

GHGT-10

## öThe Public and CCS: the Importance of Communication and Participation in the Context of Local Realities.ö

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### Abstract

The European project *NearCO2* is investigating European public perceptions of CCS via case studies (both CCS and analogous energy infrastructure), surveys, and focus groups. (The *NearCO2* project is funded under the FP7 Programme of DG Research at the European Commission. It was launched in April of 2009 and will terminate in March 2011.) The overall aim of the project is to investigate communication strategies that are designed to convey to stakeholders and to the public the advantages and risks of CO<sub>2</sub> capture and storage. These same strategies may also be used to involve these parties in local decision-making on CCS projects. This paper describes the results of the first phase of investigation of the *NearCO2* project, which focuses on lessons learned from consultation related to CCS project implementation and analogous developments in recent years.

Eight case studies have been reviewed to help determine the nature of the communications and consultation strategies used by project developers as part of energy project approval processes. The chosen range of case studies represents a number of different regulatory environments throughout the European Union and a number of different technologies. The consideration of a number of different contextual factors as part of a multi-case study approach has helped to identify factors that underpin the relationship between communications and project outcomes, as a means of informing consultation exercises for future carbon capture and storage (CCS) projects.

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*Keywords:* CCS; carbon capture; public perceptions; public opinion; risk; energy

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## 1. Introduction

Although there are numerous unknowns with respect to the implementation of carbon capture and storage (CCS), globally, a combination of increasing energy consumption and greenhouse gas mitigation targets is likely to necessitate increased uptake of CCS (IEA, 2009). [1] At the same time, public awareness of CCS is relatively low in Europe (De Best-Waldhober et al, 2006, 2008; Ha Duong et al, 2009; Reiner et al, 2006) [2-5] and some CCS development projects have encountered public opposition in both Europe and in the United States. From a communications and participation perspective, CCS presents a significant challenge given that the technology does not have a long standing implementation history or a representative data set that can be used to demonstrate the potential risks posed by underground storage.

The European project *NearCO2* is investigating European public perceptions of CCS via case studies (both CCS and analogous energy infrastructure), surveys, and focus groups. This paper is a product of the research undertaken as part of this project. With reference to eight case studies of energy infrastructure development, this paper identifies four key factors that are likely to assist effective communication and participation with local publics. We summarize observations on the relationships between public dissatisfaction and project outcome for each case study but also emphasize that there is no mechanistic, causal relationship between the quality of communication and project implementation: in educated and liberal democracies, no communications programme or tools should be expected to guarantee public acceptance of CCS or any other new infrastructure. Moreover, ultimately and in each case it is the statutory authorities which exercise final, political and decision-making power. Nonetheless, there are commonalities and generally-applicable observations that may be made, adherence to which may help to at least mitigate unnecessary public concern in relation to CCS.

## 2. Methodology: Case Study Analysis

Use of multiple case studies helps to isolate the extent to which local context may impact both public attitudes and perception of the technology. At the same time, multi-case study analysis allows the researcher to explore differences among cases and predict outcomes across them. (Baxter and Jack, 2008) [6] In this instance, the lessons learned in exploring the differences among our chosen case studies are intended to be relevant to the development of communications exercises (or even as part of consultation policy) for future CCS projects.

The scope of the case studies provides both geographic representation for projects across Europe and wide energy technology scope, covering projects relating to biomass energy, renewable energy, fuel switching and CCS itself. Although the primary objective of this phase of *NearCO2* research has been to help enhance communications around CCS projects, investigating public communication and participation in relation to other technology types enables observation and identification of common factors. Moreover, the representation of different projects from Germany, the United Kingdom, Spain, and the Netherlands helps to illustrate the importance of both the regulatory context and the political culture in influencing the effectiveness of communications and consultation efforts.

At the time of writing the *NearCO2* case study report, the majority of CCS projects in Europe were still in the pre-planning stages. [7] Projects that are close to implementation, in terms of injecting CO<sub>2</sub> underground, are primarily small scale research and development projects. These projects are not required to undergo public consultation according to the EU CCS Directive, yet they have gone beyond the EU legislative requirements in terms of undertaking public consultation and public opposition to these projects has been low. [8] Given the status of CCS throughout Europe, the study referred to a range of different project types with the intention of drawing inferences from other energy infrastructure installations. Drawing conclusions from the results of consultation exercises taken in relation to small scale research projects was not considered representative enough of standard public reaction to CCS.

Data relevant to the cases were gathered using a case study template based on data collection approaches tested as part of other energy related infrastructure projects. This template ensured a systematic gathering of data with the same methodology in all cases, as well as ensuring that all relevant factors were objectively investigated. Using this case study template, interviews with stakeholders were held, project timelines were investigated and the applicable

regulations were reviewed in addition to media sources and communication materials relating to key events impacting project development. The quality of communications and consultation undertaken for each project was assessed in terms of four criteria: the (stakeholder) groups addressed; the concerns identified; the communication materials and processes used, and the extent to which public involvement involved opportunities for dialogue, rather than simply a one-way information campaign. The level of detail obtained for each case study varied in relation to factors such as: the willingness of the project developer to provide information, the ability of the researcher to participate in the consultation process, and the level of publicly available information.

## 2.1 Case study selection

Partners of the NearCO<sub>2</sub> project team completed case studies in their country of location, thus facilitating communication with project developers, and allowing case study authors to gain timely access to information. The location of the NearCO<sub>2</sub> project partners as well as earlier work in the NearCO<sub>2</sub> project guaranteed a basic familiarity with the national legal system and consultation processes. Case studies were thus completed in Germany by the Fraunhofer Institute, in the Netherlands by ECN, in the United Kingdom by Judge Business School (Cambridge University) and Tyndall Centre Manchester (University of Manchester), and by CIEMAT in Spain.

In Germany, public participation practices were reviewed in relation to both the CO<sub>2</sub>Sink demonstration project in Ketzin coordinated by the GFZ German Research Centre for Geosciences in collaboration with the site manager Verbundnetz Gas (VNG), and in relation to an exploration permit for Vattenfall in Beeskow. The CO<sub>2</sub>SINK project started in April 2004 and had injected 23,411 tonnes of CO<sub>2</sub> by October 18th 2009. In March, 2009, Vattenfall submitted its application for an exploration permit to the competent authority LBGR Brandenburg. At the time of completing the case study analysis (20/10/2009), no decision had been announced. Vattenfall has initiated consultation with local landowners to obtain the necessary permission to undertake exploration work.

Two case studies were undertaken in the Netherlands, one relating to a wind farm in Burgervlotbrug, in the North-West of the Netherlands and the other to the (now well-known) Barendrecht CCS project. The Burgervlotbrug project started in 1993 and was completed in July 2009, with the delay being attributed to public protest. Preparations for the CCS Barendrecht project began early in 2006 when Shell started preparations for a capture and storage demonstration project in the southwest of the Netherlands in two empty gas fields located under Barendrecht, with part of the total area located under the adjacent city of Albrandswaard. Despite public opposition and opposition on behalf of both the municipality of Barendrecht and the Provincial Council of Zuid-Holland, a decision to proceed with the project was issued by the Dutch national government on November 18, 2009. Shell estimates that the project will be delayed by at least two years, with injection starting by the end of 2012 at the earliest.

Three case studies were completed in the United Kingdom. Two bio-energy projects were analyzed by the Tyndall Centre at Manchester University drawing on existing analysis. One of these was based on an unsuccessful proposal to develop an advanced 21.5MWe biomass gasifier near the village of Winkleigh in Devon, England; the second related to the successful development of a 2.6MWe biomass combustion plant at Eccleshall, Staffordshire, England. The differing outcomes of the UK bioenergy cases largely relate to the relationship of scale and location: the gasifier would have had regional land use implications. The third case study was completed by Cambridge University in relation to the public consultation undertaken as part of the Milford Haven ó Gloucestershire Gas Pipeline. In February 2003, a planning permit was granted for the LNG storage depot in Dragon, and in March 2004 for a second storage site in South Hook. Construction on the terminals begins in September 2005, while planning for the construction of the pipelines commenced in 2005 ending in 2007 with significant delays along the way due to public opposition.

The Spanish case study involved reviewing the development of the La Pereda Gas-fired power plant by two Spanish energy companies: Endesa and Hunosa. Although local environmental and civic associations initiated active opposition to the building of the new power plant in 2006, it is expected to be running by 2010.

## 2.2 Case study assessment and comparison

Despite the challenges associated with data collection, a common case study template enabled the compilation of information concerning project communications and consultation. In the first stage of the comparative analysis, the four evaluation criteria were used for each case study to grade the quality of communications and consultation practices. In the second stage, the legal frameworks for public consultation in each country (the United Kingdom, Spain, Germany and the Netherlands) were assessed and compared. Based on the results of the comparative analysis for the first two stages, projects were provided with one of three rankings:

- 1) An above average ranking was provided in cases where public satisfaction with engagement was explicitly stated. These projects were subsequently awarded the following:



- 2) A medium ranking was provided in cases where communications tools were used and where information was provided, but where the public was not fully satisfied with the engagement process. This refers primarily to the inability of the project developer (and local authorities) to engage in a two way dialogue with the general public. The term two-way dialogue could be used to a broad scope of engagement activities. These could range from a highly sophisticated effort where the public helps to decide on the location of a project at the earlier stages of the project cycle, to the provision of responses to questions from the public by either approval authorities or project developers on the basis of the minimum legal requirement. These projects were subsequently awarded the following:



- 3) A below average ranking was provided in cases where access to information was denied to the local public, and where dissatisfaction with the engagement process manifested itself in organized opposition. This refers primarily to the inability of the project developer (and local authorities) to engage in a two way dialogue with the general public. These projects were subsequently awarded the following:



With respect to the first stage of the comparative analysis, (communications evaluation), the Ketzin project was the only one to receive an above average ranking, while the Spanish Gas Power project, the Dutch wind power project, the UK gas pipeline project and the UK Winkleigh bio-energy projects all received a below average ranking, given issues related to information access and the failure of project developers to successfully initiate a two-way dialogue. In terms of consultation, the project developers for all four cases either undertook the bare minimum with respect to consultation requirements or underestimated the influence of local planning authorities as part of the decision making process. All other projects received adequate rankings given that those project developers all provided some type of information, but failed to fully satisfy stakeholders affected by the engagement process.

In comparing legal environments, national compliance with the following legislation and principles was assessed: the Aarhus Convention; the Access to Environmental Information Directive; the Public Participation Directive, and the implementation of additional public participation requirements at Member State Level. [9 ó 11] In the case of the United Kingdom, a medium ranking was provided, based on the number of cases brought before the Aarhus Convention compliance committee; for Spain a below average ranking was provided given that no real laws have been passed related to any of the principles encouraging democratic environmental decision-making. Both Germany and the Netherlands received above average rankings given that they have both embraced the Aarhus principles as reflected in the rates of access to environmental information, the enactment of numerous domestic laws encouraging public participation and the absence of cases before the EU Compliance Committee.

In terms of hypotheses, and as found in the present cases, national legal frameworks related to consultation and public participation rarely have a simple relationship to project outcomes. Nonetheless, they form the over-arching policy context and are still likely to be significant with respect to public perceptions. This context includes policy and regulation relating to project types and technologies, national and international to overarching energy policy, environmental policy and other regulation and policy only indirectly related to the CCS consultation process. In general, there are numerous other factors (in addition to effective communications and consultation) that may come to bear on the project outcome. These include the type of project developer, site characteristics and local politics, as well as the regulatory environment. In our qualitative assessment of the efficacy of communications and consultation, we judged only half of the projects as adequate, based on stakeholder perceptions. Nonetheless, six out of eight of the projects will proceed or have proceeded (with one awaiting a decision), indicating that while the quality of communications and consultation can influence the outcome, there is no simple causal relationship between the two variables.

### 3. Results summary

#### 3.1 Understanding local contingencies and engagement with stakeholders

Looking first at the non-CCS projects, there are two key, common themes in successful project implementation. First is early consultation with the general public (e.g. UK Eccleshall biomass); second is the high-level decision that a project is critical for national energy needs (e.g. UK National Grid gas pipeline and Spanish Gas Power project). Common reasons for non-CCS projects not going ahead, or being significantly delayed, include key individuals playing a critical role in strong local public objection (e.g. in relation to the arguably mis-sited UK Winkleigh biomass gasifier) and the establishment of organizations created specifically to mobilize and co-ordinate opposition (e.g. in the Dutch wind case). At a deeper level, upstream of the opposition being manifest, we attribute this in part to strong place attachment and perception of the proposed infrastructure as destructive of local environmental quality. [12]

Looking specifically at the CCS case studies, two out of the three projects have gone ahead. For Ketzin, a positive factor appears to be trust in the project developer and early public consultation. In the Barendrecht and Beeskow cases, planning approval was granted despite strong local opposition.

#### 3.2 The need for procedural justice

The case study evidence indicates that the majority of project developers did little to improve the potential for a two-way dialogue. In fact, most approval authorities were quick to dismiss the validity of opposing arguments, and did not provide the public with enough material to make informed decisions. The position of those opposing the Barendrecht project was seen as 'emotional' by Shell and the public complained about not having access to scientific data to prove safety concerns in the Vattenfall case; in some cases, access to at least some information requested by the public was refused by parties involved (Spain, UK pipeline, and UK Winkleigh).

#### 3.3 The importance of quality communications material

The most sophisticated communication approaches considered here are those developed by Vattenfall and Shell, while other project developers have done relatively little to engage in proactive communication. However, these two projects also met the broadest public opposition. While information was not withheld in the Dutch wind case, the case study does not suggest that much was provided in terms of communications. By comparison, CCS project developers have typically set up information centers, websites, and provided tours of injection sites. Without survey data, it is difficult to determine the extent to which communication has impacted the acceptance of technologies. Often, it seems to be mostly project opponents who voice opinions.

#### 3.4 The role of trust in the project developer

Nearly all of the case studies indicate that public perceptions of a self-interested private sector entity pose a significant challenge to project implementation. The public tends to question the profit-making motives of project

developers, often leading to doubts about the veracity of communication materials. This is particularly true in the case of the CCS-related information that we considered. The profit making motives of the wind co-operative Kennermerwind in the Dutch wind farm case were also questioned, despite the fact that this type of developer does not typically stand to benefit from projects financially.

The Ketzin example illustrates the importance of using an impartial observer as part of communications efforts. Public trust in GFZ, given its identity as a research institute, was high and resulted in public acceptance of both the technology and the project. In this case it is unclear whether it was the small scale of the project that led to acceptance, or the leadership of the project, or both or some other factor. For CCS, given the distrust of Shell and Vattenfall, the role of impartial bodies in communicating project details will be crucial in order to gain public acceptance. That said, while information could in principle be more impartially communicated by NGOs, research organizations, or even academic institutes, engaging these bodies in active CCS cases does present challenges.

#### 4. Comments and conclusions

Analysis of eight case studies of public engagement in energy infrastructure projects has revealed the many factors, other than approaches to communication, involved in public perceptions of CCS. These include the following:

1. *Understanding local contingencies and early engagement with stakeholders:* it is important to undertake preparatory research of locally salient issues and to initiate a dialogue with local stakeholders early on in the planning stages, in order to gain an appreciation of pertinent local and regional factors. There may, for example, be a history of large scale infrastructure development in the area that could impede CCS communications and ultimate project implementation.

2. *The need for an open, two-way dialogue:* the public rightly expects procedural justice and for their concerns to be listened to and to be taken seriously. After undertaking the preparatory research (≈profiling or ≈social site characterisation) referred to above, to help avoid unnecessary entanglement in local issues that pre-date the proposed development, the next stage is to begin to engage frankly *outside* of (in addition to) formal planning processes. This said, statutory land use planning processes typically support the developer and place them in a strong position particularly, when they go beyond the minimum legal consultation requirement. There may also be irreconcilable differences between objectors and developers that cannot be overcome via consultation, listening, or minor changes to projects or processes.

3. *The importance of high quality communications material:* engagement needs to use good quality information and a mix of formats: formal, informal, technical and simple. The information sources and the messenger need to engender trust, and ó from a contextual standpoint ó need to address questions around project timing and location. People need to be given sufficient reason to tolerate what is inevitably some degree of intrusion, be this additional direct or indirect employment, or some other form of compensation. The information provided also needs to take account of the prior knowledge of the general public; often a higher level of knowledge and awareness is assumed than is warranted, leading to misunderstandings. On the other hand, objectors can also be highly technically proficient and so a range of material will be needed. Provision of such information may at least help to reduce misunderstandings, even if it cannot wholly avoid these.

4. *The need to engender trust in the project developer:* in terms of engendering trust, it may be helpful to involve experts who are likely to be perceived as independent. Yet this also requires a need to identify suitable CCS experts and might be complicated by uncertainties associated with scientific data relating to CO<sub>2</sub> storage reliability. Despite levels of expertise, there are few data available to demonstrate the safety of underground storage for CCS given a lack of systematically applied monitoring standards. Gaining trust also takes time and in practice may involve managing a lengthy process of public relations: it is easier to lose trust than to gain it.

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