Global Environmental Change 21 (2011) 336–345

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

# Capturing the stories of corporations: A comparison of media debates on carbon capture and storage in Norway and Sweden

Katarina Buhr [a,b,*], Anders Hansson [b,c]

[a] IVL Swedish Environmental Research Institute, Box 210 60, SE-100 31 Stockholm, Sweden
[b] Centre for Climate Science and Policy Research (CSPR), TEMA – Department of Thematic Studies, Linköping University, SE-601 74 Norrköping, Sweden
[c] Department of Technology and Social Change, TEMA – Department of Thematic Studies, Linköping University, SE-58183, Linköping, Sweden

ARTICLE INFO

*Article history:*
Received 28 April 2010
Received in revised form 28 January 2011
Accepted 28 January 2011
Available online 5 March 2011

*Keywords:*
Carbon capture and storage (CCS)
Corporation
Media
Cross-country comparison
Norway
Sweden

ABSTRACT

The development and deployment of carbon capture and storage (CCS) are sensitive to public debates that socially frame the technology. This study examines the evolving CCS debates, focusing on the media's framing of firms. Corporations are central CCS actors, and we analyze them in light of the nation-state, which has been emphasized in previous research as the primary context of CCS politics. Empirically, we compare framings of Statoil and Vattenfall in the Norwegian and Swedish media, drawing on a qualitative dataset of news media articles published between 2005 and 2009. We conclude that firms make regular media statements either to foster legitimacy or to respond to criticism of CCS. We also conclude that framing is not necessarily linked to technological success or failure and that interpretations of the technology have different forms depending on whether the related activity occurs in domestic or foreign markets. Finally, we explain the media framings based on the domestic energy situation and politics.



## 1. Introduction

Regardless of one's opinion on carbon capture and storage (CCS), it is hard to ignore its entry into the climate and energy debate in recent years. Having been promoted by, for example, the Intergovernmental Panel on Climate Change (IPCC) and G8 leaders as a technology having significant potential to reduce greenhouse gas emissions while allowing the further exploitation of fossil fuels, CCS is linked to the urgent question of how to address climate change and the energy challenges of the twenty-first century. In several parts of the world, CCS has rapidly become part of the political agenda and is becoming part of the broader public debate. CCS involves a range of potentially influential actors, such as companies and their trade associations, environmental non-governmental organizations (ENGOs), the public, governments, and politicians. The evolving framing of the issue is essential for corporations investing in CCS because it provides a foundation for how public perceptions are shaped, which, in the long term, is the key to gaining acceptance and legitimacy. Indeed, CCS technologies have several characteristics that make them highly controversial because of uncertainties ranging from the strictly technical to financial requirements and environmental risks.

As highlighted by Meadowcroft and Langhelle (2009), CCS-related issues are country specific, despite being interwoven in an international debate. To date, there have been several empirical studies of CCS politics and policy in a national context (Meadowcroft and Langhelle, 2009; Shackley and Gough, 2006). While these studies convey important lessons regarding how CCS is developing in certain countries, we need to broaden our understanding of how these national debates treat the entities that ultimately operate the CCS technologies (i.e., corporations). Research demonstrates that businesses are dominant actors in the CCS community in terms of, for example, funding and the number of people involved (Stephens et al., 2011; van Alphenet al., 2010); therefore, the media portrayal of business actions and investments will likely affect societal debates. A comparative perspective can cast new light on firms' embeddedness in these national debates.

This study presents a comparative analysis of the CCS media debate in Norway and Sweden, focusing on the central corporations involved with CCS in each country: Statoil[1] and Vattenfall. Despite being based in two neighboring countries with many

* Corresponding author at: IVL Swedish Environmental Research Institute, Box 210 60, SE-100 31 Stockholm, Sweden. Tel.: +46 8 598 563 44; fax: +46 8 598 563 90.
*E-mail addresses:* katarina.buhr@ivl.se (K. Buhr), andha@tema.liu.se (A. Hansson).

[1] The company was temporarily called StatoilHydro between October 1, 2007 (when Statoil merged with the oil and gas division of Norsk Hydro) and November 1, 2009.

0959-3780/$ – see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.gloenvcha.2011.01.021

cultural similarities, some of the challenges and opportunities concerning CCS that Statoil and Vattenfall face differ considerably. We primarily use news articles for empirical data to grasp the national CCS debates in these two Scandinavian countries and analyze them in light of their national context. In this sense, we build on previous studies (Bradbury and Dooley, 2004) expanding upon the perception that firms are vocal actors in CCS media articles. In the remainder of this paper, we explain the rationale for selecting the two corporations for a comparative study and examine their national contexts within energy and climate issues and, more specifically, CCS. After describing the methods and materials underpinning the study, we present the empirical results and analysis. We conclude the paper with cross-country analysis and conclusions.

## 2. Materials and methods

News articles were used as our primary empirical data to study how public debate on corporate CCS activities in Norway and Sweden developed between April 2005 and December 2009. Several previous studies of CCS have relied heavily on media coverage for their empirical basis (Bradbury and Dooley, 2004; Mander and Gough, 2006; van Alphen et al., 2007; Gough and Shackley, 2005). These studies mainly applied quantitative content analysis methodologies to classify positive/negative statements regarding CCS, map actors, or analyze the main arguments for or against the technology. Researchers have also suggested that the media affects perceptions of CCS among policymakers and the public (Stephens et al., 2008). When using media material, however, we should be aware of the multifaceted role the media plays in modern society. First, the news media constitute an important arena where general societal debate occurs, for example, in commentary articles and reportage. Second, the media *construct* the stories that constitute news. Third, the news media play a performative role in influencing how individuals construct meaning (Gamson and Modigliani, 1989). In this sense, the media can be seen as a significant contributor to the creation of political agendas and the implementation of policies (Asp, 1986). However, studying these three aspects are not the analytical focus of this paper. Rather, we consider news media coverage as reflecting public debate. Because the media do not comprise neutral actors but actively interpret social reality and color how it is described (Furberg, 1997), any analysis using media reports as core data should interpret the data for what they convey: public debate as *reflected* by the media and not necessarily direct expressions of various actors' intentions or activities.

### 2.1. Data collection

News articles were sampled using Media Agent, a service provided by Infopaq. This search tool includes only articles published on the Internet and may overlook some important print media coverage; however, it includes the vast majority of relevant articles because most print media were also published online during the studied period. Two databases were designed, one for Norway and another one for Sweden that covered a large range of media sources, including news agencies, magazines, radio, TV, newspapers, and the web. We searched for articles in which CCS appeared anywhere in the text, using several search terms to account for language variations.[2] The date range was specified as starting April 1, 2005, the start of the Norwegian archive provided by Infopaq, and ending December 31, 2009. The initial search resulted in approximately 4000 articles from the Norwegian media and 400 from the Swedish media. The vast difference in the size of the data sample was the result of multiple publications of the same articles that were published in a range of Norwegian newspapers. The number of unique and relevant articles decreased to about 300 per country after deleting identical articles published in more than one source and articles published as updates in the same source as well as after reading the articles to verify the content actually reflected the sought-after subject and was not the result of spurious hits. Thus, despite the large initial difference in sample size, the number of unique articles was comparable in both countries. Because our initial goal was to build upon studies that recognize the importance of firms in the CCS community and to build off media articles on the topic, we selected articles featuring the largest corporations involved in CCS in each country for our data analysis. These companies were Statoil in Norway and Vattenfall in Sweden. The final dataset consisted of a somewhat surprising 64 articles for Norway and 111 articles for Sweden, indicating that CCS reports in the Swedish media have been closely linked to Vattenfall. Throughout this study, we also refer to additional sources, such as reports and studies about CCS in these two countries, to support and contextualize the stories that emerged.

### 2.2. Data analysis

In analyzing the media articles, we should recognize that contemporary media reporting is not limited to journalists' descriptions of events, but includes quotations from interviews and references to other material, such as reports or previous articles and press releases. Another type of article appears in the editorial and opinion sections, written by either the publisher or an external writer and reflects opinions and particular arguments. The diversity of these media voices requires attention to and description of who is behind certain statements. To perform the data analysis, we also examined contributions written by actors other than those representing corporate interests because they were found to have a profound effect on CCS framings, both in general terms and regarding firms' CCS activities. Therefore, although the empirical focus was on corporations, other influential actors, such as ENGOs, politicians, and the public, were also analyzed in relation to corporate CCS activities. Therefore, we used the media articles as the main empirical input, which was complemented by secondary literature to facilitate the analysis as described in the subsequent sections.

We performed a content analysis on our final empirical sample. This analysis extends beyond the quantitative methodological approaches that have dominated previous CCS media research. The first step of the analysis involved coding. Following Krippendorff's (2004) methodological recommendations, we read the data, looking for the following patterns and concepts that were foreshadowed: who are the actors, and what are the issues/controversies, oppositional writings, metaphors, values and feelings, diversity of ideas, basic assumptions, alternative perspectives, and stories about concrete projects. We were open to the emergence of new patterns and concepts and consequently shaped our final focus; therefore, the codes were not constructed *a priori*. We tagged key phrases and text sections that corresponded to our questions and noted others that were unexpected but might be important. In addition, we also searched for similarities in how the same concepts were expressed, and we continued comparing the categories and constructions that emerged during the process. The process was iterative and followed Krippendorff's (2004) recommendation to recontextualize and redefine the research until a satisfactory interpretation was reached. In this process, we also searched for secondary literature to contextualize the data and find

[2] The search terms (translated from Norwegian and Swedish) were either *carbon dioxide* or $CO_2$ in close connection with any of the following terms: *capture*, *storage*, or *disposal* and several synonyms.

support for our analytical interpretations of the media articles. Regarding the comparative design of the study, we applied a compare-and-contrast approach, focusing mainly on the contrasting aspects in a descriptive manner and omitting analysis of causality, interconnections, and intertextuality between the two countries (Denk, 2002).

## 3. Comparing the national context of corporate CCS activities

The two corporations selected for this research are interesting for several reasons, in light of the national climate and energy situation from a comparative perspective. Statoil and Vattenfall are headquartered in countries, which, at first glance, have similar political approaches to climate change and CCS. Both Norway and Sweden have explicit ambitions to link their CCS activities to the European Union's climate change policies and CCS plans, even though Sweden is a member state and Norway is not. Both countries are involved in Nordic cooperation to advance CCS, such as the Top-Level Research Initiative. Similar to Norway, Sweden has a long tradition of being proactive in the environmental and climate arenas. For example, these countries were pioneers in dealing with acid rain in the 1970s and were the first in the world to introduce $CO_2$ taxes in the early 1990s (Hansson, 2008). The Norwegian government's present political ambition is to reduce global greenhouse gas emissions by 30% of Norway's 1990 emissions by 2020, and two-thirds of which is to be carried out domestically (Ministry of the Environment, 2009). The Swedish government has pledged an objective of 40% reduction in greenhouse gas emissions by 2020 compared to 1990 (Government Offices of Sweden, 2009). However, Norway and Sweden differ considerably in terms of their domestic energy situation and CCS politics and activities to date.

A significant share of the Norwegian economy, approximately one-fourth of the GDP in 2009 (Statistics Norway, 2010), is due to domestic fossil fuel production. The majority of the country's energy production consists of oil and natural gas (International Energy Agency, 2010a). On the other hand, nearly 100% of the country's electricity is generated by hydropower (International Energy Agency, 2010b), which does not produce any $CO_2$ emissions. Norway exports natural gas to the rest of Europe, but its stake in coal power, widely considered the main energy source for which CCS is used, is very limited (Tjernshaugen and Langhelle, 2009). The overall energy situation in Sweden differs considerably from that of Norway. Domestic reserves of fossil fuels are insignificant in Sweden. Energy production and electricity generation in Sweden is mainly based on hydropower, nuclear power, renewable energy and waste (International Energy Agency, 2010c; International Energy Agency, 2010d), and the country's dependence on fossil fuels is relatively small. This finding implies that there is no "carbon lock-in" in Swedish power production (Unruh, 2000). Nevertheless, the Swedish government has proclaimed that natural gas "may be important for a transitional period" in the energy supply (Government Offices of Sweden, 2009). The geological preconditions are also quite different between the two countries. Norway has extensive geological capacity to store $CO_2$, particularly offshore, whereas the storage potential in Sweden is limited and uncertain (Teir et al., 2010).

The Norwegian government and Statoil have become world pioneers in CCS development and deployment (Tjernshaugen, 2009). Norwegian CCS projects have been hailed as role models in international debate and in research communities worldwide, since the launch of the Sleipner CCS facility in 1996. More recently initiated or planned CCS pilot plants and demonstration facilities in Norway include Snøhvit, Mongstad, Tjeldbergodden and Kårstø (Teir et al., 2010). These projects all result from the cooperation between the Norwegian government and companies with partial or full state ownership. Besides public and private support, CCS has also been promoted by the influential Norwegian ENGO Bellona. Altogether, the profile of CCS in the Norwegian national political debate versus the debate in other European countries has previously been described as high, or even very high (Shackley et al., 2007). CCS controversies even contributed to the resignation of the Norwegian prime minister early in the twenty-first century. In addition, a special regulatory framework and $CO_2$ taxation in combination with extensive expertise in the oil and gas industry had already fostered CCS initiatives in the 1990s. According to Tjernshaugen and Langhelle (2009), there is broad political agreement in Norway that CCS represents an important way for the country to realize its climate ambitions.

Sweden, in contrast, has a relatively low profile in the international CCS debate. The Swedish political and media CCS debate has been described as moderate or even low key, at least up until 2006 (Buhr and Buhr, 2010; Hansson, 2008; Shackley et al., 2007). However, the multinational company Vattenfall, owned by the Swedish government, is often claimed to be at the forefront in developing and testing carbon capture technologies and has invested heavily in coal power plants in central Europe. Vattenfall has been engaged in CCS research since 1996; it leads or participates in CCS projects in several countries and is one of a few corporations that receive major funds from the European Commission to develop a full-scale CCS power plant (Elforsk, 2008; Hansson, 2008; Vattenfall, 2009). However, acceptance of fossil fuels for power production is very low in Sweden, and the Swedish public and expert support of CCS have been found to be low in international comparisons (Viklund, 2004; Palmgren et al., 2004; Shackley et al., 2007). CCS was discussed in government circles for the first time in 1996 but was considered too futuristic a technology. The attention given to CCS has increased since then because of several factors, such as increasing interest from the European Commission and the fact that CCS become more important in international climate change politics. In addition, several concrete CCS projects involving Swedish interests have been developed, followed by occasionally intense discussions between their proponents and opponents (Hansson, 2008). In recent years, a few pilot studies have been conducted to examine Sweden's CCS potential, but its main prospects may be for industrial point sources and plants fuelled with biomass (Elforsk, 2008).

Based on these observations, these two countries exemplify how corporate CCS activities play out in national media, where CCS is either a tangible option receiving major governmental support (Norway) or essentially a hypothetical technology for domestic application with weak governmental support and a significant share of skepticism in the debate (Sweden). They represent two categories of countries from an international CCS perspective: one in which CCS has long been regarded as a real alternative approach to limiting greenhouse gases, and another in which it has not been treated as a domestic near-term climate change mitigation option. In the following sections, we present a detailed, empirical examination of the two corporations selected for this research and how they have been described by the national media in the two countries. The sources of the cited media articles are provided in endnotes and/or comments.

## 4. Capturing national media debates

### 4.1. Statoil in the Norwegian media

#### 4.1.1. Legitimacy claims

Statoil has frequently had the opportunity to make statements and distribute press releases in the Norwegian press regarding their CCS activities. These statements have usually conveyed a

sense of pride, responsibility, and even courage. Statoil seems proud to pave the way for CCS and to show how it can be done: "Everyone is talking about reducing $CO_2$ emissions to meet climate change–well we are doing something about it."[3] In the CCS community, the lack of CCS regulations has been considered one of the largest obstacles to business initiatives. Therefore, Statoil has said it is a sign of courage to go ahead with investments despite regulatory uncertainties: "In Statoil, there were some courageous people who just decided to go for it."[4]

The underlying framing of CCS in terms of responsibility and accountability has not only been brought to the forefront by Statoil but also been discussed by actors, such as the Norwegian government and ENGOs (Tjernshaugen and Langhelle, 2009). Unlike most European ENGOs, Oslo-based Bellona has promoted itself as an active CCS supporter. In 2005, Statoil entered into a three-year cooperation agreement with Bellona to exchange ideas about environmental challenges, environmental policy, and how Statoil could improve its environmental performance (Statoil, 2010). Bellona was frequently quoted in the media stressing Norway's "moral responsibility" to conduct research into CCS and to develop technology to curb global emissions, given the enormous per capita emissions of Norway when considering oil exports.[5] In our empirical material, there were many statements in favor of Statoil's CCS activities, which were linked to key goals for limiting climate change, strengthening environmental protection, and promoting sustainable development. For example, references were often made to the 1987 Brundtland Commission report (which introduced the concept of sustainable development[6]), Norway's commitments under the Kyoto Protocol,[7] or the Stern Report's support for CCS.[8]

Previous research has identified how CCS has largely been regarded as conferring important opportunities in Norway (Tjernshaugen and Langhelle, 2009). Given the significant oil and gas production in the country, CCS is seen as a responsibility of the Norwegian state, with implications for the entire country. Statoil, together with its projects at Mongstad and Kårstø, has been described as a tool for discharging this Norwegian opportunity. This has been expressed by the former Norwegian Minister for Oil and Energy, Odd Roger Enoksen (party affiliation: SV): "The government's vision is to contribute to technological developments which can provide cost reductions and the broad application of CCS."[9]

Statoil was repeatedly described by reporters as a role model or "world leader" in the CCS business, particularly towards the end of the investigated period. However, Statoil's leading position was not taken for granted. Ongoing competition was described where other countries, such as Great Britain, or companies, such as Vattenfall, could take over the lead as CCS "world champions" if the Norwegian projects received insufficient support.[10] With reference to Statoil, Norwegian oil production was described as already "the cleanest in the world."[11] Spokespeople for both Statoil and the Norwegian government claimed that increased domestic production would reduce the production and combustion of foreign fossil fuels that cause more pollution (ibid.). In the case of Europe, the reference was coal, thereby legitimizing increased fossil fuel production.[12,13]

#### 4.1.2. Political enthusiasm for CCS in Norway

The Mongstad project was celebrated by Norwegian Prime Minister Stoltenberg early on and was described as making industrial and environmental history.[14] The importance of CCS achieved a new level with the launch of the "moon landing" metaphor by Stoltenberg in his New Year speech of 1 January 2007: "This is a great project for our country. This is our moon landing."[15] Since then, the moon landing metaphor has received considerable play in the Norwegian press. This metaphor has become so pervasive in Norway that reporters there have even used it in a number of headlines referring to CCS activities in other countries, such as "Sweden has carried out its moon landing,"[16] or "Germany postpones its moon landing."[17] When a poll was published in mid-2009 showing little public support in Norway for CCS, Norwegian Prime Minister Stoltenberg, who had been eager to promote the technology, was described by reporters as being "alone at moon trip"[18]. Moreover, when an even larger CCS project was planned at Tjeldbergodden, it was referred to as a "Mars landing" by a Norwegian newspaper.[19]

The Norwegian government has provided significant funding to support Statoil's CCS investments (Tjernshaugen and Langhelle, 2009). Consequently, public criticism of CCS in the media was predominantly directed towards the Norwegian government rather than Statoil. The above-mentioned poll that revealed little Norwegian public support for CCS led the media to draw attention to Prime Minister Stoltenberg rather than Statoil.[20] Statoil was eager to claim "the main economic and operational responsibility for establishing CCS rests with the state."[21] The state responsibility for CCS sparked debate in the media regarding the appropriate scope of governmental responsibility for Statoil's CCS investments. When it was announced that governmental support for Mongstad was indeed valid and legal according to EU regulations, it attracted considerable attention.[22] In fact, the state used several measures to encourage corporate investment in environmental technology related to CCS. Several news articles also contained references to the $CO_2$ tax as the catalyst for CCS investments. In fact, in 2006, it was announced by the former Minister of the Environment, Helen Bjørnøy (SV), that there would be no additional state support for power production facilities without CCS, and the applications for gas power without CCS at Mongstad and Tjeldbergodden would be rejected.[23] In addition, regulatory developments at the EU level were described as a victory for Statoil and, therefore, for Norway[24].

The broadly claimed benefits of CCS for Norway are many as follows: $CO_2$-free domestic power production, exports of CCS technology, and improved international reputation. Because Norway's share of total global emissions is very small, the main contribution of CCS in Norway is not to reduce domestic emissions but rather to promote emission cuts in other countries. This standpoint was emphasized by Statoil, especially when responding to the criticism that specific Norwegian

[3] Sellæg, A. "Marslanding» på Tjeldbergodden," adressa.no. 5/8/2007.
[4] Svensli, R.I. "Vil tjene penger på miljøproblem," fremover. no. 6/19/2006.
[5] Hegvik, G.K, Ulekleiv, M. "Norge er verdens CO2-versting", vg.no. 12/11/2007.
[6] Svensli, R.I. "Vil tjene penger på miljøproblem," fremover. no. 6/19/2006.
[7] NTB. "StatoilHydro har ikke gitt opp «månelandingen»," VG. no. 12/12/2008.
[8] ANB-NTB. "Vi undervurderte klimatrusselen", indre.no, 6/5/2008.
[9] ANB-NTB. "Statsforetak skal håndtere CO2," finnmarkdagblad. no. 3/2/2007.
[10] Andersson, A. "Britene vil slå Mongstad," Bergens Tidene, bt. no. 6/13/2007.
[11] Lindeberg, A. "Slik skal oljebransjen bli miljøvennlig," DN. no. 3/27/2008.
[12] Gulowsen, T. "Positivt at det ikke blir bygget gasskraftverk," greenpeace.org, 12/22/2007.
[13] Lindeberg, A. "Slik skal oljebransjen bli miljøvennlig," DN. no. 3/27/2008.
[14] Bjerke, E./NTB. "Klart for gasskraftverk," DN. no. 10/12/2006.
[15] Author unknown. "Video: Ber Stoltenberg bekrefte at 'månelandingen' skal finne sted," venstre. no. 12/13/2008.
[16] Author unknown. "Svensk CO2-«månelanding» i Tyskland," h-a. no. 9/9/2008.
[17] Yngland, D. "Tyskerne utsetter sin månelanding," tu. no. 6/25/2009.
[18] Andreassen, T."Alene på måneferd", dagsavisen.no, 6/4/2009.
[19] Sellæg, A. "«Marslanding» på Tjeldbergodden," adressa.no. 5/8/2007.
[20] Andreassen, T."Alene på måneferd", dagsavisen.no, 6/4/2009.
[21] Bjerke, E./NTB. "Klart for gasskraftverk," DN. no. 10/12/2006.
[22] Author unknown. "ESA-avgjørelse: Lovlig statsstøtte til Mongstad," elogit. no. 7/17/2008.
[23] NTB. "Sier nei til gasskraft uten rensing," nrk. no. 8/12/2006.
[24] ANB-NTB. "Seier for CO2 fangst", finnmarkdagblad.no, 10/7/2008.

CCS projects would have very limited mitigation potential.[25,26,27,28,29,30] However, general political support for CCS was strong throughout the studied period. For example, Minister of the Environment Erik Solheim (SV) claimed that Norway needed to enhance its CCS investments because "the world needs it."[31] CCS was described as a way for Norway to help develop technologies that could be used in other countries where they were urgently needed.[32] Moreover, Norway was considered to have excellent offshore storage opportunities and the potential to accrue enormous revenues from importing $CO_2$ from other European countries, a future scenario framed by the media as a "new gold mine."[33]

#### 4.1.3. Criticism of Statoil's international corporate activities

While the general idea of exporting CCS technology was seldom criticized in the Norwegian media, Statoil's only major international CCS project was. The articles that were most skeptical towards CCS were those describing Statoil's oil sand activities in Canada starting in 2007,[34] for which the WWF called on Statoil to develop a CCS strategy. However, even though the WWF expressed concern regarding several environmental impacts of the oil sand extraction, the focal point was its $CO_2$ emissions and the corresponding need for CCS.[35,36,37]

Late in 2008, Statoil responded to criticism of its oil sand projects by claiming that it was going to develop suitable technologies for the oil sand industry that would be as successful as those in Norway. Statoil also emphasized that CCS development would not have been feasible without the involvement of large companies, such as Statoil, that had CCS experience.[38,39] However, only a few months later, early in 2009, Environment Minister Solheim made a statement on how to navigate Norway onto "the green track"[40]. As one of the ten most important measures, Solheim mentioned the aim of controlling Statoil and not accepting the company's investment in Canadian oil sands.[41] The oil sand investments prompted questions regarding the extent to which the government should control Statoil and whether or not Statoil's oil sand activities were an issue solely for Canadian authorities.[42] Greenpeace presented criticism that was farther reaching than WWF's and claimed that the oil sand activities were not environmentally sound, even when CCS was factored in. Under the heading "environmental freak show," Greenpeace demanded that Statoil cancel its involvement in oil sand development.[43] In addition, the Christian Democratic (KrF) parliamentary party announced that Statoil's withdrawal from oil sand development was part of their election platform, and the controversy also exposed divergent opinions within the government.[44,45] In this context, the investments were presented as a waste of taxpayers' money because CCS was deemed an expensive "smoke screen," would take too long to deploy, and would ruin Norway's reputation in environmental politics.[46] Subsequently, these opinions were supported by the reporting of Al Gore's statement that "oil sand is a threat to mankind."[47] Spokespeople from Statoil repeatedly defended its oil sand strategy, claiming that oil sand was not a "dirty" energy source and emphasized that new technology would soon be available to deal with the major problems of oil sand development. Furthermore, the firm advocated understanding the oil sands in a wider context – increasing demand for oil, especially in developing countries, and the end of access to "easy oil" – and refused to accept the criticism as relevant.[48,49]

At the end of 2009, yet another issue was briefly debated because a new directive from the European Union proposed that leakage from $CO_2$ storage would be the responsibility of the host country, which would then be obliged to buy emission rights corresponding to the amount of $CO_2$ released (European Parliament and Council, 2009). According to calculations made by PointCarbon, this legislation implied a large financial risk for the Norwegian government in light of Norway's plans to sell $CO_2$ storage space and import $CO_2$ from countries throughout Europe.[50] Greenpeace commented on this in the media, citing it as an additional argument for stopping the government from proceeding with plans to import $CO_2$ from Europe (European Commission, 2009). However, the media generally did not follow up on this criticism.

### 4.2. Vattenfall in the Swedish media

#### 4.2.1. A key actor in Swedish climate change politics

Vattenfall is one of Sweden's best-known companies and has produced electricity for the domestic market mainly via hydropower since 1909. In the 1990s and early twenty-first century, Vattenfall grew into one of Europe's largest energy companies and, consequently, one of its largest $CO_2$ emitters. Vattenfall's first concrete internationalization strategy was formulated in 1993 and was followed by an active search for international partners and companies to buy, especially in Germany. In the late 1990s, it began gradually acquiring eastern German utilities and mining companies relying on brown coal. These activities were highly controversial and attracted considerable media attention, especially as Vattenfall was simultaneously portraying itself as a green energy leader (Högselius, 2009). The attention paid to Vattenfall's international activities increased from 2005. Brown coal-related activities are generally considered one of the least environmentally sustainable ways of producing energy. Vattenfall has repeatedly defended, promoted, and explained its strategy and its vital component, CCS, in the media. In 2004, Vattenfall's CEO Lars G. Josefsson was quoted in a major newspaper stating that the Swedish people were poorly informed and had no knowledge of the new coal power industry: "You have not seen it for yourself. The coal power of

[25] Nielsen, A. "Slakter biskopenes klimautspill," opdalingen. no. 11/8/2006.
[26] NTB. "Statoil jubler over strenge miljøtiltak," dn. no. 1/10/2007.
[27] ANB-NTB. "Bellona: Norge er CO2-versting," op. no. 12/11/2007.
[28] ANB-NTB. "Ingen grunn til Mongstad-sprekk," demokraten. no. 7/16/2008.
[29] NTB. "StatoilHydro har ikke gitt opp «"månelandingen»,"VG. no. 12/12/2008.
[30] Yngland, D. "Tyskerne utsetter sin månelanding," tu. no. 6/25/2009.
[31] ANB-NTB. Ingen grunn til Mongstad-sprekk, demokraten. no. 7/16/2008.
[32] NTB. StatoilHydro har ikke gitt opp «månelandingen," VG. no. 12/12/2008.
[33] Haugstad, T. Norge som lagringsplass, tu. no. 12/11/2009.
[34] In 2007, StatoilHydro acquired the Canadian company, North American Oil Sands Corporation.
[35] Brox, K. "Ekstremt miljøfiendtlig satsing," adressa.no. 6/12/2007.
[36] Froyland, F. "Statoils karbonbombe," Dagens Næringsliv, dn. no. 9/5/2007.
[37] ANB-NTB. "Ingen grunn til Mongstad-sprekk" demokraten. no. 7/16/2008.
[38] Aune, K.A. "Storfamilien StatoilHydro" www.s-n. no. 7/20/2008.
[39] Gundersen, I. "Seig start for oljesatsing: Oljesandutvinning trenger dobbel oljepris" aftenbladet. no. 12/29/2008.
[40] Hegdal, E. 10 punkter for et grønt Norge, vl.no. 3/20/2009.
[41] Hoel, P.A. "10 punkter for et grønt Norge, vårt land," vl. no. 3/20/2009.
[42] Veslemøy, L. & Blindheim, M. "SV-opprør mot oljesandvedtak", Dagbladet. 05/20/2009.
[43] Krokfjord, T. "Statoil fortsetter «miljømessig freakshow", Dagbladet, 05/19/2009.
[44] Blindheim, A.M. "I dag velger Stortinget at Norge blir i oljesandprosjektet" Dagbladet, 06/18/2009.
[45] Olsen, S.J. "Vil ha StatoilHydro ut av oljesand" 2009-05-18, Teknisk Ukeblad, 05/18/2009.
[46] Hovland, K.M. Gir tilbake CO-pengene, Teknisk Ukeblad, tu. no. 4/7/2009.
[47] Kongsnes, E. "Al Gore langer ut mot oljesand"29/11/2009, Aftenbladet.
[48] Krokfjord, T. "Statoil fortsetter «miljømessig freakshow", Dagbladet, 05/19/2009.
[49] Nikiforuk, A. Dobler Statoils CO2-utslipp, Aftenbladet, Teknisk Ukeblad, 20/5/2009.
[50] Helgesen, O. Norge må garantere for åtte oljefond, tu. no. 12/9/2009.

today is extremely clean. There are no particles, no dirt, nothing. And when it comes to mining, I am tremendously proud of the responsibility we take.''[51]

At the early stage of CCS planning in 2004, Josefsson wrote an article in the opinion section of a major Swedish newspaper in which he stressed the need to stay open-minded regarding all available technologies for dealing with climate change and described CCS as the most promising technology.[52] Other company spokespeople emphasized Vattenfall's climate change targets as very ambitious and CCS as crucial to realizing those targets.[53,54] Optimism, similar to Statoil's, surrounded these statements: climate change was described as ''solvable,'' and it was claimed that ''by investing in CCS, Vattenfall takes the lead once again.''[55] Some years later, when Vattenfall inaugurated its CCS pilot plant in Germany in September 2008, it was called a ''milestone''[56] and described with a sense of pride,[57] especially by Josefsson, who said ''Climate change? No problem, in principle. The inconvenient truth has a convenient solution,'' thus implicitly referring to CCS.[58]

The media attention paid to Vattenfall, in contrast to the Norwegian case, primarily focused on its CEO's activities and statements. This can be exemplified by numerous cases, such as Josefsson's appointment as energy advisor to German Federal Chancellor Angela Merkel.[59] The German government was described as putting its faith in Josefsson and his ability to promote the company's vision to business leaders worldwide. The Swedish media also reported Josefsson's nickname in the USA, ''Mr. Clean,'' which he received during Vattenfall's intense campaigning in Washington, DC.[60] Furthermore, through the business initiative 3C (Combat Climate Change), Josefsson proclaimed Vattenfall's ambition to reach out to governments worldwide with messages about the need to support CCS programs as a key point of the initiative.[61] Vattenfall's EU lobbying was also described as extensive, and mounting interest in CCS on the part of the European Commission was described by the media as partly a result of Vattenfall's intense lobbying.[62,63]

#### 4.2.2. *Vattenfall's CCS activities are criticized*

An important basis to the Swedish media debate on Vattenfall's CCS activities was the increasing public questioning and parliamentary discussions of whether or not Vattenfall should be investing in coal. Vattenfall's green image was seriously questioned due to its coal power acquisitions outside Sweden's national borders. The Green parties of Sweden and Germany wrote joint commentaries in the Swedish press on this subject, and researchers and NGOs warned against putting too much faith in CCS, which was described as a ''very contested method.''[64,65,66] Furthermore, a few laypeople wrote articles critical of CCS.[67] This was in stark contrast to Vattenfall's portrayal of the CCS pilot plant as needed to mitigate climate change, a portrayal often highlighted in the very same articles voicing the criticism.[68] Another commonly expressed criticism was that only a small fraction of R&D resources were linked to renewable energy sources, while half of R&D resources were devoted to CCS. Vattenfall explained that the renewable energy technologies were either mature and did not need more research or would not become commercially viable for many years. Furthermore, Vattenfall claimed that simply spending more research funds would not necessarily enable sustainability targets to be achieved any faster.[69,70]

An example of specific criticism, articulated by Greenpeace, concerned the company's description of its CCS pilot plant, which was labeled ''the carbon-free coal power plant'' by Vattenfall itself. This expression led to a case before the Market Court in Sweden, when Greenpeace pressed charges against Vattenfall in October 2006 for false marketing and claimed that there was no such thing as ''carbon-free coal power'', as even a large coal-fired power plant equipped with CCS emits significant amounts of $CO_2$. Greenpeace used the media to demonstrate its opposition.[71,72] Vattenfall responded in the media debate that it was only a matter of semantics and that the expression had been chosen so as to use everyday words, thereby facilitating public understanding of the technology. The legal process ended in December 2007, when the Market Court decided that Vattenfall was entitled to use the expression ''carbon-free coal power.''[73] The matter was interpreted by the court as a freedom of speech rather than a marketing issue because the pilot plant did not have a primarily commercial aim (Marknadsdomstolen, 2007). Vattenfall was quoted in the media as being very pleased with the outcome, but the company decided to avoid the concept in marketing due to risks of controversy and similar ongoing court proceedings in Germany and the Netherlands.[74]

Responding to widespread criticism, Vattenfall continuously used the Swedish media as a platform to defend and legitimize its brown coal activities in which CCS was central. This led to several commentary articles written by Vattenfall staff, which usually had a set of common themes: the importance of addressing climate change, the responsibility for companies to take action rather than react with passivity, the inevitable long-term dependence on and benefits of coal and other fossil fuels, CCS as an important means of reducing greenhouse gas emissions, and, finally, citations of a range of actors who also believed in the technology, such as the

[51] Rognerud, K. ''Vattenfalls vd vill gå in i Norge-Vår vision äratt bli ett ledande företag i Europa,'' Dagens Nyheter.11/04/04.
[52] Josefsson, L.G. ''Globala tag mot utsläpp''. Svenska Dagbladet, 11/24/2004.
[53] Author unknown, Vattenfall, ''Teknikutveckling i Norge för minskade CO2-utsläpp,'' Pressrelease Vattenfall, 6/21/2007.
[54] TT. ''Ny teknik lagrar koldioxid i marken,'' Aftonbladet, 9/8/2008.
[55] Vattenfall. ''Vattenfall bygger demonstrationsanläggning för koldioxidavskiljning i Jänschwalde'' Affärsvärlden, 5/23/2008.
[56] Author unknown. ''Vattenfalls pilotanläggning för koldioxidavskiljning invigd'' Branschnyheter, 9/10/2008.
[57] Billner, A. ''Vattenfall satsar på koldioxidlagring,'' E24, 9/7/2008.
[58] Widén, L. ''Lagrad koldioxid ett dödligt hot'' Svenska Dagbladet, 2/28/2008.
[59] Lewenhagen, J. ''Lars G Josefsson blir rådgivare åt Merkel,'' Dagens Nyheter, 12/1/2006.
[60] Widén, L. ''Lagrad koldioxid ett dödligt hot'' Svenska Dagbladet, 2/28/2008.
[61] Lewenhagen, J. ''Lars G Josefsson blir rådgivare åt Merkel,'' Dagens Nyheter, 12/1/2006.
[62] Åström, K. ''Angela Merkel hoppas på Josefsson,'' SR-Ekot, 12/1/2006.
[63] Ringström, L. ''Vattenfalls kol-lobby levererar resultat,'' Miljörapporten, 11/24/2005.
[64] Wetterstrand M., Bolund P., Bütikofer R., Künast R. ''Storsyndarens dubbla ansikten,'' Upsala Nya Tidning, 4/29/2008.
[65] Vattenfall. ''Vattenfall bygger demonstrationsanläggning för koldioxidavskiljning i Jänschwalde'' Affärsvärlden, 5/23/2008.
[66] Daleus, L. ''Rädda klimatet – sluta övertro på CCS!,'' Nya Wermlands Tidningen, 7/20/2008.
[67] Hemming, J.G. ''Återvunnen koldioxid bra bränsle!,'' Processnet, 2/28/2008.
[68] Johansson, R. ''Ny koldioxidfälla invigs,'' Aftonbladet, 9/8/2008.
[69] Ahlbom, H. ''Bara en av tio FoU-kronor går till förnybar energiteknik''. Ny Teknik, 11/25/2009.
[70] Gillberg, M. ''Här är klimatets största hot,'' Veckans Affärer, 11/9/2009.
[71] Daléus, L. ''Greenpeace anmäler Vattenfall för bluff,'' Ny Teknik, 10/7/2006.
[72] Author unknown. ''Vattenfall vilseleder om koldioxidfria kolkraftverk,'' Falukuriren, 11/3/2006.
[73] Alpman, M. ''Vattenfall vann målet om det koldioxidfria kraftverket,'' Ny Teknik, 2007-12-12.
[74] Vattenfall. ''Vattenfall: Marknadsrättsprocess om ordval avgjord,'' Press release, Privata Affärer, 12/12/2007.

IPCC, the EU, Nicholas Stern, Sir David King, Al Gore, and high-level CCS researchers.[75,76,77,78,79,80,81]

*4.2.3. Struggles to gain legitimacy for CCS*

Despite heavy criticism of the increased share of fossil fuel in the company's energy mix, Vattenfall continued its growth strategy by acquiring the Dutch NUON, a company heavily dependent on fossil fuels, in early 2009. Vattenfall claimed that the acquisition, which made headlines, would speed up attainment of being climate neutral by 2050 – a goal claimed only achievable with CCS. The Green Party protested and demanded that the government stop the acquisition. However, the Minister for Enterprise and Energy, Maud Olofsson (Centre party), articulating the owner's responsibility, publicly responded to the criticism by emphasizing the possibility of converting fossil fuel power plants to run on biofuels. Furthermore, she stressed that the investment was a decision made on market-based grounds, and she had total confidence in the calculations made by Vattenfall's board.[82,83,84]

Vattenfall's foreign investments had a clear impact in Sweden and triggered official statements from governmental representatives. The Swedish government, including Olofsson, was described as having kept Vattenfall's CCS activities at arm's length for years. For example, in 2007, Olofsson had repeatedly refused to comment publicly on Vattenfall's strategy, saying that it was a matter for the corporate board of Vattenfall. The opposition political parties put pressure on the government by calling on it to influence Vattenfall. The issue of the state's responsibility for Vattenfall escalated even further in late 2009. Due to Vattenfall's criticized management of German nuclear power plants and excessive related liabilities, rumors surfaced regarding plans to build nuclear plants in the United Kingdom, and the ownership of brown coal power plants; Vattenfall was exposed to intense media scrutiny once again. The debate revolved around demands for a new owner's directive, selling off foreign acquisitions, and replacing the CEO. A public response by Vattenfall seemed unavoidable.[85]

In a commentary article in Sweden's largest newspaper, Josefsson defended Vattenfall's actions by saying that Vattenfall had failed to explain the potential and benefits of CCS to the Swedish public. He emphasized that the efforts to develop CCS had been justified even when he evaluated it in retrospect. However, his explanation was repeatedly contested in several commentary articles written by representatives of NGOs, the Green Party, and the public. One aspect that was frequently highlighted in this context was the accusation that Vattenfall had double standards. According to directives from the Swedish parliament, Vattenfall had to be a leader in the sustainable transformation of the Swedish energy system. This was often contrasted with the fact that the company was also one of the largest coal power plant owners in Europe, leading the critics to conclude that Vattenfall's international activities should be divested.[86,87,88,89] Vattenfall's international activities were heavily criticized, though the company framed them as environmental successes. Vattenfall justified its coal power activities by emphasizing that they already had reduced the acquired plants' $CO_2$ emissions compared with the baseline when they were bought. Furthermore, they claimed to be world leaders in developing CCS and would reduce $CO_2$ emissions starting in 2015, thereby not only contributing to reduced emissions from Vattenfall's plants but, more importantly, to reductions in developing countries.[90,91,92]

*4.2.4. Vattenfall's relationships with the state*

Vattenfall's CCS activities need to be examined in light of a public debate about how much the government should control the company, its role in the transformation of Swedish energy systems, and the company's influence on Sweden's environmental reputation. This debate has a long history; for example, all Swedish Ministers for Enterprise since 1998 have been censured by the Constitution Committee for lacking corporate governance strategies for Vattenfall. State ownership has traditionally been justified by the importance of energy production to society. The owners' directive for the corporate governance of Vattenfall specifies that, among other matters, the company should play a leading role in sustainable development. A significant number of articles addressed these issues.

Calls for the government to prohibit Vattenfall's investments in coal power were numerous in 2009 as well. Vattenfall's strategy was questioned by representatives of German ENGOs and deemed an anomaly in Swedish environmental politics: "While Sweden has initiated far-reaching measures to reduce its $CO_2$ emissions, the government allows state-owned Vattenfall to degrade both the climate and environment abroad-activities that damage Sweden's environmental reputation."[93] Vattenfall's strategies were repeatedly treated as part of Sweden's environmental politics, as a matter for the government and parliament, and an issue of concern for the Swedish people, rather than a matter solely for the company's boardroom.

Public support for Vattenfall was weak. A commentary article in the provincial press presented one of only a few public defenses of Vattenfall made by people not employed by the company: it strongly criticized the government for its passive approach and the Swedish media for defaming Vattenfall. The media was criticized for not acknowledging the potential of CCS and not describing the entirety of Vattenfall's environmental efforts.[94] Furthermore, under the heading "Europe's leading climate politician," a former Swedish member of the European Parliament acknowledged Josefsson's contributions to the international climate debate. However, Vattenfall's reliance on CCS to justify investments in fossil fuel-based energy production was deemed risky business from both the economic and environmental perspectives. Hence, this former European parliamentarian concluded that Vattenfall should make major changes in its business strategy, echoing an

[75] Author unknown. "EU behöver kärnkraft," Mentoronline, 10/11/2007.
[76] Echerberg, C. "Bättre att ta ansvar än att stå utanför och titta på," Nya Wermlands Tidningen, 10/26/2007.
[77] Author unknown. "Avskiljning av koldioxid redan 2014," Branschnyheter, 10/26/2007.
[78] Mogren, A. "REPLIK: Vattenfalls teknik säker," Svenska Dagbladet, 3/3/2008.
[79] Eckerberg, C. "Vattenfall arbetar hårt för att minska utsläppen," Södermanlands Nyheter, 8/20/2008.
[80] Johansson, R. "Ny koldioxidfälla invigs," Mentoronline, 9/8/2008.
[81] Author unknown/PJ. "Lovande metod för CO2-avskiljning," Elektricitetens Rationella Användande, 10/4/2007.
[82] Author unknown. "Vattenfall i rekordaffär värd 95 miljarder," Dagens Industri, 2/24/2009.
[83] Fredriksson, T. "Vattenfalls storaffär bildar ny energijätte," Sveriges Radio, 2/23/2009.
[84] Vowles, K. "Vattenfall investerar i kol- och gaseldade kraftverk," Göteborgs Fria Tidning, 2/25/2009.
[85] Digréus, A & Garcia, I. "Pris viktigare än miljö för elkunder," Sveriges Radio, 5/12/2007.
[86] Josefsson, L.G. "Vattenfall har försatt sig i en förtroendekris," Dagens Nyheter, 11/12/2009.
[87] Härdmark, E. "Vattenfall, Vattenföll," Fokus, 11/13/2009.
[88] Ådal, M. "Kejsaren är naken," Fokus, 11/13/2009.
[89] Author unknown. "Vattenfall satsar på mer kolkraft," Veckans Affärer, 11/19/2009.
[90] Press release by Vattenfall, "Vattenfall inviger världsunik pilotanläggning...," Affärsvärlden, 9/9/2008.
[91] Lundkvist, S. "Aktion mot Vattenfall," Arbetaren, 11/14/2008.
[92] Stärn, J. "Kol är den nya kärnkraften," Processnet, 11/18/2008.
[93] Hipp, R. et al. "Vattenfall är den värsta miljöboven i Tyskland," Aftonbladet, 11/19/2009.
[94] Ådal, M. "Kejsaren är naken," Fokus, 11/13/2009.

opinion that seemed to appear more frequently in the media towards the end of 2009.[95,96]

Statements describing CCS as risky should also be examined in light of the reporting of the cancellation and postponement of Vattenfall's $CO_2$ storage projects in Denmark and Germany. However, Vattenfall's spokespeople remained optimistic,[97,98] and the CEO once again stated that he had already concluded that initiating the CCS projects had been a good decision.[99] A common feature of articles criticizing Vattenfall was repeated criticism of its CEO, Josefsson, which ultimately resulted in several demands for his resignation. One article framed the issue in terms of the former hero becoming a heavy burden for the government or as failing the environment.[100]

In contrast to the Norwegian case, in public, ministers neither rhetorically supported the company nor took responsibility for its actions.[101,102]However, Vattenfall did not receive any Swedish government financial support for its development and commercialization of CCS. Instead, Vattenfall and several other energy companies pledged to fund CCS efforts, in particular to the EU.[103,104] Vattenfall referred to the cost of investments and the difficulty of a single company "moving forward on its own."[105] Swedish Member of the European Parliament Lena Ek (C) said that the energy companies behind the pledge should be ashamed of asking for funding: "Being one of the most profitable industries in Europe, they should pay for it themselves."[106]

## 5. Cross-country analysis

A cross-country analysis illuminates a number of aspects. The two countries' media approaches to Statoil's and Vattenfall's CCS activities are similar in several respects, though there are a number of key differences. This in turn mirrors the overall debate on CCS, which diverges between the Swedish and Norwegian media. In Norway, there is more agreement as to the feasibility of CCS. In addition, the Norwegian media describe the technical, financial, and practical procedures involved in implementing CCS in greater detail than do the Swedish media.

One observation, which supports the findings of previous media research, is that contemporary media not only report CCS-related events and portray the firms involved, but also that the corporations themselves are active in shaping media content. Both Statoil and Vattenfall have had the opportunity to make media statements regarding their CCS activities and, in doing so, have used very similar arguments in favor of the technology. From these statements, it was clear that both corporations repeatedly stressed their responsibility to make use of CCS, given their role as energy companies producing significant $CO_2$ emissions. Statoil and Vattenfall also claimed that their capacity to manage $CO_2$ emissions from the acquired facilities was hypothetically better than that of other parties and based their arguments on those of a range of well-known actors and initiatives supporting CCS.

These claims appeared frequently, especially in response to criticism in the media. Despite a similar rhetorical approach, however, criticism of these corporations' CCS activities, as reflected in media coverage in Norway and Sweden, differs in interesting ways. Vattenfall has faced significantly more negative criticism of its CCS activities than has Statoil. Consequently, Vattenfall has taken a defensive position in the media debate, which indicates that the company has struggled much harder than Statoil to gain legitimacy for its CCS efforts. However, the *content* of the criticism in the two countries is partly similar, as it focuses to whether state-owned corporations should engage in business abroad that involves severe environmental impact, such as oil sand development in Canada for Statoil and brown coal in Germany for Vattenfall. The government links to these companies were seen as particularly troublesome given the high international profiles of Norway and Sweden in climate policy.

Interestingly, this common ground developed very differently in the media reporting in the two countries. In the case of Statoil, it led the media to question the sincerity of Statoil's climate mitigation commitments and to ask why Statoil had invested in distant and fundamentally environmentally hazardous industries abroad. These arguments were also present in the Vattenfall case; however, they spilled over into more general debate as to whether CCS is indeed a viable technology for climate change mitigation. In the wake of the general questioning of Vattenfall's controversial expansion plans, the feasibility of CCS at a more general level has been questioned in the Swedish media, which almost never occurred in the Norwegian media. In fact, Statoil's optimistic descriptions of its CCS investments are paralleled by the media highlighting its domestic investments as important for the country because they lead to jobs and prosperity in Norway.

The media framing of the corporate-government link in each country is another interesting point of comparison. Statoil has been described as the government's main instrument in the quest for CCS. The Norwegian government has invested both money and prestige in successfully developing and deploying CCS, which was rhetorically underpinned by the moon landing metaphor. The government not only intended to provide financial support and take active part in joint CCS programs, but they also took responsibility for strategic CCS development, leaving management details to Statoil. When criticism of Statoil's domestic CCS operations was brought forward in the Norwegian media, it was often directed towards the government by demanding additional support for CCS to fulfill the deployment goals and manage specific CCS projects. This is in contrast with the Swedish media framing of the government's approach to Vattenfall's involvement in CCS. The Swedish government stressed that their responsibility for Vattenfall's specific activities, such as CCS, was limited. Swedish government representatives expressed vague or passive support of Vattenfall's CCS strategies in the media, and there has been no state financial support for Vattenfall's CCS investments. CCS skeptics have directed their arguments towards Vattenfall: most CCS-related criticism has questioned whether or not CCS is feasible and the extent to which the government should be involved in such an initiative.

Therefore, the key differences can be summarized as follows. In the Norwegian media, the CCS debate has been more detailed and characterized by consensus than in Sweden. Statoil and Vattenfall have had a similar CCS rhetoric in the national media, emphasizing their pro-activity and environmental responsibility often as a response to recent criticism, such as investments in heavy-polluting industries in foreign countries by state-owned companies, which contradict the national environmental image and political objectives. The criticism brought forward in the Swedish

[95] Wijkman, A. "Vattenfalls Lars G. Josefsson har visat mod i klimatdebatten," 11/18/2009.
[96] Härdmark, E. "Vattenfall, Vattenföll," Fokus, 11/13/2009.
[97] Karlberg, A. "Problem för Vattenfall-Ingen vill ta hand om koldioxiden," Ny Teknik, 11/17/2009.
[98] Johansson, A. "Kapitalismens falska klimatlösningar," Offensiv, 21/10/2009.
[99] Josefsson, L.G. "Vattenfall har försatt sig i en förtroendekris," Dagens Nyheter, 11/12/2009.
[100] Fröberg, J. "Josefssons stora problem," Svenska Dagbladet, 10/28/2009.
[101] Josefsson, L.G. "Vattenfall har försatt sig i en förtroendekris," Dagens Nyheter, 11/12/2009.
[102] Johansson, A. "Skammens rodnad på Mauds kinder," Offensiv, 11/25/2009.
[103] Author unknown. "Avskiljning och lagring av koldioxid måste utvecklas," Industrinyheter, 7/4/2008.
[104] Fortum. "EU måste stödja demonstration av avskiljning och lagring av koldioxid," Press release, Affärsvärlden, 10/5/2008.
[105] Öhman, J.-E. "Han gör Vattenfall grönt," Veckans Affärer, 3/15/2007.
[106] Ekelund, Å. "Energijättar tigger EU-stöd," Veckans Affärer, 6/8/2008.

media has mostly concerned Vattenfall but nevertheless led to a general questioning of CCS. In contrast, criticism of CCS in the Norwegian media has mainly been directed to the government and delimited to a few projects.

The implications of the media framing of CCS can be considerable, both for evolving perceptions of the technology and for corporations and other actors who seek to continue promoting CCS. For Statoil and Vattenfall, the particular framing of CCS has already had serious consequences. Both companies have had to manage the risk of being forced to abandon their international activities in Canada and Germany. For Vattenfall, CCS contributed to a general loss of trust, which was regarded as the fault of its CEO. These examples indicate that not only does business have an important effect on how CCS media debates evolve but that these debates are also important to businesses.

## 6. Conclusions

By studying CCS media debates, we have captured how two corporations have been depicted in national media debates. Previous research into CCS in the media has not focused on specific actors, such as firms, involved in the debate but rather described the characteristics of the debate as a whole using quantitative methodological approaches. By placing two companies involved in CCS at the centre of a qualitative analysis and remaining aware of their societal context, we have enriched the current understanding of the social framing of this technology in the media. This section presents several findings from the present study and provides some tentative explanations of the similarities and differences between the two cases.

A central finding is that, in relation to corporations, the media debate represents a tension between legitimacy creation and criticism of CCS: companies struggle to depict themselves as legitimate, yet are criticized by the media and other actors. This could partly be an outcome of the nature of media dramaturgy, in which opposing interests are typically presented in the very same article. Firms' endeavors for legitimacy are also familiar to scholars interested in corporate social responsibility (Vogel, 2005) and environmental management (Hoffman and Ventresca, 2002). Moreover, the controversies regarding CCS are likely to be fuelled in a national setting in which climate change is climbing the political agenda, and there is little acceptance of inconsistency between national political priorities and corporate activities. Yet, the credibility of firms' CCS activities seems to be fundamentally influenced by the country where they take place, and tolerance of domestic activities is greater when they are described as bringing prosperity and national growth.

Throughout the studied material, Vattenfall has been met with considerably more resistance to its involvement in CCS than has Statoil. Interestingly, the proportion of criticism cannot be satisfactory related to the technical or economic success of the actual projects. Vattenfall's CCS pilot plant was deployed on schedule, whereas Statoil's CCS project at Mongstad encountered several technical and economic problems, and the time schedule was prolonged several times. Still, this study demonstrates that Statoil's CCS-related activities have generally been described in more positive terms than have Vattenfall's in each country's news media reporting. We suggest that one important reason for this is the corporations' focus on either domestic or foreign markets. While the majority of Statoil's CCS activities are domestic, the opposite is true for Vattenfall. Moreover, these two firms are based in countries with different energy politics. Due to major domestic investments, a dominant story in Norway is that CCS is part of an important national project. In Sweden, CCS is not considered of immediate importance in a domestic context, which opens up the debate to fundamental concerns, raises expectations, and allows room for people to question whether CCS should be considered a sustainable pathway at all. However, this is not to say that domestic implementation is automatically a better precondition for corporations investing in CCS due to the benefits that the country may enjoy. Domestic implementation of CCS also implies that the public bears environmental, regulatory, and financial risks stemming from potential environmental degradation.

Therefore, how the media will portray a corporation's CCS activities is not a foregone conclusion. Several factors that could have been reasons for questioning Statoil's involvement in CCS did not become major topics of discussion in the Norwegian media, whereas similar factors involving Vattenfall had a huge impact in the Swedish media. This finding strengthens the proposition that CCS development ultimately concerns its social interpretation. If we really want to understand how the perceptions and understanding of CCS are created, we need to recognize that they are nationally grounded and that we need to look at the national preconditions to discover explanations. Energy politics in general, and CCS in particular, is still very much a national issue despite the range of international initiatives in recent years.

Given the interwoven relationship between public debates and the media, we suggest a number of implications for the study of public acceptance of CCS based on the findings of the present study. First, the finding that similar criticism can be directed to either the government or an individual company emphasizes the need for research on how and why certain actor groups are targeted for CCS criticism. Second, the decoupling between the scope of criticism and a specific CCS project's success in technical or economic terms suggest that such indicators do not necessarily coincide with critical factors that influence acceptance. Third, our empirical illustration of the role of media in the social framing of CCS reinforces previous researchers' call for attentiveness to the media when studying public acceptance. Fourth, the importance of national preconditions in public debates raises questions about the general applicability of public acceptance research across countries. Overall, social science research needs to direct attention to the sense-making processes that formulate perceptions of CCS to grasp ongoing activities and its future potential.

## Acknowledgements

The authors would like to thank Mistra, The Foundation for Strategic Environmental Research, for funding this research through the initiative "The Politics and Policy of Carbon Capture and Storage" and the international climate policy research program Clipore. One of the authors is also grateful for funding from Handelsbanken's Research Foundation. A number of people have contributed with useful comments on early drafts of this paper and we are particularly grateful to the participants of "The Politics and Policy of Carbon Capture and Storage" and the researchers at TEMA – Department of Thematic Studies, Linköping University. Finally, we would like to thank Proper English for excellent language editing.

## References

Asp, K., 1986. Mäktiga massmedier: Studier i politisk opinionsbildning, Doctoral Thesis, Department of Political Science, Gothenburg University.

Bradbury, J.A., Dooley, J.J., 2004. Who's talking? What are the issues? The Media's portrayal of carbon dioxide capture and sequestration in the United States. In: 7th International Conference on Greenhouse Gas Technology (GHGT-7), Vancouver, BC, Canada.

Buhr, K., Buhr, H., 2010. Mediaöversättningar av en ny teknik: CCS i svensk press. In: Pallas, J., Strannegård, L. (Eds.), Företag och Medier. Liber, Malmö, Sweden.

Denk, T., 2002. Komparativ metod: förståelse genom jämförelse. Studentlitteratur, Lund.

Elforsk, 2008. Lagring av koldioxid i djupa akviferer: Lagringsmöjligheter i Sverige och Danmark. Elforsk rapport: 08:84.

European Parliament and Council, 2009. Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 Text with EEA relevance. Official Journal L 140, 05/06/2009 P. 0114-0135.

Furberg, M. 1997. Medialiseringar. In: Björnsson, A., Luthersson, P. (Eds.), Medialiseringen av Sverige. Carssons förlag, Stockholm, Sweden.

Gamson, W.A., Modigliani, A., 1989. Media discourse and public opinion on nuclear power: a constructionist approach. The American Journal of Sociology 95, 1–37.

Gough, C., Shackley, S., 2005. An Integrated Assessment of Carbon Dioxide Capture and Storage in the UK. Technical Report 47. Tyndall Centre for Climate Change Research, Norwich, UK.

Government Offices of Sweden, 2009. A sustainable energy and climate policy for the environment, competitiveness and long-term stability. http://www.sweden.gov.se/content/1/c6/12/00/88/d353dca5.pdf. (accessed 6.10.2010).

Hansson, A., 2008. The Return of Coal: Carbon Capture and Storage in Science and Politics. Linköping University, Linköping, Sweden.

Hoffman, A.J., Ventresca, M.J. (eds.), 2002. Organizations, Policy, and the Natural Environment: Institutional and Strategic Perspectives. Stanford University Press, Stanford, CT.

Högselius, P., 2009. The internationalization of the European Electricity Industry: the case of Vattenfall. Utilities Policy 17, 258–266.

International Energy Agency, 2010a. Energy production: Norway. http://www.iea.org/stats/pdf_graphs/NOPROD.pdf. (accessed 28.10.2010).

International Energy Agency, 2010b. Electricity generation by fuel: Norway. http://www.iea.org/stats/pdf_graphs/NOELEC.pdf. (accessed 28.10.2010).

International Energy Agency, 2010c. Energy production: Sweden. http://www.iea.org/stats/pdf_graphs/SEPROD.pdf. (accessed 28.10.2010).

International Energy Agency, 2010d. Electricity generation by fuel: Sweden. http://www.iea.org/stats/pdf_graphs/SEELEC.pdf. (accessed 28.10.2010).

Krippendorff, K., 2004. Content Analysis: An Introduction to its Methodology. Sage, California.

Mander, S., Gough, C., 2006. Media framing of a new technology: the case of carbon capture and storage. In: 8th International Conference on Greenhouse Gas Technologies, Trondheim, Norway.

Marknadsdomstolen, 2007. DOM Publication no: 2007:31. No. C 26/06.

Meadowcroft, J., Langhelle, O. (Eds.), 2009. Caching the Carbon: The Politics and Policy of Carbon Capture and Storage. Edward Elgar, Cheltenham, UK..

Ministry of the Environment, 2009. Norwegian Climate Policy: Goals and National Implementation. http://www.regjeringen.no/upload/MD/Vedlegg/Klima/klimaforhandlinger/goals_national_implementation.pdf. (accessed 6.10.2010).

Palmgren, R., Morgan, M.G., Bruine de Bruin, W., Keith, D.W., 2004. Initial public perceptions of deep geological and oceanic disposal of carbon dioxide. Environmental Science and Technology 38, 6441–6450.

Shackley, S., Gough, C. (Eds.), 2006. Carbon Capture and its Storage: An Integrated Assessment. Ashgate, Hampshire, UK..

Shackley, S., Waterman, H., Godfroij, P., Reiner, D., Anderson, J., Draxlbauer, K., Flac, T., 2007. Stakeholder perceptions of $CO_2$ capture and storage in Europe: results from a survey. Energy Policy 35, 5091–5108.

Statistics Norway, Økonomiske nøkkeltall.http://www.ssb.no/emner/00/00/10/nokkeltall/ (accessed 6.10.2010).

Statoil, 2010. Annual Report 2008: Bellona. http://www.statoil.com/AnnualReport2008/en/Sustainability/ResponsibleOperations/Pages/Bellona.aspx (accessed 6.10.2010).

Stephens, J.C., Wilson, E., Peterson, T.R., 2008. Socio-political evaluation of energy deployment: an integrated research framework analyzing energy technology deployment. Technological Forecasting and Social Change 75, 1224–1246.

Stephens, J.C., Hansson, A., Liu, Y., de Coninck, H.C., Vajjhala, S., 2011. Characterizing the international carbon capture and storage community. Global Environmental Change 21, 379–390.

Teir, S., Hetland, J., Lindeberg, E., Torvanger, A., Buhr, K., Koljonen, T., Gode, J., Onarheim, K., Tjernshaugen, A., Arasto, A., Liljeberg, M., Lehtilä, A., Kujanpää L., Nieminen, M. (2010) Potential for carbon capture and storage (CCS) in the Nordic region, Espoo 2010. VTT Tiedotteita – Research Notes 2556.

Tjernshaugen, A., 2009. Fossil Interests and Environmental Institutions: The Politics of $CO_2$ Capture and Storage. Department of Sociology and Human Geography, University of Oslo, Oslo.

Tjernshaugen, A., Langhelle, O., 2009. Technology as Political Glue: CCS in Norway. ISA's 50th Annual Convention: Exploring the Past, Anticipating the Future, New York.

Unruh, G.C., 2000. Escaping carbon lock-in. Energy Policy 28, 817–830.

van Alphen, K., van Voorst tot Voorst, Q., Hekkert, M.P., Smits, R., 2007. Societal acceptance of carbon capture and storage technologies. Energy Policy 35, 4368–4380.

van Alphen, K., Hekkert, M.P., Turkenburg, W.C., 2010. Accelerating the deployment of carbon capture and storage technologies by strengthening the innovation system. International Journal of Greenhouse Gas Control 2, 396–409.

Vattenfall, 2009. EU Commission Confirms Support for Vattenfall's Demo at Jänschwalde. http://www.vattenfall.com/en/ccs/press-detailshidden.htm?newsid=6BF14C0B34BD48AD9434DAED79680429&WT.ac=search_success (accessed 6.10.2010).

Viklund, M., 2004. Energy policy options: from the perspective of public attitudes and risk perceptions. Energy Policy 32, 121–133.

Vogel, D., 2005. The Market for Virtue: The Potential of Corporate Social Responsibility. Brookings Institution Press.