CCS in the Baltic Sea Region – Bastor 2

Work Package 3 – Social Aspects for Baltic Sea Storage of Carbon Dioxide. A Case Study Report

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Preface

IVL Swedish Environmental Research Institute was commissioned by Elforsk to analyse aspects of communication and public perception of potential carbon capture and storage projects in the Baltic Sea region. The study was carried out jointly with the University of Linköping. This report is part of the project Bastor2 (Baltic Storage of CO_2), with the overriding objective to assess the opportunities and conditions for CO_2 sequestration in the Baltic Sea Area. The project, which runs from June 2012 through September 2014, was financed by the Swedish Energy Agency, the Global CCS Institute and a number of Swedish industrial and energy companies.[1] For this specific work package, the Foundation for IVL Swedish Environmental Research Institute (SIVL) also provided co-funding. This report is published by Elforsk and in the series of research reports, published by IVL.

[1] The companies were SSAB, Jernkontoret, Svenska Petroleum Exploration, Cementa, Nordkalk, SMA Mineral, Minfo, Vattenfall, Fortum and Preem.

Sammanfattning (Swedish summary)

Koldioxidavskiljning och -lagring (på engelska: carbon capture and storage, CCS) har i många länder och regioner lyfts fram som en viktig teknik för att hantera den globala klimatproblematiken. Den tekniska och kommersiella utvecklingen har däremot hindrats av att projekt och projektplaner mötts av motstånd från olika grupper. Mot denna bakgrund beskriver denna rapport resultaten av en studie, inom projektet BASTOR2, vilken analyserat vilka sociala faktorer som kan komma att omgärda ett lagringsprojekt i Östersjön.

Detta har genomförts genom tre svenska fallstudier av andra större energirelaterade projekt som genomförts i Östersjön. Detta på grund av att det hittills inte realiserats några lagringsprojekt i Östersjön. Samtidigt pekar litteraturen på att lokala och regionala kontexter har ett stort inflytande på hur CCS-projekt uppfattas och vilken acceptans som finns. Rapporten lyfter därför fram ett antal kontexter, eller sammanhang, som identifierats som viktiga för hur fallstudierna uppfattats, diskuterats och accepterats i de lokala och nationella perspektiven. Dessa rekommenderas att de inkluderas när sociala frågor och behovet för kommunikation inom ett framtida lagringsprojekt analyseras genom olika metoder.

Dessa inkluderar:

- Hur nära ett lagringsprojekt är befolkade områden
- Östersjöns miljöstatus
- Skillnader mellan avskiljning, transport och lagring
- Klimatförändringar och vilken typ av koldioxidutsläpp som lagras
- Möjliga ekonomiska fördelar av ett lagringsprojekt (t.ex. arbetstillfällen)
- Möjligheter att hantera riskuppfattningar
- Projektägare (t.ex. förtroende för utländska intressen i projektet)

Samtidigt som dessa identifierats finns skillnader mellan projekten, vilket gör det svårt att dra robusta slutsatser. Detta är i linje med litteraturen runt CCS och erfarenheter i EU från faktiska CCS projekt. Den generella slutsatsen är att även den mest välanalyserade och välplanerade kommunikationsinsatsen kan misslyckas med att nå målsättningar om en generell acceptans. Däremot ger rapporten goda insikter i vilka aspekter som bör beaktas och därmed öka möjligheterna att identifiera och därför ta till sig de sociala frågeställningar som ett lagringsprojekt kan medföra.

Summary

Carbon capture and storage (CCS) has in many countries and regions been highlighted as one of the vital measures needed to reduce our greenhouse gas emissions in the fight against climate change. The technical and commercial development has been impeded by projects and project plans facing opposition by different groups. Against this background, this report describes the results of a study, within the BASTOR2 project, analysing which social factors are likely to influence the plans for a proposed Baltic Sea storage project.

As there are currently no CO_2 storage projects in the Baltic region, the analysis for this report has been carried out on three Swedish case-studies of other energy related projects in the Baltic Sea. The social research literature consistently points to local and regional contexts as having a large influence on the perceptions and acceptance of CCS projects. The report consequently highlights a number of contexts, or conditions, that are identified as important factors in how the case-studies have been perceived and accepted or opposed in the local and national context. The following conditions should be considered when analysing the social contexts and communication requirements of a project:

- The proximity of an operation to populated areas (including whether the operation is onshore or offshore)
- The environmental status of the Baltic Sea
- Differences between the individual components of a project eg capture, transport and storage of carbon dioxide
- Potential to mitigate effects of climate change (including the type of operation the carbon dioxide originates from)
- Possible economic benefits from a storage project (eg job opportunities)
- Possibility of dealing with risk perceptions through funds or community investments
- Gaining a sound understanding of all stakeholder interests in the project (including trust levels in developers and foreign interests)

These are the consistent areas identified, in agreement with literature on CCS and European experiences from CCS projects.

The report conclusions do not guarantee a successful project that avoids public opposition. It notes that even the best communication and engagement strategies can face unpredictable challenges. However, the report does provide good insights into aspects of projects that have proven to be significant and benefitial in other Baltic projects. These insights increase the possibilities for future CCS developers to identify responsible methods for handling the social conditions associated with a Baltic Sea storage project.

Content

1 Background

As a measure to deal with CO_2 emissions, Sweden as well as the Euroepan Union (EU) and multinational organisations have established plans for the development and deployment of carbon dioxide capture and storage (CCS). Reaching a level of deployment that is specified in most of these plans has however proven difficult for several reasons. One obstacle has been a low level of acceptance of, and opposition against CCS projects among different stakeholder groups. Looking at the EU, a number of CCS projects have faced local, regional and national opposition. As a result, communication and public acceptance of CCS is now seen as one of the central elements on the CCS agenda. Importantly, this is not limited to the general public, as it also includes perceptions and acceptance among a broader group of stakeholders, such as policymakers. For this reason, the study divides stakeholders into three main groups:

- Project owners – organisations with an economic stake in the project
- Non-project owners – all other, non-state, organisations and individuals
- State – public organisations, such as ministries, agencies, and municipalities

In Sweden, CCS is included as a priority area within the energy and climate policy framework. It was recently given a large role in the development of a Swedish Roadmap 2050 on reaching zero net emissions. In order to evaluate the potential for storing carbon dioxide (CO_2) in the Baltic Sea, which would result in Sweden not having to rely on foreign storage cooperation or potentially long CO_2 gas transportation, the BASTOR2 project is analysing associated geological, environmental, legal and social aspects. Transport of the gas would include transport by means of ships or pipelines. The injection site may include a surface platform and the gas being injected into a deep geological formation that is deemed to provide a safe CO_2 store.

Awareness of CCS is low in Sweden among most, if not all, stakeholder groups. It is not commonly debated in mass-media and is a topic that is rarely touched upon in political discussions. As such, little is known of the social aspects that may surround a storage project. The inclusion of social aspects within BASTOR2 therefore offers an understanding of perceptions and acceptance of CCS, which is essential to an assessment of a storage project's potential feasibility.

However given the low awareness of CCS and the fact that no CCS infrastructure currently exists in the Baltic Sea, public perception surveys are likely to result in hypothetical results of poor quality. As a result, the project decided on a methodological approach to analyse three case-studies of large non-CCS energy projects that have been planned or undertaken in the Baltic Sea, partially or wholly on Swedish territory. The purpose was to seek experiences from the above stakeholder groups in real projects, to provide real fact-based data for the analysis. Compared to studying a hypothetical CCS project, this provides an experience based and complementary approach. Supporting this argument, Hammond and Shackley (2010) and Malone et al. (2010) identify that opinions based on hypothetical projects and surveys where people make "on the spot" judgments, are a poor proxy for attitudes when faced with a concrete project.[2] Acceptance studies should ideally be based

[2] The case-studies were complemented by a literature survey of lessons on communication, perceptions and acceptance of CCS. Being a practical report, scientific references are mostly used in the section presenting lessons from literature as to increase readability through avoiding extensive referencing.

on an educated position, as respondents may otherwise form pseudo opinions; they may easily change position after the survey as they learn more about the technology. However, pseudo opinions may also result in opposition and may be more difficult to predict, highlighting the complexity of developing a communication strategy for an evolving technology.

Evaluations of perceptions and acceptance can build on literature, but as argued by Brunsting et al. (2011a), lessons on CCS are difficult to transfer between cases due to the varying contexts in which projects are embedded. Has the region, for example, experienced a gas related accident? Or is there unemployment, which a CCS project could help alleviate? This does not mean that literature cannot provide lessons, but rather that past experiences from such case-studies may provide important insights into contexts, such as past experiences and general positions, that will affect stakeholders' views.

The case-studies include the SwePol Link, Nord Stream, and prospecting for oil in the Baltic Sea by OPAB. These were selected on the basis that they are energy related, occur in the Baltic Sea and on Swedish territory, include activities on the seabed, and were all relatively new projects (more on the selection and results of these in Chapter 3). This provided an opportunity to discuss similarities and thus the general applicability of initial results.

The case-studied projects have been analysed in relation to the following research questions:

- Which stakeholders have opposed or supported the projects?
- What have the arguments been within the different stakeholder groups?

The aim is to draw out lessons from the case studies, in order to identify key aspects that can be recommended for consideration when starting and executing a Swedish project to store carbon dioxide under the Baltic Sea. The purpose is to provide input to a third phase of BASTOR, which would possibly engage in physical storage activities and hence require a formal communication plan for such a project.

The communication around the project case studies has been studied from the point in time when they began to be an item for general discussion, to the point where a decision on operational permits had been taken. This includes a period before the permitting processes begin, as well as the different stages and activities during the permitting processes. The latter can include environmental impact assessments (EIAs) and public consultations. The projects were analysed using interviews with all three stakeholder groups as well as thorough analyses of media and published literature around the projects. The interviews were carried out between October 2013 and May 2014. Complementary information was gathered at a workshop attended by BASTOR2 project participants, representatives from the case studied projects, as well as from the Swedish Energy Agency.

The report is divided into a summary of literature on perceptions and acceptance for CCS, followed by descriptions of the individual case studies. A discussion on social conditions and implications for storing CO_2 under the Baltic Sea precedes conclusions on social implications for storing CO_2 under the Baltic Sea.

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2 Lessons in literature

A growing body of literature pays attention to social aspects of CCS, such as communication, awareness, perceptions and acceptance (eg Markusson et al., 2012). The level of social science research on CCS is significantly lower than that on engineering and geological aspects. This chapter aims to give an overview of the literature, rather than a comprehensive discussion on all topics and theories in this field. The section provides an account of the complexity that surrounds communication of a novel and unknown large-scale technology that is likely to draw public interest due to its role in the energy sector, being fundamental to society, and as a measure to deal with climate change.

An initial question in relation to the literature is how much the available literature can provide in terms of relevant lessons for the BASTOR2 project. First of all, as the majority of research on relevant topics has been undertaken and published in the last five or so years, the body of research is relatively recent. However, CCS has undergone major developments during this period. Moreover, several studies have identified that the national to local contexts in which a project is embedded, has a large influence on the acceptance of that project (Brunsting et al., 2011a; Hammond and Shackley, 2010; Oltra et al., 2012; Teir et al., 2010). Such contextual factors include:

- Perceptions of climate change (eg sense of urgency and responsibility to reduce emissions of carbon dioxide)
- Socio-economic situation (eg if a project can provide needed job opportunities or community regeneration)
- History of the project area (eg if there have been any related accidents or socially integrated industries)
- Industrial experiences (eg if experiences exist of similar or related activities)
- Media coverage (eg existence of media channels that may support or oppose a project)

This means that lessons from one project may be difficult to transfer to another project if it is embedded in differing contexts. Nevertheless, a number of studies have identified some main factors that appear similar across projects (Hammond and Shackley, 2010; Oltra et al., 2012; Brunsting et al., 2011b).

This includes, for example, that the climate argument may work differently, as also will be shown in the case-studies. Prangnell (2013) and Brunsting et al. (2012) have identified that the positive perceptions of CCS as a climate technology mainly exists at the regional and national level, while being less important at the local level.

A factor that is argued as more important on the local level is the socio-economic contexts. This can be exemplified through the Longannet Project in Scotland, where the local communication agenda shifted focus from climate arguments to economic benefits (Prangnell, 2013). Prangnell also concludes that economic benefits have contributed to positive attitudes in relation to the North Sea Moray Firth project in Scotland, the Weyburn-Midale project in Canada, and the Ketzin project in Germany. The Ketzin project has at several occasions been highlighted as an example of good communication. The social interactions on this project were found to be aided both by economic and historical benefits, where the local context includes that gas storage activities have been present for a long period and contributing to the local economy.

Few comparisons have focused on awareness and acceptance of different parts of the CCS infrastructure – capture, transport and storage. However, Wallquist et al. (2012) have studied this issue from a Swiss perspective, identifying that the opposition due to a NIMBY effect (“not in my back yard”) was highest for transport by pipeline. In relation to storage, this effect was found to depend on the source of emissions and that opposition was low when capturing biogenic emissions. The topic was also included in a survey by Johnsson et al. (2010), which concluded the main concerns around CCS were focused on storage, with transport and handling being the third largest concern.

The research is inconclusive as to whether acceptance increases (Tokushige et al., 2007) or decreases (de Best-Waldhober et al., 2009) as a result of information and higher awareness about CCS. Similar difficulties to draw distinct conclusions are also observed by Brunsting et al. (2011a).

Hence, reasons for public acceptance or opposition are difficult to identify and lessons are difficult to transfer. This means that there is no panacea for CCS communication and as Prangnell (2013) concluded in a synthesis report on CCS communication – “even the best laid plans and preparation can never guarantee acceptance”.

3 Case studies

The following selection of case studies was based on their similarities to a prospective storage project in the Baltic Sea. This included whether the project:

- was energy related
- occurred in the Baltic Sea
- occurred on Swedish territory
- included activities on the seabed
- occurred relatively recently

We specifically used these contextual selection criteria in order to gain a better understanding of the issues and sensitivities elucidated by Swedish energy and climate change projects with impacts on the seabed in the Baltic Sea Region.

The selection of case studies could also have been based on stakeholder criterion, such as selecting projects on the basis of having been opposed by one or more stakeholder groups. Priority was however given to the abovementioned contextual factors.

Other projects considered included the Öresund Bridge between Sweden and Denmark, and Shell's onshore prospecting for shale gas in Skåne (Sweden). These were excluded for not being energy related and/or not including the Baltic Sea context respectively.

3.1 Electricity transport – SwePol Link

3.1.1 Overview

In 1996, the process that would lead to the establishment of a 230 km long transmission link between Karlshamn, Sweden and Slupsk, Poland, was initiated. The cable was promoted by the project owner, SwePol Link AB[3], as a crucial step towards the integration of electricity markets around the Baltic Sea, a political vision called the Baltic Ring. The main arguments that were raised in favour of the project related to the commercial possibilities, ie the export of hydropower during years with high precipitation, and to the stability of the electricity supply, ie the ability to import fossil based electricity during dry periods. The application process was fraught with controversy and antagonism, primarily between actors on a local level hostile to the project – municipalities, local press and organised resistance – on one side, and the project owner and national government on the other.

The first application for network concession was filed in 1996. According to the CEO of SwePol Link AB at the time, this application was only meant to be preliminary, to be followed by a more developed application adjusted according to the initial response. The application was heavily criticised by several referral instances, eg the municipalities of Karlshamn and Ronneby, the State Geological Survey of Sweden and academics (Wiklund, 2002; Alm, 2006). It also met with intense criticism in the local press and from the local population of Karlshamn, some of whom organised the Anti-Power Link Network, a group whose activities became a constant feature of the permitting process. The referral round was expanded and continued in 1997, when the National Board for Industrial and Technical Development gave the applicant a long list of points to be complemented. During this

[3] The company was formed in April 1996 as a subsidiary of the grid administrator, Swedish National Grid, which together with Vattenfall AB held the vast majority of shares. Today, the link is co-owned by the Swedish National Grid and the Polish equivalent, PSE-O.

period, two rulings also came in that facilitated the process for the project owner, on issues that could potentially have complicated procedures. First, the question of whether the application would have to be judged according to the Natural Resources Law was answered by the Social Democrat Government in the negative, subsequent to an investigation by the Department for the Environment. Secondly, the Environmental Protection Agency determined that the Espoo Convention[4] would not be triggered by the application. Both rulings were criticised by experts consulted on the issues (Alm, 2006).

In 1997, the Government approved the application from SwePol Link AB. However, in 1998 the company retracted the first application and sent in a new one regarding a wholly new technical solution. At least partly due to the pressures from the local resistance, the project owner decided to abandon the original plan of a bipolar electrical current technology, which necessitated the installation of an electrode station in Karlshamn. Up to this point, the electrode station had been the main object of the environmental protests. Instead, the project owner opted for a more expensive solution that created a closed return current loop and removed the need for an electrode station. The new application was approved by the Government (Alm, 2006; Wiklund, 2002). In 1998, the Government also gave permission according to the Continental Shelf Act.

The cable project involved two other parallel permit procedures apart from the application for network concession. Since certain infrastructure would have to be built in Karlshamn, the Swedish National Grid, part owner of SwePol Link AB, needed to obtain a building permit, and in order for the building committee of Karlshamn to be allowed to give such a permit, it must put in place a detailed development plan. In 1997, the committee decided to abandon the development of such a plan with the argument that the area in question could no longer be considered for the purpose. Based on the lack of a detailed development plan, the building committee argued that it was legally required to deny the project owner a building permit. This decision was appealed by the Swedish National Grid to the County Administrative Board, which confirmed the building committee's ruling. The project owner then went on to appeal to the Government and in 1998, the Ministry of Interior demanded that the building committee reconsider its decision. The governmental order was interpreted by the committee as a forced approval, and it therefore gave the Swedish National Grid a building permit.

Furthermore, the project owner needed to obtain a permit for water operations. The first application was deemed insufficient and returned for amendments by the Regional Water Court in Växjö. A new application, based on the new technical solution, was filed in 1998 and approved by the court the same year. That ruling was appealed by the municipality of Karlshamn and some other parties to the newly established Supreme Environmental Court.[5] In a verdict that was highly surprising to the project owner, the approval was retracted and the case was returned to the Environmental Court. In 1999 the Environmental Court approved the application under condition of certain environmental precautions, and again the municipality of Karlshamn appealed. In 2000, the Supreme Environmental Court confirmed the approval and thus, four years of deliberations fraught with tensions between several actors came to an end.

[4] The UN Espoo convention regulates the planning procedure for projects that might have environmental impacts across national borders. The full name is Convention on Environmental Impact Assessment in a Transboundary Context.

[5] The new environmental law of 1998 meant that the system of regional water courts was substituted by a system of environmental courts.

3.1.2 State and municipalities

The Swedish Government identified concerns over the environmental effects from emissions of chloride gas, electromagnetic radiation and interference with the fishing and shipping industries. It also noted that the areas in and around Karlshamn held great natural and cultural value and that precautions must be taken to guarantee that these values would not be jeopardised. However, the Government determined that in none of these cases would the project have a significant impact and that it was permissible under all relevant provisions of the Natural Resources Law. It also made the judgment that the new technical solution would eliminate many potential risks (Alm, 2006).

It should be noted that the Social Democrat Government, primarily through the Ministry for Industry and Trade, supported the project from its beginning. In this, it argued strictly from a national-economic perspective, highlighting the project's importance for the national electricity supply and the commercial potential opened through integration with the Polish energy market. The Government was explicitly advised by the Office of the Electricity and Gas Network Operator to disregard arguments concerning global issues – mainly related to climate change – as well as local and regional issues (eg the effect of a trans-Baltic cable on local power companies), the latter arguing that such issues were of a moral nature and not established in law. The Minister for Industry and Trade also portrayed the permit process as a strictly administrative process in which there was no room for the Government or other state instances to act as policy-maker. This narrowing of the issue was partly legitimised by the Supreme Environmental Court, as it determined that trans-boundary effects must not be considered when the social utility of the project was considered, only local and national. In Parliament, the Green Party and the Centre Party explicitly took side against the project, while it was criticised by the Left (Wiklund, 2002).

On a municipal level, the situation was radically different. In Karlshamn, only the Conservative Party and the Social Democrats supported it, while the other parties objected intensely. For example, the Social Democrats and the Conservatives were the only parties on the local level that supported the decision of the building committee to finally allow the project owner a building permit in the absence of a detailed development plan. Representatives of the other political parties frequently spoke out against the project in the local press and ruled against it in the different permit processes. The arguments raised by the opposing parties were largely based on the same environmental concerns that was identified, but valued differently, by the Government. They also frequently claimed that the social utility of the project had not been sufficiently demonstrated by the project owner (Alm, 2006). As the project was approved by Government and the national legal authorities against the explicit judgments of several local regulatory instances, the whole process left many on the municipal level with a feeling of having been ignored by the central power in Stockholm (Wiklund, 2002).

3.1.3 Non-project owners

The Poland cable drew intense criticism from several actors outside of the state administrative complex. One key group in the resistance was the Anti-Power Link Network that was formed by a local academic who early on in the process took a leave of absence from her position in Germany in order to engage in the opposition full-time. The group included many academics and other people of notable cultural, as well as economic, capital, which meant they had the resources to find venues of expression and to express themselves with conviction (Alm, 2006). The local press, and especially one journalist heavily engaged in the issue, becoming an important arena for the critique formulated by the network and by politicians opposed to the project. Nationally, academic experts from various environmental disciplines also voiced critisim against different aspects of the permit

process, which they deemed to be insufficient in relation to environmental concerns. Representatives of the local fishing industry also opposed the project, as did Greenpeace.

The arguments that were raised by the Anti-Power Link Network, Greenpeace and the local press, were partly the same environmental concerns that were raised by the Government and the municipality. However, these actors also attempted to broaden the scope of the discussion to include more general environmental issues, such as the moral dimension of the prospect of making Sweden dependent on Polish coal power. The protests were also fuelled by an overall critique of the project owner Vattenfall, identified as an undemocratic, commercially short-sighted monolith with a long history of disregard for local communities These perspectives were reinforced through an information meeting held in the early stages of the process, during which several inhabitants of Karlshamn felt that the representatives of the project owners displayed a distinct disrespect for their apprehensions (Wiklund, 2002). It should be noted that the Anti-Power Link Network did not abandon its agenda when the new technical solution was launched, which seemingly made obsolete several points of the original opposition to the project, but instead went on to find new venues for criticism.

3.1.4 Project owners

Representatives of the SwePol Link AB were engaged in the opinion-formation process around the project, staying in frequent contact with the Ministry for Industry and Trade, arranging information meetings in Karlshamn and publishing debate articles in the local press. The project owners were self-critical regarding the initial phase of the permit process, when a preliminary application was filed that was open to criticism on many points. However, when protests continued unabatedly after what the project owners deemed to be significant concessions on their part, they came to form the opinion that the local opposition was irrational and unresponsive to objective arguments. The whole process, according to the project owners, became infused by hostile and antagonistic sentiments that had no relation to the actual project (Wiklund, 2002; Alm, 2006). The project owners consistently, and successfully, attempted to delimit the discussion around the project to issues related to a narrow definition of the environment and to an issue of national-economics.

3.2 Gas transport – Nord Stream

3.2.1 Overview

The Nord Stream project concerns a natural gas pipeline laid across the seabed of the Baltic Sea – from Viborg in Russia to Lubmin in Germany. The project was initiated in 2003, construction started in 2010 and operations began in 2011. The project is owned by a consortium, consisting of Gazprom (Russia, 51%), Wintershall Holding (Germany, 15.5%), E.ON Ruhrgas (Germany, 15.5%), Gasunie (Netherlands, 9%), and GDF Suez (France, 9%). The project was supported and prioritised by the EU through its inclusion in the Trans-European Energy Networks (TEN-E) (EU, 2006), which highlighted the project's importance to improving supply security of natural gas to meet increase of demand as well as diversifying supply routes.

From a Swedish perspective, the project was brought to a more general public attention in 2007 when Nord Stream AG applied for an operational permission at the Swedish Government. A period of debate on the subject followed in the parliament, governmental reports and media. The debate slowed down significantly after the project received approval in November 2009.

The project was permissible according to international law, such as the Law of the Sea. However, the Convention on Environmental Impact Assessment in a Transboundary Context, ie the Espoo Convention, necessitated an environmental impact analysis and consultation between concerned states and stakeholders. Hence, the Swedish Government could not use general environmental concerns as reasons for disapproving the project. The concerns that could serve as such grounds had to be an evaluation of a detailed environmental impact assessment (EIA) of the project's effects on the seabed and related marine ecosystems. As a result, Nord Stream project owners argued that the Ministries wanted the EIA to be carried out according to highest standard.

The initial project application and EIA that was submitted was deemed insufficient. However, consultants to the Nord Stream project argue that what is commonly referred to as the initial application was in fact an early and knowingly limited version, aimed to initiate a dialogue with the relevant ministries and agencies. The same respondent argues that the project wanted an early and more unofficial dialogue but that the ministries did not have an interest in this. Based on the initial application, the process of defining what the application and EIA should include however started. According to the Ministry of Environment, the above situation may have been a result of *"pipelines of this size simply are not built in Sweden"*, pointing to a lack of experience in dealing with similar projects.

The project initially planned for a service platform north east of Gotland. However, the project exempted the platform to avoid that the project also fell under the Environmental Code, as this raised fears about the possibilities for appeal processes that could be lengthy and risk the project's scheduled progress.

3.2.2 State and municipalities

From a political stakeholder perspective, the debate about the project started in 2007 when the permissibility application was handed to the Swedish Government. A hearing in 2007 of the Committee of Foreign Affairs showed a clear opposition among individual politicians and parties across political alignments. The main issues of concern at this stage were (in order of number of raised concerns) environmental implication from a general perspective, interference with old mines and grenades since WWII, alternative pipeline routes on land, national security, fisheries, public's concerns, post operation aspects, operational security and diversion from focus on renewable energy resources. The fragile environmental state of the Baltic Sea and protection of Natura 2000 areas was also highlighted.

Other concerns among local politicians, which were voiced through various channels, such as op-eds and blogs, mostly concerned foreign security aspects, such as protecting energy transports from terrorism and acts of war. Environmental concerns were significantly less frequently discussed. The foreign security aspects concerned the Russian interests and how the Russian government was perceived as trying to influence the Swedish government's approval of the project. While the majority of the operations were offshore, concerns were also raised about construction hubs onshore that could cause disturbances and one of them being close to defence installations.

Agencies that voiced opinions were the Swedish Maritime Administration (SMA), who raised questions about the potential negative effects for the shipping sector as well as for the pipeline (due to shipping activities). This includes risks of fires and explosions, reduced buoyancy for ships in case of gas leakage, emergency anchoring and potential dragging of anchors, and effects of ships sinking over the pipeline. In terms of the planned service

platform, SMA was concerned about the location relative shipping routes, icing conditions, and accidental collisions due to, eg, blackouts, fatigue, and alcohol (ibid). The response by Nord Stream was that the risks were low, which was considered by the SMA as underestimating risks and neglecting the status of the Baltic Sea as a particularly sensitive sea.

Several institutions in the policymaking sphere used the climate and energy policy framework to argue both in support and opposition of the project. While a fossil gas was seen as more favourable than coal or oil in the shorter term, it was by some seen as locking the EU into a fossil infrastructure in a longer outlook. An example was local politicians at the Island of Gotland, being closest to the pipeline, who objected to the project on the basis of the moral that priority should be given to developing renewable energy sources and utilisation.

Other aspects raised were the economic effects and potential job opportunities. For example, Gotland Municipality first generally objected to the project but later allowed the consortium to pay the lion's share of upgrading and thus use the harbour in Slite, harbours being an important function to an island community, as well as paying a rent to use the harbour as a logistical centre during construction.

3.2.3 Non-project owners

The main concerns among the general public focussed on accidents during operation, which, for example, was voiced at meetings with local public at the Island of Gotland, being the community closest to the pipeline and one of the project's construction hubs on the Swedish side. The main concern was leakage and the effects that this may have on fish, feedstock and humans. Other concerns included disturbances, such as road dust and noise from lorries to the construction hub in Slite. There were also concerns about the project owner's communication that was perceived as too technical and difficult to understand.

Environmental NGOs (ENGOs) raised concerns, which match those raised by politicians, however also mentioning compensation and monitoring plans. Concerns were raised about the Baltic Sea status as a particularly vulnerable sea. Greenpeace opposed the Government's approval on the basis of an alternative routing not having been fully explored, arguing a conflict with the Espoo Convention. The Swedish Society for Nature Conservation's (SNF) key point of opposition was general references to the status of the Baltic Sea. Apart from opinions shared with other ENGOs, SNF also raised concerns about old mines and chemical weapons as well as stirring up the bottom sediments and consequently nitrogen and phosphor as well as other chemicals.

The main businesses raising concerns was the fishing industry, as pipelines was seen as causing problems for trawling, as bottom plates (used to pull the nets down) could get stuck in, or damage pipelines. This also caused the fear that fishing could be prohibited in areas around the pipelines. Another problem was the fear that pipelines could change sea currents and cause reduced oxidisation, which could affect fish populations. As a result, the Nord Stream project funded the development of a new bottom plate less likely to get caught in the pipelines as well as providing fishermen an economic compensation to purchase these plates. The project moreover took out insurance to cover any damages to nets that would be caused by the pipelines nonetheless. Based on this, the chairman of the Swedish Fishermen's Federation stated that *"their interests has been satisfied"* but that it did not mean that they *"took a position in favour of the project"*, rather that the permissibility was up to the government. A technical aspect in this respect is that the bottom sediment in places was found too hard for the pipelines to be submersed into the seabed.

3.2.4 Project owners

The project owners and communication consultants to the project identified large differences in policymaking and communication cultures between the countries involved in, and affected by, the project. This is reasonable given differences in forms of government, level of democracy and political tradition. However, it was also argued that the Swedish administrative culture differed also to the German, where Sweden was perceived as having a process where stakeholders and policymakers, on all levels, were treated more similarly. An example were given that a handling officer at the Ministry of Environment had a much more similar saying in the permitting process than in the other countries where decisions were more influenced by ministers and high ranked public officers. This was typically seen as preferable, seeing such processes as more predictable due to following established rules and routines. The project owners also argued that the project initially failed to acknowledge the above context as well as the lack of experiences of gas pipelines in Sweden (especially on the east coast).

In relation to the communication being identified as too technocratic by some stakeholders, due to the focus on a detailed EIA, the project owners agreed to an extent. However, they also identified this as part of the process, meaning that the EIA was the information that the project produced and thus could make reference to. In other words, they argued that the permissibility process is largely technical and that the communication consequently follows a technical format.

The dialogue with concerned stakeholders was in general perceived as working well, however the relations with media was difficult due to a primary focus on the Russian interests that were inherent in the project. A low rate of references to the status of the Baltic Sea, was explained by a lack of knowledge by the general public thereof as well as being a distanced problem that did not cause NIMBY opinions.

3.3 Oil prospecting – OPAB

3.3.1 Overview

The company Oljeprospektering AB (OPAB; ”Company for Oil Prospecting”) was founded by the Swedish state in 1969, with the purpose of searching for oil in the Baltic Sea in order to gain a share of the rapidly growing energy market. In the middle of the 2000s, at the time of the case studied here, OPAB was a subsidiary of the privately owned Svenska Petroleum Exploration AB.

In 2007, OPAB initiated the process to gain governmental permission for exploratory drilling. The area in question was Dalders, a reserve deemed to be the largest undrilled prospect in the Baltic Sea.[6] The geological structure impinges upon the economic zones of Poland, Russia (Kaliningrad) and Lithuania, and an ongoing border dispute could also give Latvia legitimate claims to drilling in the area. The fact that several states could rightfully tap into the Dalders reserve was highlighted by an OPAB representative as a factor weighing in favour of their application, based on an argument that they would provide a greater environmental expertise than other potential candidates. Other aspects underlined by OPAB was national energy security concerns (the company estimated that findings could amount to 20 % of Swedish oil consumption for twenty years), the fact that the project was deemed to be of low risk, the company’s experience with off-shore drilling, the fact that

[6] Dalders is also the most commonly discussed site for Swedish carbon dioxide storage potential in the Baltic Sea.

sizeable investments had already been made in the project, the potential for significant tax incomes for the state, job creation and important environmental knowledge created in the process.

During 2007, the environmental consulting firm WSP produced an EIA commissioned by OPAB. The EIA included geological surveys, surveys of the seafloor fauna, seismic investigations and hydrochemical surveys. In it, the consulting firm found no potential environmental consequences of significance to hinder the prospective drilling. None of the agencies partaking in the referral process objected to the project, even though certain qualifications were put.

Consultation was held according to the Environmental Code with the three regions of Blekinge, Kalmar and Gotland, deemed to be the region's most closely affected by the project, while municipalities and expert agencies were also consulted in the referral process. The project owner was also helped by the ruling of the Environmental Protection Agency (EPA), that the Espoo-convention would not be triggered by the application, and that a simple notification to relevant authorities in the countries around the Baltic coast would suffice. However, the final application, submitted to the Department for Enterprise in November 2007 together with an application for an extension of the company's prospecting rights, was refused by the Government after a lengthy period of deliberation, in March 2009. In addition, the Government decided not to extend the prospecting rights, which OPAB had held since its inception in 1969 and which had been extended on nine occasions. OPAB immediately appealed against the government ruling, on the basis that it broke several legal principles. The company argued that the Department for Enterprise had based its reasoning on a hypothetical situation – full scale oil extraction - which the application did not actually entail, thereby 1) ruling on the basis of environmental effects which were not relevant, and 2) making it impossible for the company to respond adequately. However, the Supreme Administrative Court overruled the appeal.

3.3.2 State and municipalities

During the referral process, most municipalities and county administrative boards consulted accepted the proposal from OPAB. However, several of them made a special mention of the fact that they were aiming to reduce their reliance on fossil fuels, while the application regarded only test drilling, and that a potential future proposal for full-scale oil extraction would be judged very differently. Of the municipalities involved in the referral process, two explicitly objected to the application: Mörbylånga and Borgholm on the island of Öland in the Baltic Sea. Apart from the national-level argument - that oil extraction would be counterproductive to any serious attempt at a renewable energy shift - the two municipalities also argued from a local perspective, highlighting the fact that Öland would be likely to bear the brunt of any oil spill or other accidents.

The basis for the Government decision given in the verdict was that the environmental state of the Baltic Sea had deteriorated rapidly since OPAB was first given the exploratory rights in 1969, to a situation that was described as "precarious". The concern that any further disturbances might have catastrophic effects for the marine ecosystems were deemed to override the fact that technological advances had made accidents from off-shore drilling highly unlikely. Under the provision that"accidents can never be totally ruled out", the Government ruled that it would be improper to allow any such project under those circumstances. A parliamentary under-secretary also explained that the department feared

that a decision to open up for oil drilling in the Baltic Sea would make the government look hypocritical, at a time when the COP15 in Copenhagen was approaching and the Prime Minister had identified climate threat as a crucial area of political concern. This ”moral-political consideration”, as the under-secretary explained, could not however be used as official ground for the government verdict as it did not fall into the frame adopted by the Continental Shelf Act, which is why only the risk for marine disturbances was used as official explanation of the refusal. The department ruled that since any prospective drilling, which was what OPAB had applied for, was intimately related to full-scale oil extraction, the potential effects of the latter would also have to be taken into consideration. Furthermore, the Minister of Environment had specifically targeted the Baltic Sea as a crucial environment in need of acute protection. In that context, according to the under-secretary, the department felt induced to set an example for other Baltic states considering initiating oil projects or already drilling in the area.

3.3.3 Non-project owners

Besides the critical voices coming from Öland, there was no organised resistance against the OPAB application during the consultation phase. The press took a largely positive stance and environmental NGOs showed little interest.

3.3.4 Project owners

When the application for permission to perform prospective drillings in Dalders was submitted, the view at OPAB was that everything within the power of the company had been done in order to adhere to due process, that a very thorough EIA had been produced, revealing no significant environmental concerns, and that the consultation process had proceeded smoothly, with no crucial objections towards the project. Therefore, the Government’s ruling came as a surprise to those managing the project, and they were left to feel aggrieved by a decision – or two decisions if the appeal is taken into consideration – they felt violated the guiding legal principles. Most importantly, they expressed incredulity towards the fact that the Government based its ruling on the potential effects of a hypothetical future scenario – full-scale oil extraction – which the application did not actually entail.

4 Discussion

This section will discuss the implications highlighted by the case-studies and literature with regards to the key societal aspects of a potential Baltic Sea storage project. The section starts by presenting the topics, or contexts, that are identified as most likely to influence social concerns. These topics were identified by analysing the experiences of energy projects in similar contexts to a potential CO_2 storage project, this include:

- Proximity to operations (including offshore vs onshore)
- The Baltic Sea and its environmental status
- Differences between capture, transport and storage
- Climate change and type of emissions
- Economic benefits
- Investing to solve concerns
- Foreign interests and security
- Other

A first general point, is that the analysis confirms that acceptance of CCS developments is not only a question of public perceptions, it is equally if not more important in relation to industries and businesses, organisations, politicians and policymakers, etc.

4.1 Conditions affecting perceptions and acceptance

4.1.1 Proximity to operations (offshore versus onshore)

A commonly discussed factor that influences perceptions and acceptance among different stakeholders is NIMBY. This describes a situation where individuals are increasingly risk averse the closer an activity is to places of living, working or other interest (eg home, vacation house, parents' house, recreational areas) which is perceived hazardous or interfering. While this concept has both supporters and adversaries in terms of its analytical robustness, it would, in the case of CCS, relate to the proximity of operations to areas which can be associated with such concerns. This means that building and operating a capture or handling facility, transport solution or storage operation close to residential areas, includes a gradually increased risk of being opposed.

Such consequences lead to one of the more common conclusions in CCS literature in terms of general opposition that offshore storage is in most cases less opposed than onshore. Following this logic, the distance to shore is likely to be an influential factor in this respect. This may not necessarily apply to regions that are sparsely populated. Based on experiences in Europe and Norway, the argument that onshore activities are more opposed appears robust. While not included as a case study, the onshore exploration for shale gas by Shell in Skåne has faced far more opposition than the offshore case-studies.

This could mean that an offshore storage project in the Baltic Sea would face little opposition, being located a significant distance from land and not visible from land. However, a storage project that includes a platform would likely face more opposition, as was the case for the inspection platform originally planned as part of NordStream.

Interestingly, both the SwePol and Nord Stream case-studies demonstrated relatively low opposition to the marine activities did not mean low opposition towards the project as a whole. In the SwePol-case, the opposition focused on the activities on land. In the Nord Stream project the surface inspection platform and onshore construction hubs were a point of concern for both the general public and state. Therefore, even if the majority of the

operations of a storage project are located offshore, a project could still face opposition on the basis of the land-based activities.

4.1.2 The Baltic Sea and its environmental status

Another point that could cause opposition, and therefore a point of analysis in the case-studies, was if we could identify concerns relating to the studied projects' location in the Baltic Sea. The idea being that heightened concerns could be a result of it being a Mediterranean sea[7], which has a long history of providing foreign security, economic and cultural values. It is also home to inhabitants and tourists on the islands of Gotland and Öland and along the coastlines. However, the results indicate that the activities offshore do not cause too many major concerns.

As the Baltic Sea's environmental status is challenged, there is a risk that strong opposition could occur to prevent activities that could worsen an already negative situation. The studies show that this was the case, but in different ways. This does not mean that the results were inconclusive; rather suggests that it is difficult to predict what such opposition may focus on. The SwePol and NordStream cases resulted in concerns about the local environmental status of the seabed. The OPAB case however exhibited concerns more focused on the general environmental status. While limited to three case studies, the results were somewhat surprising as the two former projects have a larger spatial scope than the OPAB case which was more spatially limited.

In sum, a storage project is likely to face arguments of opposition that relate to the environment in the Baltic Sea, but these arguments may take different shapes and forms.

4.1.3 Differences between capture, handling, transport and storage

An interesting question for a storage project is how perceptions and acceptance may differ compared to capture and handling facilities and transport solutions. Experiences from early CCS operations have proven that storage is the part of the technology which has faced most opposition, however less so for offshore activities.

This does not mean that capture or transport solutions have not been opposed. For example, the Test Centre Mongstad faced opposition from local residents based on concerns about the toxicity of the amine acids used in the process, and transported to the plant. These concerns were dealt with by testing and communicating the risk for emissions and the operational safety. As described in section 2, a Swiss study has also shown that the transport infrastructure may be the point of largest concern.

Looking at the different parts of the CCS infrastructure, the case-studies suggest that it may be the emitting operations that will be the focus of opposition. In the cases of NordStream and SwePol, it was not the construction company that faced opposition. It was those who would use the pipeline or cable. While not specifically analysed, and hence a point for additional research, this could mean that it is not the storage operator that will face most opposition when constructing a CCS infrastructure. It could instead be the operations whose emissions that are subsequently stored. This would follow the logic that these operations would be perceived as the root of the problem (ie the need for a pipeline, cable or carbon dioxide storage) and those benefiting economically from causing the emissions.

[7] I.e., a sea that is mostly enclosed and has limited exchange of water with outer oceans.

4.1.4 Climate change and type of emissions

The case studies and literature add complexity to the above. As is found in the Swiss study, the existing NIMBY opinions disappear when the transported and stored gas is biogenic. The same has been found in several expressions in media and by politicians, all in different ways concluding that applying CCS to biogenic emissions is more favourable than for fossil emissions. There is however less information on how perceptions and acceptance are influenced by emissions originating from industrial processes. A reasonable assumption would be that views on such emissions would be positioned between the views on biogenic emissions and fossil emissions.

While CCS addresses concerns of climate change[8], the technology can be perceived both positive and negative in the climate context. Positive perceptions include avoided emissions of carbon dioxide to the atmosphere. Negative perceptions include fears of potentially prolonging the use of fossil fuels and risks of leakage. The case-study of NordStream provided that perceptions of climate change worked in favour of the project. Some environmental organisations identified a positive contribution to lowering EU carbon dioxide emissions in the medium term, seeing that the gas would replace coal in heat and power production.

Looking back at the discussion on economic benefits, it could consequently be favourable for an initial storage project to use carbon dioxide captured from Swedish biofuel combustion or process emissions from industries. This would provide a climate argument, while avoiding the negative fossil connotations, as well as a potential economic benefit with industries being able to use CCS as a tool to deal with a potentially higher future price on carbon dioxide emissions.

4.1.5 Economic benefits

Literature provides a strong support that economic benefits are an important factor in determining the level of support or opposition. Possibly even the strongest. A question for a Baltic Sea storage project is therefore what level of direct economic benefits that exist, which local groups that may gain from the project and to which extent this gain is needed? The latter is included as the economic benefits are a stronger factor if positioned within a community with a weak economic status, such as large unemployment.

The economic benefits also have a spatial component. A pilot project to store carbon dioxide in the Baltic Sea would probably be small and occur far from land. It can consequently be questioned to which extent there will be any perceptions of economic benefits. While a storage project would likely engage a reasonable number of workers during construction, the staffing needed for operations is much lower. Benefits of this nature are consequently more likely to be associated with the emitting industry or operation, if being a larger employer within the community. Being highly specialised, it can also be questioned to which extent the operation will use local businesses and other resources (ie in the areas most likely to strongly support or oppose). If relating to the need to handle emissions from the Swedish industry sector to protect its competitiveness, the job argument may apply. In terms of storing carbon dioxide in the Baltic Sea, examples of local connections in this respect, is displayed both by Cementa's plant in Slite and by SSAB's plant in Oxelösund.

[8] Being a *very large* concern for 44 % of Swedish people (SOM, 2014).

4.1.6 Investing to solve concerns

Both Nord Stream and SwePol paid a risk premium to avoid opposition in choosing technologies that were significantly more costly and less technologically proven. These investments were chosen based on opposition against the initial plans. In the Nord Stream case, local concerns such as sound pollution, was also dealt with by funding sound proofing of windows where Lorries could disturb residents. The project moreover dealt with opposition from the fishing industry by funding development and purchases of new trawling nets as well as insurances against damaged nets due to the pipeline. In the SwePol project, decisions were taken to invest in technologies that were less opposed, even if this increased both capital and operational expenses.

4.1.7 Foreign interests and security

Trust is a commonly acknowledged factor for building awareness and understanding. In the Nord Stream case the key point of opposition towards the project and its plans, were the Russian interests in the project. This kind of opposition was not witnessed in the SwePol project, also being a transnational project. Two of the aspects differing between the projects is firstly that Sweden benefitted economically from the SwePol project, but not Nord Stream, and secondly the historically less problematical relations with Poland rather than Russia. While being based on a single case-study, ie Nord Stream, the conclusion on this aspect is that while a storage project may benefit from a broad group of investors, including foreign interests may provoke opposition to a varying degree.

4.1.8 Other

A storage project in the Baltic Sea will be the first of a kind in Sweden, which will have several implications. As identified in both the Nord Stream and SwePol project, novel aspects meant a political contentiousness as well as uncertainties about the permitting process. Ministries as well as agencies with responsibilities in this process were, according to NordStream project owners, reluctant to engage in an early dialogue and provide guidance.

Also, opposition towards the case-studied project is reduced significantly once the projects have received permissions. Expansion of existing projects may also face less opposition, as was the case when plans for additional Nord Stream pipelines were initiated in 2013.

When comparing the cases of SwePol and OPAB, we see a phenomenon of incompatible perspectives giving rise to something like a Babylonian confusion of languages and embittered feelings on behalf of those left feeling aggrieved. In the former case, the local opposition could not understand why their attempts to relate the planned project to a wider discussion about energy and climate change, always fell on deaf ears. In the latter case, it was instead the project owner who was not able to see the logic behind the Government's reasoning in turning the application down. In both cases, the Government has played a crucial role. In the SwePol project, it took a leading role in closing the issue for certain aspects, disregarding arguments relating to wider issues of climate change, whereas, in the OPAB case, it did precisely the opposite, ie widening the issue to include deliberations on climate change. The conclusion to draw from this is that there is a need for a more transparent and clear status of climate change aspects in large-scale infrastructure projects, since this would facilitate a discussion where the premises are obvious to all actors involved.

4.2 Methods to guide communication

In communication science and practice, there are several theories and methods that describe what is considered appropriate strategies and ways to formulate messages. Social site characterisation is a critical first step for project developers who need to analyse a project's social setting and the needs and concerns of all the projects stakeholders. There are multiple methods for gaining this understanding[9] but according to Kirsty Anderson, Principal Manager for Public Engagement at the Global CCS Institute, this is the area that is very often underestimated when creating a stakeholder engagement and communication strategy.

The central elements can be summarised by dividing the processes into the following steps:

- Context analysis
  - Identify socio-economic context
  - Identify political context
  - Identify cultural context
- Stakeholder analysis
  - Identify stakeholders
  - Map stakeholder interests
  - Map stakeholder concerns and perceptions
- Project-related analysis

The above highlights the steps to consider, which overlap to an extent. The key concept is to firstly identify the contexts in which the project is embedded. Thereafter stakeholders are identified and mapped. This data is then brought into the project's context, providing an analysis of which topics and concerns are likely to be a result of the project plans. One of the ideas behind these methods is to identify whether a project is *de facto* feasible. Some projects will simply be too difficult to realise in areas for a number of reasons.

[9] See http://www.globalccsinstitute.com/publications/social-site-characterisation-concept-application

5 Conclusions

Robust conclusions about the implications for storing CO_2 in the Baltic Sea are difficult to make. This is due to the differences highlighted through the case-studies, as well as variations in the lessons from literature and existing CCS projects. However, from a research point of view it is possible to conclude that the approach of studying proxy projects in situations similar to those of a potential CCS project, is a feasible methodology. This does not mean that such an approach will give full recommendations for a future communication and engagement strategy, but it can provide valuable insights into topics that should be prioritised in moving beyond the case studies and evaluating specific needs for communication and social interaction of a CCS project.

From analysis of the case-studies it is possible to point to topics that are more or less likely to cause opposition or support for a Baltic Sea storage project. These topics should be seen as prioritised points for evaluation in relation to initiating a future CO_2 storage project. Including such topics in a proactive, open, transparent and honest communication would provide a strong foundation for a deliberative and participatory stakeholder engagement process. It also provides additional information to the growing body of social science literature on CCS perceptions and acceptance.

Two of the conditions that are identified as typical determinants for opposition and acceptance are the proximity of the operations and the economic benefits. Regarding the former, the studied projects appear to have been as far offshore as not to cause concerns. However, this could also reduce the perceived rate of economic benefits. Should the project however be positioned in relation to the long-term success of the Swedish industries, the probability for identified benefits would be greater.

Similarly to the above benefits, the climate change argument for CCS is more applicable at a national level. In a local context, a project's contribution to mitigating climate change is considered more of a side benefit, a much larger focus is put on the potential economic benefits of a project. Hence, for a project offshore, the need for a discussion on local benefits is largely non-existent, meaning that a regional and national communication on benefits and climate action will be more important.

However, the presence of large point sources (Cementa in Slite and SSAB in Oxelösund) close to the prospective sites for Baltic Sea storage could provide a local context and increase perceived benefits among the closest onshore communities. Such perceptions could potentially be strengthened should the stored carbon dioxide be captured at one of these operations. The same positive perceptions may also be achieved by storing carbon dioxide from a biogenic source.

Acceptance should not only be seen as relating to the general public's opinions. Important stakeholders that may drive the need for communication can be businesses that do not have a stake in the project. It can be state actors on different levels and may, naturally, also be ENGOs.

Another important factor is that a storage project is likely to be a first of a kind project for the Swedish public, businesses and policymakers. This will add to the complexity of predicting perceptions and concerns of the respective stakeholders. Such a project should consequently acknowledge this challenge and engage in early analyses and communication in dealing with a broad group of stakeholders with different levels of awareness and perceptions on climate change, emitting industries, the Baltic Sea and CCS.

Another conclusion is the importance of avoiding focusing the communication of the results of an EIA, as this can be perceived as technocratic and undemocratic. While an EIA can be an important tool, a range of other concerns should be included on the communication agenda.

The key conclusions, not specifically relating to the Baltic Sea, are:

- It is possible to derive lessons from non-CCS projects and identify topics that should be prioritised on a CCS project communication agenda.
- Acceptance and perceptions should be evaluated from a broad stakeholder perspective, not focusing exclusively on the general public.
- Offshore projects may face opposition regarding onshore activities.
- The perceptions of how CCS contributes to combating climate change are difficult to predict, however the perceived value of storing industrial and biogenic emissions appears higher than from fossil fuels for power production.
- Foreign interests and foreign security may be a key determinant of acceptance.

As stated by Nord Stream project owners, CCS communicators should prepare to discuss a wider range of concerns than previously anticipated with a larger group stakeholders than initially predicted.

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