischhoff (1995), elucidate the complexities in deciding what risks matter most and how the spectrum of risks can be structured in a framework where choices of what needs to be better understood are laid bare. How these issues are defined, evaluated and communicated are central to understanding how various stakeholders may "tolerate" these decisions and how they define potential "hazards." Hazards can be defined as threats to people and what they value thus linking wind energy potential risks to the broader risk perspective again. Value issues in a community must be addressed and science alone cannot be a full basis for any risk decision (Stern and Fineberg 1996, p. 26, Gregory et al. 2012). Wind developments are in the end essentially public policy choices. In the past, energy siting decisions (including wind) often followed the siting practice of the "deficit model" and "decide, announce, and defend" and ran into predictable problems *(*O'Hare et al*. 1983*, Cronin et al. 2014*)*. If we are to move forward more rapidly and be more resolute, due to the urgencies of climate change, a new age is upon us in energy siting that requires more effective and sustained communication about risks and decision making.

Structuring the process for informing an effective decision process involves sound judgement at each step in the decision process (Pidgeon et al. 2003). Criteria for sound judgment have been

established by many national government agencies, including the U.S. National Research Council (Stern and Fineberg 1996, p. 6-7 and Fischhoff 1995). Their criteria are as follows:

- *"Getting the science right* – The underlying analysis meets high scientific standards in methods, data bases and assessment of uncertainty.
- *Getting the right science* – the analysis addresses the significant risk-related concerns of public officials and those of interested and affected parties.
- *Getting the right participation and engagement* – The decision process satisfies the decision makers and the interested and affected parties by carefully considering the range of ecological, health, and social risks. There is a general agreement that the openness in the process has been defined and the most important perspectives considered.
- *Developing an accurate, balanced and informative synthesis – "*The risk characterization presents the state of knowledge, uncertainty, and disagreement about the risk situation to reflect the range of relevant knowledge and perspectives within the limits of available knowledge."

Risk communication is an essential part of this public engagement and decision process. A wide variety of social media is available to risk managers and stakeholders. In an effective risk communication program, the process is two-way and iterative. This process informs decision makers, deepens public understanding of a project and its risks. Participants build greater understanding and conflicts among people with different values and perceptions become visible and articulated in the decision process.

Finally it should be noted that identifying stakeholders or "players" must be sufficiently broad to cover the range of "interested and affected" people. Values and perceptions are often difficult to discern and address since different stakeholders hold different values. A wide range of tools is available for this task, including:

- *Public Hearings.* Often mandated by law or regulation, these hearings assume that the public needs to know and the hearings provide a forum where questions may be asked and concerns addressed.
- *Citizen Advisory Committees and Task Forces.* These mechanisms can be a vehicle for formulating recommendations and building relationships between managers and the public.
- *Citizen Juries and Citizen Panels.* They develop and provide priorities among policy or management alternatives.
- *Focus Groups*. The groups are often convened so that stakeholders can engage in searching discussions of policy or risk issues.
- *Dispute Resolution.* A variety of methods have evolved for resolving conflicts among participants and building consensus.
- *Media Training.* Special efforts may be undertaken to so that media representatives, including community groups, are well informed and trained.
- *Social Media.* Social media, such as email, Twitter, Facebook, and LinkedIn, is taking on a growing role in local and network communication.
- *Surveys.* Surveys can provide an important base of understanding about awareness and stakeholder concerns.

2.2 Risk Perception: Key findings and considerations.

The traditional view of risk perception involves "getting the numbers right" in what some have called the "deficit model" (e.g., the effects of energy supply options on death and health related issues) and that should suffice for what the experts and the communities need to know. This views risk primarily as the probability and consequence of technological accidents (NRC 1983). But the

scientific discourse and decades of studies have found that risk perceptions are anchored in values and worldviews (Stern and Fineberg, 1996, Boholm 1998, Gregory et al. 2012, Wynne et al. 1996). Thus it is important to recognize that numbers can conceal some of the truth as well as the uncertainties. This "deficit model" is based upon the idea that the public lacks information and analysis and they need to know what the scientists and engineers know. Therefore, some have assumed that we must educate the public to think like the experts (NRC 1983*)*. The central premise of this model is that where the public is hostile to new technologies, this is a result of ignorance or lack of understanding.

A relatively new concept of risk has recently emerged in relation to how the public perceives risks and uncertainties. It is reasoned firstly that the "public" is not homogeneous: there are many "publics" (NRC 1996 and Dietz and Stern 2008). Factors such as age, gender, education, profession and culture form strong impacts on the perception and understanding of communicated risks. Secondly, it is clear that public(s) perceives and evaluates risks very differently than experts. Psychometric analyses have shown convincingly that publics and experts differ substantially as to how they rate the acceptability of risks and impact of public concerns. Others research on siting experience has reinforced this perspective. Qualitative aspects of risks are important in public perceptions, including issues concerning the processes involved and not just the end product. There are many such qualitative aspects. Using factor analysis, they can be reduced to two major factors: dread and newness of hazard. Some risks are really feared (e.g., people don't want to die from cancer) and newness means they don't have much experience or knowledge (Slovic et al. 2000). In other words, risks that have big uncertainties are different and the public(s) doesn't like them. As mentioned previously, risks have a range of consequences that can be translated as "harm" to people and what they value, including ecological aspects, privacy, and civil liberties. In the case of wind power, until recently, fear and dread were not often recognized as possible feelings or harmful threats, since wind is relatively benign compared to fossil, nuclear and some other renewables. There is little air pollution hazard from operations, few dangerous spills on land, no radioactive releases, etc. The perceived risks of wind to local communities stem from uncertainties and unknown risks of this homegrown technology.

Early into the commercial wind turbine industry, there did not seem to be a panoply of risks to the local citizens until large-scale wind power began to unfold in the 1990s. In Denmark, the risks and benefits of wind power have a different history than in North America and most other European nations, since a significant portion of early, single turbines were owned by local citizens and multiple turbines by cooperatives and/or neighbouring farms. The need for wind was clear and the benefits seemed to far outweigh any perceived environmental or social risks. Most of the wind energy risk literature to date in Denmark has focused on the ecological effects of utility scale offshore wind facilities, with less attention on what is social acceptability. It was only later in the 1990's as land-based wind turbines got taller and more capital intensive and local and cooperative ownership declined that the profile of human risks and uncertainties become more of a concern. In Denmark, conflicting views of sustainability clearly need to be better understood and considered (Christensen and Lund, 1998). So obviously an approach is needed that addresses the range of effects that the siting of new facilities can entail. At stake are major issues in Denmark as to what values should prevail in locating new facilities. Whose concern really matters (and should matter) in choosing one location over another? And how do decisions relate to often poorly articulated values? But differing perceptions of risks are only part of the story. How decisions are actually

made, what issues come into prominence in the decision process, and how is fairness in the process assessed are critical to long-term success and "acceptability" of the green energy transition.

Beyond environmental and human effects, wind siting presents a list of potential concerns raised by the community that relate to process issues, siting, and planning. Factors such as perceived equity and fairness (Gross, 2007, Tuler et al. 2014), place attachment (Devine-Wright, 2009a, 2009b) and impact on visual amenity (Gipe, 1990; Johansson and Laike, 2007; Thayer and Freeman, 1987; Toke et al., 2008; Wolsink, 2007a, 2007b) all seem to play important roles in local developments (Haggett and Toke 2006). Empirical research on public perceptions of wind farms indicates that complaints usually focus on visual, acoustics, socio-economics, environmental, and technical aspects (Devine Wright, 2006 and 2005a). Jones and Eiser (2010) observe that it is the aesthetics of wind power that primarily drive both positive and negative public opinions on wind turbines. In general, it is not the wind turbines that people don't like –- it is the wind turbines in a certain landscape that creates part of the debate (Wolsink 2000).

Are these risks significant? Can we reduce them? Are they linked to uncertainties rather than potential negative health impacts that can be identified? These risks can be both legitimate public concerns and possibly issues that get raised as a method to oppose or delay the project (Ram 2011). Distinguishing between these categories is difficult. Of course, we must continue to invest in research and mitigation strategies for the range of potential impacts raised, but how will decision makers select the significant risks and use national resources for studies effectively? Moreover we recognize that scientific studies will not resolve all of the possible questions (Renn 2008). One important step often not realized may be to compare risks and benefits to help frame the potential effects of renewable energy with other supply options (Ram and Stephens 2017).

In addition, the literature shows that alas, scientific studies do not necessarily address key public concerns. Studies of risks and uncertainties are needed, but an assessment of how we build this knowledge base and a clearer definition of the roles of the experts and the developers is needed. Developers prepare EIA documents and associated environmental studies that are directly related to the local siting issues and potential risks. These studies are generally made public (in Denmark) and shared within the wind community but this still raises issues of transparency, independent peer reviews, and the roles of government agencies. Still, however, the public is not convinced. No doubt because the studies fail to address their broader concerns but 'only' follow the consent process. Public hearings and comments submitted for the EIA process do not substitute for a more nuanced understanding of the public's concerns. Some scientists advocate collaborative studies and citizen science to enhance the perception of independence and to focus on community priorities (Irwin 1995).

2.2.1 Values, Emotions and Cognitive Biases. Another important area of risk perception recognizes that environmental and health effects are not emotion free or a neutral subject (Slovic 2010). Impacts are often emotion filled ---- people care about harm even when the science suggests that it is minor. We know from the literature that emotions depend upon what the perceptions of risk are and those perceptions usually have links to cognition. Steps can be taken to change perception linked to cognition with a greater understanding of the issues of concern. However, emotions connected to the risk are still very difficult if not impossible to change. The literature indicates that you have to have a discourse about the risks and benefits in order to address effectively the range of perceptions and emotions. This can be time-intensive, demand early

engagement and communication strategies, and involve creative decision making tools. Moreover, these strategies may have cost of energy and schedule implications for developers and decision makers. The critical point is that the wind-based knowledge base is not emotion free and cognitive understanding could lead to a change in risk perceptions over time. Psychometric research explains the general rules or heuristics that people employ to assess (or distort) risk judgments (Teversky and Kahnenman 1974). Heuristics could lead to cognitive biases or overconfidence in decision making and problem solving—by experts as well as local citizens. For example, the 'availability heuristic' a mental short-cut that can be a helpful tool to make fast albeit sometimes distorted assessments (Slovic 2010, Kahneman 2011). These psychological insights provide a significant understanding of how communities are engaged and how the experts might better communicate uncertainties and risks in decision making.

Instead of understanding these nuanced views, the wind community (developers, government agencies, NGOs, etc.) may often fall into the trap (again) of the deficit model. Just get the public some facts about wind power --they argue-- and communities will be more willing to accept wind has been the accepted notion. Given the perception of a benign technology with low risks, this is often not satisfying. The reality is that in addition to disseminating facts, decision makers and public officials need to find ways to engage the public(s) and individual citizens in an honest and direct dialogue about potential risks and benefits of energy choices under low-carbon scenarios.

2.2.2. Social trust. The local and cultural contexts can also affect risk and benefit perceptions and each location is different (e.g., small rural communities, rich seaside resorts,). How may the place change? Some believe (as the case studies show) that this place will never be the same again. Place identity is an important value that explains why local citizens do not necessarily want changes to their town even though there may be prospects of jobs and economic developments (Devine-Wright and Howes 2010).

We know from previous experience people don't like risks that are imposed on them (Kasperson 2017, Stern and Fineberg 1996). The scientific literature indicates that it can be more effective if the decision or siting process provides opportunities for input so that the risks are more voluntary. The literature shows that we may accept higher risks where the perceived benefits are higher (NRC 2009). The more that risks are imposed (decided by someone else), the more social trust is required. In Denmark, the social trust of government bodies has been much higher than other EU and US agencies. It is important to ask, however, whether the reservoir of social trust is declining in Denmark as is happening in many other countries. And, as most developers already know, managers need to take public concerns seriously, even if the scientists view these concerns as "ridiculous," ill founded, or simply NIMBY thinking. But in the end, what public engagement strategy has the best chance of success if experts are not trusted?

2.2.3 Uncertainty and the public(s). Another challenge apparent in the theoretical literature of decision making is uncertainty. The literature typically differentiates three fundamentally different types of uncertainty. These are *aleatory, modelling-based,* and *epistemic uncertainty*. Aleatory is the most common uncertainty and is related to statistical relationships where there is small percentage of impacts actually occurring. Models never capture the complete context and so each model has its inevitable uncertainty. The epistemological category is related to basic scientific phenomenon that we just do not understand the phenomenon and/or cannot predict events (NRC 2009). Much scientific information includes some degree of uncertainty about the applicability and validity of the

findings. Communicating this uncertainty to the public to enable greater public understanding and informed decision making has been the focus of much research (Tversky and Kahneman, 1974, Morgan and Henrion 1990, Bruine de Bruin et al. 2000; Johnson and Slovic 1995; MacGregor et al. 1994). Issues relate to the trustworthiness of the information conveying uncertainty can be interpreted as a weakness of the researcher or scientist (Goodwin et al. 2010) or uncertain information may be misinterpreted or scientific terms misunderstood (Klinke and Renn 2012).

2.3 Framing social acceptability. The term 'social acceptance' is laden with values and beliefs regarding how acceptability should be conceptualized (Aiken 2010, IEA Task 28, Upham et al. 2015). Some risks change over time and are affected by the range and magnitude of benefits involved. We know from the literature that most citizens are not well-informed about the electricity system or wind energy technologies. Their opinions and perceptions are framed by experiences and the 'need to know'. The evidence about what the public(s) know may affect whether they accept, tolerate, or reject wind power is complicated and often ambiguous.

According to Wüstenhagen et al. (2007, p. 2684), there are three dimensions of social acceptance -- socio-political acceptance, community acceptance, and market acceptance. But one of the authors goes further now suggesting that this is still a simplistic notion of a complicated construct that should now focus on socio-institutional dimensions rather than community acceptance (Wolsink 2017). Unravelling acceptability also involves "informed consent" and "consensus-based decision making" at the individual and community levels. Does the local community, for example, trust the information and the intentions of the investors and actors from outside the community? (Huijts et al. 2007, Tuler et al. 2014). Hence the authors are not defining social acceptability for these case studies but look to the literature to inform our research.

One particular demonstration of the distance that often exists between public officials, the publics, and the general developer community is apparent in the terminology used. Some developers' comments about public views, particularly opponents, may be unnecessarily pejorative. Some opponents state that they do not want wind turbines anywhere in their view and thus get quickly labelled as espousing not-in-my-backyard (NIMBY) opinions (see Cronin et. al 2015 for a more detailed summary). People may not want wind turbines in their community for many reasons, but lumping these reasons into a "they are just selfish" or "emotional" categories is not only unhelpful, but may also be misleading. For over a decade, it is understood that the "individual" and "social" gaps suggest different policy responses as well (Bell et al. 2005). This may result in experts or decision makers having inaccurate intuitions about the informational needs of the public, as we learn from other approaches, such as mental models (Bruine de Bruin and Bostrom 2013). Perhaps the wind community also can learn some lessons from the previous decades of siting literature related to these dynamics (Tuler et al. 2014).

2.4 Offshore issues: "Out of sight, out of mind?" Moving wind turbines offshore, far away from the locals on coast, may seem as a quick and easy way to solve the issues of local acceptability on land, but just because offshore wind farms are out of sight, it is not clear that they are also out of people's mind. While some research (Ladenburg, 2008) suggest that people have less knowledge and interaction with offshore wind farms, others (Haggett 2011) claim that this theory is only valid if the turbines are installed a very long way out to sea. The effect of moving turbines further offshore in order to reduce the risk of local opposition is unclear and needs to be studied further.

The first offshore wind farms around the world that were sited far from shore have not been free from opposition. In the UK, wind farms off the coast of England, Wales, Scotland, and Northern Ireland have not proceeded without opposition or conflicts (Toke 2005, O'Keefe and Haggett 2012). These protests have in most cases led to long delays, public inquiries, and ongoing disputes. Kempton et al. (2005) analysed reasons underlying public support for and opposition to Cape Wind –the now defunct coastal project off Cape Cod in the Northeast of the U.S. --- and found that certain values and beliefs led to opposition.[2] These included beliefs that the project was uneconomic; that it would not make a significant contribution to energy supply, and that it might have negative environmental impacts. This concern may not only be visual or aesthetic but "is more importantly, a gloss for the value that the ocean is special and humans should not intrude on it" (2005:146). Since the Danish near shore projects are still in the planning phases in Denmark, the dynamic opinions of the publics, decision makers, and developers are still in play.

2.5 Summary. The literature review process, in itself, identified a number of important, multidisciplinary issues for Wind2050 research initiatives. These include:

1) "The publics" are many and so are the sites (or places). Public attitudes and perceptions are changing over time and need to be carefully monitored and assessed.
2) Developer and other stakeholder statements about the NIMBY myth often reinforce the view that the publics are irrational and selfish when they oppose wind projects. It is essential to understand the origins and nuances of community concerns over time so that appropriate communication and decision strategies can be designed and implemented. Throughout, the public needs to feel and believe they are respected and that their concerns are addressed seriously in a two-way dialogue.
3) Uncertainties matter and need to be communicated by the developer and other actors in the decision process. Oftentimes uncertainties are found in the scientific evidence as well, (e.g., Low Frequency Noise) but the experts and the decision maker may not communicate these issues effectively. These issues are more complex to address when public trust is lost or in decline.
4) Offshore wind projects raise a varied set of issues related to siting and consent processes for engaging publics, the roles of developers, and national decision makers, as well as public concerns and perceptions. The near shore projects now moving forward in Denmark may present challenging and different dynamics as compared with siting land-based wind and farther offshore projects that need further exploration and careful analysis.

SECTION 3. The Legal Framework and National Decision Making

This section frames the case studies with an explanation about the legal framework for the near shore and offshore projects on the national level, including the compensation and green schemes that are unique to Denmark.

3.1 Introduction. The legal framework for offshore turbines, including the near shore projects, reflects a top-down national decision-making process as opposed to the local decision-making process for onshore turbines in Denmark. The current legal framework (October 2016) is primarily based on the Act on Renewable Energy (RE Act – lovbekendtgørelse nr. 122 of 6th February 2015 af

[2] The Cape Wind project was the first offshore wind site permitted in the USA. Being about 8-20 km from shore and located within one of the wealthiest summerhouse regions on the East Coast, the project generated a lot of controversy and dozens of lawsuits. (See: Project website here: https://www.capewind.org and opposition website here: http://saveoursound.org). Significantly, it also jump-started the offshore wind industry in the US when its first permit was filed in 2001 and preceded the federal regulations in 2005. https://www.boem.gov/Regulatory-Framework/.

lov om fremme af vedvarende energy, with subsequent amendments). The RE Act establishes not only the general permit procedures, but also lays down provisions on the so-called RE-schemes which may in different ways compensate neighbours for perceived negative effects wind turbines, (i.e. the value loss scheme, the co-ownership scheme, and the green fund scheme). The extent to which these RE-schemes apply to offshore turbines is elaborated below. The RE Act also includes rules on EIA for offshore wind energy projects as well as other environmental assessment requirements linked to the protection of Natura 2000-sites and protected species under the EU Habitats and Birds Protection Directives. However, a new crosscutting Act on Environmental Assessment was adopted in May 2016 that, with effect from 17th May 2017, applies to offshore wind energy projects, thus repealing the EIA rules in the RE Act. Other amendments of the RE Act are also expected in 2017 in accordance with a political agreement from November 2015 stipulating new procedures for the so-called open door projects. Public hearing requirements are mainly linked to SEA and EIA procedures for offshore (and near shore) turbines, as there has not yet been a formal offshore planning process. Consultations with relevant state authorities/agencies are carried out according to practice, but as yet there are few formal consultation requirements in the legislation for offshore activities.

The RE Act was adopted in 2008 (lov nr. 1392 of 27th December 2012) as a follow-up to the 2008 Energy Agreement.[3] The RE Act has subsequently been subject to several amendments. In 2012 a new Energy Agreement was adopted by all the political parties in Parliament – except the Liberal Alliance. The 2012 Energy Agreement of 22nd March 2012 established the objective to increase by 2020 offshore wind energy capacity with 1.000 MW (Kriegers Flak -- 600 MW and Horns Rev -- 400 MW) as well as 500 MW near shore turbines of which 50 MW should be test turbines. The target for near shore turbines in a 2014 Growth Agreement was reduced to 350 MW plus 50 MW for test turbines.

The following describes the general legal framework for offshore turbines with a particular view of the permit and environmental assessment procedures and associated public participation requirements. In addition, a short note is provided on the RE compensation schemes and their (potential) applications to offshore turbines.[4]

3.2 General legal framework for offshore turbines. The general legal framework for offshore turbines envisages three different types of offshore projects: 1) large-scale projects subject to tender, 2) near shore projects subject to tender, and 3) other projects subject to the open door procedure. The RE Act does not, however, provide any clear definitions of these three types of offshore projects and in principle the same permit and EIA procedures apply to all three project types (although with some variations in practice due to the tender procedure). An important difference rests with the price regulation. The price subsidies for tender projects will be determined through the tender, while the price subsidies for open door projects are generally the same as those for onshore projects. The nearshore projects in Denmark that were tendered in 2015-16 followed a tendering process similar to other offshore projects. The projects offered for

[3] The 2008 Energy Agreement of 21st February 2008 was a political agreement among the majority of the political parties in Parliament (at that time Venstre, Konservative, Socialdemokraterne, Dansk Folkeparti, Socialistisk Folkeparti, Radikale Venstre and Ny Alliance). According to the 2008 Agreement the share of renewable energy in energy consumption should increase to 20 % by 2011, including additional 400 MW offshore turbines.

[4] Parts of the section draw upon Anker, H. T., & Jørgensen, M. L. (2015). Mapping of the legal framework for siting of wind turbines - Denmark. Frederiksberg: Department of Food and Resource Economics, University of Copenhagen. (IFRO Report; No. 239).

tender can to some extent be linked to the Energy Agreements (2008 and 2012) and thus can be said to rest on a political mandate. On the other hand, the open door projects rely on developer initiatives and the general permit procedures of the RE Act that rests with the Energy Agency. It is, however, proposed that the open door projects will in the future be subject to a more political decision-making by the Minister of Energy, Supply and Climate. The tender projects and open door projects are mutually exclusive; an open door application cannot be accepted in an area designated for tender, while a tender project cannot include areas subject to an open door permit (cf. RE Act § 22). Please refer to Appendix 2 for an overview of the formal public decision making processes for offshore tenders and the open door projects.

3.2.1 Planning and designation of potential sites for tender. There is no formal planning process for the designation of potential sites for offshore turbines. The RE Act, however stipulates as a prerequisite for the tender projects that the Minister for Energy, Supply and Climate may designate sites for 1) large-scale wind farms, and 2) nearshore wind farms. The Havmølleudvalget report (2012) identified 16 potential nearshore sites for further examination.[5] The report included a strategic environmental assessment and was subject to a public consultation procedure. Of these 16 sites, 8 were selected as "cost-efficient" and subject to a consultation process with the relevant municipalities. This resulted in the selection of 6 potential nearshore sites for initiation of tender procedures –-- all were located more than 4 km from the coastline.

Subsequently, the permit and EIA procedures were initiated for the 6 sites prior to publication of the call for tenders. The EIA procedures resulted in the withdrawal of one site – Sejerø Bugt – from the tender projects, primarily due to the potential risks to the common scooter population – a protected species under the EU Birds Directive.

3.2.2. Permit and EIA procedures. Offshore projects are subject to a phased permit system consisting of at least three different permit requirements in accordance with the Renewable Energy Act. In principle, the same permit requirements apply to all types of offshore projects. There are, however, some adaptations to the tender procedure as compared with the open door procedure. A major difference is the fact that for tender procedures the EIA is carried out by Energinet.dk prior to the tender, while the developer is responsible for the EIA for the open door projects. In practice, however, it appears that tender projects to some extent may involve a double procedure as an EIA is carried out prior to the tender, while a supplementary EIA may be needed after the tender procedure has been finalised and the final project details are determined.

The first step is a preliminary investigation permit (RE Act Sec. 22). This is followed by an approval of a preliminary investigations report, most often including an EIA (RE Act Sec. 24). The next permit step is an establishment permit (RE Act Sec. 25). The final step is a production or operation permit (RE Act Sec. 29). Specific conditions for the project (e.g., addressing adverse environmental impacts) can be included in the establishment permit. An operation permit is granted to applicants that comply with the conditions set in a preliminary investigation and/or establishment permit. This permit is granted for 25 years, and can be extended.

[5] Havmølleudvalget, 2012: Kystnære havmøller i Danmark Screening af havmølleplaceringer indenfor 20 km fra kysten. Havmølleudvalget was headed by the Danish Energy Agency and included representatives from other agencies (Søfartsstyrelsen, Naturstyrelsen) as well as Energinet.dk and DTU-Wind Risø.

In the current legal framework, the Energy Agency is the competent authority for granting the permits. It is proposed, however, that for open door projects the Minister will grant a preliminary investigation permit that will be subject to Parliamentary consultation if local councils raise objections. For projects subject to tender, a preliminary investigation permit will normally be granted to Energinet.dk with the purpose of carrying out preliminary investigations regarding the selected site(s), including an EIA (Sec. 23(3)). When the preliminary investigations report and the EIA have been approved by the Energy Agency, the tender procedure can then be initiated. When a final decision on the tender has been made, a (new) preliminary investigations permit will be granted to the winner of the bid. In such cases there may be a need to make a supplementary EIA before an establishment permit and a subsequent production permit is granted. This is, however, not clearly described in the RE Act.

Also, it is unclear how closely the RE Act permits are interrelated and what criteria should be applied by the Energy Agency when deciding on permits. It is in particular unclear as to whether it is possible to reject an establishment permit if the preliminary investigations report has been approved since Sec. 24 grants the developer the right to use the preliminary investigations report and to give notice within 3 months whether he wishes to establish the production facility. As regards the preliminary investigations permit, a 2013 amendment of the RE Act assumed that the Minister would issue criteria for preliminary investigation permits which in particular would be relevant to open door projects, (e.g. a minimum distance to the shore). Such rules have, however, not yet been issued.

While in practice, the EIA requirements are linked to the preliminary investigations and the approval of a preliminary investigations report, the RE Act formally links EIA to the establishment permit (Sec. 26). The Energy Agency determines whether an EIA is required or not as set forth in the Executive Order 68/2012. An EIA must be submitted to the Energy Agency. The Energy Agency will, according to the Executive Order, make available information on the application and the EIA on their website and submit the EIA for consultation with other authorities. In practice it works differently for tender projects where the Energy Agency cooperates with the Nature Agency (now The Agency for Water and Nature) and Energinet.dk on the elaboration and presentation of the EIA. New EIA rules will enter into force as a new Act on Environmental Assessment of Plans and Projects has been adopted that incorporates the EIA rules of the RE Act in cross-cutting EIA rules (with effect from 16th May 2017). The Energy Agency will, however, remain as the competent EIA authority in regard to offshore wind energy projects. The assessment of potential effects on Natura 2000 sites (Sec. 27) and protected species (Sec. 28) is also linked to the establishment permit, according to the RE Act. Such assessments will normally be included in the EIA. As mentioned above, there may be a need to make supplementary assessments if the project is adjusted during the permit procedures. This may be relevant to tender projects, as the EIA carried out by Energinet.dk might not take into account all the subsequent details of the awarded project.

3.3. Public participation, consultations and appeals. For offshore wind energy projects, the public participation requirements are formally linked to the EIA requirements and the establishment permit. This means that the only formal rules on public participation in the RE Act are laid down in Sec. 26 and the Executive Order 68/2012. The designation of potential near shore sites can, however, be characterised as a plan and it has been subject to a Strategic Environmental Assessment (SEA), including public participation in accordance with the Act on Environmental Assessment of Plans and Programmes. Furthermore, there might be additional options for public

participation as determined by the developer or the Energy Agency –-- or possibly Energinet.dk. As there are no formal requirements for supplementary EIAs, it is unclear if and when public participation should be part of such procedures. According to the EU EIA Directive –--- and in particular the rulings of the Court of Justice of the European Union – public participation would, however, somehow be an integral part of a supplementary EIA.

The RE Act (from 16th May 2017 the Act on Environmental Assessment of Plans and Programmes), and Executive Order 68/2012 stipulate that relevant information, including the EIA statement, shall be made available to the public and sent to affected authorities and associations. The deadline for submission of comments shall be a minimum of 8 weeks. The formal requirements for public participation are thus a (written) public consultation procedure. In practice, however, public hearings have been organised by the Energy Agency and/or Energinet.dk as regards the near shore projects. Furthermore, public meetings have also been organised for the near shore projects as part of a pre-hearing (or scoping) prior to the elaboration of an EIA. There is no formal requirement for pre-hearing in the current legal framework. However, with effect from 16th May 2017, pre-hearing will be a formal requirement under the new Act on Environmental Assessment of plans and projects. The RE Act provides for a specific access to administrative appeal to the Energy Appeals Board on environmental matters of establishment permits if the EIA and Natura 2000 rules apply (cf. Sec. 67 of the RE Act Sec. 67). The RE Act in accordance with the EIA Directive (and the Aarhus Convention) explicitly grants access to administrative appeals to local and national Environmental NGOs (ENGOs). Local citizens – as individuals – only have a right of appeal if they are significantly and individually affected by the decision.

3.4. RE compensation schemes. The RE Act in 2009 introduced three compensation schemes specifically designed to address concerns of local citizens as regards wind energy projects. The schemes include 1) a compensation (or value-loss scheme) to neighbours; 2) a co-ownership scheme; and 3) a community benefit scheme (green scheme). The schemes originally only applied to onshore turbines. In 2013 the value-loss scheme and the co-ownership scheme were, however, extended to include near shore projects up to 16 km from the coastline. In 2016 the Government has proposed to apply the green fund scheme to offshore projects subject to the open door procedure. However, the Government has subsequently announced plans to skip the green scheme entirely as a consequence of abandoning the PSO tariffs that fund the green scheme. The two other measures are funded by the developer.

3.4.1 The value-loss scheme. Wind energy developers are obliged to compensate neighbours for loss of property value that exceeds 1 percent. The compensation to neighbours may either be settled by an agreement between the developer and the neighbour or (in case of no agreement) by the Valuation Authority. A public meeting shall be organised by the developer within a minimum of 8 weeks after the granting of an establishment permit. Claims for compensation shall be submitted to Energinet.dk within 8 weeks after the meeting. Owners of dwellings located more than 6 times the total height of the turbines must pay a fee of 4.000 DKK. The fee is subsequently reimbursed if compensation is granted.

3.4.2 The co-ownership scheme. The developer shall offer at least 20% of the ownership shares to local residents. Regarding nearshore (or offshore) wind turbines, the persons entitled to buy shares are citizens over the age of 18 years registered with a permanent residential address in municipalities with a coastline within 16 km from the installation site. Permanent residents no

more than 4.5 km from the installation site have a preferential right to buy 50 shares per person. The Government has in 2016 proposed to extend the co-ownership scheme for open door offshore projects to owners of summer houses if they have owned the summer house for more than 2 years. If the project developer does not comply with the co-ownership rules, it results in the loss of the price supplements for energy produced by the wind turbines. Furthermore, a criminal penalty consisting of a fine can be imposed (cf. Sec. 72 of the RE Act). Specifically for near shore wind turbines, an additional incentive of a price supplement of 0,01 DKK/kWh was discussed for projects that could obtain at least 30% co-ownership from local citizens and enterprises. It appears, however, that the additional price supplement was not adopted due to conflicts with EU rules and possible non-competitive arrangements. [6]

3.4.3 The green scheme. The green scheme does not apply to near shore or offshore turbines under the current legal framework. It has, however, been proposed to extend the green scheme to offshore open door projects up to 8 km from the coast –-- possibly with effect from 2017. Yet, there are some uncertainties as the Government in October announced its intentions to abandon the green scheme together with the PSO. Subsequently, an agreement has been made on phasing out the PSO and replacing it with funding from the state budget. It appears that the green scheme will be maintained. It provides funding for local projects enhancing landscape or recreational values or promoting cultural and educational activities. For each municipality, an amount of 0.004 DKK per KWh for 22,000 peak-load hours for each onshore wind turbine connected to the grid since 21 February 2008 has been set-aside in a public funding scheme. This is approximately 88,000 DKK per MW installed effect. The costs of the green scheme are paid by the electricity consumers through general energy taxes and administered by Energinet.dk on the basis of applications from the municipalities.

SECTION 4: The Case Studies: The Decision Process in Practice

This section describes how the decision process led by the government agencies at the national level, including the EIA process, local siting selection, the public hearing activities, was applied for the near shore projects and provides some insights in local stakeholder views based on the three near shore case studies.

4.1 The national decision making process: Background

Since the near shore projects were in the planning stage when this research began, it allowed an examination over time of different phases including:

- The political agreement and project announcement at the national level,
- Local site selection phases,
- Planning and consent processes employed to down-select the sites and engage local politicians and citizens,
- Pre-qualification and selection of the developers,
- Feedback from the communities and stakeholders with hearings and consultations, and
- Final award of the two near shore sites.

[6] As we learned in the interviews with developers, voluntary compensation and valuation schemes worked well in the past, but the depressed prices of electricity make it very difficult for co-ownership and/or shares to be worthwhile and the pay-back period tends to be longer. Also the lower income populations may not have as much available savings for equity payments to invest in these shares and then wait many years to make some profits from the projects.

Figure 3 below provides a decision making timeline for the near shore projects. Some scrutiny reveals both the weaknesses and strengths of the current approach implicit in the regulations that were explained in the previous section. The following considerations are highlighted in this analysis:

- The only early involvement of the public required (following the release of the six EIAs) is one scoping hearing and even then opinions may be considered or not;
- The Energy Agency documents their response to written comments received at public hearings or submitted about the EIAs and these responses are posted online;
- Public meetings occur (2 years into the process) and written responses are made, but no follow-up discussions at the community level are mandated;
- No specific requirements for involving or communicating with members of the local communities, beyond one required public consultation and public hearings, are stated at any point in the process;
- Binding tenders are envisioned in the last year of this process, whether or not local community concerns have been addressed or not; and
- Following the tender decision, the chosen developer will follow the legal processes for permits and marine construction, but the public engagement strategies are uncertain.

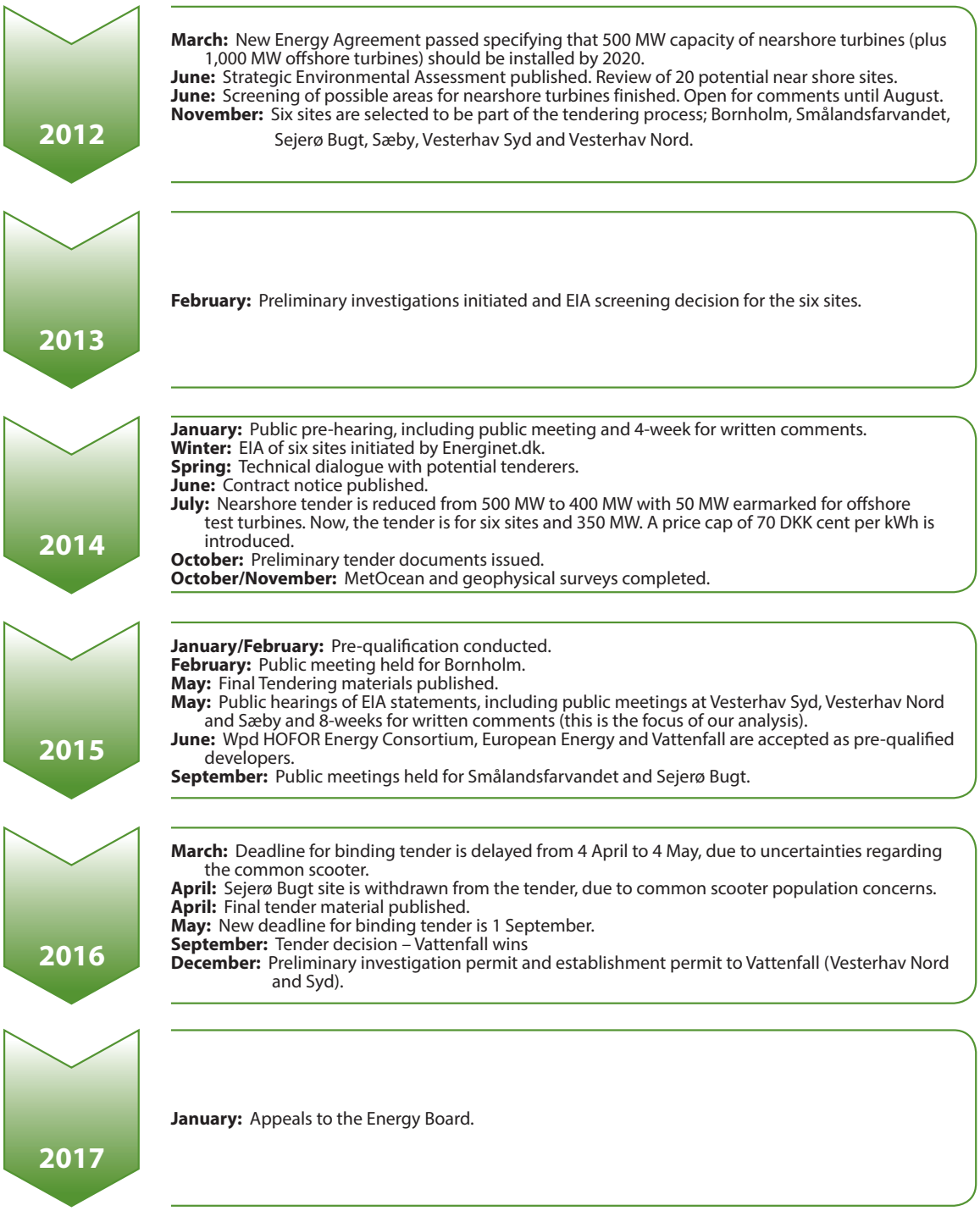
Following the political decision about siting near shore wind farms in 2012, a screening process was launched by the Danish Energy Agency including a report proposing 15 potential sites between 4 and 20 km from the shore. The screening process also included a strategic environmental assessment (SEA, prepared by COWI in June 2012), consultations with key stakeholders, a public hearing phase, and a substantive visualization report.[7] During the public hearing phase from 26 June to 26 August 2012, the Energy Agency received 190 responses from institutional as well as private stakeholders and three organized campaigns. In addition, the Energy Agency scheduled an invitation-only meeting with local politicians from the identified sites who might be willing to consider deployment of these near shore sites (Confidential interviews, May 2016). Following this stage of the planning process, the 15 proposed areas were reduced to six---- Sejerø Bugt, Smålandsfarvandet, Bornholm, Sæby, Vesterhav Nord and Vesterhav Syd).

Almost 2 years later (January 2014), the Energy Agency moved forward with individual, local hearings at each of the 6 selected sites as part of the EIA procedure for each site. The first step was a public call for ideas and proposals in January 2014 based on preliminary observations, including environmental and geotechnical studies. This pre-hearing (or scoping) phase included a public meeting as well as a four-week period for submission of written comments. After the scoping phase, environmental impact statements for the six sites were prepared by the Energy Agency and the Nature Agency and a public consultation was carried out in summer 2015 including also a public meeting for each site and an 8-week period for submission of written comments.[8] This community response from the public hearing, including individual commenters, is the heart of our analysis.

[7] All documents are publicly available at www.ens.dk in Danish. Direct link to the report: https://ens.dk/sites/ens.dk/files/Vindenergi/strategisk_miljoevurdering_af_kystnaere_placeringer_juni_2012.pdf or the link to page where it is found: (https://ens.dk/ansvarsomraader/vindenergi/handlingsplaner-statslige-reservationer-screeninger-mv

[8] Information on the EIA and the public consultations is available at www.energinet.dk.

Figure 3: Decision Making Timeline for the Nearshore Projects



The EIA procedure was conducted in parallel with initiation of the tender process for the near shore turbines. In mid-2015 three consortiums were "pre-qualified" and announced as: Wpd HOFOR Danish Offshore Consortium; European Energy Nearshore Consortium; and Vattenfall Vindkraft A/S. [9] The tender material was published online (4 May 2015)[10] with a deadline for submission of

[9] There was an additional submission by the group called "Wind People." They were not pre-qualified and filed a lawsuit

bids by 4th April 2016. This deadline was later postponed until September due to the withdrawal of one site – Sejerø Bugt – from the tender for environmental concerns (see section 4.2). Moreover, the tender process was beset by political disagreements and some uncertainty as the Danish Minister for Energy, Utilities and Climate announced that he no longer supported the plans of near shore wind farms (June 2016).[11] This occurred while the three pre-qualified consortia were finalizing their bids that were handed in the beginning of September 2016.

The arguments presented by the Government related to the funding of the near shore projects through the Public Service Obligation (PSO)---an 11% tariff added onto residential electricity rates.[12] The Government was of the opinion that the PSO should be abandoned after criticism was raised by the EU Commission on a possible limiting effect of the PSO on competition from other EU countries. The PSO also was very unpopular among – in particular – energy intensive businesses. This situation created a lot of uncertainty, but in November 2016 a political agreement was made to phase out the PSO and replace it with funding from the national budget.

Clearly in our interviews with developers, the political uncertainties with the PSO scheme and subsidies for wind projects had domestic and international impacts. Historically, Denmark has had one of the most consistent subsidy policies for offshore wind developments, but these political and funding uncertainties created negative affects both on potential international partnerships and perceptions of stable national policies. [13]

In September 2016 it was announced that Vattenfall won the bid at two locations -- Vesterhav Nord and Vesterhav Syd -- but it was still uncertain if the national subsidies would be available. Of course, one of the key elements of these decisions was that Vattenfall submitted the winning bid at a price of 47,5 DKK øre per kWh compared to the cap of 70 DKK øre that was set politically with the tender announcement. This was the lowest price offered for an offshore project in the history of the Danish wind industry and made international news. The electricity payment also includes the cost of the grid connections. A political majority including the Government acknowledged the substantial cost reductions and approved the two projects. This allowed the national process to move forward again. Fortunately, this resulted in a good turn of events for the research team, as these two west coast sites were part of our case studies.

Significantly, Vattenfall adjusted the Vesterhav Nord project layouts in the bid slightly by using larger turbines and moving them further away from the coastline. The Vesterhav Nord project is now located 4,3-7,3 km from the coast, whereas the Vesterhav Syd project is located 4,2 to 10 km from the coast. (See Appendix 3 for the proposed site maps and the turbine layout of the two tender

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questioning the government decision. Wind People wanted to develop a unique "community designed and owned" project, as they have attempted for some land-based wind projects. However, the steep capital requirements for offshore most probably eliminated them from consideration. They lost the lawsuit. Press release in Danish: https://erhvervsstyrelsen.dk/sites/default/files/media/wind_people_mod_energistyrelsen.pdf. Full "judgment" also in Danish: https://erhvervsstyrelsen.dk/sites/default/files/media/udbud/wind_people_mod_energistyrelsen_0.pdf

[10] News archive in Danish: https://ens.dk/ansvarsomraader/vindenergi/udbud-paa-havvindmoelleomraadet/nyhedsarkiv-om-kystnaere

[11] Minister for Climate and Energy, Lars Christian Lilleholt suggests that the nearshore tender should be cancelled with regard to the PSO. 6th of June 2016. Link (in Danish): http://jyllands-posten.dk/debat/kronik/ECE8738665/det-er-ren-ebberoed-bank-at-bevare-den-dyre-og-konkurrenceforvridende-psoafgift/

[12] https://www.thelocal.dk/20160510/denmark-to-scrap-green-energy-levy

[13] The PSO debate has far reaching consequences beyond the scope of this study. Moreover, the price of electricity and PSO subsidies, underlying project economics, are decisive factors for future siting particularly on land, according to the developers. The declining price of electricity also impacts the options for ownership and pay back for shareholders. How will this affect the wind customer and electricity rates in Denmark? How does this affect co-ownership opportunities?

projects awarded). One explanation for adjusting the projects in the bid was to avoid common scooter habitat along the shore (Confidential Interviews November 2016). Apparently, the government excluded this marine space before the bid was submitted. At this point, according to the developer, it appears that the changes are still within the original designated areas reviewed in the EIA, thereby not triggering a supplemental EIA. But the final decision on this process is still to be determined. In the current timetable, the two wind farms (Vesterhav Syd and Vesterhav Nord) totalling 350 MW will be in operation at the end of 2020.

In January 2017 a large number of appeals have been submitted to the Energy Appeals Board following the establishment permit being granted to Vattenfall in December 2016. It is likely that some of the points raised in the appeals are related to the quality of the EIA as well as to the question whether the adjusted project(s) fall within the scope of the current EIA or a supplementary EIA will be needed.

4.2 Methodology in Brief: Selecting the Three Local Sites. The research team selected an active national process related to 6 near shore sites to examine the planning process in terms of agency, public and developer involvement. Key questions and analyses have been linked to the literature review with a focus on; the public engagement processes, risk communication, risk perception, and decision process. The researchers prepared a timeline of Energy Agency activities and the steps toward a down select to six sites, including when the publics were invited to engage, particularly with public hearings and consultations. The authors selected case studies in different municipalities to assess whether different locations and coastal communities would paint a varied depiction of public views and risk concerns. The research team selected three case studies out of the six proposed under the competitive tender according to several considerations. The chosen sites were highly likely to be selected because of good wind resources, a long history with the wind industry, and co-ownership of land-based wind in the communities (the 2 west coast sites). Sæby provided a comparison to the two west coast sites, as it did not have a significant density of turbines or a long history with the wind industry. The island of Bornholm was excluded from our study as it is a unique island community, the Energy Agency had limited the proposal to 50MW at that location, and there was a dearth of public comments from their hearing. The 2 other sites --Sejerø Bugt and Smålandsfarvandet -- (between Zealand and the Island of Fyn, along the Great Belt Strait) were not chosen as they represented some significant environmental and community sensitivities and were unlikely to be selected for the tender and the public hearings documents were not available online (our instincts turned out to correct on these assumptions as both these sites were eliminated from the tender sites). By the spring of 2016, there were still five viable sites remaining for coastal turbine projects. Below we summarize some of the other steps in our methodology:

- The research team narrowed down the number of sites to examine from six to three locations – Sæby, Vesterhav Syd, and Vesterhav Nord.
    - Two sites did not have summary public hearings statements available when the team was selecting the case studies. Both Smålandsfarvandet and Sejerø Bugt hearings were delayed because of environmental concerns, including fish larvae and the common scooter, respectively. Ultimately, Sejerø Bugt was eliminated 12 April 2016 from the group of six eligible sites due to potential cumulative affects on the migratory path of the common scooter population in Danish waters after additional

biological studies and modelling.[14] In the Smålandsfarvandet site, NGOs raised potential risk concerns calling for further environmental studies regarding sensitive fisheries and the affect of construction on fish larve and spawning grounds.
    - Bornholm was not included as it is considered a unique island site that was limited to a 50MW size project, due to land-based grid limitations as well as small load requirements. In addition, the Bornholm site had very few comments from the public hearings. There were 9 comments from governmental agencies of which 5 noted that they do not have any comments. 2 individuals sent one combined statement concerning the onshore cabling.
    - The selection of the 3 sites was fortuitous for the Wind 2050 team, as 2 of the 3 sited studied were chosen in September 2016 as the winners of the tender from one developer consortium (Vattenfall Vindkraft A/S).
- Local public hearings were held in 2015 and summarized by the Energy Agency and posted online, allowing the team to conduct an analysis of public concerns.
- Graduate student helper and co-author (Thomas Raahauge Lund Nielsen) translated public comments from Danish to English for the 3 selected sites; individual stakeholder statements were grouped by stakeholder type and topics; The team then carried out an in-depth qualitative analysis of these near shore public hearing comments.
- Background information was assembled on the 3 selected sites in order to understand better the local municipalities within the context of the site characteristics, sense of place, and their history with wind energy.
- Understanding the limitations of the public hearings process, the team investigated further with local sites visits and interviews with different actors and decision makers; Interviews were conducted from January – June 2016 before the siting decisions on the six sites were final. They addressed both the history of land-based siting as well as the more recent near shore competitions. Although our interviews are confidential, the actors and the developer competition are well known and so we provide a selected list of the agencies and the developers that were engaged in the tender:
    - Interviews with the Energy Agency in Copenhagen that is leading the tender process
    - Interviews with the pre-qualified developers (European Energy, HOFOR, Vattenfall)
    - Discussion and interviews with local citizens, municipal employees, and local politicians in Lemvig, Ringkøbing-Skjern, and Sæby.

4.2.1 The Three Municipalities. The sites are located within the following municipalities: Frederikshavn (Sæby), Ringkøbing-Skjern (Vesterhav Syd), and Lemvig (Vesterhav Nord). The characteristics of these municipalities located along the Danish coast are important for understanding the context of public engagement in relation to their demographics, history of the wind industry, and their climate plans. Table 1 below summarizes some of these characteristics. Frederikshavn and Ringkøbing-Skjern are two municipalities experiencing population declines of 3.8% and 2.2%, respectively. Lemvig (where Vesterhav Nord is located) has an even smaller population and a decline in population of 8.2% over the last 10 years.

[14] Sejerø Bugt also had a large turnout (estimated at 300-350 people) for the public hearing in September 2015 with quite a "negative tone, according to some observers (Confidential interviews 2016). It might be a good case study for a future research study interested in public responses to coastal turbines.

Table 1: Background of the Three Municipality Case Studies

	Total Population (2016 2nd quarter)[1]	Population change over the last 10 years*	Average age of inhabitants (DK average: 41.2 years)[2]	Summerhouses[3] owners	No. of wind industry jobs within the municipality[4,5]	Number of turbines and capacity in Municipality: Installed capacity[MW]	No. of turbines	Capacity per 1000 inhabitants[MW]	No. of turbines /km2	Self-sufficient with renewables by	Percentage of Electricity production from wind energy (year 2013 numbers)
Vesterhav Syd-(Ringkøbing-Skjern)	57,060	-2.2 %	42.5	9,795	2,434	404	260	7.1	0.17	2020	107%
Vesterhav Nord-(Lemvig)	22,210	-8.2 %	44.9	2,280	80	193	117	8.7	0.23	2020	120%
Sæby-(Frederikshavn)	62,847	-3.8 %	45.5	4,796	250	57	56	0.90	0.08	2030	21%
National average	–	+4.0%	–	–	–	52+	49	0.89	0.11		33%

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3. http://www.statistikbanken.dk, Levevilkår-> BOL104: Boliger efter område, beboertype, anvendelse, udlejningsforhold, husstandstype og antal hjemmeboende børn
4. Wind industry association, Peter Alexandersen & Damvad statistics, Personal contact. Oct. 2016
5. http://ipaper.ipapercms.dk/Windpower/Branchestatistik/Regionalbranchestatistik2016/ or http://www.windpower.org/da/fakta_og_analyser/statistik/vindarbejdspladser_i_danmark.html

* Last ten years for national population figures are 2003-2013 and show an increase due in part from immigration.

All three municipalities have seen an exodus of the younger generations to the larger urban areas, with a greater number of retirees over time, exacerbating the demographic challenges. Significant economic development activities for these three areas stem from their coastal geography with significant numbers of summer houses and related summer recreational activities, (e.g., sailing off the coast of Sæby). The public sector is one of the largest employers in these municipalities as well.

In fact, it is obvious that in Ringkøbing-Skjern (the Vesterhav Syd near shore site) there are a significant number of summerhouse owners (9,795) as compared to the next highest number of 4,796 in and around the Sæby area. Ringkøbing Skjern is also one of the largest municipalities in size-- covering 1,489 km^2 and is a prime destination for German and other European tourists during the summer. And so it is not surprising that visibility of turbines and sense of place are important issues. While at all three sites there are a large number of summerhouse owners, they also have the largest number of people employed by the wind industry (2,434). This generates a variety of opinions and emotions related to the costs and benefits of a near shore project in view of the coast. On the one hand, the summerhouse owners fret about the visual impacts and how this might affect the German and other European tourists in the summer. Another interesting fact about summerhouse owners, since Denmark joined the European Community in 1972, is that foreigners are not allowed to own a summer house in Denmark ---so most of these houses are in fact owned by Danish nationals.[15].

Another aspect of the municipal characteristics is that the climate plans establishes goals for "self-sufficiency" in renewable energy. These are goals set by the municipal councils (mayors), the local elected councils, and the citizens. All 3 of these locations have goals to achieve a percentage of low carbon energy in either 2020 or 2030. A striking statistic in these municipalities is the number of turbines in the areas and the capacity (in MW) per 1000 inhabitants. Clearly the two west coast locations have a higher density of turbines even though the total number may seem small

[15] In 2014, 251 foreigners received permits from the Ministry of Justice to purchase summer homes in Denmark. 1058 individuals over the last 10 years got permission.

(compared with larger industrialized nations). The percentage of electricity from wind power is also interesting since the percentages are 107% for Ringkøbing-Skjern and 120% for Lemvig – clearly exporting their wind power across the regional grid to other areas---and far above the national average of 33% in 2013 (In 2015, the national percentage of wind on the electricity rose to 42%).

It was clear in the two western municipalities that wind siting was a centerpiece of the economic development of the region, including personal investments and jobs in the community. Although only about 20 percent of the citizens are shareholders in wind turbine projects on land, a much larger proportion is connected through family and indirect employment. But what was also clear is that private development and turbine ownership "have changed a lot" and the municipal planners are trying to stay current with the new dynamics of information flows (e.g., local press and social media) and the declining economics of land-based wind pricing. Both these changes – information flows and declining prices of wind—were linked to potential negative aspects of future wind siting decisions in their local areas.

Frederikshavn stands out with the smaller number of turbines. This also relates to the history of wind across Denmark where the west coast has played a fundamental role in growth of the Danish industry and the roots of the global corporate industry (e.g., home to Vestas, one of the largest global wind manufacturers). It is clear from research on other energy facility siting that the local characteristics and history have played a vital role in understanding the local areas. Indeed the two west coast sites have a strong history of economic benefits from the wind industry, but there is also a pride in knowing that the origins of the now global Danish industry has its roots in these municipalities. It was clear that some families may have someone employed by the wind industry and may be more likely to see the potential benefits from construction and operation of a near shore sites. These local histories help to frame some of the public views and provide a context for interpreting results from the public hearing comments in the following section.

Section 4.3 Observations about the Public Hearings. As mentioned earlier, the Energy Agency is legally responsible for the public engagement program relating to the near shore tenders. This public engagement program is primarily based upon the EIA process, including project scoping and public hearings around the final documents. Typically national government officials lead these hearings, with project overviews based upon the environmental studies. Then citizens present comments, ask questions, and/or mail in written comments to the Agency. Since there has not been a sign-up sheet at the hearings, there is not a full public record of how many people attended these hearings or which persons provided oral questions and/or comments. But our research found the number of public comments submitted to the Energy Agency from written records available on-line and they have value when placed in the context of the local communities and interviews. This evidence is the core of the analysis related to public views.[16]

Reservations are apparent. As noted in the scientific literature, citizens typically attending public hearings do not necessarily reflect the broader local population, but rather those that have a specific grievance or concern. Those supporting or not supporting the project may voice their opinions whilst the majority may not be engaged at all. (Dietz and Stern 2008). Despite these limitations, public hearings provide insights into the opinions of attendees. The hearing records

[16] See 2015 Public hearing documents link (https://ens.dk/ansvarsomraader/vindenergi/udbud-paa-havvindmoelleomraadet/om-udbud-af-de-kystnaere).

also list perspectives from local politicians about the significance of local concerns and how to mitigate potential impacts. These comments are supplemented by confidential interviews conducted by the research team in 2016 with developers, local planners, and politicians. First we look at the total number of commenters (both individuals and organizations) that submitted written comments during the 2014 hearings in Table 2. One observation is that summerhouse owners are an important stakeholder group participating in these hearing and represent more than 50% of the total comments received, particularly at the two western sites--- Vesterhav Syd and Vesterhav Nord. Summerhouse owners, needless to say, constitute a significant source of local economic development and were the dominant stakeholder at the 2014 public hearings. Clearly, in Sæby, not as popular as a summerhouse or vacation area for foreign tourists, the individual permanent residents were the dominant voices with 55 commentors out of a total of 103 total. Some local residents, of course, may also summerhouse owners.

Table 2: Total Number of Commentors and Written Concerns at Public Hearings at the Three Near Shore Sites (June 2014)

Stakeholder groups	VESTERHAV NORD	VESTERHAV SYD	SÆBY	Totals by Stakeholder Group
Residents	34	14	55	103
Local Businesses	0	7	2	9
Summerhouse owners	54	58	18	130
Government	8	6	8	22
NGOs	4	3	4	11
Not identified	1	3	10	14
TOTAL	**101**	**91**	**97**	

As one can see from the Vesterhav Syd hearings, held in June 2014, mostly summerhouse owners and their associations were represented by 58 individual comments or 63% from that location. Their comments focused largely on the visual and tourism/recreational impacts of the project –--- emphasizing some of the expected values held close by tourists and proximity to the beach. Also one of the most important comment categories related to finding an "alternative location" – with 75 commentors (see Table 3 below). This topic could be expected from summerhouse owners and residents who value the aesthetics of a coastal town and fear tourism would negatively affect siting of wind turbines on the close horizon.

It is noteworthy that NGOs were also part of the public record, including the Danish Society for Nature Conservation (DN), Greenpeace, and the Danish Ornithological Association (DOF).[17] The NGO community brought to prominence environmental issues even though some may not always resonate with the public view. As mentioned above, the issues related to the migratory route of the common scooter (a large black duck) led to the cancellation of Sejerø Bugt site and fisheries

[17] See link for DN here: http://www.dn.dk/Default.aspx?ID=463 and DOF here http://dofbasen.dk/KOMMUNER/index.php?id=vis&kommune_id=559

protection issues near the Smålandsfarvandet site. These concerns were linked to the NGOs and the studies led by the Nature Agency to support the EIA process, rather than broadly voiced public concerns. The following quote from one citizen perfectly characterizes this sentiment:

"*We advocate for green energy and offshore wind turbines, but they must be placed so that they take people and nature experiences into consideration! This project takes into account the seals hearing ability and how far gull species are flying from Hirtsholmene, that is fine, but one has completely forgotten human beings![18]*"

4.4 Insights from public hearings. The three community case studies provide major insights into the siting of new wind energy facilities. While it is often assumed in Denmark that the judgment of governmental authorities and private developers or the assessment of scientific and technical experts should suffice in locating such facilities, recent experience now casts significant doubt on this presumption. Indeed judgments reached on "deficit model" assessments have been characterized as decisions based only on an unduly narrow scope of issues. As mentioned in the review above, in addition to disseminating scientific facts, decision makers and public officials need to engage the public(s) and individual citizens in a dialogue about potential risks and benefits of energy choices under low-carbon scenarios.

The primary instrument (and constraint) for public engagement stems from the requirement to prepare an EIA document and hold timely public meetings to discuss the scope and comments on the content of the document. EIA document preparations usually structure the range of issues and considerations addressed that are important to the National Energy Agency and the sister organizations (Energinet.dk and the Nature Agency). In the case of the near shore projects most of the information disseminated by the agencies involved, the nature of the wind resource, the connection to the energy grid on land, areas designated for conservation and environmental protection, economic development, and how the projects help to meet the national climate goals. Community people were provided with this information and basics relating to turbine technology selected and project layout so that any visual impacts could be evaluated. Typically this was done with a public hearing and information provided in the local media following the decisions on location of the proposed projects. Issues such as local institutional impacts, changes to community milieu, and sense of place were rarely taken up. As mentioned in Section 4.1, some local municipal authorities bordering the original 15 sites were invited to Copenhagen to discuss their willingness to host one of the near shore sites in 2012.

Since there is a tender competition for developers to secure the sites for one or two new wind facilities, there is much pressure to demonstrate that community risks will be kept to a minimum, potential benefits will be substantial, and the community as a whole will share in the potential benefits. Also, of course, there is the general view that the community is contributing to a better world where the risks of global climate change have been reduced. The central part of the near shore process is that the developer cannot play any public role with the communities during the tender process because of the fierce competition. So the very nature of the secret competition prevents any proactive community engagement by the (potential) developer.

[18] Sæby: Vi går ind for grøn energi og havvindmøller, men de skal placeres så de tager mest mulig hensyn til mennesker og deres naturoplevelser! I dette projekt er der taget hensyn til sælers hørelse og hvor langt mågearterne flyver fra Hirtsholmene, det er også fint, men man har helt glemt mennesker!

All this is apparent in the assessment of the written comments of those attending the public hearings at the six candidate near shore wind sites. The written comments from attendees at public hearings, for all their limitations, provide some needed insight into the issues that any public engagement strategy must address. While it is clear that only partial insights can be had from the scant information available from an unknown number of the community members attending the hearings, even though such information has value. Public hearings are only one insight into the complex process of public risk perception and communication that needs to consider a fuller process in the use of multiple tools of public engagement. But even this limited information from the hearings is useful.

Written statements from hearings are thin records of public reactions, of course, as they are simply a snapshot in time. Opinions and views are expected to change over the long timeframe of these near shore projects, but alas there are few instruments in place to track these important trends. A fuller analysis of public sentiment and values would involve the results from other potential tools of public engagement, as noted in Section 2.1 above. Nonetheless, what is available should be mined for whatever insights they afford into community reactions and concerns. It is in this spirit of "what can we learn" that the following discussion proceeds.

4.4 Insights from the Public Hearings at the Three Sites. The public comments gathered through public hearings reveal multiple local concerns. Most residents who attended these hearings were not in favour of the coastline project, at least at the outset, and usually voiced critical concerns. Typically, the hearings provided an opportunity for opponents and concerned stakeholders (e.g., summer house owner and bird and nature conservation ENGOs) to voice these concerns rather than for the hearings to identify in detail who were potential supporters and advocates.

Table 3 provides a detailed profile of local concerns for the three sites; Vesterhav Syd, Vesterhav Nord, and Sæby by the category of stakeholders participating in this process. Taken together, what is striking are the differences of feedback among the three sites at the public hearings. Summerhouse owners constituted over 50% of the commenters in Vesterhav Syd and Vesterhav Nord, but their concerns vary perhaps due to community histories as well as organized opponents representing the tourist industry. As mentioned, Sæby is not nearly as well-travelled with summerhouse owners from outside Denmark are the west coast sites, (less than 10% of the total commenters from that area were summerhouse owners) as but it is a popular sailing area. There we see the local residents weighing in on the visual effects and asking for an alternative location for the near shore projects. Some of the same concerns were noted in Vesterhav Syd; with the perceived reality that the near shore project will transform the seascape with visual impacts with an almost equal number of comments indicating the government should find an alternative location. "Put it somewhere else" is the clarion call. Much of the same view prevails in Vesterhav Nord. Thus the commentors at the three sites have different concerns that our research explores below with quotes from individual citizens. We selected the following topics: Visibility, Lights, and Noise Concerns; Tourism Impacts; Conflicts of Interest; and the Decision Process (The original Danish language comments are noted in the footnotes).

Table 3: Summary of Specific Public Concerns from Three Public Hearings May 2015

Number of Public Comments by Concern/Potential Risk

Stakeholder Group	Visual*	Aircraft lighting	Maritime flora & fauna	Business & employment	Tourism & recreation	Noise & health	Alternative location/ solutions	Cable landfall & flora/fauna	Property values	Process issues
SÆBY										
Residents & homeowners associations	22	2	9	7	22	20	46	7	14	7
Local business associations and local businesses	1	0	0	1	1	0	2	0	0	0
Summerhouse owners, associations, tourists**	9	0	3	2	8	10	17	0	4	3
Government agencies	0	2	0	1	0	1	2	4	0	2
NGOs	1	0	1	1	0	0	0	0	0	0
Not identified	3	0	0	2	4	3	8	0	1	1
Total	**36**	**4**	**13**	**14**	**35**	**34**	**75**	**11**	**19**	**13**
VESTERHAV NORD										
Residents & homeowners associations	9	15	0	2	3	3	9	5	10	5
Summerhouse owners & associations	30	49	1	0	2	2	30	3	11	2
Government agencies	1	0	0	0	0	0	3	0	0	1
NGOs	0	1	0	0	0	0	2	0	0	0
Not identified	0	0	0	0	0	0	1	0	0	0
Total	**40**	**65**	**1**	**2**	**5**	**5**	**45**	**8**	**21**	**8**
VESTERHAV SYD										
Residents & homeowners associations	12	0	0	3	8	4	13	4	5	5
Local businesses & associations	3	0	1	2	4	1	2	1	3	1
Summerhouse owners, associations, tourists	52	1	12	25	50	10	55	27	31	36
Government agencies	2	1	0	0	1	0	0	3	0	0
NGOs	3	0	0	0	2	0	3	1	0	2
Not identified	2	0	2	2	3	0	2	0	1	2
Total	**74**	**2**	**15**	**32**	**68**	**15**	**75**	**36**	**40**	**46**

* : both on- and offshore
** : includes 1 former resident

Reference: 2015 Public hearing documents (https://ens.dk/ansvarsomraader/vindenergi/udbud-paa-havvindmoelleomraadet/om-udbud-af-de-kystnaere).

Visibility, Lights, and Noise Concerns:

In Vesterhav Nord, on the western coast of Jutland in Denmark, lighting and signals appear to have played the most dominant role in the risk spectrum of concern of those who provided written comments with 65 individual comments. This concern may well have been related to the location of the DTU-owned wind test site at Høvsøre. This test site is located in Lemvig municipality ---thus the public concern over the aircraft safety lights for the proposed near shore site with taller turbines is not surprising[19]. "*Let us get the turbines away from the coast and out to sea. I, myself, live in Sæby and will not have the view spoiled by expensive and noisy turbines.*"[20]

"*I'm writing to you because I simply do not understand the location of this wind farm. I am 100% in favor of green energy, but I cannot understand why turbines should be placed next to the coast of Sæby? Both north of Frederikshavn, between Frederikshavn and Sæby and especially south of Sæby there are large stretches of coast where there are no towns or houses, summer houses nor permanent residences. (...) If the turbines are placed in front of Sæby a large part of tourism will vanish and the city will inevitably suffer, and then it is not quite as attractive to live there. Sæby is actually a gem, unspoiled, but not much longer. I simply do not understand (the plans).*[21]

"We certainly have no objection towards wind turbines, but with the extremely unfortunate consequences of a large number of wind turbines that are this close to shore, the visual impression will conflict with the values we cherish and tourists demand. We find it absolutely unacceptable that a unique area gets destroyed by a number of large offshore wind turbines located so close to the coast as described."[22]

Another example of one citizen's feelings about the lights follows:

"*In addition, there is the inferno of light that will affect the stunning scenery with interferences of light / flash of light. It is so artificial and disruptive for the amazing peace at sea that we who live here, love*."[23]

It was also interesting to note that there were not many comments on "noise and health" in the locations with the larger density of turbines (Vesterhav S and N), although this is a concern that is persistently raised on the national scale, including political concerns. One of the interviews with a local politician indicated that some new resident moving into Vesterhav Nord voiced some concerns with that he was "afraid of the low frequency noise" and its potential impact on a local school and a nature area. (Confidential interviews. June 2016). On the other hand, we can see that the residents of Sæby did raise this concern –noise---almost equal to visual and tourist impacts. The ongoing study by the Danish Cancer Society examining wind turbines noise and cardiovascular disease is an

[19] The largest turbine at Høvsøre is now a Siemens 3.6 MW with a 164.5 meters height. The turbines for the near shore sites have not been decided, but the size will be most probably much larger and taller. For example, one turbine that may be considered for the near shore sites is the Vestas 8 MW turbine that is 222 meters at tip height. For further information on the Høvsøre test site, see : (http://www.vindenergi.dtu.dk/english/about/hoevsoere_uk).

[20] Sæby: "Lad os få de møller helt væk fra kysten og ud på havet. Jeg bor selv i Sæby og vil ikke have udsynet spoleret af dyre og støjende møller."

[21] Sæby: Jeg skriver til jer fordi jeg simpelthen ikke forstår placeringen af denne møllepark. Jeg er 100 % for grøn energi, men jeg begriber ikke hvorfor møllerne skal placeres ud for Sæbys kyst? Både nord for Frederikshavn, mellem Frederikshavn og Sæby og ikke mindst syd for Sæby er der store strækninger på land, hvor der ikke er byer eller huse, sommerhuse eller helårsboliger. (…) Hvis møllerne placeres ud for Sæby forsvinder en stor del af turismen og byen vil uvægerligt lide under det, og så er det ikke helt så attraktivt at bo der. Sæby er rent faktisk en perle, uspoleret, men ikke meget længere. Jeg forstår det simpelthen ikke.

[22] Vesterhav Nord: Vi har bestemt ikke noget principielt imod vindmøller, men med de yderst uheldige konsekvenser af et stort antal havmøller, der er så kystnære, vil det visuelle indtryk stride meget i mod de værdier, som vi sætter pris på og som turister efterspørger. Vi finder det helt uacceptabelt, at et unikt område ødelægges af et antal store havmøller placeret så kystnært som beskrevet.

[23] Vesterhav Nord: Noget helt andet ("In addition" er bedste oversættelse for forståelsen) er det inferno af lys, som vil påvirke den fantastiske natur med forstyrrelser af lys/lysglimt. Det er så kunstigt og forstyrrende for den fantastiske fred ved havet, som vi, der bor her, elsker.

important initiative with national interest. [24] Is this an example of a quantitative/expert study that may or may not answer public concerns about noise? Is this an example of a risk perception challenge? In fact, some municipalities are postponing wind siting decisions until this study is completed (Confidential interviews May 2016).

Tourism Impacts

Turning to the potential risks and uncertainties that underlie public concerns, they are, alas, often opaque in the public hearings data. The concerns, however, appear primarily to come from community residents. And so at Sæby, a community on the northern shores of Denmark that is a charming historical town with an influx of tourists and sailors (7000 ships annually) in the summer, comments about visual effects and potential impacts on tourism and recreation played an important role in shaping overall attitudes. At Vesterhav Syd, on the western shore (also with a substantial tourist industry) the potential impacts on tourism and recreation and the perceived impact on the visible horizon, all assumed important places in public concerns.

"I work in one of the two major wind turbine companies in Denmark because I am enthusiastic about the green transition and to create a better world for our children and future generations. (…) There should be no doubt that we support the green transition, but wind projects must not be at the expense of the people who support it. Therefore, we suggest alternatives to the current location considered in order to move the park further away from the coast, reducing the number of turbines, optimize height and generally reduce the annoyances."

Although the research team did not delve into the social media aspects of this debate, it was clear that some residents in Vesterhav Syd (near the beach town of Søndervig) organized an association that is prepared to "fight against turbines" in early 2016 prior to the tender decision. This same group was responsible for a survey that indicated that tourism would suffer in Hvide Sande area and "nearly 70% of the tourists will go to other places if the turbines are a reality." This also conflicted, they indicated, with the interests of the local politicians who desperately need to generate employment in an area with population declines. [25] Significantly, as mentioned in the previous section, the final tender bid did move the turbines farther out from shore in this location (Søndervig), thereby possibly mitigating some local concerns about visibility, tourism, and property compensations.

Conflicts of Interest

Some commenters even perceived a conflict of interest because the same authorities were both the developer and those approving the project. The following comments provide a view on these public concerns over the planning process and calls for more transparency:

"*The approval authority on the project is also The Energy Agency and The Nature Agency, and the developer is the Energy Agency represented by Energinet. When the same authority is both developer and approval authority conflict of interest may occur and awareness should be paid towards requirements of objectivity and impartiality facing decision-makers of the authorities involved."*[26]

" (…) the involved agencies must be described as blatantly authority-incompetent. The project must of course succeed, and therefore the civil service from the outset had a tied task in which the result - that the EIA report should not stand in the way - has been an integral part of the task. In a case like this where the involved authorities' roles as authority

[24] At the time of publication, the Danish Cancer Society had not published any results. Two Canadian studies (Council of Canadian Academies 2015, Health Canada Wind Turbine Noise and Health Study) have forged new directions that could help shape our next steps on noise-related risks.

[25] "Turbine opponents open their wallets." Struer Dagbladet, 22.02.16, Møllemodstandere åbner pengepungen.

[26] "Den godkendende myndighed på projektet er ligeledes Energistyrelsen og Naturstyrelse, og bygherren er Energistyrelsen repræsenteret ved Energinet. Når den samme myndighed er både bygherre og godkendende myndighed kan der opstå interessekonflikt, og der bør gøres opmærksom på krav om objektivitet og upartiskhed overfor beslutningstagerne af de involverede myndigheder.

and operator are so conflicting, as is the case, the studies should necessarily be supported by independent players, which has not happened in this case."[27]

The Decision Process

While decision process issues, such as public engagement and risk communication, emerged only prominently at Vesterhav Syd, a closer look at the data suggest that such issues ran through concerns at all the sites, as indicated by the following comments:

"Further recommends that the municipality and the state authorities in charge of the project strengthen its efforts to inform and communicate with citizens in the affected communities." (Comment from Sæby by Birgit Stenbak Hansen, Mayor and Christian Roslev, Manager, technical and environmental services.

"*It should be clarified that the public hearing taking place now cannot replace the original lack of involvement of those affected. The area allocation already taken place entails that the public hearing carried out now, in the circumstances described, can be defined as a regular show trial, as the project, in principle, is decided and determined. It is therefore predictable that all objections will be "swept off the table."*

In addition, the local planners and politicians were critical of the national government process, due to an alleged lack of transparency in siting decisions that occurred without their knowledge. One story was particularly poignant, as the local politician told the research team about how the exact location of the near shore site shifted from the original location, but he was not informed until the EIA document was revised, but the map on the cover indicated the same site! *"If we are lucky, we find out about the national decision before it is made."* Indeed if this is the sentiment of the local planners and politicians, then the hopes for early engagement of the general public may be significantly diminished.

The general impression among local officials interviewed for this study is that resistance is growing and the local people and municipalities are quicker to threaten with lawsuits and appeals. As one local politician noted, "opponents are learning from the US." Also a developer made clear that the summerhouse owners, generally considered in the upper income classes, are increasingly willing to sue developers. As one local planner noted, "the dentists, they will sue us" (Confidential interviews. June 2016).

It was also clear from the comments and media reports that negative images of pre-qualified developers prevailed as corporate, global businesses, rather than local businesses with community interests in mind. But the array of developers involved with near shore and offshore developments is a diverse group. Vattenfall is a state-owned (Swedish) company with a large share of land-based and offshore wind developments in Denmark; DONG was a public company that went private (with Goldman Sachs) but still has a Danish brand now exclusively in offshore; European Energy is considered a smaller business with mostly a domestic, land-based focus; and HOFOR is a public sector water and energy utility that is relatively new to the offshore wind market located in Copenhagen. But the consolidation of wind businesses in Denmark may also contribute to the notion that these corporations are larger and more interested in profits than community benefits. The changes in the marketplace contribute to larger social changes in the nation.

And so the past may not be prologue for the future of siting the next round of wind facilities in Denmark—both on land and near shore. Already the assessment and decision process appear more complex and uncertain as

[27] " (…) the involved agencies must be described as blatantly authority-incompetent. The project must of course succeed, and therefore the civil service from the outset had a tied task in which the result - that the EIA report should not stand in the way - has been an integral part of the task. In a case like this where the involved authorities' roles as authority and operator are so conflicting, as is the case, the studies should necessarily be supported by independent players, which has not happened in this case."

compared with the past. Not only does technology and science change, but so does society. Thus it is important that the wind energy community in Denmark assess how the social context for addressing climate and siting wind facilities may be changing. This will require ongoing research on social change in Denmark---both on the green energy transition and other public decision making areas. Experiences in other countries may also provide useful perspectives on the changing response of publics and communities to the implementation of new policies at the national level, changing attitudes and perspectives of risk, and changed expectations of the decision processes employed to site new energy facilities.

SECTION 5. Conclusions and Research Needs: Research questions reviewed. This section recaps each of the research questions and discusses some of the salient points from our case study findings, whilst considering the context of some of the issues identified in the review of the literature. Based on our observations and discussions, the research team suggests further research and/or possible strategies for the decision makers. This research hopes to contribute to a more resilient path forward that includes a more robust public engagement strategy with diverse options for dialogue on national climate plans and the realization of the ambitious Green Energy transition in Denmark.

1. ***What can be learned from the top-down national decision making process for siting utility-scale near shore wind projects and is this an effective process in continuing to move towards the green energy transition?***

- The national and EU government climate commitments drive the siting of offshore wind projects in Denmark with political agreements in Parliament. The ambitious goals to achieve a fossil free energy system by 2050 require aggressive targets, consistent policies, and ongoing social and public engagement about low carbon energy technologies, such as near shore turbines. In addition, since the projects are located at sea and along the coasts of Denmark - where the State is the relevant authority- the rules are based on national marine spatial boundaries[28] rather than local or municipal affiliations. One could argue that this national decision making process has been successful thus far as sites have been selected, EIA documents and associated hearings are complete, and a 350 MW near shore competitive tender was awarded for 2 locations on the west coast (as well as a 600MW farther offshore—Kriegers Flak—in the Baltic Sea) ---- all within about 4 years. These two west coast municipalities not only have some of the best wind resources in the country, but also have a long history of supporting and engaging with the wind industries. The speed of these decisions may outpace that of any other European country. In this regard, the decision process has been effective as it has pushed forward the green energy transition with greater possibilities of carbon offsets from current fossil fuel use. In fact, the intermediate goal of 50% wind energy on their electric grid by 2020 will most likely be met as well (if the recent tenders for 350MWs move forward as planned).

- The government met the EIA requirements for public engagement by holding hearings and consultations relating to the draft and final publications of the EIAs at each of the proposed sites. The information presented at the public hearings and the analyses in the EIA focus primarily on the environmental impacts with minimal investigation into community effects and values. It's apparent from the commenters, including some of the local politicians, that these public hearings were perceived as "one-way" information exchanges, without adequate time for discussion and questions from the participants. Also since the competitive tender was in process, the developers did not play any obvious role at these hearings.

[28] The upcoming EU integrated marine policy may not impact the current near shore sites in the planning phase, however, future offshore wind initiatives will be affected by these new policies that will have to be in place by 2021. See http://europa.eu/rapid/press-release_IP-14-459_en.htm?locale=en In addition, the EU tendering scheme for land-based projects -- scheduled to begin in February 2018 -- may have an impact on the diversity of developers and the price of wind deployments in the future as wind projects will be competed in a national market.

- It has become clear that decision makers and developers too often slip into the "deficit model" thinking at their own peril. Publics often assess risks and benefits quite differently than technical experts. Thus the presentation of "facts" and uncertainties at public hearings require qualitative as well as quantitative context. Moreover the trust image of the presenter carries a heavy responsibility. It is important to recognize that community values and place attachment issues are critical to understanding local dynamics in coastal wind energy and deserve further exploration as the projects move forward.

- We also know from the siting literature that early engagement is essential for project success. This may pose problems, however, for the developer as well as the national agencies. At sea, the Energy Agency is the first mover with site selections and engagement with the local politicians. But fuller engagement with the community did not begin in earnest until the pre-investigations studies (e.g., geotechnical) were carried out and the EIA was drafted. So it took two years for the Energy Agency to hold public hearings at the 6 sites. Therefore the mechanics of wind planning –at this stage – did not seem to support transparency early on in the planning process.[29] Also, the fact that the EIAs were carried out by the authorities before the tender process was finalized meant that the developer entered the stage very late.

- The lack of transparency in this case may have triggered more local opposition resulting from frustrations with the planning process and unknown impacts to the shoreline and visibility. Although the Vesterhav Nord and Syd project locations were adjusted to be farther from shore in the end, these decisions may have come too late in the process when controversy was already blooming and the opponents were getting organized. Some of these tensions could have been minimized.

- As noted in the legal section, the RE Act explicitly grants access to administrative appeals to local and national ENGOs as well as individually affected citizens. In January 2017, about 300 appeals have been submitted to the Energy Appeals Board on the Vesterhav projects --- in particular Vesterhav Syd. If the Energy Appeals Board considers that there are any (significant) flaws in the decision-making process and the EIA, the decision might be revoked on formal grounds or a supplementary EIA requested. Will the government agencies and the developer chosen be prepared to address fully these concerns? This is uncertain at the moment.

2. *Given the limited opportunities for public engagement with this top-down process (e.g., public hearings), will the government /developers be prepared to address effectively community concerns as well as controversy should they occur?*

- In the near shore case studies, the local communities voiced opinions of being "marginalized" in the public hearings process---allowing only limited engagement and discourse through two public hearings and two consultations in about 4 years. The mayors also have expressed a need to be more involved to ensure that their constituencies would be satisfied and could share in these developments. The fact that wind energy helps to meet the national (and local) climate goals is important, but the local politicians often also seek a real "trickle down" of economic benefits. Wind energy is a cornerstone of economic development in the western municipalities as well as tourism. But opportunities for benefit sharing may need to be more explicit and innovative.

[29] On land, the Wind2050 research teams found that communities often wanted early information, but the developers and municipalities often did not want to engage with the community until the landowners had been identified, had agreed to the arrangements, and had leases that were secured. Yet, this can take months if not years (for larger projects with many landowners such as Nørrekær Enge). This is understandable yet may have consequences for tolerability of wind strategies moving forward. See Nørrekær Enge case study at wind2050.dk

- Engagement also relates to the potential "offering" of property compensations and turbine shares. For land-based wind project, 20% shares have been offered since 2008 and they will be offered for the near shore projects as well. Significantly, summerhouse owners will not be able to purchase shares unless they are also local residents. These potential benefits may have worked well in the past, but the depressed prices of electricity make it very difficult for co-ownership and/or shares to be worthwhile and the pay back tends to be longer. Also the lower income (and older) population may not have as much available to invest in these shares and wait to make some profits from the projects. From other energy siting experiences, some of these benefits are perceived as a bribe and dismissed from those opposed or not satisfied with the decision process. Will the developer have alternative community benefits to offer citizens in Vesterhav Nord and Syd and will this affect community views now and in the future?

- The final site selection does not appear to have been influenced by public engagement or the local community "tolerance," but probably much more by economics and national commitments to find more offshore sites. It will be important to watch what the possible citizen engagement process may be as these two near shore developments move forward. The research team believes that the developer may have serious challenges developing a "sustained strategy" to engage the relevant stakeholders and to share the benefits whilst meeting the tough cost regime. However, given their experiences with a number of other wind sites in Denmark (land-based and offshore), the importance of these projects to the national government, and partnerships with local community leaders, an effective strategy could be designed and implemented.

- The psychometric literature provides a window into how the publics engage or utilize heuristics (taking short cuts) in arriving at their views about potential risks and benefits of these near shore projects. Developers may be able to influence the decision process, if there is a deeper understanding of community views and responses. In this way, communication strategies could be designed differently to address "fast and slow thinking." One-way communication or educating the public (the deficit model) would be only one aspect of a multi-pronged strategy that is based on proven social science methods.

3. Do the three coastal wind case studies undertaken in this research capture the potential conflicts and agreements that could occur given the urgency of achieving climate goals and the processes needed for sustained public participation?

- As mentioned previously, the EIA process and public hearings are limited in their utility for understanding the broader community views. However, there was a clear message at the hearings that the process was not adequate, visual and recreational impacts remained a deep concern, and local benefits were not clear. A full analysis of public engagement and responses, not simply public hearing records, requires broader tools of public engagement that are noted in Section 2.1, such as focus groups.

- Significantly, one developer did conduct a confidential web-based survey of the six proposed sites to explore local views of the near shore proposals with a PhD student. Another developer we interviewed conducts land-based surveys to assess community views of a proposed project. These types of efforts are commendable and the evidence from these surveys is used for a more nuanced view of the local citizenry. These survey data, in combination with the engagement tools noted above, are critical for public understandings and could capture some community responses or avoid potential conflicts. There are many publics—not one public group or one community. And so people often differ on what risks and benefits really matter. So some care mostly about themselves, others worry about their neighbors, and still others focus on the community as a whole. What

really matters differs from person to person and this creates an enormous challenge to risk communicators at the local and national levels as well as project developers.

- Communication is central to any effective siting strategy. A panoply of risks may be at stake because people differ. A two-way communication process is absolutely essential, as the experience at many sites across the country suggests, but seldom happens with "top-down" decision making. This calls urgently for an adaptive risk communication strategy that could incorporate psychometric approaches, such as heuristics. Experiences at many sites reveal that "listening" is often what is missing and fails to occur. Effective listening needs a process that is highly varied in outreach and patience.

- The decision process really matters. Well-considered vehicles of public engagement not only begin early (with the gleam in the eye of the decision makers, developer or government official), but also change and adapt rapidly to the evolving social context. In the end, there may be a national decision to move ahead, but having the local community on board, even with the possibility of introducing delay and rethinking of project basics. Although the Danish communities are very familiar with wind energy, siting much larger turbines closer to shore may be considered a new approach with unknowns and uncertainties. Perhaps the view of the national decision makers and the developers is that "coastal" projects have already been sited around Danish coasts so that these near shore tenders are not anything new. But the public hearing comments, the vocal opposition in Vesterhav Syd, and recent filing of appeals, indicate the story is still evolving.

- Local media really count. The social context is constantly changing and needs to be monitored so that the decision process is informed and adaptive. Most publics lack direct experience with the issues that comprise local concerns about coastal wind projects. Much of this comes from the local histories and/or social media. Most needed information does not come directly from the scientists or technical experts, but from the intermediaries who frame and reframe what the issues are. The role of social media must be considered. So the developer and government officials need to be alert to the changing social context and to gear their risk communication and the decision process to this evolving context. Is there a more active role for intermediaries that may engender more trust?

- There are important policy uncertainties and risk conundrums that the country, the wind industry, and communities face. Seeking more public involvement is not a guarantee, of course, that people will want to be engaged or that involvement will smooth the path of siting and decision making in the future. Given the urgency of climate change, how do we reconcile quickly deploying ---one of the advantages of wind energy—with the time consuming and messy process of public engagement? This is a fundamental problem. Working with the scientific knowledge base, finding trusted intermediaries, earning the trust of the communities, respecting a contentious dialogue, and approaching community benefits with a strong commitment to equity are steps in the right direction. In short, there has been much success in Denmark, but there are also opportunities for addressing future uncertainties. More can be done to build upon past success in the offshore wind sector. These elements of success also have important lessons for other countries building an offshore wind energy sector even with distinct cultural and political contexts.

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List of Appendices

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Appendix 2. Formal Public Decision Making Process --- Offshore Projects/Tender and Offshore Projects/Open Door

Appendix 3. Project Locations and Layout for the Three Near Shore Sites:

a. Sæby proposed project location
b. Proposed location and project layout for Vesterhav Nord
c. Proposed location and project layout for Vesterhav Syd

Appendix 1: Active Offshore, Nearshore Windfarm and Test Facilities in Denmark (as of January 2017)

Project	Size	Location	Distance to shore	Developer	Tender date	Status	Price pr. kWh	To be commisioned	Type	Comments
Kriegers Flak	600 MW	Baltic Sea, West of Bornholm	15 - 30 km	7 Companies prequalified.[1] Winner: Vattenfall A/S	8 November 2016	Awarded 9 November 2016	0.372 DKK (4.9 Euro cent)	Ultimo 2021	Tender	Wpd Hofor withdrew their bid, meaning six prequalified developers remained
Horns Rev III	400 MW	North Sea (Esbjerg)	20 – 30 km	Vattenfall A/S	February 2015	Concession Agreement 21 May 2015	0.77 DKK (10.31 Euro cent)	1 January 2020	Tender	
Vesterhav Syd	170 MW[2]	Søndervig	4.2 – 10 km	Vattenfall A/S	1 September 2016	Awarded 12 September 2016	0.475 DKK (6.4 Euro cent)	2020	Tender	
Vesterhav Nord	180 MW[3]	Thyborøn/ Harboøre	4.3 – 7.3 km	Vattenfall A/S	1 September 2016	Awarded 12 September 2016	0.475 DKK (6.4 Euro cent)	2020	Tender	
Nissum-Bredning[2]	4 x 7 MW Testturbines	Thyborøn	–	Siemens Windpower A/S and I/S Nissum Bredning Vind	–	Permission for pre-investigation given 4 July 2016	–	–	Open Door	They might try to apply for some of the 50 MW capacity test turbines in the nearshore tender
Omø Syd	200 – 320 MW	South of Omø	4.5 km	European Energy A/S	–	Pre-investigation permit ended 3 March 2015	–	–	Open Door	Location very close to "Smålandsfarvandet", which is part of the nearshore tender
Jammerland Bugt	120 – 240 MW	South of Kalundborg	1 – 5 km	European Energy A/S	–	DEA received the EIA from EE 17 June 2015 – it is still not approved[3]	–	–	Open Door	

Information is taken primarily from: https://ens.dk/ansvarsomraader/vindenergi/eksisterende-havvindmoelleparker-og-aktuelle-projekter and www.4coffshore.com

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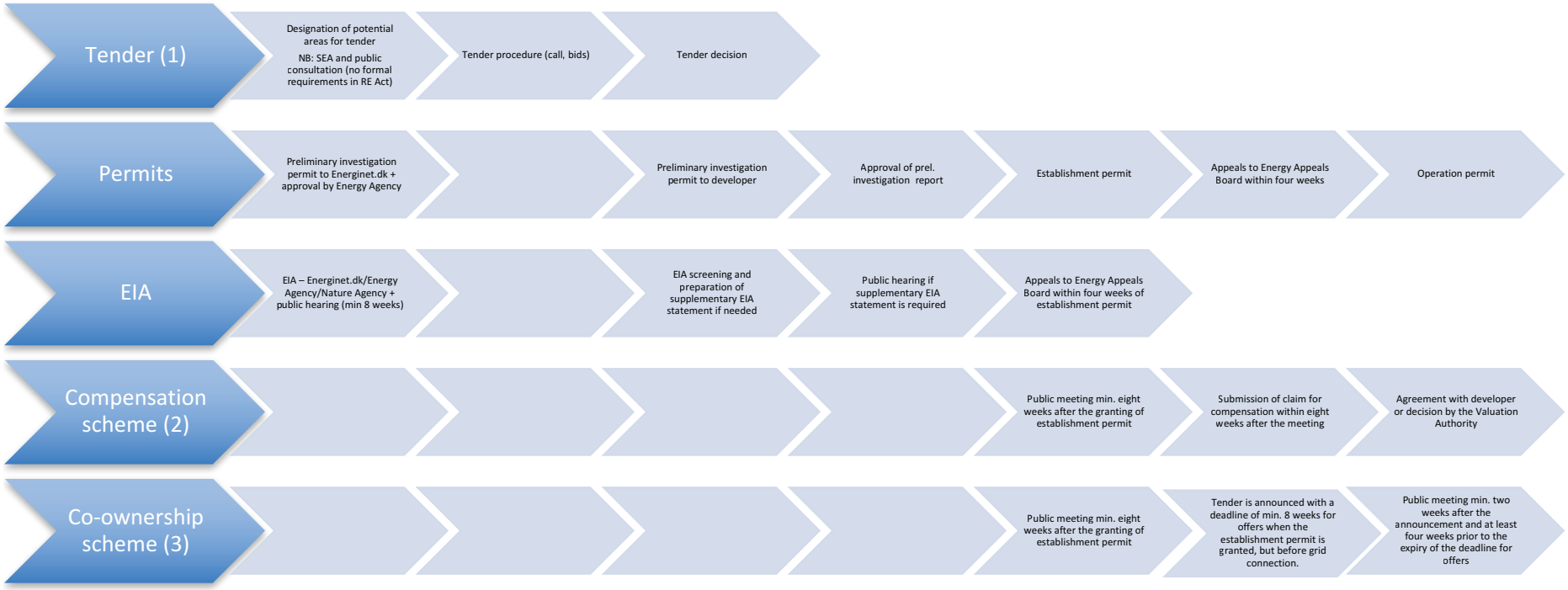
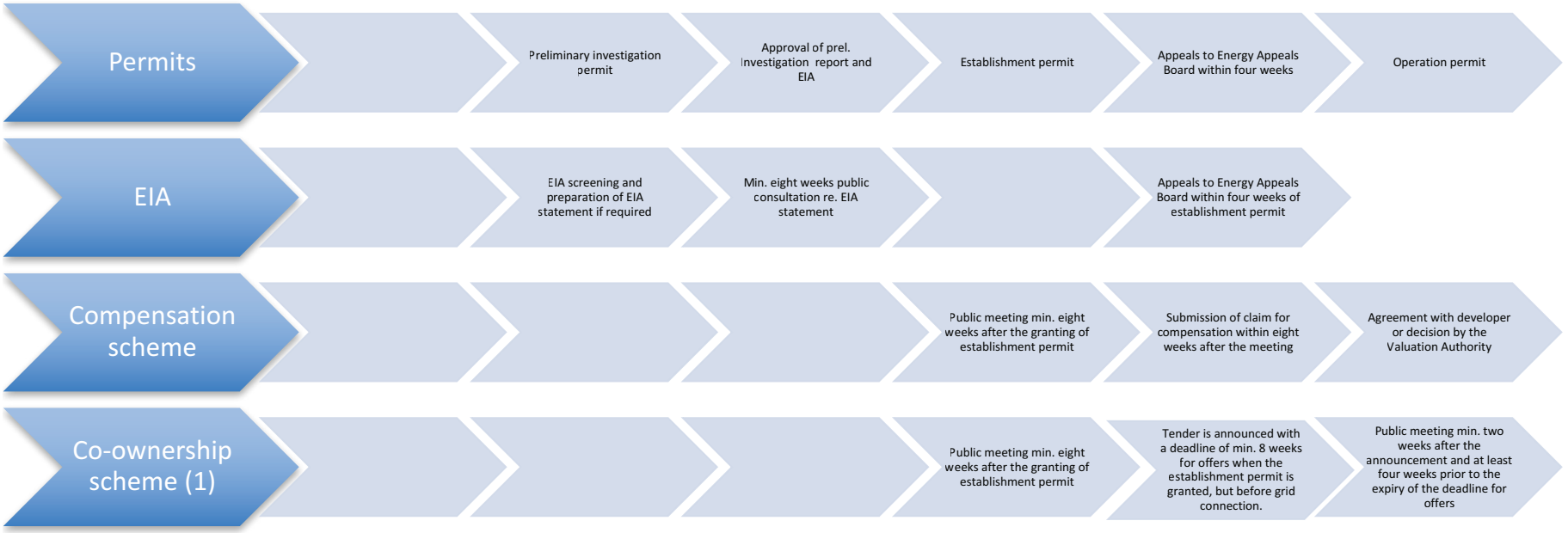
1. https://ens.dk/en/our-responsibilities/wind-power/ongoing-offshore-projects/kriegers-flak/breaking-news OR directly https://ens.dk/sites/ens.dk/files/Vindenergi/breaking_2015.pdf . News: 29.10.2015
2. https://ens.dk/presse#/news/regeringen-offentliggoer-laveste-bud-i-udbuddet-af-kystnaere-havvindmoeller-185296
3. https://ens.dk/ansvarsomraader/vindenergi/eksisterende-havvindmoelleparker-og-aktuelle-projekter

Appendix 2: Formal Public Decision-Making Processes – Offshore Projects/Tender

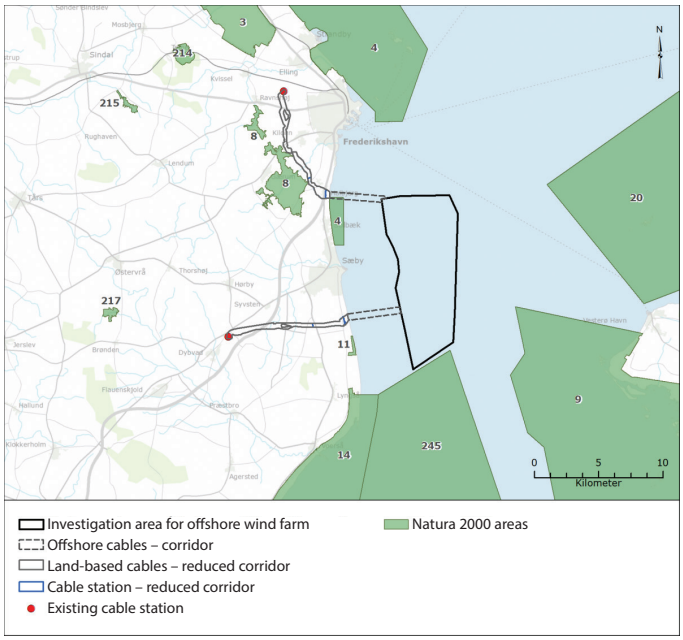


Appendix 2: Formal Public Decision-Making Processes – Offshore Projects/Open Door



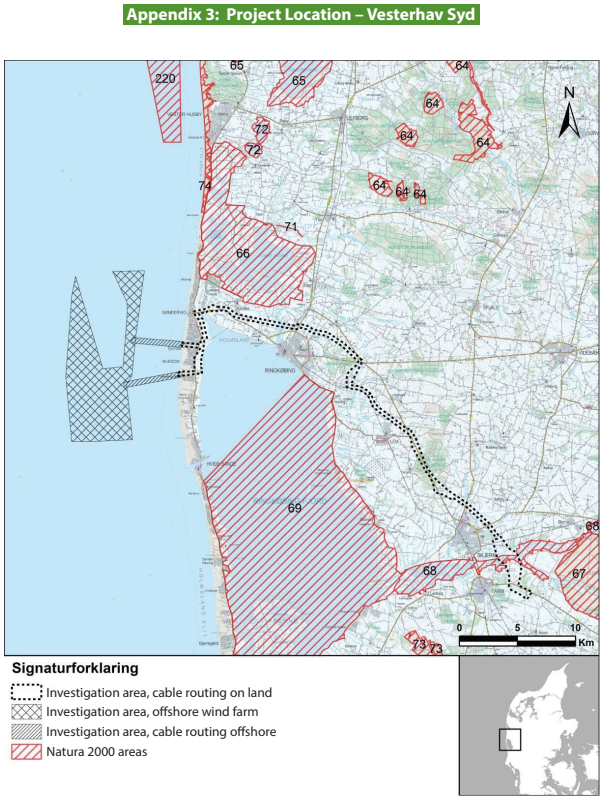
Appendix 3. Proposed Project Locations for the Three Near Shore Sites and Layout of the Two Awarded Tenders in Vesterhav Nord and Syd:

Appendix 3: Project Location – Sæby



Appendix 3.B. Project Location and Turbine Layout: VESTERHAV SYD

The original project location with conservation areas (Natura 2000 and Ramsar sites) are shown in the figure on the left from the EIA[30] The turbine layout is a portion of this original area as is shown in the image on the right[31]

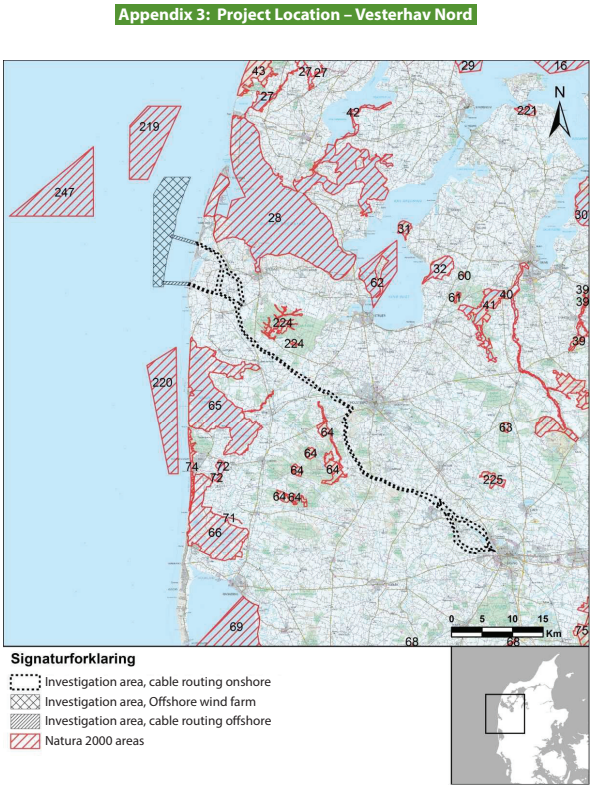


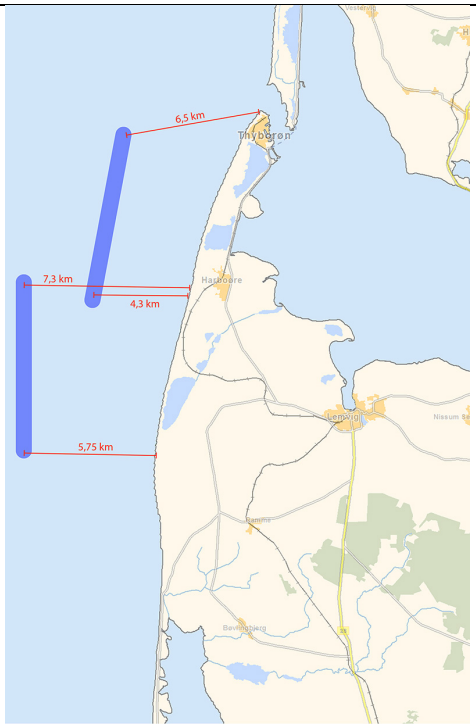
[30] Non-technical summary of the EIA can be found here: https://ens.dk/ansvarsomraader/vindenergi/udbud-paa-havvindmoelleomraadet/om-udbud-af-de-kystnaere

[31] https//corporate.vattenfall.dk

Appendix 3.C. Project Location and Turbine Layout: VESTERHAV NORD

The original project location with conservation areas (Natura 2000 and Ramsar sites) are shown in the figure on the left from the EIA.[32] The turbine layout is a portion of this original area as is shown in the image on the right. [33]





[32]https://ens.dk/ansvarsomraader/vindenergi/udbud-paa-havvindmoelleomraadet/om-udbud-af-de-kystnaere
[33] (https//corporate.vattenfall.dk