



Analysis of a prominent carbon storage project failure – The role of the national government as initiator and decision maker in the Barendrecht case



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ABSTRACT

CO₂ capture and storage (CCS) represents an important option to mitigate climate change. However, the implementation of CCS is slow. We analysed one of the unsuccessful projects in the Netherlands that is referred to as the Barendrecht CO₂ storage project, with an emphasis on the role of the national government. We performed an event analysis based on debates in the Dutch Parliament, interviews with the relevant stakeholders and published literature. We show that the opinion of the national government regarding this project changed over time. Consensus on the necessity of CCS was assumed at the start of the project. However, over time, the local opposition intensified, and both CCS as a climate mitigation strategy and its implementation, including its location, were contested. An important contributor was the lack of solid outside support, whereas the views of opponents were strongly represented. Additionally, due to multiple delays, the momentum was lost, which ended the enthusiasm of initial supporters. To ensure implementation of future CCS projects, overall national support should therefore be guaranteed prior to the start of the project.

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1. Introduction

CO₂ capture and storage (CCS) is considered an important option to reduce CO₂ emissions in order to mitigate climate change (e.g., EU, 2011; IEA, 2013; IPCC, 2005). However, the actual implementation of CCS is slow, as many planned demonstration projects have not been realised (GCCSI et al., 2012). It is anticipated that the contribution of CCS to climate mitigation will be insufficient at the current rate of implementation (Scott et al., 2013). It is therefore important to analyse the cause of the discontinuation of CCS projects. The Barendrecht CO₂ storage project in the Netherlands is an important example of one of these demonstration projects.

In this project, it was proposed that CO₂ produced by a nearby refinery would be stored in two small empty gas fields that are located under the city of Barendrecht, which is a small community in the Netherlands. The Dutch government was responsible for the storage permits and financially supported the project, which would be executed by Shell. Over time, the local opposition increased,

and the concept of CCS, as well as its implementation, was heavily debated in the national Parliament, which ultimately led to cancellation of the project.

Wüstenhagen et al. (2007) showed that the introduction of a renewable energy technology depends on three different types of acceptance: market, local community and (national) social-political acceptance. Although CCS is not a renewable technology according to the classic definition, as an environmental technology it addresses similar issues. First, the current acceptance of CCS by the market is generally poor because viable business models for CCS are lacking (IEA, 2013). This was, however, different in the Barendrecht case because Shell tendered for the demonstration project (Kuijper, 2011).

Second, local community acceptance is a problem for many onshore CCS projects (Huijts et al., 2007; Shackley et al., 2009). Similarly, most residents in Barendrecht opposed the CCS project (Terwel et al., 2012). Several previous articles that analysed the Barendrecht project focussed on the local opposition, as it is a relatively new phenomenon (Ashworth et al., 2012; Brunsting et al., 2011; Kuijper, 2011; Oltra et al., 2012; Terwel et al., 2012). However, in most large (infrastructural) projects, the decision does not rest with the local community because the national government plays a crucial role.

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In the Netherlands, the Minister of Economic Affairs, who is a member of the Cabinet and represents the government, has the authority to grant storage permits for CO₂. Additionally, this Ministry is responsible for Energy policies and, as such, may grant financial support for CCS projects. The Dutch Parliament has a monitoring role and can adjust, approve or reject new laws that are proposed by the Cabinet. In exceptional cases, the Parliament can dismiss Ministers and the Cabinet.

The Barendrecht project was cancelled by the national government after heavy debate in Parliament. The lack of local support was used as the main motivation (Economic Affairs, 2010a). Nonetheless, the national government is not always responsive to local opposition, especially when national benefits are deemed to outweigh local concerns. This is, for instance, the case with constructing airports, nuclear power plants or highways. A good example is the realisation of the planned railroad track of the Betuwe cargo route. In spite of intense local protest from the neighbouring communities, the railroad track was built. Interestingly, one of the local communities was Barendrecht, but in this case, their protests were mostly ignored (Parliament, 2004). Furthermore, in the same period as the Barendrecht CO₂ storage debate, the local community at Bergermeer was unable to prevent a large natural gas storage project, despite substantial local protest. The same ministry was responsible for the storage permits, and both cases were discussed at the same meetings in Parliament several times (e.g., Parliament, 2009a). Hence, local opposition may influence the national decision process, but it is not the only explanatory factor for the cancellation of projects. This is supported by recent literature, which also emphasises the importance of interactions between different geographical levels (e.g., national and local in this case) for successful implementation of new technologies (Binz et al., 2013; Coenen et al., 2012).

In this study, we analysed the national decision processes related to the Barendrecht project, including the influence of the local opposition. A better understanding of why the government changed position during the debate, ultimately resulting in termination of a prominent CCS project, will help to successfully realise future projects.

2. Methods

Discussions and (national) decisions of the project were analysed according to the process method 'Historical Event Analysis' (Van de Ven et al., 1999; Poole et al., 2000). An event is defined as the smallest unit of change that can be identified, for example a meeting, a news article, or a discussion in Parliament. The effects of events are however not equal, as some events have a major impact on the final outcome, while other events only contribute marginally. Events were categorised as either local or national. Local events were related to actors at the level of the Barendrecht municipality, which includes local population and politics. National events were related to the national government, as well as the regional administration, scientists and (inter)national non-governmental organisations (NGOs), as these parties do not have direct local interests. Shell acted on both local and national levels. Shell Storage BV, as the executor of the project, was part of the local level, whereas events related to the Shell Company, including Shell Netherlands, were categorised at the national level. We made this distinction because the interests of both parties were not necessarily identical, even though there was obviously much interaction between the Barendrecht project team of Shell and the main company.

For the event analysis on the local level, several academic papers that already addressed this issue in detail were included (Ashworth et al., 2012; Brunsting et al., 2011; Kuijper, 2011; Oltra et al.,

2012; Terwel et al., 2012). The literature search also included the newspaper database Lexis Nexis, which covers Dutch newspapers since 1990 (Lexis Nexis, 2014), and official documents, such as the (interim) permit application.

Furthermore, the deliberations on the Barendrecht project in the Dutch Parliament are well documented. The minutes are almost word-by-word transcripts of oral debates between Members of Parliament and the national Cabinet. The written correspondence between Members of Parliament and the Cabinet is also publicly available. We searched all of these documents for the keyword "Barendrecht", followed by a trace back process, as parliamentary documents have dossier numbers that link to older documents in the same series. That made it possible to find documents about onshore CCS demonstration projects before the location of Barendrecht was mentioned. All documents of Parliament were coded in NVivo10 (QSR) and searched for keywords. We hypothesised that 'demonstration or pilot project' reflects a more neutral description of the project, whereas 'experiment' could be related to risks. We therefore analysed the tone of the Parliament debate by including the words 'demonstration' and 'pilot' (in Dutch: 'demonstratie' and 'pilot') versus experimental project (in Dutch: 'proef' or 'experiment'). Additionally, a search on 'necessary evil' (in Dutch: noodzakelijk kwaad) was performed.

To evaluate the interest of the Dutch society on climate change, the newspaper database Lexis Nexis (2014) was searched for the keywords 'climate change' (in Dutch: 'klimaatverandering') and 'greenhouse gas effect' (in Dutch: 'broeikaseffect'). Outcomes were correlated to a survey of the Dutch population on important concerns potentially threatening their future. The question in the survey was: 'What do you think are the two most important issues facing the Netherlands at the moment?' (Eurobarometer, 2014).

Finally, we conducted personal interviews with different stakeholders closely involved in the Barendrecht project. Shell, as well as the national government and the regional administration, made their own evaluations of the project. These evaluations are confidential. However, we have interviewed the people involved in these evaluations, which have been taken into account. Moreover, we have sent draft versions of our study to key stakeholders, who overall supported the analysis.

3. Background and timeline of the Barendrecht project

The Netherlands developed an interest in CCS during the 1990s. It took until the mid-2000s before the first projects were realised, which included an offshore storage pilot project and the delivery of CO₂ to greenhouses by Shell. The Dutch CO₂ storage capacity for the next decades is roughly equally distributed between onshore and offshore (TNO, 2007). Because an offshore demonstration project was already successfully realised in the Netherlands and as onshore storage is in general less expensive, a strong preference for new onshore demonstration projects was expressed by the government (SenterNovem, 2008). Therefore, the national government tendered for two CO₂ storage demonstration projects in 2007 with a payment of €30 million each (Economic Affairs, 2007). The selection process was to take place through a negotiated tender procedure (SenterNovem, 2008). The actual choice of the (onshore) location was left to the applicant.

The tender was confidential. As such, only the two applicants that won the tender are known. DSM AGRO was one of the contenders. In this project, they planned to inject CO₂ generated from an ammonia plant in the South Netherlands into an aquifer below the plant. This project was far less developed compared to the Barendrecht project. For instance, a preliminary Environmental Impact Assessment was not performed, and the project was cancelled due to financial issues before it raised significant public

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