



Communication, project planning and management for carbon capture and storage projects: An international comparison

Energy Transformed Flagship

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I Introduction and overview

I.1 Approach

This report provides an overview of the findings that have emerged from an international study comparing public communication and outreach practices associated with large scale carbon dioxide capture and storage (CCS) projects. The study focused on a direct comparison between five case studies of specific CCS projects and their associated communication and outreach activities. The five case studies were:

- **Barendrecht Project** – The Netherlands
- **Carson Project** – United States of America
- **FutureGen Project** – United States of America
- **Otway Project** – Australia
- **ZeroGen Project** – Australia

While there are key lessons around what constitutes best practice in communications and outreach, these alone are not sufficient to ensure successful CCS project deployment. The findings suggest that a project's ability to adjust its planning and management to its social context is more likely to ensure a positive outcome for all involved in the project. A fundamental conclusion is that communication should not be seen as an add-on to the project. Successful projects integrate communication and outreach as a critical component of the project from the beginning.

Additionally, there are many interpretations of the terms 'communication', 'stakeholder engagement' and 'outreach' depending on the cultural backgrounds and prior experiences of the reader. Too often communication in the context of projects can be interpreted as public relations. And in some countries, stakeholder engagement and outreach are considered as one-way messaging of information to the community, general public and other stakeholders. In this report, the researchers stress the importance of communication, engagement and outreach being considered as an active two-way dialogic approach to working with stakeholders internal and external to the project, including the community and general public.

This overview document presents the case studies and then elaborates on the notions of adaptive project management and two-way communication and engagement based on an assessment of the case studies. It is hoped that these findings will assist project developers to go beyond 'best practice' communication and outreach to contribute to more successful outcomes for the commercial deployment of CCS projects. Finally, the report presents a summary of the findings of the five case studies.

The summary comparison included in this paper is based on a set of evaluation factors the authors have drawn from the case studies. The evaluation factors have been rated using a traffic light system: red – factor was not addressed, amber – there is an opportunity to address the factor; and green – factor was addressed. The evaluation factors may be a useful guide to help future projects assess the social context for proposed projects and develop effective communication and outreach programs.

The researchers strongly recommend that this report is read in conjunction with the case studies because of the richness they provide as background to the issue of communication, stakeholder engagement and outreach. In addition, a toolkit of suggested activities has been developed to assist projects and appropriate references are made to this document in the report.

The research was sponsored by the Global Carbon Capture and Storage Institute (GCCSI) and was conducted by international researchers from the following research institutions: Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia; Energy research Centre of the Netherlands (ECN), Netherlands; Illinois State Geological Survey, University of Illinois, USA; Pacific Northwest National Laboratory, operated by Battelle for the US Department of Energy, USA; and AJW Inc., USA.

1.2 The Case Studies

The projects have technical and geological diversity as summarised in Table I.

Table I Project Characteristics

	Barendrecht	Carson	FutureGen ¹	ZeroGen	Otway
<i>Overview</i>	Demonstration project to store CO ₂ from existing hydrogen production plant in nearby expended gas fields, largely located at Barendrecht	First-of-a kind 500 MW hydrogen power plant, using petroleum by-product from nearby refineries and CO ₂ storage in nearby oilfields	275 MW model integrated gasification combined cycle (IGCC) power plant storing 90% of CO ₂	Commercial scale, 530 MW IGCC with CCS	First Australian demonstration project of geological storage of CO ₂
<i>Location</i>	Rotterdam harbour area, West Netherlands	Los Angeles Basin, California, USA	Mattoon, Illinois, USA	Central Highlands region, Queensland Australia	Victoria, south-west Australia
<i>Funding</i>	Privately funded largely by Shell, with significant grant award by government	Privately funded, largely by BP, with significant tax credits	Government-industry partnership	State government funding	Public/private funding
<i>Planned volume CO₂ injection</i>	~10 million tonnes would be stored over the project lifetime	~5.5 million tons per year	~one million metric tons (~0.9 million metric tonnes) CO ₂ per annum	3 mega-tonnes per annum	65,000 tonnes CO ₂ over an 18-month period; Phase 2 is 10,000 tonnes per annum
<i>CO₂ source</i>	Captured hydrogen plant emissions	Captured power plant emissions	IGCC power plant	IGCC power plant	Extracted from existing gas well
<i>Timing</i>	Grant awarded 2007; planned start 2012	Announced 2006; planned start late 2011 / early 2012	Created 2005; site selection announced June 2006	Beginning 2006, expected to take 11 years from conception to completion	Began discussions 2004; injection started April 2008
<i>Site selection process</i>	Private industry selection, supplemented by grant award, based on need for CO ₂ emissions mitigation	Private industry selection, based on commercial advantage of proximity to feedstock (pet coke)	Competitive process using extensive siting criteria to select from interested potential host communities	Queensland Government backed initiative, investigating best storage sites	Geological variability/site characterisation
<i>Current status</i>	Uncertainty and delay, awaiting final decision	Decided not to develop Carson Project	On hold, pending further government action	Pre-feasibility study just completed; selection of final plant site to be announced	Completed first phase of injection; monitoring to continue to 2015

¹The FutureGen Case Study and all related information is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.

2 Project planning and management

One of the key findings of the research is that before commencing any project, there are a number of key questions the project developer² should consider. These questions include:

2.1 To what extent are the key government (national, state, local) and development team members aligned? Does the project developer have the ability to affect the situation and enhance coordination and a shared agenda?

Through examination of the discrete cases, it became clear that successful deployment requires the national, state and local context surrounding projects to be aligned. That is, there need to be elements of support and coordination between all three levels of government and this includes that basic regulatory frameworks are also in place. Alignment and coordination between levels of government was evident in the Australian and FutureGen case studies. Although key government agencies appeared to be aligned at the outset of the Carson project, opposition from the environmental justice groups derailed this support. Similarly, in the Barendrecht case, there was no point at which alignment across the three levels of government was in evidence. Without such alignment it is unlikely that projects will succeed, as visible conflict between levels of government is likely to erode public confidence concerning the suitability of the project. Therefore project developers need to understand the nature of the political landscape as well as identify what potential exists for engagement and influence at the various levels to bring about a more coordinated and aligned vision.

2.2 Are communication experts/staff included as an integral part of the project team from the outset of the project?

Including communication/outreach experts as an integral part of the project team from its inception is critical. Having the communications/outreach experts working alongside the more technical experts means that all related communications/outreach considerations can be factored into the project plan. The communications/outreach perspective often focuses on social, economic and political details that will impact on the project but are often overlooked. These details are not necessarily tied to the technical details most often considered by the project team. The successfully deployed projects integrated communications/outreach expertise in project design and implementation from the outset.

2.3 To what extent are factors related to social context included in:

2.3.1 Selection of a specific site

Previous experience has demonstrated that projects invest large resources, in time and money, into selecting a site based on geological and technical suitability. Often these selections do not adequately consider the social context of the site. For example, in Barendrecht, although the location was deemed suitable to address technical aspects of the project, it became apparent after the project location was announced, that consideration of the possible social constraints had not been factored into the choice of the onshore storage site. Similarly, in Carson, the strategy for selecting and announcing a site for storage might have been altered if the project had fully considered how the environmental justice community might view the issues related to criteria pollutants and the potential precedent for California energy policy associated with the power plant portion of the Carson project.

In contrast, state and local team members, including economic development personnel, vying to be selected for hosting FutureGen, worked with their community leaders from the outset to describe the project and its benefits if they were to win. In addition, the FutureGen Alliance, the proponent of the project, tracked community sentiment about the project by reviewing media transcripts. The site evaluation report included public acceptance as a “primary goal” of the project (FutureGen, 2006). Once the candidate site list was reduced from a dozen to four, interviews and meetings were arranged with a variety of stakeholders from the semi-finalist sites. The Otway Basin Project prioritised local stakeholders from the outset and conducted social research to understand what issues

²Note: The term project developer is used to connote the entity responsible for making key project decisions. The project developer may include a team comprised of financial partners, technical partners, emission sources, and others. A project developer typically identifies a project manager with day-to-day operational responsibilities.

might be encountered from local communities. Being able to respond immediately to concerns raised and having some flexibility in how the project evolved helped to build relationships with the community, resulting in a more positive view of the project.

2.3.2 Project design and implementation

Involving communication/outreach expertise from the outset of a project means that assessments of potential social issues can be used to inform the project design and implementation. This can be as straightforward as identifying the priority issues for the local community so that project benefits can be tailored to address these issues where appropriate. It can also entail making acceptable modifications and even improvements to project design. By making stakeholder identification and engagement a priority, the project can develop a communications and outreach plan that is more likely to reveal and address priority stakeholder issues and concerns. It is imperative that these stages are not rushed and that appropriate time and consideration is given to overall community relations and engagement.

2.4 What degree of flexibility does the project developer have in framing the project?

The project, both in the way it is communicated and what is communicated, will have a significant impact on the way it is perceived and its ultimate deployment. In a relatively straightforward example, it was apparent in these five case studies that projects communicated as part of a research project were more positively accepted than those that were initiated by a private company. This is reinforced by the literature which shows that industries are not often trusted by the general public. Instead, they tend to be sceptical of the commercial gains proponents may make from a project and with a perception that proponents have scant regard for the local public (Terwel et al., 2009).

The link to a research component is one aspect of framing the response to the questions: What is the value of the project? Why is it taking place here? And why should I care about this? In the case studies conducted for this paper, the reaction to projects noted as being research was favourable. However, classification as a research or demonstration project does not guarantee success. In the Barendrecht case for example – although not classified as a research project – the fact that the project was called a ‘demonstration project’ (to demonstrate permission procedures and legal frameworks), was interpreted by local community members as it being a test, an experiment, which resulted in increased local opposition. Examples of other projects, not studied herein, have also shown that projects designated as research have not progressed in part due to community response to project risks and/or disbelief in global climate change or the need for mitigation technologies.

It is important for project developers to consider how they are framing the communications about their project in consideration of how it will be perceived locally.

2.5 What degree of flexibility does the project developer have in adjusting the project implementation strategy?

Project uncertainty and delays can be costly, but it is apparent that having some flexibility in project implementation, whether allowing time for informal discussions before project announcements or identifying multiple options for storage or pipeline sites, provides greater opportunity to involve the local community in some of the decision-making processes around a project. This can facilitate true partnering which often leads to more positive outcomes than typical ‘top down’ approaches that do not have as much room for flexibility. The research team acknowledges that with some projects, subject to strict proposal criteria and other constraints, there may be limitations on this kind of flexibility. Further, given the complexities with selecting geological storage sites, it may not be possible for public involvement in site selection. In such instances, it may be productive to explain the limitations to project flexibility and the explicit criteria on which these decisions are made, to those responsible for engagement with perhaps less technical expertise and then to the local community. Furthermore, good relations across the project team will certainly enhance the opportunities for greater flexibility across the project.

Another consideration around flexibility that can be drawn from the case studies is although project developers may not at the outset have much room for flexibility, in the case of fierce opposition, a project may have to be delayed and timelines altered or changed accordingly. In both instances, it reinforces that, where possible, projects need to invest time at the front end of the project to adjust their project implementation as required by local communities.

3 Communication, stakeholder engagement and outreach

The importance of communication, stakeholder engagement and outreach are highlighted throughout each of the cases. The research found that it is important to establish and maintain trust through transparent, frequent communication, using multiple information sources and a variety of forums for informal as well as formal engagement.

3.1 Timing – engage early

From the case study research, the timing of the community engagement can have a decisive influence on the acceptance of a project. Early engagement with the community has emerged as the best approach to facilitate meaningful participation and to instil a sense of empowerment within the community. Evidence has shown that announcing project plans before public engagement has contributed to significant conflict between stakeholders. Meaningful dialogue between project developers, national and local authorities and the public is essential well before project plans are finalised.

3.2 Know your community

Successful project communication efforts allowed time for personal interactions to understand the needs and priorities of local communities and individuals. This helped to address stakeholder concerns in project design and to ensure that communications materials would respond to stakeholder needs as much as possible. Time also needs to be spent identifying where stakeholders receive their information so that appropriate channels can be used when communication is undertaken. Assessing the level of understanding of CCS among stakeholders, including the community, is also important to help devise suitable communication outputs tailored to the needs of the various stakeholders. The toolkit recommends a number of ways to assist project proponents undertake these analyses.

3.3 Identifying local benefits

The attention given to national and especially local benefits is central to gaining support for the project. A key lesson that can be drawn from the case studies is that identification of benefits is case dependent. What is important to one community may be of no importance to another. Therefore it is critical that project developers talk to their local communities, through various means including focus groups, interviews and so on to identify what is important to them. For some it may be jobs – either new or maintaining current employment, for others reputation, development goals, infrastructure development potential or even regional revitalisation.

Regional benefits may warrant consideration and have a potential role to play in the alignment of local, regional and national policies as discussed previously. National benefits, slightly less tangible, may be perceived as less important by the local community. However, they are nevertheless important. Examples of national benefits could be the establishment of a new CCS technology industry, a reduction in national emissions and possibly a long-term stabilisation of energy prices.

3.4 Information – what to communicate

Stakeholders will look to the project for an array of information that may include scientific basis, project details, the rationale and benefit for the community. It has been observed that releasing information that focuses specifically on the details of the proposed CCS project to a community unfamiliar with CCS is likely to raise questions about the motives behind CCS in general, the specific project, and the reason for the selection of a particular area or location. The project developer should aim to be as transparent as possible about all information that relates to the project, ensuring that any information presented is clear and easy to understand. Earlier research has demonstrated that communications about CCS are most effective when multiple stakeholders representing different views of CCS collaborate in information provisions (Ter Mors et al., 2006).

At this stage it is imperative that communities are able to understand the link between the perceived risks/costs of the project and the potential benefits that may come to them and their community. In addition, the community may look to the project for the broader perspective of human-induced climate change, the perceived impacts of inaction (locally and globally), and where CCS fits into the portfolio of mitigation options. Existing national or regional strategies targeted at mitigating carbon dioxide emissions from power generation and industrial sources can also be

summarised and presented to the community. Any information that is released should be accurate, understandable by multiple audiences and as consistent as possible.

3.5 Information – how to communicate and engage

Representatives of the project should interact personally with local stakeholders using a variety of methods, depending on the stakeholder group. Engagement and communication with various stakeholders, including the community, is critical and should not be rushed. The case studies found that residents near possible project locations expressed a need for time to absorb new information, and to realise that their surroundings may alter due to the potential project. Furthermore, individuals expressed the need for multiple opportunities to engage with project personnel, local experts and information sources. An open channel of communication is needed so that questions can be answered as they arise.

Stakeholder identification and analysis helps to establish a priority of stakeholders and ultimately the most appropriate way to communicate and engage with them. From the case studies, a range of methods were used, some of which are listed below. A complete list of examples of ways to engage can be found in the toolkit in Section 5:

Ways to investigate needs of stakeholders:

1. Face-to-face, group interviews or surveys – with community leaders and other influential stakeholders to understand the community and their perception of the project.

Ways to communicate:

2. Presentations – these may take place at a variety of local meetings and should be seen as a positive way to promote information exchange about the project. Examples include local service club organisations, farmer bodies and bureaus, book clubs, mother's groups and schools where it presents an opportunity to educate parents as well as the students. Posters were helpful materials for presenting information at such presentations and the use of a 3D model to show how the concept of storage works was also well received.
3. Shop fronts – in many of the communities where a new project has been announced it is common for the project proponents to operate a shop front within the community they are planning to work in to allow individuals to easily access information about the project and have their questions answered.
4. Newsletters, flyers and mail box drops – all of these communication methods were employed in most of the case studies in some form or another to keep local communities up to date with what has been happening and where the project is heading.

Ways to engage:

5. One-on-one meetings – are critical for engaging land owners and locals immediately impacted by the project. During these meetings several aspects of the project can be discussed to create better understanding and acceptance for the project. Focus should be on how to adapt the project to the needs of the stakeholders. Such meetings should happen early in the life of the project and may happen more regularly.
6. Focus groups/workshops – are an excellent way to engage groups to provide them with information about the project and to provide an opportunity for more in-depth discussion about the project. Social identity theory suggests that if the groups are run with like minded individuals i.e. peers, neighbours, educators or local businesses they are more likely to interact open and honestly and share their thoughts and concerns about the project.

Information should be modified based on stakeholder requests. Overview fact sheets and figures of how CCS works can be provided in engagements. However it is wise to ask stakeholders what further information would be helpful to them in understanding CCS. Answers to stakeholder questions need to be provided immediately if known, and if not, follow-up should occur with the answers provided as soon as possible. This feedback can be helpful in modifying information sources or used as the basis for Frequently Asked Questions that can be posted on a proponent's website.

3.6 Sources of information

Research should be conducted to identify where stakeholders receive their information and what information sources are most trusted. Ideally single messages about the information will help minimise confusion for various external stakeholders. However, this is not always easy to achieve. If a trusted expert can be found to help in the communication efforts, this also helps to build trust between local communities and the project proponents. Evidence suggests that information released at different times from individual entities may cause distrust in a community, especially if the public and private stakeholders appear to be acting in isolation.

Media can be an important means to distribute information. Sufficient time should be spent engaging editors and lead reporters in a community to answer any questions about a proposed project. A similar effort should be spent on important local, regional or national media, and online source publishers.

3.7 Unique factor – competition

One unique factor, competition as a motivator, emerged from the FutureGen case study.⁴ The FutureGen site selection process was conducted as a national competition in which communities self-nominated sites based on an established set of criteria. Semi-finalist communities met three types of criteria defined by the FutureGen Alliance: (a) qualifying criteria, (b) scoring and best value criteria, and (c) final decision criteria. The successful sites were solid technical matches with the criteria but were also able to demonstrate community enthusiasm. Site selection processes involving competition and community self-selection were found to bring enthusiastic communities together with the project developer, cultivate community pride, and foster inter-community cooperation. Self-selection was found to be an effective community engagement ideal, which allowed communities to consider pros and cons of projects before project commitments and creating a situation where the competing communities became invested in winning. Future project developers may consider adding the competition element and include public acceptance as an explicit criterion in evaluating sites.

4 Summary comparison of case studies

It is challenging to compare case studies that have widely different technical, organisational and social characteristics. The authors have attempted to develop a set of factors to be considered in comparing the case studies but also in developing new projects. These factors are not meant to be overly prescriptive or rigid; instead they summarise important considerations that a development team should endeavour to understand. Based on that understanding, the project team may wish to adjust the project design to help ensure a positive outcome. However, the sheer fact of including these will not necessarily guarantee success.

Table 2 lists the key evaluation factors and provides a brief explanation for each factor. Table 3 compares the five case studies utilising these evaluation factors. Finally, Table 4 presents a more detailed summary for each case indicating the special circumstances that led to the decision to rank factors. In all cases, the following colour codes are used:

- Red – factor was not addressed and/or considered; this could also be a 'show stopper'
- Amber – there is an opportunity for this factor to be addressed or considered but it was not always completed and/or done sufficiently
- Green – factor was addressed and had a positive impact
- Blank – not able to assess.

⁴The FutureGen case study and all related information is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.

Table 2 Overview of evaluation factors

EVALUATION FACTORS	
Context	
National/State	Were priorities and values of all authorities related to the project aligned?
	Is there an appropriate regulatory system in place?
	Is there a process for gaining project approvals in place?
	Has the project identified and mitigated liability, or does it have a process to do so?
	Is there ENGO support for the project?
	Is there any open opposition to the project at the national or state level?
	Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?
Local	Was public acceptability explicitly factored into the site selection process?
	Did the project team sufficiently gather and assess information about community views, values, and perceptions?
	Did belief in climate change within the community impact their view of the project?
Communication	
General	Has the team done a careful assessment of stakeholders and their concerns?
	Did the team prioritize stakeholders?
	Does the project have a robust communications plan?
	Did the project team conduct early informal discussions with influential stakeholders
Informal	Did the project team conduct early informal meetings with critical property and land owners?
	Did the project team develop early informal relationships with journalists?
	Did the project team set up grass roots level community groups?
	Did the project team proactively work with media releases?
	Did the project team proactively seek multi-stakeholder endorsement?
Formal	Did the project team proactively work with TV and radio interviews?
	Did the project team proactively have flyers and fact sheets available?
	Did the project team proactively establish a website?
	Did the project team proactively communicate through a shop front in the local community?
Project Design	
	Did the framing of the project as being first of its kind influence the acceptance?
	Did the framing of the project as being a research project influence its acceptance?
	Did the framing of the project as a commercial project influence its acceptance?
	Has the team conducted preliminary technical suitability studies of the storage site?
	Can the team adequately monitor injected CO ₂ ?
	Is the project team able to make adjustments in technical specifications and project implementation?
	Are local stakeholders and the community able to influence some project outcomes?
Project Management	
	Did the combination of public and private funding of the project influence its acceptance?
	Did the private funding influence the acceptance of the project?
	Did the public funding influence the acceptance of the project?
	Is communications and outreach built in as an integral part of project management?
	Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?
	Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?
	Does the community have the ability to identify and work with a trusted expert to obtain their own information?

Table 3 Summary comparison between cases

Context		Consideration						ZeroGen	Otway	FutureGen ⁵	Barendrecht	Carson
National/State	Were priorities and values of all authorities related to the project aligned?											
	Is there an appropriate regulatory system in place?											
	Is there a process for gaining project approvals in place?											
	Has the project identified and mitigated liability, or does it have a process to do so?											
	Is there ENGO support for the project?											
	Is there any open opposition to the project at the national or state level?											
Local	Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?											
	Was public acceptability explicitly factored into the site selection process?											
	Did the project team sufficiently gather and assess information about community views, values, and perceptions?											
	Did belief in climate change within the community impact their view of the project?											
	Were local needs and trade-offs incorporated in the project?											
Communication												
General	Has the team done a careful assessment of stakeholders and their concerns?											
	Did the team prioritize stakeholders?											
	Does the project have a robust communications plan?											
Informal	Did the project team conduct early informal discussions with influential stakeholders											
	Did the project team conduct early informal meetings with critical property and land owners?											
	Did the project team develop early informal relationships with journalists?											
Formal	Did the project team set up grass roots level community groups?											
	Did the project team proactively work with media releases?											
	Did the project team proactively seek multi-stakeholder endorsement?											
	Did the project team proactively work with TV and radio interviews?											

⁶ The FutureGen Case Study and all related information is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.

The authors acknowledge the large difference between the Barendrecht project and the other projects referred to in this table and would like to direct the reader to the elaborate case study on the Barendrecht project in which more details and nuance are given

Consideration		ZeroGen	Otway	FutureGen	Barendrecht	Carson
Did the project team proactively have flyers and fact sheets available?						
Did the project team proactively establish a website?						
Did the project team proactively communicate through a shop front in the local community?						
Is the team prepared to evaluate their communication plan and make rapid adjustments as needed?						
Project Design						
Did the framing of the project as being first of its kind influence the acceptance?						
Did the framing of the project as being a research project influence its acceptance?						
Did the framing of the project as a commercial project influence its acceptance?						
Has the team conducted preliminary technical suitability studies of the storage site?						
Can the team adequately monitor injected CO ₂ ?						
Is the project team able to make adjustments in technical specifications and project implementation?						
Are local stakeholders and the community able to influence some project outcomes?						
Project Management						
Did the combination of public and private funding of the project influence its acceptance?						
Did the private funding influence the acceptance of the project?						
Did the public funding influence the acceptance of the project?						
Is communications and outreach built in as an integral part of project management?						
Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?						
Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?						
Does the community have the ability to identify and work with a trusted expert to obtain their own information?						

Table 4 Detailed review for each case

Evaluation factors – Carson

Evaluation factors – Carson		Consideration	Carson	Carson situation
Context	National/State	Were priorities and values of all authorities related to the project aligned?		Obtained alignment initially, though unable to retain when controversy erupted
		Is there an appropriate regulatory system in place?		Introduction of regulatory issues into state legislature raised controversy that affected project
		Is there a process for gaining project approvals in place?		CEC in place for plant siting but regulations not in place for storage
		Has the project identified and mitigated liability, or does it have a process to do so?		Was raised as an issue late in the project
		Is there ENGO support for the project?		Divergent views at the local level
		Is there any open opposition to the project at the national or state level?		Spokesperson from one influential vocal group (though should have been anticipated)
		Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?		Ongoing EJ and energy issues overwhelmed other considerations
Local		Was public acceptability explicitly factored into the site selection process?		Siting strongly driven by technical consideration of proximity of power plant component to feedstock
		Did the project team sufficiently gather and assess information about community views, values, and perceptions?		Not sufficiently comprehensive or not considered seriously enough
		Did belief in climate change within the community impact their view of the project?		Yes, but strongly differing views on how best to address it
		Were local needs and trade-offs incorporated in the project?		Considered but EJ activism and energy issues overrode potential benefits
Communication				
General		Has the team done a careful assessment of stakeholders and their concerns?		In light of proposed legislation after project announcement, did not give sufficient consideration to key EJ spokespersons
		Did the team prioritize stakeholders?		Lined up high level stakeholders but not critical EJ stakeholders at an early stage
Informal		Does the project have a robust communications plan?		Comprehensive plan, involving Hispanic and community organisations
		Did the project team conduct early informal discussions with influential stakeholders		Lined up support from Governor and high level stakeholders before going public
		Did the project team conduct early informal meetings with critical property and land owners?		

Consideration		Carson	Carson situation
Formal	Did the project team develop early informal relationships with journalists?		
	Did the project team set up grass roots level community groups?		Conducted outreach with several local groups
	Did the project team proactively work with media releases?		Project launch took place before all technical details were finalised and they had not fully engaged all key stakeholder groups
	Did the project team proactively seek multi-stakeholder endorsement?		All except one key vocal group
	Did the project team proactively work with TV and radio interviews?		
	Did the project team proactively have flyers and fact sheets available?		Included information in Spanish for Hispanic population
	Did the project team proactively establish a website?		
	Did the project team proactively communicate through a shop front in the local community?		
Project Design	Was the team prepared to evaluate their communication plan and make rapid adjustments as needed?		Adapted as issues emerged
	Did the framing of the project as being first of its kind influence the acceptance?		This project was very well received at the national level
	Did the framing of the project as being a research project influence its acceptance?		
	Did the framing of the project as a commercial project influence its acceptance?		Two components – power plant and storage
	Has the team conducted preliminary technical suitability studies of the storage site?		Had several candidate locations but was unable to easily shift to local alternative site after public announcement
	Can the team adequately monitor injected CO ₂ ?		
	Is the project team able to make adjustments in technical specifications and project implementation?		Project announced in early stage, when technical considerations arose, project location was abandoned for a new site and configuration
	Are local stakeholders and the community able to influence some project outcomes?		Provision in CEC process for this to occur

Consideration		Carson	Carson situation
Project Management			
Did the combination of public and private funding of the project influence its acceptance?			
Did the private funding influence the acceptance of the project?			Positively viewed as local investment
Did the public funding influence the acceptance of the project?			
Is communications and outreach built in as an integral part of project management?			Yes but key members of communications team brought on after announcement of project during finalisation of site selection
Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?			Although under contract, project worked with experts who had process and stakeholder experience
Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?			Early outreach to all key stakeholders except some in the EJ community who were expected to become involved during the CEC siting process
Does the community have the ability to identify and work with a trusted expert to obtain their own information?			

Evaluation factors – FutureGen project ⁶

Context		Consideration	FutureGen	FutureGen situation
National/State	Were priorities and values of all authorities related to the project aligned?			Significant alignment across all levels
	Is there an appropriate regulatory system in place?			Existing environmental regulations adequate to cover project, but are changing for CCS in future. No federal liability provisions exist, but states are moving forward on legislation
	Is there a process for gaining project approvals in place?			State and federal regulatory bodies in place
	Has the project identified and mitigated liability, or does it have a process to do so?			States of Texas and Illinois (semi-finalist sites) accepted liability for injected CO ₂
	Is there ENGO support for the project?			Support varies, many NGOs have chosen to take no position
	Is there any open opposition to the project at the national or state level?			Very little active opposition to project
	Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?			No existing controversies
	Was public acceptability explicitly factored into the site selection process?			Criteria related to public access and acceptance considered, stated goal of project
	Did the project team sufficiently gather and assess information about community views, values, and perceptions?			FutureGen Alliance collected data on all semi-finalist sites and conducted extensive interviews with population
	Did belief in climate change within the community impact their view of the project?			Mixed opinions, but stated understanding that FutureGen project is related to climate change mitigation
Local	Were local needs and trade-offs incorporated in the project?			Very sophisticated understanding of local needs/trade-offs by project developer, community leaders, and community
	Communication			
	General			
	Has the team done a careful assessment of stakeholders and their concerns?			
	Did the team prioritize stakeholders?			Community leaders, neighbours, and regulators
	Does the project have a robust communications plan?			Comprehensive plan developed by both FutureGen Alliance as the project developer and the Illinois FutureGen Team as local proponent
	Informal			
	Did the project team conduct early informal discussions with influential stakeholders			
	Did the project team conduct early informal meetings with critical property and land owners?			

⁶ The FutureGen case study and all related information is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.

Consideration		FutureGen	FutureGen situation
Formal	Did the project team develop early informal relationships with journalists?		
	Did the project team set up grass roots level community groups?		
	Did the project team proactively work use media releases?		FutureGen Alliance and Illinois FutureGen Team provide media releases at key milestones
	Did the project team proactively seek multi-stakeholder endorsement?		Conducted by trusted sources
	Did the project team proactively work with TV and radio interviews?		Developed in response to questions and input
	Did the project team proactively have flyers and fact sheets available?		Both FutureGen Alliance and Illinois FutureGen Team created websites to provide information
	Did the project team proactively establish a website?		Local economic developer maintains office. Once final site selection made, FutureGen Alliance opened local office
Project design	Did the project team proactively communicate through a shop front in the local community?		Adapted as project competition progressed from 12, to 4, to 1 site
	Was the team prepared to evaluate their communication plan and make rapid adjustments as needed?		
	Did the framing of the project as being first of its kind influence the acceptance?		Significant to community
	Did the framing of the project as being a research project influence its acceptance?		Significant to community
	Did the framing of the project as a commercial project influence its acceptance?		Commercial-scale CO ₂ injection
	Has the team conducted preliminary technical suitability studies of the storage site?		On-site storage in Mt Simon Sandstone reservoir
	Can the team adequately monitor injected CO ₂ ?		Monitoring system in place and part of Illinois State legislation for acceptance of liability
	Is the project team able to make adjustments in technical specifications and project implementation?		Actively sought community input for components that might impact community
	Are local stakeholders and the community able to influence some project outcomes?		

Project management		Consideration	FutureGen	FutureGen situation
Project management	Did the combination of public and private funding of the project influence its acceptance?			
	Did the private funding influence the acceptance of the project?			
	Did the public funding influence the acceptance of the project?			
	Is communications and outreach built in as an integral part of project management?			
	Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?			
	Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?			Key stakeholders identified and contacted early
	Does the community have the ability to identify and work with a trusted expert to obtain their own information?			Illinois State Geological Survey provided input and information about project in public forums

Evaluation factors – ZeroGen Project

Context		Consideration	ZeroGen	ZeroGen situation
National/State	Were priorities and values of all authorities related to the project aligned?			Strong support across Australia and locally
	Is there an appropriate regulatory system in place?			Federal and state government developed at the earliest stages of the project
	Is there a process for gaining project approvals in place?			
	Has the project identified and mitigated liability, or does it have a process to do so?			
	Is there ENGO support for the project?			Open endorsement by WWF and change in perspective of local conservation groups
	Is there any open opposition to the project at the national or state level?			Minimal at the beginning - was able to be engaged
	Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?			
Local	Was public acceptability explicitly factored into the site selection process?			Not initially but engagement was a priority for the project
	Did the project team sufficiently gather and assess information about community views, values, and perceptions?			Used CSIRO to conduct workshops in key communities
	Did belief in climate change within the community impact their view of the project?			
	Were local needs and trade-offs incorporated in the project?			Not openly in a predetermined way, however gathered some through various interviews
Communication				
General	Has the team done a careful assessment of stakeholders and their concerns?			Well developed
	Did the team prioritize stakeholders?			Actively prioritised and targeted accordingly
	Does the project have a robust communications plan?			
Informal	Did the project team conduct early informal discussions with influential stakeholders?			Ongoing
	Did the project team conduct early informal meetings with critical property and land owners?			A high priority at the beginning of the project and on an as- needs basis
	Did the project team develop early informal relationships with journalists?			Some were already existing
Formal	Did the project team set up grass roots level community groups?			Continue to engage with them
	Did the project team proactively work with media releases?			Yes, and continues at opportune times

Consideration	ZeroGen	ZeroGen situation
Did the project team proactively seek multi-stakeholder endorsement?		Endorsed by NGOs and international partners
Did the project team proactively work with TV and radio interviews?		As required
Did the project team proactively have flyers and fact sheets available?		These were developed by an external group who worked closely with the team from the beginning
Did the project team proactively establish a website?		Website was where fact sheets and other information could be accessed
Did the project team proactively communicate through a shop front in the local community?		No local shop front was established – parent company was already in the community
Was the team prepared to evaluate their communication plan and make rapid adjustments as needed?		This is continually being reviewed
Project design		
Did the framing of the project as being first of its kind influence the acceptance?		A very new project for Australia
Did the framing of the project as being a research project influence its acceptance?		Originally began this way but changed to larger project
Did the framing of the project as a commercial project influence its acceptance?		Yes, in its final form is seen as a commercial project
Has the team conducted preliminary technical suitability studies of the storage site?		Appropriate storage has been an ongoing issue for the project
Can the team adequately monitor injected CO ₂ ?		
Is the project team able to make adjustments in technical specifications and project implementation?		Were able to walk the track with indigenous and alter pipeline proposal accordingly
Are local stakeholders and the community able to influence some project outcomes?		Yes, early engagement allowed that input.
Project management		
Did the combination of public and private funding of the project influence its acceptance?		
Did the private funding influence the acceptance of the project?		
Did the public funding influence the acceptance of the project?		
Is communications and outreach built in as an integral part of project management?		Communications has been a high priority for this project

Consideration		ZeroGen	ZeroGen situation
Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?			Have a board but not necessarily independent
Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?			Yes, engagement happened early in the life of the project
Does the community have the ability to identify and work with a trusted expert to obtain their own information?			These were utilised at various stages to engage stakeholders

Evaluation Factors – Otway Basin Project

Context		Consideration	Otway	Otway situation
National/State	Were priorities and values of all authorities related to the project aligned?			Strong support across Australia and locally
	Is there an appropriate regulatory system in place?			Federal and state government developed at the earliest stages of the project
	Is there a process for gaining project approvals in place?			Ongoing and well regulated
	Has the project identified and mitigated liability, or does it have a process to do so?			Endorsed by leading national NGOs
	Is there any open opposition to the project at the national or state level?			Some opposition about CCS extending fossil fuel industry
	Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?			
	Was public acceptability explicitly factored into the site selection process?			Not at the beginning of the project
Local	Did the project team sufficiently gather and assess information about community views, values, and perceptions?			This was done early in the life of the project - in depth both local and wider community
	Did belief in climate change within the community impact their view of the project?			
	Where local needs and trade-offs incorporated in the project?			Some of this came out of the baseline research data and influenced messaging
Communication				
General	Has the team done a careful assessment of stakeholders and their concerns?			Advanced and ongoing
	Did the team prioritize stakeholders?			As appropriate
	Does the project have a robust communications plan?			Worked with government as well as research organisations to enhance their impact
Informal	Did the project team conduct early informal discussions with influential stakeholders?			Local councils through to federal governments were well engaged throughout
	Did the project team conduct early informal meetings with critical property and land owners?			This occurred, only one major issue which was dealt with by state government
	Did the project team develop early informal relationships with journalists?			Ongoing although quality of relationship varies with journalists' personal interests
Formal	Did the project team set up grass roots level community groups?			Local community groups were a priority

Consideration		Otway	Otway situation
Did the project team proactively work use media releases?			Always proactive about their project
Did the project team proactively work seek multi-stakeholder endorsement?			From local to international level
Did the project team proactively work with TV and radio interviews?			As required
Did the project team proactively have flyers and fact sheets available?			Ongoing communication through fact sheets, newsletters etc
Did the project team proactively establish a website?			A key resource for Australia and beyond
Did the project team proactively communicate through a shop front in the local community?			Not actually a shop front but had the place at site and a local community liaison officer
Was the team prepared to evaluate their communication plan and make rapid adjustments as needed?			Was adapted and responded to issues in a timely manner
Project design			
Did the framing of the project as being first of its kind influence the acceptance?			Yes in Australia
Did the framing of the project as being a research project influence its acceptance?			Yes and seen in a positive light
Did the framing of the project as a commercial project influence its acceptance?			Has commercial partners but well know because of its research approach
Has the team conducted preliminary technical suitability studies of the storage site?			Confirmed from the outset
Can the team adequately monitor injected CO ₂ ?			Ongoing and part of the publicity of the project - anyone can see how it is happening
Is the project team able to make adjustments in technical specifications and project implementation?			Some but little was required
Are local stakeholders and the community able to influence some project outcomes?			Little ability
Project management			
Did the combination of public and private funding of the project influence its acceptance?			Yes but seen as a research project and trusted
Did the private funding influence the acceptance of the project?			
Did the public funding influence the acceptance of the project?			

Consideration		Otway	Otway situation
Is communications and outreach built in as an integral part of project management?			Yes this was well managed by the communications capability to be engaged early
Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?			Not for the project overall
Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?			A high priority for this project
Does the community have the ability to identify and work with a trusted expert to obtain their own information?			Various researchers were available to the project as required

Evaluation factors – Barendrecht CCS Project

Context		Consideration	Barendrecht	Barendrecht situation
National/State	Were priorities and values of all authorities related to the project aligned?			The national government was a proponent, however the local and regional government were against the project
	Is there an appropriate regulatory system in place?			Most of the project relates to existing regulation. The project would serve as a demonstration for the needed specific regulation regarding CCS (including issues of liability) that are underdeveloped.
	Is there a process for gaining project approvals in place?			Treated as any large infrastructure project
	Has the project identified and mitigated liability, or does it have a process to do so?			Additional measures for damages and loss of value to residential property were instigated by national government, under pressure from local residents
	Is there ENGO support for the project?			National NGO's had mixed opinions about CCS in general and this project in particular
	Is there any open opposition to the project at the national or state level?			Most opposition to the project comes from local authorities and other stakeholders. This has erased some national opposition as well (e.g. in the national parliament)
	Is there a history of industrial, environmental, or other problems on national level that might impact public perceptions of the project?			Some distrust existed towards Shell (with the image of a commercial multinational oil company) leading a climate friendly project
	Was public acceptability explicitly factored into the site selection process?			None recorded
Local	Did the project team sufficiently gather and assess information about community views, values, and perceptions?			None recorded
	Did belief in climate change within the community impact their view of the project?			Not measured
	Where local needs and trade-offs incorporated in the project?			This did not occur prior to the project announcement, and was only done on a limited base during the process (after opposition occurred)
Communication				
General	Has the team done a careful assessment of stakeholders and their concerns?			None recorded
	Did the team prioritize stakeholders?			Some prioritisation was done after oppositions increased, but not in a structured way

Consideration		Barendrecht	Barendrecht situation
Does the project have a robust communications plan?			None or at least none which accounted for public perception, was developed at the start of the project. After opposition increased, further communication actions were developed
Informal	Did the project team conduct early informal discussions with influential stakeholders		Meetings with influential stakeholders took place after presentation of (final) project plans
	Did the project team conduct early informal meetings with critical property and land owners?		No specific meetings with property owners worrying about property value decrease were recorded
	Did the project team develop early informal relationships with journalists?		No specific actions to develop relationships with journalists were recorded
Formal	Did the project team set up grass roots level community groups?		No community groups were set up
	Did the project team proactively work with media releases?		The project developer made statements through own website and press releases. These included often reactions to issues raised by opponents
	Did the project team proactively seek multi-stakeholder endorsement?		CCS, nor the project was endorsed publicly by the government or other stakeholders prior to project announcement
	Did the project team proactively work with TV and radio interviews?		The team conducted several radio and TV interviews but mostly in a reactive manner
	Did the project team proactively have flyers and fact sheets available?		Flyers and fact sheets were only made available as a reactive measure to public opposition
	Did the project team proactively established a website?		A website was established after the project announcement and after public opposition was established
	Did the project team proactively communicate through a shop front in the local community?		An information centre in the community was opened approximately a year after the announcement of the project
	Is the team prepared to evaluate their communication plan and make rapid adjustments as needed?		Additional communication activities are set up after opposition increased. Questionable is however whether the activities are evaluated adequately
Project Design	Did the framing of the project as being first of its kind influence the acceptance?		Being the first of its kind influenced the acceptance negatively (it was perceived as a 'test' and 'experiment').
	Did the framing of the project as being a research project influence its acceptance?		The project was not framed as a research project

Consideration		Barendrecht	Barendrecht situation
Did the framing of the project as a commercial project influence its acceptance?			The project was viewed as a commercial project regardless of the part government funding
Has the team conducted preliminary technical suitability studies of the storage site?			The site was chosen on the purpose of technical and financial feasibility
Can the team adequately monitor injected CO ₂ ?			Extensive monitoring will take place
Is the project team able to make adjustments in technical specifications and project implementation?			The project team does not show flexibility in the storage site or technical project design. Flexibility on the timing and scale of the project does exist
Are local stakeholders and the community able to influence some project outcomes?			Community members could submit views via the official pathways but none additional possibilities to influence the project were established by the project team
Project Management Did the combination of public and private funding of the project influence its acceptance?			The governmental funding of a private project, increased the distrust of the community to the national government in being able to evaluate the official procedures and safety aspects
Did the private funding influence the acceptance of the project?			N/A
Did the public funding influence the acceptance of the project?			N/A
Is communications and outreach built in as an integral part of project management?			Only after opposition occurred more communication activities were set up and communication experts were involved
Did the project seek outside experts (independent or via a contracted reference group) to help them understand stakeholder concerns and work effectively with stakeholders?			Not for the project overall, but external experts were consulted for specific elements (e.g. chair for information event)
Has the project team worked with local stakeholders at an early stage to identify concerns and potential benefits?			There was no early engagement with the local residents
Does the community have the ability to identify and work with a trusted expert to obtain their own information?			The local council enlisted its own experts, due to distrust of the project developer experts

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Appendix I Barendrecht Project – The Netherlands

What happened in Barendrecht?

Case study on the planned onshore carbon dioxide storage in Barendrecht, the Netherlands

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Abstract

Since 2007, there have been plans to establish an onshore CCS (carbon capture and storage) demonstration project in the Dutch town of Barendrecht. This project, initiated by Shell, aims to store CO₂ from its nearby oil refinery in Pernis (in the Rotterdam harbour area) in two depleted gasfields largely located under Barendrecht. The plans caused debate between proponents and opponents, which delayed implementation of the project. Until the time of writing (June 2010), no decision about the implementation of the project has been made.

This case study report describes the events related to the Barendrecht project between 2007 and June 2010. The report, which is based on desk research and interviews with relevant stakeholders, outlines the defining moments that influenced the relationships between the stakeholders and their opinions of the project. It focuses on the characteristics of communication between stakeholders and to the community. Shortcomings in this communication are identified and presented as lessons for future CCS project developers.

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Glossary

AMESCO study (Algemene Milieu Effecten Studie CO₂-opslag): Study on the environmental aspects of CO₂ storage led by consultancy Royal Haskoning

BCO₂ (Bestuurlijk overleg CO₂): Administrative consultation group of the Barendrecht CCS project on which the municipal, provincial and national government are represented

CO₂: Carbon dioxide

CCS: Carbon capture and storage

DCMR (Dienst Centraal Milieubeheer Rijnmond): Environmental Protection Agency of Rijnmond, which is the permitting authority and consultant of the Province of South Holland, municipal governments, companies and individuals in the Rijnmond area

DHV: A global consultancy and engineering company, that helped the municipality of Barendrecht define its 'checklist' about the CCS-project

DNV (Det Norske Veritas): Global independent consultancy foundation aiming to protect life, ownership and environment

EIA: Environmental Impact Assessment. Required national procedure to assess environmental impacts of projects

NAM (Nederlandse Aardolie Maatschappij BV): The biggest oil and natural gas producer in the Netherlands

OCAP (Organic Carbon dioxide for Assimilation of Plants): A joint venture specialising in distribution of CO₂ from the Shell refinery in Pernis to neighbouring greenhouses

RCI (Rotterdam Climate Initiative): A climate partnership of the port and city of Rotterdam, Environmental Protection Agency DCMR and employer organisation Deltalinqs to reduce local CO₂ emissions, prepare the area for climate change and strengthen the local economy

RCR (Rijkscoördinatieregeling): National Coordination Regulation. Projects appointed under this regulation have national impact and the national government is authorised to award all needed permissions, including those normally awarded by local authorities

RIVM (Rijksinstituut voor Volksgezondheid en Milieu): National Institute for Public Health and Environment

SNM (Stichting Natuur en Milieu): National Society for Nature and Environment. A national independent environmental organisation

TNO (Toegepast Natuurwetenschappelijk Onderzoek): National research institute with a strong knowledge base on underground technology

Ministry of VROM (Volkshuisvesting, ruimtelijke ordening en milieu): Ministry of Housing, Spatial Planning and Environment

What happened in Barendrecht?

Executive summary

Since 2007, there have been plans to establish an onshore carbon capture and storage (CCS) demonstration project in the Dutch town of Barendrecht. This project, initiated by Shell, aims to store CO₂ from its nearby oil refinery in Pernis (in the Rotterdam harbour area) in two depleted gasfields largely located under Barendrecht. The plan caused debate between proponents and opponents, which delayed implementation of the project. Until the time of writing (June 2010), no decision about implementation of the project has been made.

The debate between the opponents and proponents of the project began immediately after the project was presented to the local community in early 2008. The local stakeholders (mainly municipal government) opposed the project and its proponents: the project developers and national government. During the debate, other stakeholders became involved and were considered to be opponents (e.g. citizens founded group No to CO₂ and experts who made critical remarks about the project) or proponents (e.g. researchers claiming that the project is safe).

From 2007 to June 2010, opposition to the project has increased, became more formalised and better organised. What began as opposition and critical questions from some local politicians led to formal opposition of the project by the whole municipal government later in 2008. This position was also taken by the provincial government in 2009. Increased communication from the opponents to other stakeholders and the community entrenched the debate in 2009. During a 'time-out' period announced by the national government (after the positive advice of the EIA Committee) to perform further research and 'cool down' emotions, the then only government opposition was extended with a local citizens initiative to oppose the project. The formal decision of the national government to continue with the project and growing attention on national television and other media increased the discussion and opposition (in Parliament and the community) further in 2010.

This case study report describes the events related to the Barendrecht project between 2007 and June 2010. The report, which is based on desk research and interviews with relevant stakeholders, outlines the defining moments that influenced relationships between the stakeholders and their opinions of the project. It focuses on the characteristics of communication between stakeholders and to the community. Shortcomings in this communication are identified and presented as lessons for future CCS project developers.

The most important lesson learned from the Barendrecht project is that it is important to create mutual trust between stakeholders and commitment to each other and to the project. This can be done by including all stakeholders in the project process at an early stage and communicating about the project and its process to the community. During this process the demands, needs, values and interests of the different stakeholders should be defined, discussed and integrated into the project design. The project process should be open and transparent to the participants, the community and other stakeholders.

1 Introduction and overview

Since 2007, advanced plans have existed to establish an onshore CCS (carbon capture and storage) demonstration project in the Dutch town of Barendrecht. This project, initiated by Shell, aims to store CO₂ (carbon dioxide) from its nearby oil refinery in Pernis (in the Rotterdam harbour area) in two depleted gasfields largely located under Barendrecht. The plans caused debate between proponents and opponents, which delayed implementation of the project. Until the time of writing (June 2010), no final decision about the implementation of the project has been made.

This case study report describes the national and local context of the Barendrecht CCS project (Chapter 2), the technical aspects of the project and the stakeholders involved (Chapter 3), the defining moments in the project's history from the end of 2007 until June 2010 (Chapter 4), media coverage (Chapter 5) and the debate between the stakeholders and the events and circumstances influencing this debate (Chapter 6).

The concluding chapter focuses on the characteristics and shortcomings of the communication between stakeholders and to the community. These shortcomings played an important role in the increased opposition, which led to the current delay in project planning and the remaining uncertainty about the project.

The conclusions of this case study are presented as lessons for future CCS project developers worldwide concerning the communication between and engagement of stakeholders and the community.

1.1 Methods used

To perform this case study an approach using a combination of desk research and interviews has been adopted. Through desk research we collected written information (including research reports, minutes of meetings, slides of presentations, press releases, websites of the different stakeholders, media reports) as well as video recordings of local and national television items on the Barendrecht project. Another important resource for this case study is the report on the project by Brunsting and Mikunda (2010) performed within the European research project NearCO₂. Most of these sources are available online via websites (see the list of websites consulted in the resources overview at the end of this report). Other written resources were collected via the stakeholders e.g. the employees of the information centre provided hard copies of brochures, information about the visitor statistics, etc.

Information was also collected via interviews with representatives of the stakeholders involved. The interviews were based on a guideline developed in advance (see Appendix A). Interviewees were asked to elaborate on their own role in the project, the other stakeholders, the events they thought were important in the project communication, the relations between and the opinion forming of the stakeholders, the role of the media etc. Interviewees were selected because of their involvement in and opinion about the project. Between 5 October and 23 November 2009, a total of 10 people were interviewed representing the national Taskforce CCS (1), project initiators NAM and Shell (2,3), the municipal government (4) and local political parties (5,6), the provincial Environmental Protection Agency DCMR (7,8), the information centre CO₂ storage in Barendrecht (9) and the national NGO Greenpeace (10). The period between the interviews and the end date of the focus of this report (June 2010) was investigated via desk research and additional phone and email contact with some of the stakeholders.

2 Background

This chapter contains the technical and other details of the project planned in Barendrecht (2.1) as well as details about the location (2.2) of the planned project.

2.1 Project details

In Pernis (see figure 2.1), at the heart of the Rijnmond district and about 20 km from Barendrecht, Royal Dutch Shell operates a hydrogen production plant, part of a large oil refinery. As part of the hydrogen production process, a very pure stream of CO₂ is produced as an unwanted by-product (Shell CO₂ Storage, 2008). Shell has already managed to mitigate part of the plant's 1 million CO₂ton/year emission through the provision of CO₂ to the soft drink industry (150,000 CO₂ton/year), and to greenhouses in the summer months (380,000 CO₂ton/year). Mainly because of lower demand in the winter, about 400,000 tonnes per year is still available for storage. Using an existing process installation, Shell plans to capture and compress the CO₂, and then inject this amount into two almost expended gasfields that sit two to three km under Barendrecht, and partly under the neighbouring town of Albrandswaard

What happened in Barendrecht?

(Herber, 2008). If the project is to be implemented, Shell will receive a €30 million government subsidy for the small scale demonstration project, and would also benefit from emission savings under the European Union's Emissions Trading Scheme.

Barendrecht lies some 17 km from Pernis. In order to transport the CO₂ to the injection wells, a new steel pipeline of 16.5 kilometer will need to be built between Pernis and Barendrecht, however a large section of the pipeline will be able to be placed in an existing natural pipeline corridor (see Figure 3). Starting in 2011, it is foreseen that over 25 years, two depleted gasfields will be used to receive the CO₂. The smaller of the two fields (Barendrecht) can store about 0.8 million tonnes at a depth of 1,700 m. The larger (Barendrecht-Ziedewij) can store about 9.5 million tonnes at a depth of 2,700 m. The sandstone reservoirs have a cap rock made of a thick layer of clay rock. The CO₂ will be compressed to a pressure of 40 bar before entering the pipeline. A second compressor at the point of injection will gradually increase the pressure until the end of the injection period. Each field will have one injection well. In Barendrecht one monitoring well is available and Barendrecht-Ziedewij has two potential monitoring wells.

The storage site at Barendrecht is particularly suited to the project for a number of reasons:

- The CO₂ stream from the hydrogen plant is very pure, and requires no additional treatment
- The CO₂ stream can be collected using an existing process installation
- The storage location is very close to Pernis
- The gasfields will be fully expended in 2010 and 2013, and thus utilisable for CO₂ storage
- The first gasfield is relatively small; therefore implementation of the entire project cycle can be completed within three years.

Shell has agreed to take ownership of the gasfields and injection site from Nederlandse Aardolie Maatschappij BV (NAM). According to the national government and the project developers, no major new technology is needed for this project. These parties state that the main learning objectives are in the areas of public acceptance, legal procedures and regulations, monitoring and verification, and obtaining CO₂ credits in the EU Emission Trading Scheme.

If successful, the Shell project at Barendrecht could lay the foundation for the replication of fully integrated CCS systems both in Rotterdam and the rest of the Netherlands. The Dutch Government is also optimistic that the project contributes to the development and innovation of CCS technologies in the country, placing the Netherlands in a favourable position for the international trade of equipment and expertise. If the endeavour is abandoned for whatever reason, this will negatively affect the attainability of local and national emission targets (Herber, 2008), and will perhaps warrant a government re-think of the deployment strategy for further CCS projects.



Figure 1 The location of the planned CO₂ pipeline and gasfields in Barendrecht
Source: Shell CO₂ Storage, 2008.

Nature	In 2007, the Dutch Government announced a tender for two small CCS demonstration projects to take place in order to build experience with CCS before larger CCS demonstrations due to begin in the country in 2015. The project would be deployed by a private company, although financial support would be made available by the government. Shell won a tender for one of these projects, and proceeded with EIA and licensing procedures in early 2008
Scale/size	Small demonstration project
Cost	No cost data is available, but the government will provide a subsidy of €30 million
CO ₂ amounts	Planning indicates that approximately 10 million tonnes would be stored
Source of CO ₂	A gasification hydrogen plant, a pure stream of CO ₂
Project duration	Injection in the first field was planned to start in 2011, for three years. Injection in the second field was planned to start in 2015, lasting for approximately 25 years
Technology type	Storage of CO ₂ , comprehensive monitoring and verification
Pipeline	A steel pipeline with a diameter of 36 cm (alternative 70 cm) is planned to be built 16.5 km from the source to the first gasfield, with an extension of 3.5 km to the second gasfield. The pipeline can use part of an existing pipeline corridor in certain places
Site selection	Site was chosen on the basis of close proximity to the source, the suitability of the geological storage complex, the possibility to inject CO ₂ through existing wells, and the possibility of filling the first smaller gasfield, allowing full life cycle monitoring in a brief period (three years)
Location choice	Location is based on the existence of suitable storage site
Regulations	The environmental impact assessment has followed government guidelines and it was concluded that the project has an acceptable level of risk, both to site workers and the community. The effects of noise, waste and increased traffic are also understood to be negligible
Current status	In preparation stage, awaiting final approval from state government
Website	http://www.shell.nl/home/content/nld/environment_society/co2_storage/

2.2 Location

Barendrecht is located in the west of the Netherlands (see figure 1), and has a population of approximately 44,000 people (Gemeente Barendrecht, 2009). The town is situated between the Rivers Maas (south of the town) and Rhine (north of the town). It is part of the conurbation of Rotterdam and close to the heavily industrialised Rijnmond district. The Rijnmond industrial area is home to a number of large oil refineries operated by (among others) Shell, ExxonMobil, Kuwait Petroleum (Q8) and BP, as well as chemical manufacturing plants such as Dow Chemical and ICI/ Akzo Nobel. This area is responsible for the bulk of chemical and fuel manufacture, storage and transport for large parts of central Europe. The area contributes significantly to the Dutch economy, but is also given precedence in Dutch energy and climate policy given its high rate of energy consumption and contribution to the country's greenhouse gas emissions.



Figure 2 Location of Barendrecht in the Netherlands (Zoekplaats, 2010)

What happened in Barendrecht?

Barendrecht can be considered to be comprised of two areas, the town centre and Carnisselande (Gemeente Barendrecht, 2010). A large part of Carnisselande features newly built houses, and is mostly populated by families. A motorway (the A29), dissects the older part of Barendrecht from the newly built neighbourhood of Carnisselande. In recent years, the municipality of Barendrecht has witnessed a number of major infrastructure projects in the area, including the expansion of the large motorways that surround the town, and railway infrastructure such as a double-track freight line from Rotterdam to Germany ('Betuweroute', completed in 2007) and the commencement of the High-Speed Line South which connects Antwerp with Amsterdam Schiphol airport (started in 2009).

As shown in figure 3, most of the population is made up of people between the ages of 30 and 50, as well as a high proportion of children below the age of 10. The demographic distribution is not particularly unusual for the Netherlands, but the higher proportion of middle-aged citizens and children indicates that many families with young children live in the area.

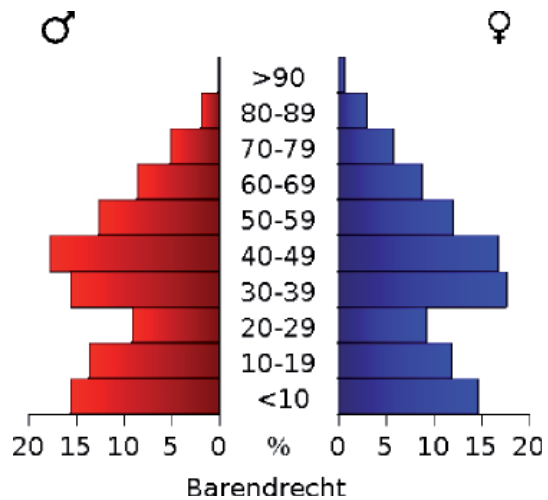


Figure 3 Population pyramid of Barendrecht (data source CBS, 2009)

3 Project context

In this chapter we present the relevant elements in the national (3.1) and local (3.2) context of the Barendrecht CCS project. The third sub-section describes the stakeholders involved in the project in more detail.

3.1 National context

Dutch CO₂ emissions have increased steadily from 161 MT CO₂ in 1990, to 176 MT CO₂ in 2005 (VROM, 2007). Carbon capture and storage (CCS) became a seriously considered CO₂ abatement option in Dutch climate and energy policies in 2007, as part of the 'Clean and Efficient' ('Schoon and Zuinig') policy package (VROM, 2007). This action plan for energy and climate calls for annual energy efficiency improvements of 2 per cent by 2020, a 30 per cent reduction in greenhouse gas emissions by 2020 (compared to 1990) and 20 per cent renewable energy in the energy mix by 2020.

In 2008, another set of policy recommendations called the 'Energy Report' (EZ, 2008) was adopted by Parliament. This report contained descriptions of a joint 'CCS project' between the Ministry of Housing, Spatial Planning and the Environment (VROM) and the Ministry of Economic Affairs (EZ). As part of the project, the CCS Taskforce was established in March 2008. This public-private partnership is responsible for the realisation of commercial CCS infrastructure. This requires a market-ready technology, organisation of the infrastructure, policy and juridical facilitation, financial arrangements and community endorsement. The Taskforce aims to speed up CCS projects in the Netherlands, by contributing to a positive image of CCS. Social acceptance is identified by the Taskforce as a major issue that is difficult to manage (Vergragt, 2009).

The Dutch Government has provided a budget for several research projects, including the implementation of four capture and two storage projects by 2012; the building of two large demonstration projects from 2012 to 2015 (with a storage component integrated from 2015-2020), and from 2020 onwards large-scale industrial implementation of CO₂ storage. From 2020 onwards, CCS is expected to be commercially viable without the need for government support. On 27 November 2008, the government decided to allocate €60 million for two CO₂ storage demonstration projects. These projects are located in Barendrecht, the subject of this case study, and in Geleen, in the south-east of the Netherlands.

3.2 Local context

In the Rotterdam area, the Rotterdam Climate Initiative (RCI) was set up in 2007 by four partners: the port of Rotterdam, the city of Rotterdam, Deltalings (a branch organisation representing the industrial and logistical companies in Rijnmond) and the Environmental Protection Agency of Rijnmond (DCMR). The chair of the RCI is former Dutch Prime Minister Lubbers, who is also member of the Dutch CCS Taskforce.

Rotterdam is aiming to become 'the world capital of CO₂-free energy', and is one of 40 cities affiliated with the Large Cities Climate Leadership Group (C40). The RCI states that, despite maximum efforts to increase energy savings and the use of renewable energy, CCS will be necessary (RCI, 2008). In terms of CO₂ emission reductions, the target is a reduction by 2025 to 50 per cent of measured CO₂ levels in 1990, far exceeding national and European objectives. CCS plays the lead role in reducing CO₂ emissions from industry. To meet the challenging target, planned activities include advancements in energy conservation, sustainable energy and CCS (Vergragt, 2009).

According to the RCI, the Netherlands is in an excellent position to become a frontrunner in CCS technology development. There are plans to develop the Rotterdam Port area ('Rijnmond') into a major hub for CCS (RCI, 2008). Around Rotterdam there is a high concentration of CO₂ point sources, proximity of onshore and offshore storage sites, and existing CO₂ infrastructure that could connect to the harbour of Antwerp in Belgium and the German Ruhr region.

3.3 Stakeholders involved

Many stakeholders are involved in the Barendrecht CCS project. Their involvement ranges from being an official project partner (who are involved throughout the whole process and debate) to individuals or small groups that are involved in some part of the discussion or project process. The following outlines the most important stakeholders involved, their roles and positions.

Project developers

Shell is the initiator of the project. To develop the project, the company Shell CO₂ Storage BV is responsible for storage and monitoring. In this company, Shell cooperates with the employees of the NAM (Nederlandse Aardolie Maatschappij BV – the biggest oil and natural gas producer of the Netherlands). The NAM is responsible for existing natural gas production from the gasfields in Barendrecht. Another partner of the project developers is OCAP (Organic Carbon dioxide for Assimilation of Plants), a joint venture specialised in distribution of CO₂ from the Shell refinery in Pernis to neighbouring greenhouses. OCAP will be responsible in the Barendrecht project for the transport of CO₂.

National government

The *national government* is involved via two ministries: the Ministry of Economic Affairs (EZ), represented by Minister Maria van der Hoeven, and the Ministry of Housing, Spatial Planning and Environment (VROM), represented by Minister Jacqueline Cramer.¹ The national government has set up the tender procedure to stimulate demonstration projects of CCS through which the Barendrecht project is funded. The Ministry of Economic Affairs established the CCS Project Directorate and the Taskforce CCS with representatives of public and private parties including industry, NGOs and governments to support the development of CCS in the Netherlands.

The Barendrecht project was also discussed within the *national parliament*. Most parliamentary discussions took place towards the end of 2009 and in the first half of 2010. Questions were asked by individual members of the parliament to the responsible Ministers about the local opposition, safety and health issues and technical characteristics. These questions were often raised after events related to the Barendrecht project were reported in the media. Most of these questions were critical of the Ministers' decisions to continue with the project despite local opposition.

¹ These ministers were in charge from the beginning of the Barendrecht project until the fall of the government on 22 February 2010. At this date minister Cramer resigned (together with all her colleagues from the Labour Party (PvdA)) and her position was taken over by Tineke Huizinga-Heringa. Between the fall of the government and the formation of the new government (based on the elections of 9 June 2010), the ministers are so-called 'demission-air' which means that no decisions may be made on sensitive topics.

What happened in Barendrecht?

Local governments

Beside the national government, provincial and municipal governments are involved in the Barendrecht CCS project. The *provincial government* of Zuid-Holland consists of an *Executive Board* (represented by Deputy Eric van Heijningen) and a *Provincial Council* with representatives of different (national and local) *political parties*. The Deputy is head of the administrative consultation group (BCO₂ in which all governmental levels are present). The Executive Board is also involved and responsible for permitting procedures related to environmental issues and the EIA advice. In November 2009, the Provincial Council announced that it is officially against the project.

The Provincial Government cooperates closely with the Environmental Protection Agency of Rijnmond (DCMR). DCMR is the permitting authority and consultant of the province of Zuid Holland, the different municipal governments including Barendrecht, companies and individuals in the Rotterdam region. DCMR also controls the execution of permits and monitors all kinds of environmental issues in the region. In this CCS project, DCMR has three roles. It is appointed by the provincial Deputy to execute the leadership of the BCO₂, responsible for the environmental permits related to the project, and one of the founders of the Rotterdam Climate Initiative (RCI) which actively promotes CCS in the region. DCMR officially is a neutral stakeholder in this project.

At the municipal level, the *governments of Barendrecht and Albrandswaard* are involved. The gasfields in which the CO₂ is planned to be stored are located under these two municipalities. The municipal government of Barendrecht is however much more actively involved in the project and the debate which makes stakeholders and the 'outside world' consider it as the 'Barendrecht project'². The municipal government of Barendrecht consists of an *Executive Board* chaired by the mayor (represented in this project mostly by Alderman Simon Zuurbier) and the *Council* in which representatives of several national and local *political parties* take place. The official position since June 2009 of the Council and the Executive Board is that they are against the project. They also agreed to speak with one voice about the project, which blocks the expression of any individual opinions about the project of local politicians or parties. Some differences between the local political parties are seen in their activities related to informing and mobilising the public. The local Christian Democratic party, for example, has extensive information about the project on its website and the Green (GroenLinks) Party organises several events and campaigns to mobilise people.

Other researchers, consultants and experts

Both the project initiators and opponents have hired several external experts, consultants and research organisations to perform research on aspects of the project or to answer specific questions. For example, several professors from Dutch universities and other experts were involved in the 'Knowledge Tables', meetings in which a set of questions from the municipality were answered by several experts. Other examples are the Dutch research organisation TNO, which was involved by Shell for its strong knowledge base on underground technology. Shell also hired consultancy Royal Haskoning to lead the AMESCO study about the environmental aspects of CO₂ storage in the Netherlands. In this study, other parties were involved including energy companies (Electrabel, Essent and Eneco) as well as other governments (provincial governments of Zuid Holland, Friesland, Groningen and Drenthe and the Ministry of VROM). Another example is the involvement of TNO, DCMR and the RIVM (National Institute for Public Health and Environment) for additional research by order of the national and provincial government. Other individuals also were involved to give their opinions about aspects of the project in written articles or television items.

Although external experts, researchers and consultants are mostly hired to have a neutral voice about different aspects of the project, we notice that in the debate those experts pronouncing opinions that are consistent with the message of the project developers are considered as project proponents and vice versa.

NGOs

A few NGOs have also become involved in the debate about the project. National NGOs such as Greenpeace and SNM (the Netherlands Society for Nature and Environment) have stated their general vision about CCS. They are reluctant to pronounce their opinion on this specific project and prefer to act on the national level. Greenpeace, both nationally and internationally, is against CCS in relation to coal usage. SNM favours CCS because it considers CCS as the necessary intermediate step towards clean energy. It does, however, oppose public funding of CCS and

² It is understood that the municipality of Barendrecht is more active in protesting against the project because most of the storage location lies under the town (see Figure 1).

states that the polluters should pay themselves. SNM is also a member of the national Taskforce which promotes CCS in the Netherlands. Several stakeholders tried to involve more national and local NGOs, but these attempts were not successful. A reason for NGOs not to become involved is that they did not want to take a standpoint on a particular CCS project

In 2009, a group of Barendrecht citizens set up a foundation against the project (Stichting CO₂ is nee – CO₂ is no). They actively protest against the project via a website and different events.

Local population

An important stakeholder in this project is of course the local population of Barendrecht (and Albrandswaard). The municipal government represents the people of the municipality in the debate. We don't know however to what extent community opinion is consistent with the opinion expressed by the municipal government. No official community consultation has taken place and it was beyond the scope of the present case study to undertake such an activity. Our observations of local public opinion is based on the reactions and involvement of the community in the debate, reporting in the media, on the interviews with the stakeholders and on the observations of the employees of the information centre in Barendrecht. Between March and October 2009, about 900 people visited the centre of which a large majority were inhabitants of Barendrecht. According to the opinion of an employee of the information centre, about one-third of these visitors are against the project, one-third is in favour and one-third is relatively neutral. If this is the case, there is significantly more diversity and balance in the positions of the community than in the opinions expressed by the local political parties and municipal government.

Media

Most of the media (local and national newspapers and television, websites, magazines etc) are following the debate and present the different opinions about the project. Only a few media events have aimed to form or influence opinions. The media has thus not taken a pronounced position in the debate (see further the media analysis in Chapter 5).

4 Defining moments in the project's history

In the interviews, the stakeholders were asked to name the moments (events, activities, circumstances) in the project's history that have been important in forming opinions of stakeholders and the community. We concentrate on these so-called 'defining moments' named by the interviewees because these give insights into what the stakeholders consider as important moments in the project which influenced stakeholders' opinions and the debate. These insights provide a good overview of the project process and the accompanying debate. Below these 'defining moments' are described in more detail in chronological order. These descriptions combine data from written resources about the defining moments with data collected via the interviews. In Figure 4 a schematic overview of these defining moments is given.

4.1 The initial phase

The national government announced a tender procedure for grants for CCS demonstration projects in 2007. Shell submitted the Barendrecht project to this tender. The grants were expected to be assigned by the end of 2007. At that time CCS was not a large topic at the ministries. The CCS Project Directorate and the national Taskforce CCS were established later in 2008 to stimulate the development of CCS.

One of the reports often referred to by stakeholders is the AMESCO (Generic Environmental Impact Study on CO₂ storage) study, which was initiated by the NAM, composed by different public and industrial parties and published in July 2007. The report aims to provide a basis for EIA procedures and legislation in relation to CCS. In the conclusion of the chapter on Dutch geography, the report states that one could claim that policy is needed to forbid the storage of CO₂ in densely populated areas. The surrounding text however explains that such an approach would limit possibilities for storage sites to agricultural areas with low population density, and did not conclude that such a policy would be desirable. However, this sentence is often referred to as such by opponents of the project.

What happened in Barendrecht?

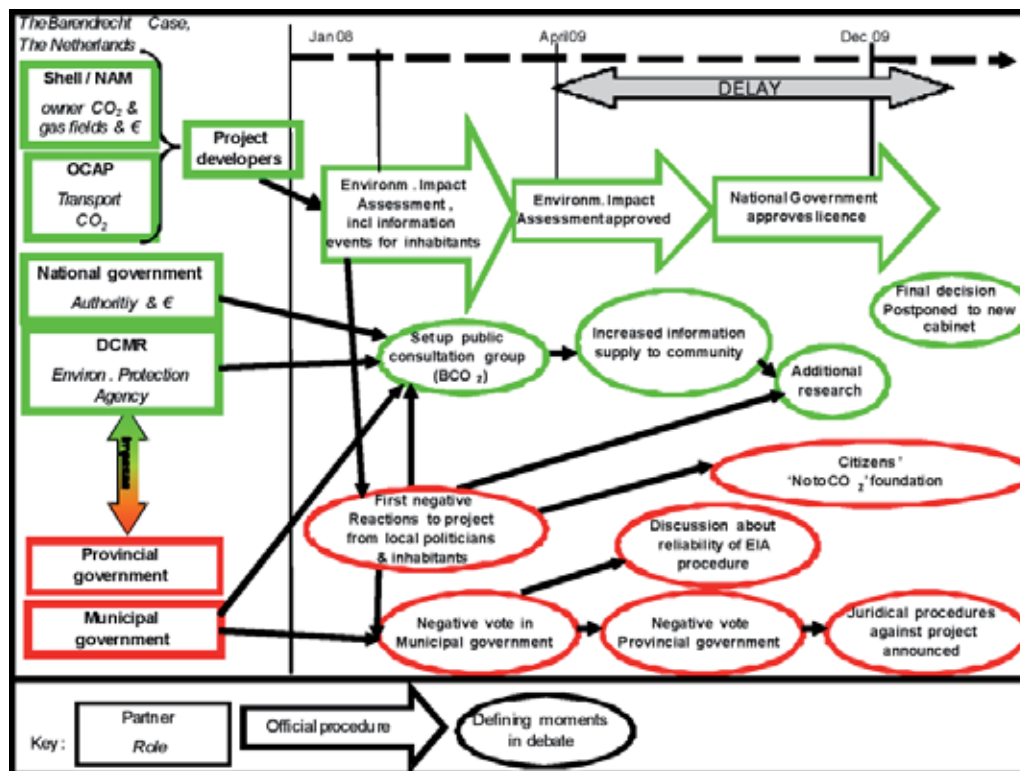


Figure 4 Schematic overview of defining moments in Barendrecht CCS project

4.2 First presentation to the community

In the interviews, representatives of Shell and the municipal government refer to the first informal contacts about the CCS project in 2007. Shell presented its project to the Executive Board of Barendrecht. Some of the members of the Executive Board were initially in favour of the project, others had doubts and it was decided to consult the city Council about it. Shell was asked by the Executive Board to present the project to the city Council, which it did at the beginning of 2008 (before the public meetings mentioned below). Most of the Council was not enthusiastic about the project. This opposition was strongest in the local labour party (PvdA).

Meanwhile, Shell had begun the Environmental Impact Assessment (EIA) procedure. A couple of weeks after the project was presented to the city Council, Shell organised two information meetings to present the CCS project to the Barendrecht community. These meetings were part of the EIA procedure. Both were chaired by an external discussion leader and consisted of several presentations of the project developers (NAM, Shell, and OCAP) and TNO. The meetings were approved by the municipal Board, but no representatives of the municipality were involved in the organisation or in a presentation because a formal decision of the municipal Board about the project was pending.

The first of these public meetings (in February 2008) was attended by about 60 people, of whom many were known for being active in local politics in Barendrecht. During the meeting, Shell and TNO presented details about the technology, risks, geology of the project, details about the EIA procedures and the AMESCO study. It was stated that the project was completely safe. A representative of the national government was present to explain why CCS in general was needed. His role was limited because the national government was hesitant to speak about specific CCS projects while no decisions about the grants were yet made. During the meeting some concerns were raised but no significant debate was held, according to interviewees present. It was decided to organise a second meeting to answer questions and inform more people.

During the second public meeting (in April 2008), no representative of the national government was present due to a cancellation just before the meeting. The most distinguishable features between the two meetings, was the increased attendance (180 people), and the increased number of questions and concerns raised. Those questions that could not be answered during the meeting (due to lack of time), were answered by the project developers on paper in the minutes of the meeting which were publicly accessible on Shell's website. Another difference between

what was presented at the meetings was a change in the presentation made by Shell, which concerned an added remark next to an image with a cross-section of the local geography which stated that the trees on the picture were not properly scaled.³

Most stakeholders refer to the public meetings as the beginning of the debate. Two elements of these meetings are often mentioned for having a supposedly great influence on the opinion formed by stakeholders. These were the questions and concerns raised about the technical details and safety of the project, especially by some local politicians who in their view did not receive satisfying answers of the project developers. This was the first public opposition to the project from local politicians. Secondly, the limited visibility of the national government at these public meetings was identified by most stakeholders as having a large influence on the following debate. Apart from a short presentation by a representative of the ministry of VROM during the first public meeting, only limited attention was given to the standpoint of the national government, the role of this project in a national context and related national policy. This created the feeling that the project was Shell's idea. Reflecting on these meetings, an interviewee said that community irritation was raised and an atmosphere was created of Shell versus the public.

4.3 Initial reactions and actions of the community

After the first public meeting, the frequency of discussions about the project within the local political parties increased. One of the local party leaders who had been present at the public meeting and who had read the AMESCO report was convinced that the project had not been thought through well enough. She was especially worried about monitoring and long-term storage. She asked for all Shell's reports of the EIA procedure. It took Shell some time to fulfil this request due to, among other matters, the confidentiality of the reports. The local party leader followed by other local politicians took this delay as evidence that Shell was not willing to provide information. In the same period an article about the project was published in a national newspaper (Volkskrant). Opposing residents and local politicians were quoted as being worried about the safety ("because people make mistakes") and location of the project ("so many young families live here").

After the second public meeting organised by the project developers, the municipality advised the project developers to stop informing the community because this seemed to have a negative impact on the project. Representatives of the municipality went to the office of Shell/NAM in the town of Assen to express this message. The alderman and the mayor also visited Minister Cramer to ask for more information about the standpoint of the national government on this matter, and discuss the project with her.

Meanwhile, opposition among local politicians increased and more questions were raised. The Executive Board of Barendrecht as well as the Council wanted to base their official position on the EIA reports (which were published in 2009). The local political debate however raised enough concerns to accept a motion in June 2008 that more research was needed before the project could be accepted or rejected. On demand of the alderman, a consultation group ('klankbordgroep') was established with most local party leaders as members. They directly discussed issues related to the CCS project with the alderman. An interviewee involved in this local decision-making process stated that there was an enormous unity within the municipal government although some were more extreme in their position than others. The local Green (GroenLinks) Party ceased to support the motion for several weeks because it thought more action should be taken against the project by the Council and Board. The party began mobilising the Barendrecht community via a petition (resulting in about 900 signatures) and a protest walk against CCS in which 300 to 400 people participated.

To create an overview of questions, concerns and requirements of the municipality, the consultation group together with the Council and alderman set up a 'checklist' (toetskader) for the project. Residents and external experts were also asked for input. The checklist (finalised on 15 December 2008) contained about 100 questions and requirements divided into seven themes: general issues, safety, risk analysis, geological research, changes of property values, legal issues and monitoring. The official position of Board and Council was that answers to all questions must be provided and all requirements fulfilled before the Board could make a decision about accepting or rejecting the project. Checklist questions were taken up in the non-public meetings ('Knowledge Tables') in which several experts were invited to provide answers to the municipality at the beginning of 2009 (see Paragraph 4.4).

³ In later presentations and brochures of Shell the image with the tree was replaced by an image of a cross section of the geography and the local IKEA building and the Euromast (a high tower in Rotterdam) in the same scale to illustrate the depth of the gas fields.

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Meanwhile, the local Christian Democratic party widened the debate about the CCS project. It sought contact with and discussed the project with other local, provincial and national policy makers from the same and other political parties. It contacted local politicians in Geleen, the town in which another CCS project had received a grant from the same tender, and former Prime Minister Ruud Lubbers (also a Christian Democrat) to increase opposition to the project. It also sent a letter with questions to the national Parliament and Senate, and actively updated the community via the party website.

To summarise, the approval of the motion within the municipality meant that the internal debate and normal dualism between local council and executive board was put aside.⁴ This had a large effect on the debate about the project. The motion made it possible for the local political parties as well as the Board and Council to cooperate efficiently at the municipal level and express their viewpoints to the public and other stakeholders. By excluding internal debate about the project, it was also difficult for local political parties to reconsider their viewpoints, ask critical questions or bring in nuances in the debate.

4.4 Actions taken to improve communication and information

4.4.1 The administrative consultation group (BCO₂)

The growing discrepancy between the viewpoints of the local and national government in the months following the presentation of the project to the community negatively influenced the communication between stakeholders. The debate took place mostly via press releases and media, with almost no direct communication between the local government and the project developers (including the national government). To improve communication with the public, the administrative consultation CO₂, called BCO₂, was set up in mid-2008.⁵ Deputy Eric van Heijningen was appointed as the official chair of BCO₂. DCMR became the executive and Arie Deelen, head of the expertise centre of DCMR, was appointed as facilitator. Other members of BCO₂ were the responsible aldermen of the municipalities of Barendrecht and Albrandswaard and two representatives of the national government (the Project Director CCS and an expert on mining legislation). Two working groups were established within the BCO₂: a Procedures Working Group and a Communication Working Group. Project developers Shell and OCAP were not members of BCO₂. They were informed about the discussions and outcomes of the consultation group via facilitator DCMR. Looking back, a representative of the municipality stated that the structure of the BCO₂ is not common. It would have been more logical to have the BCO₂ chaired by the Minister and not by the Deputy, who is a middle-level official.

In the second half of 2008 and beginning of 2009, the EIA processes and permissions and legislation were discussed in the Procedures Working Group. Because the project procedures were new for all parties, many questions existed about the process, planning and responsibilities. The activities of this working group decreased at the beginning in 2009 because most procedural issues were clear by then for the stakeholders involved.

Communication experts of the parties involved in the BCO₂ together with Shell formed the Communication Working Group. They did not aim for a collective communication strategy (that was not possible any more according to the parties involved because the opinions about the project were too diverse). The aim of this working group was to inform each other about what would be communicated to the 'outside world' before it was done to avoid unpleasant surprises for each other. Still, the communication working group was involved in other communication activities including two information events organised by the municipalities Barendrecht and Albrandswaard at the beginning of 2009 for the citizens of Barendrecht, the establishment of the information centre in Barendrecht in March and visits of the Ministers to Barendrecht in June 2009.

Apart from the consultation and communication working group, the BCO₂ initiated the expert meetings ('Knowledge Tables') to answer the checklist questions of the municipality.⁶ The questions were grouped in four

⁴ Interviewees have different ideas about the exact reasons for this decision. Some state that an earlier conflict between the alderman and members of the Council might be a reason and that the Council wanted to ensure that the alderman would not make any decisions without involving the Council

⁵ During the interviews, different stakeholders were named as the initiator of BCO₂. Other resources also do not give a definite answer. In any case, the national government played an important role in the formation of BCO₂

⁶ According to one interviewee DCMR advised the municipal government to start already with setting up the check-list and not wait until the EIA advice would be published before performing a second opinion (this was the initial plan of the municipal government).

clusters: external safety, underground aspects, monitoring and location choice. Each cluster was discussed during one day in February 2009 with internal experts from stakeholders involved (Shell, NAM, the ministries, TNO etc) and external experts invited by the municipal government. All these checklist questions were discussed in the Knowledge Tables, which took place before the EIA report was published.

4.4.2 Public information meetings

The information meeting for the Barendrecht community organised by the municipal government on 18 February 2009 attracted 1,000 to 1,100 visitors. No other item on the political agenda of Barendrecht had attracted so many people before. Several speakers were present from the local government, national government, DCMR and Shell. Some NGOs that are not in favour of CCS were also invited by the municipal government, but none was present at the information kiosk. Greenpeace did send a set of brochures which explained its general view on CCS in relation to coal plants. Many questions and concerns were raised during the discussions. Stakeholders interviewed about the meeting said that they had the impression that most of the people present opposed the project. In any case, an observer mentioned that the few who were neutral or in favour of the project did not express themselves during these meetings. In its report of the meeting, Shell claimed that the project was not profitable. This remark was heavily debated afterwards because the public did not believe it. Shell also said that they would take into account public opposition. This was interpreted by the public that the project would be cancelled if local opposition was large. Shell explained later that it meant it would cancel the project if general (national) public opposition was too large.

A week before this meeting in Barendrecht, a similar event, with stands and representatives of the different organisations involved, was organised for the Albrandswaard community. About 20 to 40 people attended. No strong concerns were reported from the community. The difference between the reactions of the politicians and communities are explained differently by the stakeholders interviewed. Many point out that the image that Shell used in its first presentations, which highlighted the exact locations of the gasfields under the municipalities, played a large role in shaping community reactions. People literally checked whether their house was located above the gasfields or not. If it was not, they were less concerned. This is supported by findings of the people working in the information centre where the same image is shown to visitors. People first check if their house is above the gasfields and often feel relieved if it is not. The limited amount of concerns raised by the public and local politicians in Albrandswaard can be explained by the fact that only a few houses in the municipality are located directly above the gasfields. Some interviewees point out another reason for the difference between the opposition across the municipalities. According to them, the initial loud and emotional protests of some politicians in Barendrecht and their active encouragement of others to be involved in the debate, increased the emotions and opposition in the town. Because no such activism was shown in Albrandswaard, the project became a less of an issue there.

4.4.3 Public information centre

Another result of the Communication Working Group of the BCO₂ was the establishment in March 2009 of an information centre in Barendrecht (Infopunt CO₂ opslag) with its own website, www.infopuntco2opslag.nl. The aim of this centre is to inform the general public about all aspects of and opinions about the CO₂ storage project in Barendrecht. The information centre is located in Shopping Centre Clarnisse Lande, near one of the CO₂ injection sites and in the middle of the neighbourhood situated above one of the gasfields. The company Podium BV was ordered by the Ministry of Housing, Spatial Planning and Environment to establish the information centre. The company also pays the people working in the centre. Other parties involved are Shell, OCAP, DCMR and the province.

Communication experts of the parties involved in the information centre regularly work together to decide the content and deliver the necessary information for the centre. The information presented is divided into two sections: a set of permanent displays and a topical section. The permanent section is comprised of several large posters (A2) of OCAP, Shell, DCMR and TNO with information (text and images) about the technical aspects of the project, the characteristics of the geology and the planning. These posters, apart from those of DCMR, carry the logo of the organisation that produced them. A centre employee said that these posters include good information to explain the project to visitors. The topical section of the centre includes information such as the status of different procedures, recent articles in local, national and international newspapers, brochures about the project and CCS in general from the different stakeholders (including Shell, DCMR and the Taskforce CCS) but also from NGOs not directly involved

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in the project (such as Greenpeace and SNM), and announcements about activities related to the project. The employees aim to present all opinions about the project in a neutral and objective way.

The municipality is not involved in the establishment of the information centre or in the content of the information provided (although it is mentioned as a partner on the centre website). A representative of the municipality said that they are not joining because of the difficulty of representing different opinions in one information centre, which is paid by the national government (a proponent of the project). The interviewee also said that the number of visitors is relatively low and this indicated that the public did not want an information centre. The municipal government has its own ways of bringing its message to the public, including its website and through the local political parties, interviews with representatives of the municipal government in local and national media, columns and other articles in local and national media and public meetings.

At the time of the interview with an employee of the information centre (29 October 2009), about 900 people had visited the centre since its opening in March 2009. These include individuals, groups of people (such as students) and media (mostly local press). According to the interviewee most visitors are from Barendrecht (about 90 per cent). Other visitors come from surrounding municipalities or further away. The employee confirmed that many visitors think that the information centre is a proponent of the project and that the staff are paid by Shell. The employees explain to these visitors that this is not true and that they are a neutral information supplier. The employee estimates that about one-third of the visitors are neutral about the project, one-third in favour and one-third against.

The visitors have different backgrounds, questions and opinions of the project. The employees see some changes in the questions of the visitors. In the first months after the centre was opened, most questions related to procedural issues (who was responsible, when and what would be decided, what possibilities there were to participate in or react to decisions). Later in 2009 (after the EIA was approved), more questions were related to health risks (often related to the pipelines) and long-term safety. The employees also noticed that the visitors become more informed and reacted less emotionally than in the first months.

Apart from providing information, the centre also organises events such as visits to the injection point. Two visits to the injection point took place in May 2009. A total of 36 people joined these outings (19 and 17). A large majority of these participants were already involved in the project through their job or political activities. A journalist present on the first visit reported in the local newspaper *De Schakel* under the heading: "Information Centre tells the half truth about CCS", suggesting that the excursions were pro-CCS propaganda. The few citizens present on the visits asked critical technical questions.

In the first months after the opening of the centre, the employees actively approached the community and offered to give presentations about the project to sporting and service clubs, schools, elderly homes, Christian and Muslim associations and other groups within Barendrecht. Only some service clubs (Rotary and Lions) were interested and a centre employee gave a presentation to them about the project together with a representative of Shell in May 2009.

Visitors to the centre often refer to the public meetings organised by the municipality in early 2009. The interviewed employee, who was not present at these meetings himself, said that based on the reactions of the visitors he gets the impression that these were very important and emotional meetings in which a trend was set. Visitors to the centre also often refer to the visits of the Ministers to Barendrecht in June 2009 (see below).

4.4.4 Personal visits of the Ministers

A third action of the Communication Working Group was organising visits of the Ministers Cramer of Housing, Spatial Planning and Environment and Van der Hoeven of Environmental Affairs to Barendrecht. The aim was to discuss the project with the municipal government and residents in an informal way and answer community questions. These so called 'Living Room' visits took place in June 2009 at the homes of residents worried about the project and in the information centre. The interviewed employee of the information centre noticed that many people were very positive about these visits. Although opinions did not really change, people liked the fact that the Ministers came, listened and answered questions openly.

4.4.5 Other communication actions

In the same month that the information centre was established (March 2009), Dutch NGO MilieuCentraal (an environmental information organisation) launched the website www.co2afvangenopslag.nl. The website was developed by an editorial board with representatives of the national government, NGOs, research organisations and

industry. It provided information about climate change, CO₂ emissions and CCS. The website was requested by the national government and aimed to be neutral and represent different views. It was however not positively received and considered as pro-CCS propaganda. This may be due to the number of other events occurring in the same period or because that none of the known opponents of the Barendrecht project was involved.

In sum, several activities took place to improve communication between the stakeholders and information supply to the community when the opposition to the project increased. A stakeholder consultation group was set up to create dialogue between government stakeholders on the different levels. No official dialogue was set up with all the stakeholders involved. The only occasions where all stakeholders cooperated with each other were the expert meetings (Knowledge Tables) in which experts invited by opponents and proponents discussed the municipality's checklist. These were not public meetings and only invited stakeholders were allowed to participate.

After the project was presented to the community by the project developers, proponents and opponents also increased their communication to the public using their own communication channels (such as websites, posters and brochures). Proponents sometimes coordinated their communication (e.g. the establishment of the information centre and the website www.co2afvangenopslag.nl). Only on very few occasions did local opponents cooperate with the proponents in combined communication actions (except the 'Living Room' visits of the Ministers, which were co-organised by the municipal government).

4.5 Events related to legislation and the EIA procedure

Representatives of the different levels of government refer to the effect of the so-called National Coordination Regulation (rijkscoördinatieregeling or RCR) on the opinion forming and position of the governments involved. On 1 March 2009, the CO₂ storage project in Barendrecht was included in the RCR. This meant that it is a project with national impact and so the national government can grant all permissions, including the ones related to the zoning plan that are normally awarded by the municipal government. Before the project was included in the RCR, the municipal government was the single stakeholder authorised to add the necessary changes to the zoning plan (and change the purpose of the location of the injection point from gas extraction to CO₂ storage). It lost this authority through the RCR. According to a representative of the municipal government, the municipality did not know that this RCR was going to be put in place. Several stakeholders confirmed that the RCR had a negative effect on the relationships between stakeholders. The municipal government believed the RCR was a means of coercion to continue the project. According to the interviewee, the first reaction of the municipal government was dismay because it felt that the decision had been taken out of its hands.

The EIA procedure was started by Shell in 2008. Together with several partners, the required research reports about safety and environmental aspects were compiled and together with the accompanying licence requests sent to the responsible authorities in December 2008.⁷ According to one of the stakeholders, an EIA support group was established which came together every six weeks during the EIA procedure to discuss its progress. The members were Shell, DCMR, the ministries of Economic Affairs and VROM, the province and the municipalities involved. Membership was voluntary and the group operated independently from the BCO₂. Apart from this one stakeholder, none of the other stakeholders referred to this EIA support group in the interviews, and the desk research found no information about this group.

The approval of the EIA report was published in local and national media and the report was made public in early February. Stakeholders and individuals were invited to make submissions in the following six weeks. A total of 1,570 viewpoints were submitted including more than 900 'standard forms' signed by members of the Barendrecht community. This form had been provided by the local Green (GroenLinks) Party, which is opposed to the project. It summoned people through local media to object to the project via the form. Subsequently the EIA committee reviewed the EIA report including the submissions and the outcomes of the expert meetings and published its decision to approve the EIA on 23 April 2009. This approval meant the project could continue with the design of the necessary licences, to which again viewpoints could be submitted.

According to the municipal government, not all answers provided via the expert meetings and the EIA reports were satisfactory and not all requirements of their checklist were fulfilled. Although the requirements of the municipal

⁷ The responsible authority for the approval of the EIA procedure is the provincial government, which assigns a EIA Committee of independent experts to formulate the EIA advice.

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government were discussed, an interviewee representing the municipal government stated that it was unclear and not decided upon if and how the requirements would fit the licences. The municipal Board and Council pronounced this dissatisfaction in an official submission (zienswijze) to the EIA. The Ministers involved sent a letter to the municipal government in June 2009 stating that they understood that the municipality must have felt overwhelmed by the project and that they would discuss their future decisions with the municipal government.

Another discussion about the procedures related to the EIA was raised by the municipal government. The EIA procedure consists of two parts: a 'plan-EIA' and a 'decision-EIA'. Often these parts are carried out separately (including two procedures in which viewpoints can be submitted), but they can also be combined in one procedure as in this project. The 'plan-EIA' focuses on the location of the planned project. According to the municipal government, the evaluation of possible locations has not been done sufficiently because the location was already decided upon (based on economic reasons because other locations would be more expensive for Shell) and the project at this location was already awarded with a subsidy from the national government. The lack of a separate 'plan-EIA' confirmed this idea in its view.

In sum, for the local opponents (mainly the municipal government), the procedural issues related to the RCR and the EIA were interpreted as events that removed any remaining possibilities for legal opposition from the project process. After this, they did not have any legal possibilities or power left to oppose the project. Because they felt strongly that they were not involved and not listened to in discussions about these procedural issues, their opposition to the project increased.

4.6 Towards the final formal decision

4.6.1 Additional research: location choice, human health and project safety

After the EIA was approved, the Ministers postponed the decision about continuation of the project to November 2009. They announced that they wanted to wait for emotions to cool down and to commission additional research on issues raised by the local stakeholders opposing the project. Three topics were further analysed and the outcomes were published in October 2009.

Additional research on the choice of Barendrecht as the location for CCS was performed by the Dutch research institute TNO. It found that there is one offshore (P6 South) and one onshore (Barendrecht) location with best suitable geographic conditions for CCS. The outcomes were verified by the research institute Det Norske Veritas (DNV).

The draft research outline set up for this research was discussed within the BCO₂. According to the interviewee representing the municipal government, the aim was to perform this study together with all stakeholders to search for answers to the open questions of the municipality. The comments the municipal government presented were, according to the interviewee, not taken into account and TNO researched only what the national government had asked for. The interviewee referred to it as a typical result of the BCO₂. The municipal government reacted to the outcomes of the location study with a press release and news conference stating that it was happy to hear of other potential locations.

A second topic for additional research was the impact of the project on human health, especially the psychosomatic effects (such as fear) on residents. The Dutch National Institute for Public Health and Environment (RIVM) stated in its research report that no exact predictions could be made because no initial measurement of the psychosomatic situation had been performed nor were results available from comparable situations nationally or internationally. It did give some recommendations to the project developers (mainly to the governments involved) on how to proceed to reduce the risks for residents before, during and after the project was established.

The other additional research study in this period was performed by DCMR on project safety. Together with the authorities responsible for the safety in the area (e.g. fire brigade, police), it assessed the risks of the project and concluded that no safety or risk boundaries would be exceeded. The report stated that the largest risks of the project were related to the transport of CO₂ through the pipeline, to be largely built within the existing pipeline corridor. It also stated that with additional measurements, these risks could be managed.

4.6.2 Increasing local opposition

After the approval of the EIA, the local (and other) stakeholders realised that there were no remaining formal possibilities to stop the project through standard procedures. In the period before the final decision from the Ministers, local opposition remained one of the few things that could convince the Ministers not to continue with the project. But many stakeholders interviewed, including the representatives of the municipal government, indicated that they realised that if the Ministers would decide that the project in Barendrecht would not go through, it would become very difficult to implement onshore CCS in the Netherlands.

So far the local opposition was still organised and initiated by the municipal government, local political parties or individual politicians. In the second half of 2009, the first organised community opposition took place. In the local newspaper *de Schakel*, a group of residents announced the formation of a local activist group called 'CO₂ is no', which became an association soon after. The group organised demonstrations, set up online and paper petitions and informed other residents about the project and why they should oppose it, using a website, local media and leaflets. The group also contacted municipalities and stakeholders involved in other CCS projects in the Netherlands to protest against those. The mascot of the association is a guinea pig (named 'Cootje 2', referring to CO₂) because guinea pigs live close to the ground and would be the first to suffer when high concentrations of CO₂ would exist (from leakages).

4.6.3 Final decision

On 18 November 2009, the Ministers of Economic Affairs and Housing, Spatial Planning and Environment announced their official approval of the project despite the formal opposition of local and provincial government (the provincial government had announced its formal rejection of the project a few weeks earlier). The Ministers considered the project as being safe and necessary as a transition technology to buy time to create other sustainable energy solutions. They stressed that the storage in the larger of the two gasfields would start only after the injection and storage in the first and smaller field had proven to be safe. The media coverage of the government decision included headlines such as: "Shell has taken the government as hostage". The municipal government announced that it would now try to stop the project via legal procedures and the Council of State.

The Ministers had promised the Barendrecht community that they would visit the town to explain their decision in detail. This meeting took place on 1 December 2009. The municipal government had called for community members opposed to the project to join the meeting in the local theatre. Some 600 people attended and an unknown number watched the event (via live broadcasting) at the town hall. According to the second author of this report, who was present in the theatre, the large majority of people in the theatre were opposed to the project. The Ministers were continuously interrupted by many boos, whistles, cries of disapproval and insults. The speeches of community members frequently raised the point that the decision-making process had been unfair and that they would not allow the project to take place. The event was reported widely in national and local media.

In sum, the period between the EIA approval and the formal decision of the Ministers to continue with the project, the local opponents took stronger positions and further formalised their actions. The period which was originally planned by the national government to decrease the emotions and improve the relationships with and between the stakeholders had the opposite effect. The positions of the different stakeholders were at this stage very much polarised, lacking mutual trust, respect and understanding. The stakeholders interviewed mostly agreed that it would be difficult to re-open the discussion or have an effective dialogue with all stakeholders.

4.7 The discussion continues ...

After the formal decision from the Ministers to continue the project, other decisions about planning and the necessary permissions had to be made by the national authorities (Ministries). Preparations for these took place early in 2010. In the same period, several other events reinforced the discussions about the project again.

In January 2010, discussions in the national parliament showed that most opposition parties oppose the project. Also at that time, the local political parties opposing the project in their constituency tried to influence the national wing of their political parties to turn against the project. A situation arose in which the national Christian Democratic and Labour Party agreed with the project, but the local divisions of the parties in Barendrecht were strongly against it. Supporting a project with so much opposition would not bode well for local elections.

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In February 2010, the national government fell and the Labour Party left the government. This meant that structural decisions about the project had to wait for the new government to be installed (based on the elections of 9 June 2010). In March, it was announced that the Barendrecht CO₂ project became part of the Crisis and Economic Reform Law (Crisis- en Herstelwet). This law was created to stimulate the economy after the financial crisis in 2008-2009 by speeding up large national (infrastructure) projects. This law forbids local governments to take any legal action against projects. The possibility for private parties or citizens to protest against the project however still exists.

Also in the first months of 2010, several items were broadcast on national television in different news programs about the project. In these programs, opponents, proponents, community members and external experts were interviewed. The statements of the people interviewed raised again the discussion in the media but also in the national parliament. Based on these statements, members of several opposition parties officially asked explanation from the Minister Van de Hoeven about some of the statements of the external experts interviewed.

To summarize, due to the ongoing discussion and the fall of the government, structural decisions needed for the project to continue could not be made but preparations for the project within the Ministries continued. Meanwhile, the local opposition appeared to broaden from local government to the community and also to a national level (mainly due to the growing attention on the project).

5 Media coverage

The project has received a great deal of media attention since first appearing in the press in early February 2008. The following media analysis focuses on describing the media reaction to key events related to the project and also to national CCS policy. The selection of these key events is based on the 'defining moments' stipulated by the stakeholders involved in the interviews presented in Chapter 4 of this case study report. The media analysis has been conducted by first producing a chronological log of media reports⁸, a total of 66 from different media sources⁹ between 5 February 2008 and 26 May 2010. These reports have been selected and categorised on the base of date published, their source (media format) and the topic covered.¹⁰

Due the huge amount of media attention, making an account of every piece of media on the project and (Dutch) national CCS policy would be unrealistic within the framework of this case study. Working with a selected number of entries instead of a database of all media coverage of the project also includes some limitations. No conclusions can be drawn about the complete media coverage and we therefore also decided not to include any quantitative analysis. The analysis below and the conclusions presented focus on the used set of data and not all media coverage of the Barendrecht project. Readers are encouraged to return to the detailed descriptions of the 'defining moments' in Chapter 4 to make optimum use of this analysis.

5.1 The initial phase

During the initial phase of project, when Shell submitted the demonstration project at Barendrecht for the tender of the national government, there was no media coverage because the process was not made public.

5.2 First presentation of the project to the community

Consistent with the first public meetings between Shell and members of the Barendrecht community (active in local politics), the initial appearance of the project in the media occurred on 5 February 2008 in a national newspaper. The article, entitled: "For the first time – underground CO₂ storage", is mostly a descriptive piece, explaining the basic nature of the project, the intended schedule of activities and role of the project developers Shell and OCAP. The issue of safety is mentioned in the article, and a Shell spokesperson is quoted as saying that CO₂ is not dangerous.

⁸ See appendix B for the overview of entries used

⁹ National and local newspapers, magazines, newsletters, international media, national and local television / radio, press releases and internet based media (blogs, twitter, Youtube, websites, etc)

¹⁰ Titles and quotes from the media reports are translated by the authors of this report.

5.3 Initial reactions and actions of the community

Soon after the first public meeting, the first article that included interviews with Barendrecht residents was published on 16 February in a national newspaper. The article featured the headline: "No CO₂ under our backgarden!" The article involves a number of interviews with residents of Barendrecht and the neighbouring area of Carnisselande, one of which expresses her frustration at not being able to have a say in the plans, referring to a 'dictatorship'. Another resident infers that the subsidised storage will save Shell having to pay emission rights. This point also marks the first moment when a local leader of a political party becomes involved. Tessa Augustijn, of the Green (GroenLinks) Party, states her opinion that Shell and NAM are telling the residents of Barendrecht to "jump in the water and see if you reach the other side", given the nature of the demonstration project.

The newspaper article also refers to the volcanic Lake Nyos in Cameroon, when 1.6 million tonnes of carbon dioxide was released from the lake bed in 1986, suffocating 1,700 people. The article states: "Who considers the safety risks of underground storage of CO₂, will be led to the disaster in Cameroon". However, from a scientific perspective, the basic geological aspects of Lake Nyos (CO₂ is released from a magma chamber), are not comparable to CO₂ injection and storage, and therefore the risks cannot be perceived as similar.

In April 2008, another article by a national newspaper was published with the headline: "Unrest grows in Barendrecht about CO₂ storage". This piece featured an interview with a resident of Barendrecht, who said: "From an investigation it seems that if the gas escapes everyone within the range of 16 to 23 km will be dead. That could be 10,000, more like 100,000 people, how can it [the project] be safe?" Another resident said: "The pipeline will sit very shallow in the ground. If some idiot drills through it, that sort of disaster can happen." This statement cannot be substantiated. The article also explained that a local politician from the Christian Democratic Party had been asking Shell for the official investigation reports for two months. Shell responded by saying that "these investigations will be integrated into the official environmental impact assessment report".

In November 2008, the responsible Alderman (Mr Zuurbier) of Barendrecht was interviewed by a local radio station. During this interview he announced: "There is a great deal of concern among the residents, concerns that I have to take seriously." In the same interview, the alderman also announced that the council was commissioning an independent investigation of the project. On 19 December 2008, on a different local radio station, it was declared that the council of Barendrecht had unanimously decided on the questions to be included in the municipal 'checklist', a list of actions and questions which much be fulfilled or answered before the Executive Board of Barendrecht would accept the project.

5.4 Actions taken to improve communication and information

The public information meeting on 18 February 2009 attracted between 1,000 and 1,100 people, and also a team from a national television channel who produced a three-minute item for the national news the following day. This item included an interview with the project manager of Shell, and also with an opposition leader from the local Christian Democratic Party. It was also reported that: "Neither Alderman Zuurbier nor the environmental authority, the DCMR, could win their [the local residents'] trust. Others had more sinister beliefs about the project, choosing to hold the opinion that CO₂ storage was going to earn Shell and the state huge sums of money." The report said that one opponent shouted: "Why don't you just tell us that Barendrecht is the cheapest option, because that's the truth."

For the opening of the public information centre on 17 March 2009, the Ministry of Housing, Spatial Planning and Environment (VROM) announced the opening with a press release on its website the previous day. According to the media analysis, the opening of the information centre was not covered by any local or national newspaper. The press release said: "During the information evening in February, it appeared that a number of citizens had questions about the advantages, disadvantages and risks of the project. The goal of the information point is to answer some of these questions." A particular initiative that did receive media attention (national newspaper) was the visits to the injection point that took place in May 2009.

5.5 Events related to legislation and the EIA procedure

In February 2009, the Environmental Impact Assessment (EIA) was approved and released to the public, after which stakeholders and individuals could submit responses. A local television channel covered the issue on its website, with a descriptive article. After the compulsory period provided to comment on the EIA, the council of Barendrecht

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published a press release on 27 April which said: “The most important concerns have not been addressed.” One of the specific concerns of the council was that Shell had used model calculations to estimate the behaviour of CO₂ underground, and these were only calculations. Because of this, and several other reasons, the council said that the EIA was not sufficient to meet official judicial procedures.

5.6 Towards the final formal decision

5.6.1 Additional research: location choice, human health and project safety

After the EIA was approved, and the independent commission declared the project safe, Minister Cramer (VROM) announced that the decision to go ahead with the project would be delayed until the beginning of 2010. This news was released in a national newspaper article on 22 June 2009. The reason for the delay according to the newspaper was that Minister Cramer wanted to consider the necessity and usefulness of the project. The newspaper also highlighted that the decisions were originally planned for the end of 2009, but had now been further postponed.

Shortly after the decision was postponed, Minister Cramer sent a letter to the council of Barendrecht explaining that additional investigation would be conducted regarding the suitability of alternative locations for the project. A press release from the ministry of VROM on 26 June 2009 explained that the Ministers Cramer (VROM) and Van der Hoeven (Economic Affairs) recognised that a number of people still did not understand why the location at Barendrecht had been chosen, and they felt this was understandable. Because of this, an investigation would take place comparing the location with other potential storage areas in the Netherlands. It was stated that no decision would be taken until this report was complete. The Ministers also said that the project has had an awkward beginning, and this would be taken into account for the remainder of the process.

On 29 October 2010, a press release by the Ministry of VROM said that several investigations regarding the Barendrecht project had been completed, and that reports were now publicly available. One of the reports produced by the Dutch research institute TNO focused on alternative storage locations for CO₂ in the Netherlands, a report on which the Ministers had previously placed a great deal of emphasis. On 3 November, an article was published by a national newspaper with the headline: “Eleven alternative storage locations for CO₂ storage Barendrecht.” The opening sentence said: “In the Netherlands there are 11 locations where CO₂ storage can be done safer than under Barendrecht.” This was not an official conclusion of the report made by TNO. What the newspaper was referring to was the comment (included in the article) from Alderman Zuurbier of Barendrecht, that the gasfields that would be used for CO₂ storage had the thinnest layer of clay ‘cap rock’ of all the locations, and that the Barendrecht location has been chosen only because of financial reasons.

5.6.2 Increasing local opposition

In March 2009 a protest march was organised by the local branch of the local Green (GroenLinks) Party. The march was covered by a national newspaper, with an article on 21 March entitled: “Hundreds protest against CO₂ storage Barendrecht. Before the protest march, a member of the Green (GroenLinks) Party handed the Mayor of Barendrecht approximately 750 letters of complaint about the project. With the establishment of the activist group, Stichting (foundation) ‘CO₂ is Nee’ (CO₂ is no), the efforts of this group featured prominently in a local newspaper *de Schakel*. One of the most bizarre actions organised by the group was featured on the front page of the newspaper on 5 November 2009, with the title: “Guinea pig race against CO₂”. The group had previously chosen the guinea pig as its mascot, and had organised the event at a local pet store for the guinea pig owners of Barendrecht. On 10 November 2009, members of the group were interviewed on regional radio, and called for the Ministers Maria van der Hoeven (Economic Affairs) and Jacqueline Cramer (VROM) to make a final decision on the project.

5.6.3 Final decision

On 18 November 2009, the Ministers of Economic Affairs and Housing, Spatial Planning and Environment (VROM) agreed to continue with the CO₂ storage project at Barendrecht. The story was covered by at least three national newspapers. On the same day as the news release from the Ministers, the Council of Barendrecht released its own announcement stating that the “Dutch cabinet has been taken hostage by Shell, as Shell has said they will only start [CCS] project in Barendrecht and nowhere else. The Ministers have slammed the decision in the faces of the Provincial Council, and have ignored all the conclusions of the reports, and the will of the inhabitants of Barendrecht.” Also on 18 November, in an article entitled: “Greenpeace not happy with CO₂ storage”, a national

newspaper had spoken to a representative of Greenpeace who had said that the people of Barendrecht were correct to be concerned about their safety, and that "The system [CCS] is only possible with huge governmental support, not only in the demonstration phase but also afterwards."

Shortly after the announcement of the final decision, on 1 December the Ministers attended a meeting in a local theatre, with the intention of explaining their decision to the community. A report of the event in a national newspaper carried the headline: "Ministers defy angry and scared citizens". The paper reported that the Ministers had to cope with a great deal of resistance from the audience, not only questions and voiced opinions, but also angry shouting and insults.

5.7 The discussion continues ...

In early January 2010, the Barendrecht CO₂ project continued to appear in local and national newspapers. With the formal decision to proceed with the project made by the Ministers in November 2009, emphasis was placed on the acceptance of the project by the national parliament. On 26 January it became known that the majority of the Dutch parliament were in agreement with the decision, and this was reported in a national newspaper under the headline: "Parliament supports Barendrecht decision". The article also stated that: "The test in the South Holland province is meant to be a precedent to mass CO₂ storage in the north of the Netherlands."

In addition to coverage of the judicial proceedings of the project in the national parliament, the general discussion of CCS in the Netherlands continued. Various local newspapers published reports of potential CO₂ projects in other parts of the country, and the reactions of local officials to such suggestions. One local newspaper published an article with the headline: "Shock of suggestion of CO₂ storage in Grijpskerk", and another had the headline: "CO₂ in the Drenthe unspeakable". Greenpeace also published a report in February, stating that a survey had revealed that the building of new coal-fired power plants with CCS was not welcome in the north of the Netherlands, and would lead to political unrest.

On 18 February 2010, the Dutch cabinet broke down over a disagreement regarding withdrawing troops from the war in Afghanistan. The government decided that 'structural decisions' (which could not be reversed) about the Barendrecht project would have to be postponed until a new cabinet was formed (due after elections on 9 June 2010). A local newspaper reported on the subject: "After the fall of the cabinet CO₂ storage now in the freezer". Preparation for the required legislation of the project continued (these were not considered 'structural decisions'). After the project had been accepted to become part of the Crisis and Economic Reform Law, a parliamentary decision was reached to continue with the project. The same local newspaper reported on 15 March: "Sorted: CO₂ in Parliament". The article continued to read: "The underground storage of CO₂ in Barendrecht looks to have been arranged with a trick." The case appeared suddenly on the parliamentary agenda on 16 March. In an interview with the opposition leader of a local political party, it was stated that this was 'not fair play'. An alderman of Barendrecht said in an interview that he felt 'fooled' by the Cabinet.

On 28 March 2010, a Dutch national television program (Zembla) aired a documentary about the Barendrecht project, using the title: "CO₂ bomb under Barendrecht". It said: "CO₂ storage is presented as the solution to the climate problem. The Netherlands must reduce its CO₂ emissions by 20 per cent by 2020 and so must rush. Moreover, storing CO₂ in used gasfields can earn much money. Everything is being done to arrange a test under the residential area of Barendrecht." In the program, Barendrecht residents opposed to the project were interviewed as well as some external experts who claimed that the project should not take place. Resigned Minister Cramer and a spokesperson of Shell were also interviewed. The documentary also claimed that a critical report by a university professor was held back from the decision process, and this story was covered separately in a national newspaper with the headline: "Debatable report about CO₂ storage – under the mat". After the program, questions about this report were also raised by members of parliament. The Zembla documentary had taken a notably negative stance towards the project at Barendrecht, and would have had significant outreach given it was broadcast on national television at peak time (9.50pm).

On 21 April 2010, the Barendrecht project was again debated by the Dutch Cabinet. A national newspaper carried the report with the following headline: "Cabinet: until now no reason to block CO₂ storage project". It was reported that by majority vote, the cabinet saw no reason to withdraw the project, however the final decision will be made after the national elections in June 2010. Preparations for the project could in any case continue. Local opposition to the project remains, and on 1 June a local newspaper announced a symposium entitled: "CO₂ under Barendrecht. That's not going in", that would be held the following day.

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5.8 Concluding remarks

The media generally took the role of event following rather than active opinion former. This is primarily so for national newspapers, which in general reported on major events and important political decisions, and hence played a neutral role in discussion. Most local newspapers sided strongly with local opposition parties, and one local newspaper even printed a petition form, which could be filled in and cut out. Nevertheless, a number of media reports could be regarded as opinion forming. An article was published in the popular scientific magazine *Nature, Science and Technology* in March 2009. It carried the headline: "Sleeping with the windows closed", and also included a computer-generated image of a CO₂ 'blowout' in the town of Barendrecht. In addition, the Zembla documentary (see above) can also be regarded as subjective material. The article headed: "No CO₂ under our back garden", one of the first published on the project, in February 2008, draws on the natural CO₂ disaster in Cameroon in 1986. Given that the scientific details of the Barendrecht project and this natural event are fundamentally dissimilar, the reason for this report is unclear, however it could lead to the formation of incorrect opinions by readers.

The language used by the media to describe the project is worth attention. Local and national newspapers continually refer to the project as a 'test'. Although a full analysis of all the media attention has not been conducted, it is understood that the project is referred to as a 'demonstration' rather than a 'test' by the project initiators. The term 'demonstration' was used in the tender procedure of the national government and refers to the demonstration of the procedural and legal issues related to CCS projects in Dutch context. It was however often interpreted by project opponents as 'demonstration of technologies'. The project is also referred to as an 'experiment' by project opponents, but not directly by media.

6 The larger debate about the project

This chapter focuses in more depth on the debate between the stakeholders and the communication towards each other and the community in relation to the Barendrecht CCS project between the end of 2007 and June 2010. It covers the development of the debate, the reactions of the project developers to the opponents' arguments and other events or circumstances that influenced the opinions and positions of stakeholders.

6.1 Development of the debate

The debate between the opponents and proponents of the project began directly after the project was presented to the local community in 2008. The local stakeholders (mainly municipal government) opposed the project from this moment onward. Official proponents of the project are the project developers and national government. During the debate, other stakeholders became involved and were considered as being opponents (e.g. citizens group No to CO₂, experts who openly criticised the project) or proponents (e.g. researchers claiming that CCS in general or in this particular project is safe).

Between 2007 and June 2010, opposition to the project increased, became more formalised and better organised. Starting in 2008 with opposition and critical questions from some local politicians, later that year the whole municipal government formally opposed the project. This position was taken by the Provincial Government in 2009. Increased communication from the opponents to other stakeholders and the public entrenched the debate in 2009. During a 'time-out' period announced by the national government (on the advice of the EIA Committee) to perform further research and 'cool down' emotions, the so far only government opposition was extended with a local community initiative to oppose the project. The formal final decision of the national government to continue with the project and growing attention for the project on national television (and other media) increased discussion and opposition on a national scale (in Parliament and the community) in 2010.

6.2 Reactions from project developers to arguments of opponents

From the desk research and interviews with stakeholders we learn that the project developers and other proponents reacted with several actions to the arguments used by the opponents. Most of these actions were related to performing additional research or attracting external experts to the debate, increasing information supply or adapting the project to local demands. These reactions however did not visibly change the opinions of the opponents or decrease local opposition. For example:

- Shell and the national government performed *additional research* on the location for CCS demonstration projects, the risks for public health and the effects on the environment. These were reactions of the project developers to

the arguments of the local opponents that Barendrecht would not be the best location (but the cheapest), that it would not be safe and that it was unclear what the effects on public health and the environment could be. The outcomes of these investigations were that the gasfields in Barendrecht are technically the best onshore location for a CCS demonstration project and that no health, safety or environmental boundaries would be reached. These outcomes however did not decrease local opposition.

- The project developers reacted to many questions from the community about the project, the procedures, the risks, the planning, why CCS is needed by *providing more information* about the different aspects of the project via different channels (e.g. expert meetings, personal visits of Ministers, information centre). This increase of information supply did not change the opinions of the opponents.
- The reaction of the project developers to worries about the effects of the project on property values was to start the set up of compensation measures for property value decrease. Although this *adaptation of the project to local demands* might have changed the opinions of some individuals in Barendrecht, it did not affect the opinions of the municipal government or other opposing stakeholders.

The reactions to the arguments of the opponents provided additional answers and discussion about the project. Most of these reactions were related to additional research and led to numbers and facts that according to the proponents illustrated that the arguments used by the opponents were not valid (any longer). But the local opposition did not decrease. This remaining resistance was explained by the project developers as 'emotions', 'incapability to understand the technical aspects' and 'irrationality' of community members. Seeing the opponents (mainly local community members) as 'emotional' and 'irrational' seems to have been the justification used by project developers to avoid cooperation with the local community.

6.3 Other events and underlying circumstances influencing the debate

The limited changes in the opinions of the project opponents after the actions and reactions of the project developers to their arguments, suggest that other elements have a larger influence on the debate. The stakeholders interviewed referred to many other underlying events and circumstances which have influenced the debate, their opinions about the project and the relationships between them. These are mostly not named as arguments in the debate or in the communication about the project and are thus often not known by others stakeholders or the outside world. For a full insight into the debate around the CCS project in Barendrecht, these underlying events and circumstances are essential.

One of the circumstances influencing the opposition of the local community is that they were *not involved in the design or planning* of the project in an early phase. The moment Shell presented the project plan to the community, it was already at a progressed stage of development. Technology, location, infrastructure, project partners, project planning etc were already decided. The community was confronted with (maybe even overwhelmed by) the plans and felt little space for manoeuvre. They could not participate in the project or have their ideas or opinions incorporated. The community felt that the only possibility they had was to accept or reject the proposed plan. Due to the lack of participation and involvement in the process, they felt little need to accept a project with such a large (negative) local impact.

The *order in which decisions were taken* in the project process also influenced the positions of the stakeholders. The EIA took place after the allocation of a grant from the national government to the project. The local stakeholders interpreted the fact that the grant was allocated as a signal that the national government had a strong preference for this project to take place at this location. This created the feeling among local opposing stakeholders that they were ignored and not listened to and that the EIA would not be a neutral and fair process.

Focusing on the initial rejection of local politicians and other community members, several interviewees refer also to the *lack of attention for local benefits* in the presentation of the project. The benefits presented (such as gaining knowledge and technology improvement) were benefits for the project developers. No local benefits for the community were incorporated in the project plan. Simultaneously the community strongly felt that they would be exposed to the risks of having CO₂ under their territory. The idea of having no benefits but high risks influenced the rejection of the project.

Lack of sufficient attention for the context of CCS also encouraged the community's rejection of the project. This context of climate change, the role of CCS in fighting climate change, the European and national policies related to CCS and climate change, were not included (or detailed enough) in the presentation of the project. This context would have explained why technologies such as CCS are developed, and would have shown the advantages and

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benefits of this project on a larger scale (for the Netherlands, Europe and the rest of the world). The lack of context led to the community being unable to view the project from a broader perspective, and hence focused on the local consequences.

Another circumstance influencing the relations between the stakeholders negatively and increasing the local opposition which was identified by local stakeholders in the interviews, were the *changes in related regulations*. In 2009 (after the project was presented to the community and local opposition was growing) the so-called National Coordination Regulation took effect. This regulation shifted all decision-making authority in relation to local projects with national relevance (including CCS projects) to the national government. The local politicians in Barendrecht felt that this regulation forced them to accept the project because their influence on local permission decisions was overruled.

These underlying circumstances and events with a negative impact on the debate, the positions of the stakeholders and their relationships can be summarised as a lack of involvement of stakeholders in the project design and process and too little attention for the context in which the project is taking place (a densely populated area, strongly opposing local politicians). Not surprisingly, these are very much consistent with conclusions of existing research¹¹ about the acceptance of projects by communities and stakeholders. These state that to create more societal acceptance for projects it is important to involve the needs, expectations and demands of (local) stakeholders and the local context in the planning and design of the project and throughout the whole project process.

In sum, in observing the debate between the stakeholders in Barendrecht, the growing impasse between the opponents and project developers and the underlying events and circumstances influencing the debate, it is likely that opposition to the project has increased due to the absence of an effective project process in which all stakeholders are involved in an early phase and in which mutual trust is built by openness and transparency.

7 Conclusion and lessons learned

This case study report outlines the context of the Barendrecht CCS project, the defining moments in the project history between the end of 2007 and June 2010 according to the stakeholders, the debate between the stakeholders, and the underlying events and circumstances influencing the opinions and positions of the different stakeholders.

From this we can conclude that the project has so far been delayed mainly due to increased (local) opposition. The previous chapters also show that this increased opposition can be largely explained by shortcomings in the communication between stakeholders and to the (local) community. This concluding chapter summarises these shortcomings and how these could have been overcome and translates them into lessons for future CCS project developers.

7.1 Shortcomings in the communication

Communication plays an important role in the process of projects such as Barendrecht CCS. The debate presented in the previous chapter and the underlying events and circumstances that influenced this, illustrate that shortcomings in the communication can be a crucial factor in the debate and the growing opposition of stakeholders and the public. Below we summarise these shortcomings, making a distinction between the communication between stakeholders and the communication towards (and engagement of) the public.

Based on desk research and the stakeholder interviews, the following characteristics of the communication between the stakeholders increased opposition to the project:

- The national government allocated a grant to the project to take place in Barendrecht via a tender procedure. No local stakeholders were consulted or involved in this process. The tender procedure did not include consultation of stakeholders or investigation of opinions of local stakeholders towards a CCS demonstration project in their community. If this would have been done, the potential for local opposition might have been noted and taken into account in the further project process and project design and in the presentation of the project to the community.

¹¹ See for example the outcomes of the research performed in the project EU-research project 'Create Acceptance' (www.createacceptance.net)

- In the initial phase, no discussion or dialogue took place between the project developers (Shell and the national government) and the community. Shell presented the project to the community as a final plan. Even between the project developers (Shell and the national government) no open dialogue existed in this initial phase except from the formal tender procedures. This led to a situation in which the project was presented and interpreted as a project of Shell alone and not as a mutual project of different stakeholders. It increased the 'us and them' feeling and made Shell an easy target for opposition.
- After the local opposition became clear, a dialogue between stakeholders was set up via the BCO₂ (administrative consultation group). Members of the group were however only the public parties involved in the project. Shell or other industrial parties, NGOs, research institutes or community groups were not involved. Although the consultation group did improve communication between the different levels of government, it did not bring the viewpoints of the members closer to each other or decrease local opposition to the project. The consultation group could have been more successful if it would have been established earlier in the project process (before the project was presented to the community), when stakeholders had not taken strong positions towards each other and the project.
- The debate between the stakeholders took place mostly in public via formal procedures, the BCO₂, organised events, press releases or through the media. Little (informal) direct contact existed between the project developers and opponents. This made it difficult to reconsider or add nuances to earlier expressed opinions. The relationships between stakeholders could have been better if more direct contact between them was established or organised (especially in the beginning of the project, when stakeholders had not taken their positions). This could have been done via a project process (led by a 'neutral' process manager) in which mutual trust and openness was created about the project and the considerations of the different stakeholders. Within this process, the project could have been further designed to take into account the needs, values and demands of the different stakeholders. Although the outcome of this process (implementation of the project) might not be consistent with the wishes of all stakeholders, the fact that they had been involved in an open, fair and transparent process in which stakeholders trusted each other, would limit their resistance to the project.
- Through various institutional procedures, the national government gradually withdrew executive decision-making abilities from the municipal government. These changes in procedures (which were often not announced to the municipality in advance) increased the distrust in the national government by the local stakeholders and increased their opposition to the project. When these changes in procedures would have been discussed openly with the local stakeholders (especially with the municipal government) in advance (for example via a project process as described above), these would probably have had less negative impact on the debate.

When focusing specifically on communication towards the public (the community), the following characteristics increased local opposition:

- When the project was introduced to the local community, the reasons why CCS is needed, the link to national and international policy on climate change and CCS, the effect of CO₂ emissions and the choice of this location, were not explained well enough. The public had difficulties understanding why the project had to take place and why it should be located in their community. The project was perceived as an idea from Shell. If more attention would have been given to these contextual aspects and the involvement of the national government of the project in the initial phase, the public might have interpreted the project differently and accepted it better.
- The initial presentation of the project and the procedures was too complicated for the public to understand. It raised many questions and was conceived as too technical. A better adaptation of the presentation to the demands and needs of the public could have overcome this.
- Shell and the national government were not considered trustworthy information suppliers by the community because they were perceived to benefit from the continuation of the project. The information they provided and the risks was not trusted nor were the outcomes of research performed by others funded by Shell or the government. The project developers could have been perceived as more trustworthy by the public if the project process would have been more open and transparent from the beginning. If the project developers would have shared their ideas, uncertainties, underlying reasons and values and communicated about the submission of the project for the tender procedure, this could have created more trust in the project developers and the information they provided.
- Opponents and proponents of the project both communicated to the residents of Barendrecht. They provided separately from each other information about the project, the aspects raised in the debate and gave arguments

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for the public to be in favour of (the project developers) or against (the opponents) the project. There were almost no communal communication efforts in which opponents and proponents cooperated with each other. This lack of communal communication increased the idea within the public that you had to be in favour or against the project and that a more nuanced point of view was not possible. If more mutual communication efforts would have been made in which the project developers as the opponents would have cooperated, more nuance might have been brought into the debate.

Shortcomings in the communication led to opposition to the project, which increased throughout the project process. This led to delays in the project planning, the current impasse between stakeholders in which opinions are formulated that leave no room for manoeuvre or for an open dialogue and the still possible cancellation of the project.

Based on the debate about the project and the negative effects of this on the project process and planning, lessons can be learned for future CCS project developers worldwide. These lessons relate to the communication and relationships between stakeholders during the project process and to the communication with the community and public engagement.

7.2 Lessons learned about communication in CCS projects

From the Barendrecht CCS project, several lessons can be learned about communication between stakeholders and with the community. These lessons are especially relevant for future CCS project developers. They include:

- All stakeholders, including the community and local stakeholders, should be involved early in the project process to create mutual trust and commitment to each other and the process of developing the project together.
- The values, needs and opinions of all stakeholders and the community should be defined and taken into account in discussing possible project designs. This also implies that there is not just one solution put forward by the project developer without leaving room for adaptation. Compromises must be sought and incorporated in the project design.
- Regular formal and informal contact should take place with all stakeholders to discuss changes in the project, the process, the procedures, the needs or viewpoints of the stakeholders or in the context (e.g. legal changes).
- Stakeholders should not only discuss the actual CCS project, but also available alternatives and the larger context of CCS including why CCS is needed (climate change), what other CCS projects exist, what policies exist nationally and internationally and what this project contributes to the larger context.
- Communication towards the community (the public) must answer the specific needs of the community. These needs must be investigated before starting the communication. Based on the outcomes of this investigation the right communication materials, channels and senders can be chosen. From the Barendrecht project, we can learn that the following elements should be investigated:
 - The existing knowledge of the target group about climate change, characteristics and effects of CO₂, existing policies on CCS and about the specific project.
 - The need (and level of detail) for information about technical, economic (for example property values), environmental elements of the project.
 - Existing local (and national) discussions or debates that can be related to the project.
 - The image and position of stakeholders involved and their (historical) relation with the community.
- The sender of the message must be trusted by the community. Any message from a distrusted stakeholder will be distrusted by the public.

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Interviews

Between 5 October and 23 November 2009, a total of 10 interviews were held with representatives of the following stakeholders of the Barendrecht CCS project:

- National Taskforce CCS
- NAM
- Shell
- Municipal government
- Local political parties (2)
- DCMR (2)
- Information centre
- Greenpeace

Websites

Many websites provide information about the project and the opinions of stakeholders. These websites also provide links to additional resources such as the EIA documents, brochures, presentations, reports of the research performed, press releases and media articles.

Websites from stakeholders

www.shell.nl
www.dcmr.nl
www.barendrecht.nl
www.d66barendrecht.nl
www.cdabarendrecht.nl
www.barendrecht.groenlinks.nl
www.infopuntco2opslag.nl
www.senternovem.nl/taskforceccs
www.vrom.nl
www.rijksoverheid.nl
www.rotterdamclimateinitiative.nl

Websites of local and national media and blogs

www.deschakelbarendrecht.nl
www.deweekkrant.nl/het_zuiden_barendrecht
www.rijnmond.nl
www.volkskrant.nl
www.detelegraaf.nl
www.fd.nl
www.retecool.com
www.vkblog.nl
www.clubvan30.nl

Other websites

www.co2afvangenopslag.nl
www.algemene-energieraad.nl
www.createacceptance.net

Appendix A – Interview guide

Interview Guide for International Comparison of Public Outreach Practices Associated with Large-Scale CCS Projects

Discuss informed consent with participant and ask to sign and return letter. Notify participants that they can stop the interview at any time. Notify and receive consent from participant that the interview will be audio-recorded.

1. Tell me a little about you, your prior experience and what brought you to the project?
2. [For those related to project INDUSTRY, GOVERNMENT, RESEARCHERS ETC]
What was your specific role in relation to the project XX? Why did you get involved in that role?

OR

[For others in the community: LOCAL COMMUNITY NGOs OTHERS ETC]

How and when did you first hear about the project?

3. How would you describe your relationship to the local community?
 - a. If multi-generational, going how far back?
 - b. Do you own, rent, work in the subject community?
 - c. How long have you been in the community?
4. How would you describe/(characterize) the/your local community?
 - a. Close knit, rural, urban, in decay, vibrant, etc - can you provide some examples that demonstrate this?
5. What do you know about sequestration/carbon capture and storage - what is your level of expertise, experience with CCS (country specific)?
6. Did you know about sequestration/carbon capture and storage before or after learning about the project in your community? (LESS LIKELY TO BE ASKED OF PROJECT PERSONNEL, GOVERNMENT ETC)
7. What were the benefits that the developers communicated about the project?
 - a. How were they presented?
8. What do you think were the benefits of the project to the/your community?
9. How did the community perceive the benefits?
10. What do you believe were the main questions/issues raised by stakeholders in the community?
11. What is the community perception of the project developer?
12. Was community engagement a project priority? How was the community engaged? What information was presented about the project?
13. Can you think of an event or circumstance when things related to the project and how the public viewed it went very well?
14. Can you think of an event or circumstance when things related to the project and how the public viewed it went poorly?
15. Was there a particular event that marked a change in the level of public acceptance towards the project?
 - a. What happened?
 - b. [If INTERVIEWEE IS RELATED TO PROJECT]: How did you respond?
16. What other information would stakeholders have liked to have heard or seen?
 - a. Were there any unanswered questions?

As participant if they are willing to provide educational background information, how long lived in community, and other information they believe might be important to understanding their role in the community.

Appendix B – Data used for media analysis

2008

Date	Source	Topic	Headline	Summary
5 February	National newspaper	Barendrecht CCS Project: Announcement	For the first time - underground CO ₂ storage.	The almost empty gas fields at Barendrecht will be probably used to store CO ₂ . The Dutch Oil Company (NAM), Shell and gas transport company OCAP are responsible for the project. It will be the first time CO ₂ will be stored underground.
16 February	National newspaper	Barendrecht CCS Project: Public opinion	People of Barendrecht: "No CO ₂ under our backgarden!"	The underground storage of CO ₂ means less greenhouse gas emissions in the atmosphere, but what if you live above the storage area? "Have we no say in this small dictatorship?" Resident Jeannette Michels is disgruntled at the plans to store CO ₂ under the recently built neighbourhood in Barendrecht. Residents are asking the question why a potentially dangerous project is being planned for their highly populated family neighbourhood. The local leader of political party Groenlinks Tessa Augustijn exclaims that its like Shell and NAM are telling them to "jump in the water and see if you reach the otherside". Given the demonstrative nature of the project. NAM reacted by saying that CO ₂ is often injected into oilfields to increase pressure, and is totally safe. References are made to the leakage of CO ₂ from a natural underground lake (lake Nyos in Cameroon) that killed 1,700 people. The government of Barendrecht was informed of the project this week, and will wait for the environmental impact assessment before making a decision.
3 April	Press release - VROM	National CCS policy	Cramer: "The Netherlands should be a frontrunner in CCS."	The Dutch Minister of the Environment, Jacqueline Cramer has said that the Netherlands should be a frontrunner in the development of carbon capture and storage.
8 April	Press release: VROM	National CCS policy	Taskforce for Carbon Capture and Storage officially announced	Minister Cramer of VROM officially announced the Taskforce Carbon Capture and Storage. The Taskforce will be responsible for the regulations of CCS in the Netherlands, the European regulation of CCS, the storage and transport of CO ₂ and the demonstration projects.
8 April	National newspaper	National CCS policy	Shell wants government support for CO ₂ project	The chairman of Shell Jeroen van der Veer stressed yesterday that the regulation for CCS in the Netherlands has large gaps. Liability of the storage is a major issue for Shell, and they want to know who will be responsible should a leak occur.

2008

Date	Source	Topic	Headline	Summary
18 April	Newsletter - Energy sector	Barendrecht CCS Project: Expert opinion	CO ₂ Expert: "Rather no CO ₂ storage at Barendrecht."	A CO ₂ expert, Dr Cozijnsen has stated that even though underground storage of CO ₂ is considered safe, to avoid public unrest and jurisdictional procedures it would be better to test the concept in a less populated area. He feels that the unrest felt by the inhabitants of Barendrecht is already reason enough to move the project to the North of the Netherlands.
21 April	National newspaper	Barendrecht CCS Project: Public opinion	Unrest grows in Barendrecht about the CO ₂ storage project.	The inhabitants of Barendrecht are not satisfied with the proof of project safety provided by Shell and NAM. A member of the public of Barendrecht states that "CO ₂ is dangerous in high concentrations. The don't know what will happen if something goes wrong." "Investigations have shown that if the gas escapes that everybody in an area of 16 to 23 kilometers will be dead." Last week Shell and NAM provided an information evening about the project. Local leader of political party VVD, Vera Spruit, mentions that they are preparing judicial steps to move against Shell and NAM because they were not invited to talk about the plans before they were announced.
3 June	Press release: Barendrecht council	Barendrecht CCS Project: Judicial proceedings	Barendrecht: "Have not said no to the project yet."	The council of Barendrecht have still not given a definitive answer whether to support the storage of CO ₂ . The members will wait until they have more information about what the exact plans are. The State was unanimous in announcing that in considering all the information for the project consent, the concerns of the citizens of Barendrecht will come first.
11 June	National newspaper	Barendrecht CCS Project: National policy	Cramer: "May be we would rather not have underground storage under Barendrecht".	The Minister of the Environment Jacqueline Cramer, has doubts about the project because the area is so densely populated. However she has also said that it would be a great shame if the project didn't go ahead because of social commotion.
27 June	National newspaper	Barendrecht CCS Project: National policy	Decision of underground storage in Barendrecht is delayed.	A national newspaper reported yesterday that Minister Cramer has delayed the consent decision of the Barendrecht project. The decision was initially planned for the end of June 2008, but has no been delayed until 'this summer'. The reason for the delay is unclear.
16 August	National newspaper	Barendrecht CCS Project: National policy	Decision of CO ₂ Project Barendrecht delayed until later this year.	The decision will now be taken during 'sometime this Autumn' to fill the two nearly empty gas fields in Barendrecht. The decision, which was originally planned to be announced in April 2009, was first delayed until 'sometime during the summer', and has now been delayed a second time until Autumn. The government has stated that there is no special reason for the delay. There is much unrest in the town of Barendrecht.

What happened in Barendrecht?

2008

Date	Source	Topic	Headline	Summary
5 September	Press release: National research institution	CCS: Public opinion	Citizens doubt whether CO ₂ storage is a good solution.	Citizens have big doubts about CO ₂ storage procedure, they are not sure whether it is the right solution for the climate problem and are concerned about the risks of leaking and ground instability. This result has come from an investigation by the Rathenau Institute, which was offered to the energy ministers of certain Dutch political parties yesterday. The investigation reveals that 'clean fossil' was viewed by many participants in the investigations as false advertising.
4 October	Press release: Provincial government	Barendrecht CCS Project: National policy	Governments look to cooperate on Barendrecht decision	At the CO ₂ storage project in Barendrecht, a careful and clear procedure for the area is being followed. The state, province and council will work together so that all the required information regarding safety and the environment will be provided, and that good communication with the inhabitants will be organised.
18 October	National newspaper	Barendrecht CCS Project: Information evening.	Shell and VROM reassure inhabitants about CO ₂ storage	During an information evening for the town of Albrandswaard, Shell and the Dutch ministry of the Environment (VROM) have reassured the inhabitants about the plans of CO ₂ storage in Barendrecht. The most pressing questions were about what would happen in the CO ₂ would leak. Annemarie van der Rest stated that "the cap rock that now holds the natural gas will also hold the CO ₂ ", and when asked about the risks to housing, "at the deepest point, around 1700m, the soil may move around 1 cm".
27 November	National radio - website report	Barendrecht CCS Project: Public opinion	Barendrecht not happy with CO ₂ storage project	The people of Barendrecht will not readily accept Shell putting CO ₂ under their ground. According to the Alderman Simon Zuurbier, there is great concern amongst the people, a concern that he must take very seriously. Personally, the Alderman would rather see the CO ₂ be stored offshore. The council are having an independent investigation of the Shell plans. If the report says the storage is safe, then the council will agree with the project, said the Alderman. On Thursday is was made know that Shell would receive millions of Euro's to experiment with CO ₂ storage under the ground.
11 December	National newspaper	Barendrecht CCS Project: Public opinion	CO ₂ Storage: Barendrecht residents want the value of their houses guaranteed	Barendrecht residents want to have a fund setup so that any drop in value of their house can be compensated. The leader of the local political party the CDA, Corrie Righolt-Dam, insists that this fund is organized before any storage activities take place. "Experts have said that there could be depreciation in the value of the houses, then we want the money available. It doesn't matter if Shell or the government contributes it." The compensation

2008

Date	Source	Topic	Headline	Summary
15 December	National newspaper	CCS in the Netherlands	So, CO ₂ storage is not dangerous, Minister Cramer	fund is one of the conditions for Barendrecht allowing the project to gain consent, as well as the question of who is responsible in case of leakage, being adequately answered. “A disaster cannot be ruled out. There only has to be one thing to go wrong, and a disaster could take place.” Said Rob Biersma, editor of a national newspaper NRC-Handelsblad. Mr Biersma was reacting to minister Cramer's (VROM) statement that “CO ₂ is no dangerous gas. We breath it out.” Biersma warns that according to the American Environmental Protection Agency (EPA), carbon dioxide is not just a suffocating gas, but also has paradoxical and active physiological effects. In the blood 4% makes the breathing deeper, but a concentration of above 17% can kill most people within a minute. In between can lead to dizziness and unconsciousness.
16 December	Local newspaper (Barendrecht)	Other CCS projects abroad	Shell: No leak at Sleipner.	Shell has responded to claims that an onshore CO ₂ storage in Norway, known as Sleipner, is leaking, as incorrect. The claim has been used by the council as an argument against the project at Barendrecht. Shell, TNO and the company responsible for the project in Norway, Statoil, have said that claims of leakage are unfounded. The project in Norway will use the same technological procedure as in Barendrecht.
19 December	Local television	Barendrecht CCS Project: Public opinion	Barendrecht decide on question checklist	The council of Barendrecht has unanimously decided on a question checklist for the project coordinators. The council wants all the questions to be answered before the project is granted consent. The main subjects of the questions revolve around, safety, risk analysis, geological analysis, depreciation of houses, legal procedures and monitoring.

What happened in Barendrecht?

2009

Date	Source	Topic	Headline	Summary
28 January	Greenpeace briefing	Other CCS projects abroad	CO ₂ storage in the North Sea is leaking process water.	The Utsira field in the North Sea is leaking process water. The significance of this is that it is the same field which as demonstration for CO ₂ storage is running, the so called Sleipner project. 1 million tons of CO ₂ has already been injected, however this has currently been stopped. The question has been raised that, if process water can unexpectedly leak, can the same eventually happen with CO ₂ .
5 February	National newspaper	Barendrecht CCS Project: Academic opinion	Expert is negative about CO ₂ storage in Barendrecht	An expert appointed by the council of Barendrecht has stated that when viewed scientifically, there is currently too much uncertainty about underground CO ₂ storage. A professor of hydrology, Cees van den Akker, finds the underground storage of CO ₂ at Barendrecht not safe enough. He also mentioned that a government report published two years ago regarding suitable places for CO ₂ storage in the Netherlands, advised against storage projects in highly populated areas with much infrastructure. Mr van den Akker also feels that safety has not been guaranteed. At the end of June, a decision on the project will be made on the basis of facts and figures.
6 February	Local television	Barendrecht CCS Project: Public involvement	Barendrecht can now comment on the Environmental Impact Assessment.	Residents of the council of Barendrecht and Albrandswaard have the opportunity over the next six days to comment on the environment impact assessment (EIA) about the underground storage of CO ₂ . The EIA has been made public this week. The council of Barendrecht will shortly organise another information meeting for residents.
12 February	Horticulture industry newsletter	National CO ₂ pipeline leakage	CO ₂ pipeline Westland leaks	The delivery of CO ₂ to the horticultural industry North of the Rotterdam Harbour, and Shell's Pernis refinery, was stopped on Tuesday. It seems that the transport pipes were leaking. It is not known how long it will take to fix the leak, or how much CO ₂ has escaped.
19 February	National television	Barendrecht CCS Project: Public opinion	Barendrecht vote against CO ₂ storage project	During an information evening in Barendrecht, approximately 1000 residents showed their concerns yesterday evening. Most of the residents have been asking why their highly densely populated area has been chosen for this pioneering project. Many are afraid of the risks if something should go wrong, or that their houses will lose value. Neither Alderman Zuurbier or the environmental authority the DCMR could win

2009

Date	Source	Topic	Headline	Summary
6 March	National newspaper	Barendrecht CCS Project: Academic opinion	'CO ₂ storage under Barendrecht a irresponsible experiment'	their trust. Others had more sinister beliefs about the project, choosing to hold the opinion that CO₂ storage was going to earn Shell and the State huge sums of money. One opponent shouted, "why don't you just tell us that Barendrecht is the cheapest option, because that's the truth." A professor and leading lecturer at the University of Utrecht in the Netherlands, Krijn de Jong, finds the storage of CO₂ in the empty gasfield not safe, calling it 'irresponsible'.
10 March	National newspaper	Barendrecht CCS Project: Researcher opinion	ECN: The state has had too little influence in Barendrecht.	The state should have been involved more with 'Barendrecht'. If CCS is not deployed there the technology runs the risk of being sidelined. According to ECN, "something has gone wrong with the communication." states Heleen Groenenberg. "So far, all the explanation for the project has been the responsibility of Shell, which is not enough for such a sensitive project."
13 March	Environmental organisation release	National CCS information	New website about CO ₂ capture and storage	Since yesterday there is a new website available www.co2afvangenopslag.nl (CO₂ capture and storage). The goal of this website is to give citizens a reliable knowledge basis in order to form their own opinion. The information on the website has been compiled by experts from business, the government and environmental organizations.
13 March	Energy related website	Barendrecht CCS Project: Communication and participation	'Cramer should have allowed Barendrecht to comment on planning proposals'	In spite of energy research institute ECN reiterating this week that CO₂ can be stored safely, Barendrecht is less sure about that. The mayor and the councilors are against the project a stance which ECN believes has been caused by miscommunication. This importance of this project has only been communicated by Shell, there should have been more parties behind the message, especially the government." States Heleen Groenenberg from ECN.
17 March	Press release VROM	Barendrecht CCS Project: Communication	Information point opened in Barendrecht	Residents of Barendrecht can from today find information about the underground CO₂ storage project. The information point opened its doors on the 17th of March and will be opened 5 days per week.

What happened in Barendrecht?

2009

Date	Source	Topic	Headline	Summary
22 March	National newspaper	Barendrecht CCS Project: Public opinion	Hundreds protest against CO ₂ storage Barendrecht	On Saturday, hundreds of protestors marched against the CO ₂ storage project. The protest was organized by the local division of political party Groenlinks. Groenlinks has given the mayor of Barendrecht 750 objection letters, and a petition containing 1000 signatures. The people of Barendrecht are concerned about the project as a number of risks are still unclear.
26 March	Energy related website	Barendrecht CCS Project: Public opinion	Barendrecht unanimous against CO ₂ storage project	The council of Barendrecht has unanimously approved the objections of the mayor and Aldermen, regarding the CO ₂ storage project.
28 March	National newspaper	Barendrecht CCS Project: Shell comment	Shell angry at suggestive information about Barendrecht	Shell is angry about the publication of a manipulated photo depicting a CO ₂ disaster in Barendrecht. The photo was published by the Natural Science and Technology magazine, who say that CO ₂ storage is not as safe as the safety studies have shown. According to the magazine, the model used in the studies does not include potential for terrorist attacks, or if a leak should occur when there is very little wind.
31 March	National newspaper	Barendrecht CCS Project: Shell comment	Barendrecht: Shell criticizes the communication of the project by the State	Shell Director, Peter de Wit has stated that the State has not done enough to emphasize the importance of the CCS project in Barendrecht. "The government should have communicated the national importance of CCS, and Barendrechts role within that. If the government has done enough? No, not yet."
16 April	National television	Barendrecht CCS Project: Judicial proceedings	Stop the storage project at Barendrecht	Barendrecht has asked minister Cramer from VROM to stop the project. According to the council jurisdictional mistakes have been made, in particular Shell should have investigated which location in the Netherlands is most suited to storage of CO ₂ . But instead they chose Barendrecht immediately.
22 April	International newspaper	Barendrecht CCS Project	Shell's Plan to Lead in Storage of Carbon Dioxide Hits a Snag	Royal Dutch Shell PLC's push to become a world leader in the technology to capture and store carbon dioxide has hit a snag in the Netherlands, where locals are trying to block the company's plan to bury CO ₂ under their town. The case of the Dutch town of Barendrecht shows there are other obstacles, too: grassroots opposition from locals who say it's unsafe. Barendrecht shows how not-in-my-backyard activism can trump efforts to stop global warming, even in countries with powerful green movements like the Netherlands.

2009

Date	Source	Topic	Headline	Summary
24 April	Press Release Environmental Impact Assessment Agency	Barendrecht CCS Project: Judicial proceedings	'CO ₂ -storage Barendrecht conforms to safety standards	The independent commission for environmental impact assessment has declared that the EIA for the underground storage at Barendrecht is reliable, and conforms to Dutch safety standards.
27 April	Press release: Barendrecht council	Barendrecht CCS project: Local council opinion	Barendrecht: The most pressing concerns have not been addressed	The commission of the environmental impact assessment (EIA) agency has missed out the most important concerns of the Barendrecht report. Because of this the EIA report is not sufficient to meet judicial requirements.
27 May	National newspaper	Barendrecht CCS Project: Communication and participation	Excursion to the CO ₂ capture site at Pernis	Next Saturday, inhabitants of Barendrecht that still have many questions can visit the place where the CO ₂ is captured at the Shell Oil refinery in Pernis. At the refinery, the district manager will answer questions about gas extraction and CO ₂ injection.
11 June	National newspaper	Barendrecht CCS Project: Judicial proceedings	The Netherlands must participate in CO ₂ storage	During a hearing at the Dutch parliament, the director of the Taskforce CCS, Stan Dessens insisted that the decision should not be left to the local councilors alone, otherwise nothing will happen.
16 June	Local newspaper	Barendrecht CCS Project: Communication and participation	Minister in Barendrecht: The procedure was poorly initiated	Minister Cramer has admitted in a meeting in Barendrecht that the project was poorly initiated, but insisted that the miscommunication would be corrected. "Absolute safety I can't guarantee, but safety is the most important criteria." Said Maria van der Hoeven.
21 June	National television	Barendrecht CCS Project: National government decision	Barendrecht decision, expected in 2010.	The cabinet has delayed the decision about CO ₂ storage in Barendrecht until 2010. Minister Cramer wants to consider the necessity and usefulness of the project, speaking at a meeting in Barendrecht. Shell has advanced plans for the project. An EIA has concluded that the project is safe, however the inhabitants of Barendrecht are still concerned about the risks of leakage, and a reduction in the value of their homes.
26 June	Press release VROM	Barendrecht CCS Project: National government decision	Ministers: Letter to Barendrecht council	There is further investigation needed before a decision can be taken. Therefore alternative locations will be considered. In a letter written to the council of Barendrecht, more investigation is required into different location alternatives before a decision can be made. The council have asked the ministers to stall the preparation of the project until all of their questions have been answered. One of the most important questions is why the Barendrecht area was chosen, and that is why the investigation of alternative locations will be performed.

What happened in Barendrecht?

2009

Date	Source	Topic	Headline	Summary
23 July	National newspaper	Barendrecht CCS Project: National government decision	Barendrecht business is taking CCS policy hostage	If the cabinet deviates from its plans for CCS in Barendrecht due to public resistance, it will create a governing dilemma for itself. What will remain of the credibility of CCS policy, and where, when and how will CCS be allowed to take place. "The inhabitants of Barendrecht are holding the government hostage, who don't dare to press the go button," says Mr Zijlstra.
3 November	National newspaper	Barendrecht CCS project: Local council opinion	11 optional storage options for CO ₂ storage Barendrecht	In the Netherlands there are 11 alternative locations where CO ₂ storage can be much safer than under Barendrecht. According to Alderman Zuurbier, Barendrecht has the thinnest layer of clay, and the most densely populated area. A report from TNO, "makes clear that Barendrecht has only been chosen on the basis of a financial argument. The council believes that the billions of euros that will have to be eventually invested for CCS, that the cost of the demo project is not a decisive factor.
9 November	National newspaper	Barendrecht CCS Project: Shell comment	Shell will step out of CCS if Barendrecht is cancelled	If the state decides to choose a storage pilot project in another location rather than Barendrecht, then Shell will leave the project. Storage in the North Sea is no option. This reaction came in response to the findings of Dutch research institute TNO, which declared that there are 11 optional storage locations other than Barendrecht. Shell state that Barendrecht is the ideal pilot project, and it is economically feasible. Shell do not see a reason why the project should not be realised.
10 November	Local television	Barendrecht CCS Project: Action group comment	Action group asks for decision about Barendrecht	The association CO ₂ is NO from Barendrecht have called ministers Van der Hoeven and Cramer to give the final decision about the project within a month. In a letter to the Ministers, the residents of Barendrecht has said that more time is needed to study all the reports that have been made by experts.
18 November	Press release VROM	Barendrecht CCS Project: National government decision	Green light for the restricted CO ₂ storage at Barendrecht	Minister Cramer (VROM) and minister Van der Hoeven (EZ) has decided today, under conditions, to give the green light for restricted CO ₂ storage at Barendrecht. The cabinet leaders have decided to phase the project, with first a small field being used for storing 0.8 megaton CO ₂ .
18 November	Press release: Barendrecht Council	Barendrecht CCS project: Local council opinion	Barendrecht: Cabinet is blind towards the concerns of the people	With the decision to go ahead with the CO ₂ storage project at Barendrecht, the cabinet has been taken hostage by Shell. Shell has stated that they will only start a project in Barendrecht and nowhere else. The Ministers have slammed the decision in the faces of the provincial states, and have

2009

Date	Source	Topic	Headline	Summary
				ignored all the conclusions of the reports, and the will of the inhabitants of Barendrecht
18 November	National newspaper	Barendrecht CCS Project: NGO comment	Greenpeace not happy with CO ₂ storage	According to Greenpeace, the inhabitants of Barendrecht are correct to be concerned about their safety. They have also said that CCS requires huge amounts of government support, which is better spent on renewables. "The system is only possible with huge government support, not only in the demonstrations phase but also afterwards."
18 November	Internet site VROM, web-blog		Cramer comments on Barendrecht: Difficult to convince locals	It is clear that anyone who deploys a serious climate policy does not want to be the winner of a popularity contest. It is difficult to convince locals that storage of CO ₂ is safe. As I say, who works on an effective climate policy, should not busy themselves with their own popularity.
1 December	Press release: Provincial government	Other planned Dutch CCS projects	Friesland also turns against CO ₂ storage	The states of Friesland does not want any CO ₂ storage in the Frisian ground. Because the risks of CO ₂ storage cannot be excluded, and also the fact that there are no businesses where CO ₂ would be captured from in the state, we have chosen not to work with plans for CO ₂ storage in Friesland.
2 December	NRC Handelsblad	Barendrecht CCS Project: Participation and communication	Ministers defy angry and scared citizens	Account of the public meeting in Barendrecht on Monday December 1st, at which the Ministers of Spatial Planning and Economic Affairs explained their decision to go ahead with the project to 500 people in the local theatre. The meeting was broadcasted on a screen at the town hall where more people (number not reported) had gathered to watch. The Ministers had to cope with a great deal of resistance from the audience. Not only questions and voiced opinions, but also angry shouting and insults.
4 December	National newspaper	Barendrecht CCS Project: Participation and communication	'Barendrecht'to be presented at Copenhagen	The South-Holland Province representative Erik van Heijningen (VVD) will give a presentation at the climate conference in Copenhagen, calling Barendrecht an innovative project.

What happened in Barendrecht?

2010

Date	Source	Topic	Headline	Summary
12 January	National television	Barendrecht CCS Project: Judicial proceedings	SP and PVV votes against Barendrecht storage project	A small majority in the parliament has voted for the storage project. The political parties of the SP and the PVV voted against the project.
18 January	Local newspaper	Other potential storage locations	Shock of suggestion of CO ₂ storage Grijskerk	The Major of Grijskerk has said that local politics should not suggest that CO ₂ storage could come in the area, "absolutely no way".
19 January	National television	Barendrecht CCS Project: Judicial proceedings	Barendrecht decision deferred	The Dutch parliament has deferred the decision to store CO ₂ under Barendrecht. On Tuesday that was a number of motion which were to be voted on, but one party the 'Christian Unie' asked to delay the decision.
26 January	National newspaper	Barendrecht CCS Project: Judicial proceedings	Parliaments supports Barendrecht decision	The Dutch parliament is in agreement with the CO ₂ storage project in Barendrecht. The test in the South -Holland province is meant to be a precedent to mass CO ₂ storage in North-Holland.
17 February	Press release: Greenpeace	National CCS Projects: Public opinion	No support for CCS in North-Holland	The storage of CO ₂ shall in many councils lead to political unrest. The plans of the government to build new coal-fired power plants and pump the CO ₂ under residential area are not welcome in 70 councils.
22 February	Local newspaper	Barendrecht CCS Project: Judicial proceedings	CO ₂ -plan in the freezer	With the fall of the parliamentary cabinet, the plan for the underground storage at Barendrecht will probably disappear into the freezer until after the elections.
2 March	National newspaper	Barendrecht CCS Project: Judicial proceedings	CO ₂ storage Barendrecht postponed	The resigning Minister Maria van der Hoeven from Economic Affairs will not be permitted by the Dutch parliament to give permission to the CO ₂ storage project in Barendrecht.
15 March	Local newspaper	Barendrecht CCS Project: Judicial proceedings	Complete: CO ₂ storage in the Senate	The underground storage of CO ₂ in Barendrecht seems to have been arranged like a trick. Tomorrow, the decision came suddenly on the agenda of the Senate, as part of the crisis and recovery law.
17 March	National television	Barendrecht CCS Project: Judicial proceedings	CO ₂ storage in Barendrecht cannot be fought anymore	The council of Barendrecht cannot go to the judge anymore to fight against the CO ₂ storage plans. The is the result of the agreement of the Senate after the motion was brought in under the crisis and recovery law.

Appendix 2 Carson Project – United States of America

Case Study of the Carson CCS Project

By Judith Bradbury¹ and Sarah Wade²

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operated by Battelle for the United States Department

²AJW, Inc.

In fulfillment of Task 1 for CSIRO on behalf of the Global CCS Institute:
International Comparison of Public Outreach Practices
Associated with Large Scale CCS Projects



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Acronyms

AB – Assembly bill

CalEPA – California Environmental Protection Agency

CARB – California Air Resources Board

CCS – Carbon capture and storage

CEC – California Energy Commission

CO₂ - Carbon dioxide

CSIRO – Commonwealth Scientific and Research Organisation

DOGGR – Division of Oil, Gas, and Geothermal Resources

DWP – Department of Water and Power

EJ - Environmental justice

ENGO – Environmental non-governmental organization

EOR – Enhanced oil recovery

GCCSI - Global CCS Institute

IGCC – Integrated gasification (with) combined cycle

IOGCC – Interstate Oil and Gas Compact Commission

IPCC – Intergovernmental Panel on Climate Change

NODA – Notice of data availability

NRDC – Natural Resources Defence Council

RCSP – Regional Carbon Sequestration Partnership

RPS – Renewable portfolio standards

SCAQMD – South Coast Air Quality Management District

UIC – Underground injection control

UNFCCC – United Nations Framework Convention on Climate Change

US – United States

USEPA – United States Environmental Protection Agency

USDOE – United States Department of Energy

WESTCARB – West Coast Regional Carbon Sequestration Partnership

Executive summary

In February 2006, BP announced plans to construct and operate a commercial hydrogen power plant in Carson, California. Carbon dioxide would be captured at the plant and piped to a location in nearby oilfields for enhanced oil recovery (EOR) that would result in carbon dioxide storage. Combined, this is referred to as the Carson Project.

At the time of the announcement, the decision had not been made as to where the carbon dioxide EOR and storage would take place. Finalising this decision proved technically challenging in the area first announced as the intended location and, in mid- to late- 2007, the project 'stood down' while work to finalise the location for carbon dioxide EOR and storage was resolved. In the interim, opposition had begun to surface in relation to proposed legislation regarding storage regulation and the Carson Project.

In mid-2008, the trade press reported that a new partnership was filing an application permit for a hydrogen power plant with CCS related to EOR in the Kern County area. By May 2009, the local media reported that the Carson Project had been "quietly abandoned". Primary reasons cited by BP for the change in venue were business reasons stemming from the complicated ownership of the nearby oilfield and costs of constructing a pipeline to other suitable locations further away. The purpose of this case study is to review the communication activities that took place in relation to the proposed Carson Project and to identify key lessons learned about communicating future carbon sequestration projects.

1 Introduction and overview

This case study examines the plan to implement a power plant with carbon capture and storage (CCS), which was announced by BP in February 2006. The project involved two components: a first-of-its kind commercial hydrogen power plant to be built in Carson, California, and planned storage of the carbon dioxide in nearby oilfields.

The purpose of the study is to identify key lessons learned in communicating about future sequestration projects. It is one of five studies of individual sequestration projects coordinated by CSIRO and funded by the GCCSI.

The case study is presented in five sections. Following this overview, Section 1 outlines the methodology and briefly describes the project and its location. Section 2 provides the background that outlines the national and state political context of CCS, with a focus on the factors that affected project deployment. Key stakeholders and issues are identified in Section 3. Section 4 describes the media portrayal of the project and summarises the communication approach. A final section draws on the previous analyses to critique the communication and public engagement approach and highlight the factors that affected the project outcome. A detailed summary of the national context, which formed the basis for the discussion in Section 2, is provided in Appendix 1 and the interview protocol is included in Appendix 2.

1.1 Methodology

Data for the study were drawn from secondary and primary sources. Secondary data were used to develop a background picture of the project in preparation for the interviews and then again to provide a fuller case study description when writing the report. These data included a wide range of government documents, including legislative and regulatory documents and analyses available through the internet. Additional secondary sources included presentations, letters, websites, and media reports, including news releases.

Primary data were gathered in a series of interviews with representatives of stakeholder groups knowledgeable about the project, using a protocol common to all five case studies (see Appendix 2). They included members of the project team, local government and national environmental groups. Representatives from local and state-based environmental justice (EJ) groups who had been active in the debate over legislation related to carbon storage and the project declined to be interviewed.

1.2 Project description

The proposed Carson Project, announced in February 2006, was to be a commercial, hydrogen power plant project designed to generate baseload power and capture and store 90 per cent of its carbon dioxide. It was introduced by its joint developers, BP and Edison Mission Energy, as a 'first-of- its-kind' 500 megawatt hydrogen-based power plant to produce low-carbon electricity, powering 325,000 Californian homes.

The project would have been a low-carbon facility in several ways. It would have used a petroleum by-product (known as petroleum coke or pet coke) from existing nearby refineries, which would be burned to produce hydrogen. This would result in the cleaner treatment of pet coke. The current treatment involved shipping the pet coke to China where it was used as a fuel to generate electricity. Several studies showed that because China was not requiring emissions controls, the emissions from the pet coke combustion could actually be tracked back to California. It would also have eliminated marine and truck emissions from the current pet coke transportation to China. In addition, the proposed plant would have captured four million short tons of carbon dioxide a year that would otherwise have been emitted to the atmosphere. Plans were under discussion to transport the captured carbon dioxide by pipeline to nearby oilfields for enhanced oil recovery (EOR) operations.¹ In the EOR process, carbon dioxide is injected into mature oilfields to mobilise oil that would otherwise be unrecoverable. Today more than 35 million tons of carbon dioxide is used for EOR in the United States.

¹ BP Energy and Edison Mission Group Plan Major Hydrogen Power Project for California, Media release, 10 February 2006. www.bp.com/hydrogenpower/

1.3 Location ²

The power plant was to be located in the City of Carson in an industrial area next to BP/Arco and other existing oil refineries, just west of the Terminal Island Freeway. This location would benefit from being near the needed supplies of pet coke and recycled industrial wastewater. It would need only the addition of pipelines to transport the carbon dioxide and finalisation of the carbon dioxide EOR and storage location, as well as construction of the facility.

Initial planning focused on the advantages of the Carson location because of its proximity to the feedstock and end-users of the electric power; there was less concern about finalising the location for carbon dioxide storage. The option of running a relatively short (about 16 km / 10 miles) pipeline south to Long Beach was favored over other options including running a 160 km (100 miles) pipeline through Beverly Hills to potential storage locations north of Los Angeles. These locations, where EOR is common practice, were expected to provide depleted oilfields with sufficient storage capacity. Accordingly, carbon dioxide storage was tentatively planned to be located in the Wilmington Oil Field, a large petroleum field that runs south-east to north-east through Long Beach in the Los Angeles Basin, about 8 to 16 km (5 to 10 miles) away. It is the largest oilfield in the United States, and with 90 per cent of its original reserves recovered, it was a likely location for using carbon dioxide to recover otherwise stranded oil.

Carson is 20 km (13 miles) south of downtown Los Angeles and is bordered by Long Beach on the east and Wilmington on the south (see Figure 1). The city is a part of what is known as the South Bay region of the south-west peninsula of Los Angeles County, stretching along the southern shores of the Santa Monica Bay south of LAX airport and west of Long Beach. It is one of the most culturally, economically and ethnically diverse areas in the United States. The area is highly industrialised, with the petroleum refining, aerospace and automobile industries and the Port of Los Angeles the major sources of employment. Air pollution from the oil refineries has long been a concern of activists and politicians.

Census data for the year 2000 showed the city of Carson, where the power plant was to be located, had a population of 89,730. The population, as reported in the Census data, was very diverse: 29 per cent white, 24.4 per



Figure 1. Greater Los Angeles Area (Google Maps 2010)

² The narrative descriptions in this section of Carson, Long Beach and the South Bay area are based on information in Wikipedia, http://en.wikipedia.org/wiki/South_Bay_Los-Angeles

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cent African American, 22.3 per cent Asian, 3 per cent Pacific Islanders, 0.6 per cent Native American; 18 per cent from other races and almost 35 per cent who were Hispanic or Latino of any race. The population density was high (about 11,900 per square km / 4,762 per square mile) and family household median income was US\$60,457.

The carbon dioxide was to be piped to a portion of the Wilmington reservoir that was operated by Occidental Petroleum Company in the Long Beach Area. The 2000 Census population of Long Beach was 461,522 – much larger than Carson. That population was also diverse and reportedly the most ethnically diverse large city in the United States. Compared with Carson, the population was composed of fewer white and more African American people and more Hispanics and Latin Americans; median household income was notably lower at US\$37,270. In 2005, the Port of Long Beach was the second busiest seaport in the US. The combined operations of the Port of Long Beach and the Port of Los Angeles are the busiest in the country, serving shipping to and from the Pacific Rim, and the region has a complex road and rail network. Nearby Wilmington is a relatively small community, and although it was incorporated in 1886,³ its census data is included in county statistics. A community database for a California real estate website estimated the 2010 population at 53,308, with 13,966 households and median income of US\$30,259.⁴

As the site of the power generation facility, Carson stood to gain the lion's share of employment, which was estimated by the project sponsors at 1,000 construction and 150 permanent jobs. It was also financially very attractive to the city, which would receive the tax increment accruing from a location in a redevelopment zone. By improving a deteriorated area, the city could claim increased tax revenues resulting from increased property values.⁵ The plant was located in an industrial area bordered by Wilmington and the western part of Long Beach. As indicated in Figure 2, residents of these two communities would be equally close to the facility as residents of Carson.

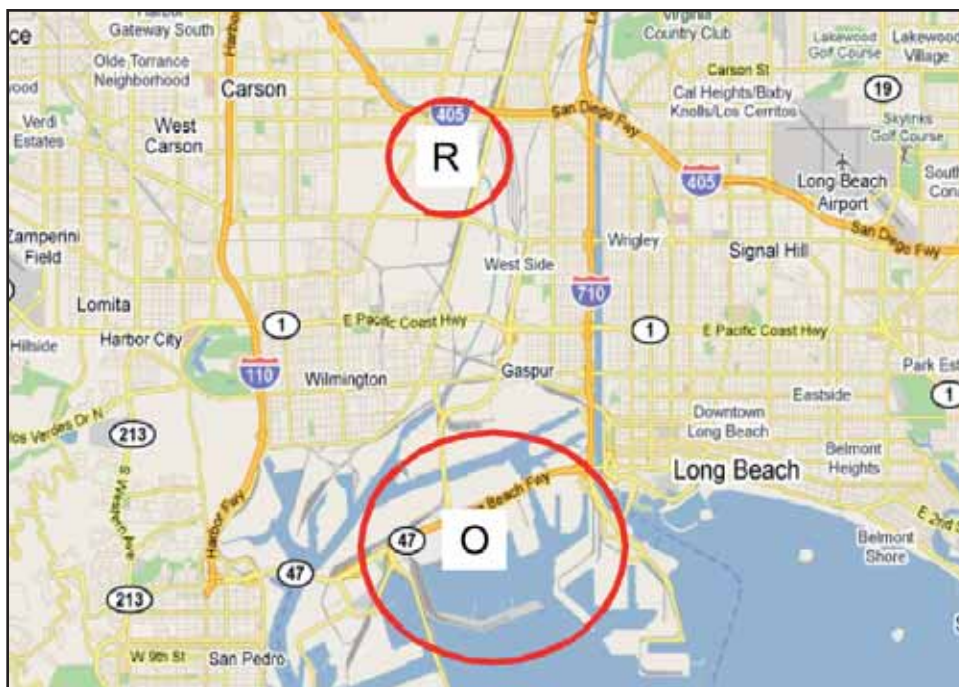


Figure 2. Detailed view of Carson indicating the general location (R) of the refinery and the general location (O) of the oil fields

³ Historical US Census Populations of Places, Towns, and Cities in California, Compiled by California Department of Finance, accessed August 2010 at: http://www.dof.ca.gov/research/demographic/reports/census-surveys/historical_1850-2000/documents/calhist2.xls

⁴ Fizber.com, City Profile – Wilmington, accessed online August, 2010 at: <http://www.fizber.com/sale-by-owner-home-services/california-city-wilmington-profile.html>

⁵ Redevelopment agencies do not levy taxes and do not have the ability to raise taxes. However, State law allows redevelopment agencies to pledge tax increments so that they can repay bonds and other types of debt incurred to make investments in project areas. In essence, redevelopment agencies fund themselves to make improvements to their communities. They stimulate increases in property values that otherwise would not have occurred. See <http://calredvelop.org/AM/Template.cfm?Section=Home&CONTENTID=5860&TEMPLATE=/CM/ContentDisplay.cfm>

1.4 Planned timeline

The project was announced in February 2006, and construction was scheduled to begin in late 2011 or early 2012. The initial plan was to apply for permits relevant to the power plant and carbon dioxide storage project in late 2006, but that date quickly slipped to 2007. One of the main reasons for the delay was that the location for the storage project had not been finalised. In mid- to late- 2007, the project 'stood down' while efforts were focused on finalising a location for the storage. During that period, the project team informed local decision-makers that potential alternative locations were being considered but did not issue a formal public announcement. In mid-2008, the trade press reported that a new partnership was filing an application permit for a hydrogen power plant with CCS related to EOR in the Kern County area. Finally, in May 2009 a report that the project had been "quietly abandoned" appeared in the local Long Beach media. In an interview, BP said that primary reasons for halting the Carson Project were business reasons stemming from the complicated ownership of the oilfield, leading to a lack of commitment to purchase the carbon dioxide. The alternatives remaining included very long pipelines through populated areas which, while technically feasible, would be costly and unpopular. An Occidental Petroleum spokesperson reported that the company's geologists "determined that the Wilmington Field was not amenable to a flood of carbon dioxide."⁶ The Carson Project, as originally conceived, had been cancelled.

2 Background

The Carson Project was announced at a pivotal time in the public discourse on climate change and CCS nationally, within the states, and within California – and indeed, at the global level. Even among those working for aggressive actions to be undertaken to reduce greenhouse gas emissions, CCS was a controversial topic, some arguing that CCS would simply extend the era of fossil fuel use.

2.1 National context of CCS

Within the United States, there were several facets to the public discussion of CCS. Chief among these was the question of whether the country would adopt meaningful policies to address climate change. This set the stage for strategic responses to CCS. To underscore the value of this metaphor, a more detailed history of developments in climate policy and regulations as well as the response by key stakeholder groups is included in Appendix 1.

2.1.1 Political activity

Climate change evolved into a potent political topic in the United States during the 1990s. The country played an important role negotiating firm emission targets and market mechanisms in the United Nations Framework Convention on Climate Change's (UNFCCC) Kyoto Protocol. At the same time, the US senate expressed concern that the nation not adopt the Kyoto Protocol greenhouse gas targets if the developing world did not also adopt targets and/or if the cost of meeting the targets would harm the economy. This set of events characterised a growing divide in political opinion over climate change: some fervently believe it is a problem that needs to be addressed throughout the economy and others believe, just as fervently, that it is not a problem and/or that we cannot afford to address it. As described in Appendix 1, a series of political events has largely polarised the discussion of climate change so that today, efforts to defeat or promote climate change policy may appear more symbolic of loyalty to political party ideals than to science. In the absence of setting clear climate change policy, congressional activity has supported significant efforts in research and development of technologies that have the dual benefits of contributing to energy security and potentially addressing climate change.

2.1.2 Regulatory developments

As CCS gained prominence as a potential option for addressing climate change, the issue of regulatory oversight of carbon dioxide (CO₂) storage also gained prominence. At the heart of the discussion was a concern over who would regulate carbon dioxide storage, how stringent the regulations would be, and whether efforts to regulate CO₂ injection for sequestration would interfere with the business of EOR using CO₂. The US Environmental Protection Agency (USEPA) convened an internal work group in 2005 to review CCS and subsequently issued guidance for the

⁶ "Plans for Carson 'green' power plant are dropped," *Daily Breeze*, May 17, 2009

permitting of early sequestration pilot projects. Importantly, USEPA did not indicate how it would regulate large-scale injection projects at this time. Thus, during the active period for the Carson Project, it was not clear if, how, or when USEPA would establish a regulatory framework specifically for carbon dioxide storage. Lack of regulatory certainty led to different reactions from stakeholders. In the national discussion about regulations that was occurring, some believed that the existing regulatory framework was sufficient to allow early projects to move ahead safely; others believed strongly that regulators were not prepared to ensure that large projects would protect public safety. The topic of whether to develop regulations became a contentious federal issue.

2.1.3 Regulatory developments – other states

In the aftermath of an uncertain landscape for federal climate change policy in the United States, many states initiated climate change policy activities. California, as discussed in the next section, was in the forefront of those states actively adopting policies to curb greenhouse gas emissions and about 20 other states adopted programs that directly addressed climate change through reduction requirements or incentives. One of these states, Washington, adopted rules that required all new power plants to meet an emission performance standard that was roughly equivalent to the emission from new natural gas power plants, and at the same time the state passed rules enabling new plants to meet this standard using CCS. In addition, more than 20 states adopted policies that required or strongly encouraged the development of renewable energy and energy efficiency programs (e.g. renewable portfolio standards, alternative energy portfolio standards). Importantly, during this timeframe, New Jersey passed a law classifying CO₂ as a contaminant and several states (e.g. Kansas) rejected bids to develop new power plants that did not address climate change.

The states were also very active with regard to CCS. Some were more focused on the environmental protection aspects of CCS and others expanded their focus to include issues that arose out of commercial development of natural resources. By 2006, there was a growing discussion about several issues including property rights, liability and regulatory authority. A key issue arose over whether CCS would be regulated as an environmental protection concern (typically administered by a federal or state environmental protection agency) or a resource management concern (typically administered by a state oil and gas agency).

2.1.4 Other national stakeholder groups

At the national level, several key stakeholders, including environmental groups, industry and the Department of Energy, were actively pursuing issues related to CCS.

Large, well-known environmental groups play an important role in helping to shape public opinion, and in 2005 they were sending mixed signals about CCS.⁷ Some large groups, for instance, Natural Resources Defense Council seemed to view CCS as a necessary tool for addressing climate change. Other large groups, including Greenpeace and the Sierra Club, were more sceptical if not outright opposed to CCS, seeing it as a deterrent to moving rapidly to a renewable energy-based economy.

At the same time, 'industry' was actively involved in studying CCS but the conventional wisdom was that it would not be deployed in the near term. Many in the power generation industry cited the fact that carbon capture had not been applied at large scale. Both the oil industry and the power industry expressed concern about the uncertainty of using saline reservoirs for storage, and the oil industry was protective of the enhanced oil recovery business. All were focused on the high cost of CCS. Given this profile, it is easy to see how some stakeholders might perceive efforts involving industry to develop CCS and other advanced climate technologies, such as the hydrogen car, as not very serious.

At the time of the proposed Carson Project, federal action to encourage commercial deployment had begun. Under a US Department of Energy (USDOE) regional partnership program, seven regional partnerships had been established in 2003. About 20 regional demonstration projects were scheduled nationwide, beginning in 2005. Although these were primarily small-scale tests sequestering a few thousand tons, their activities served to increase awareness and involvement by a wide range of stakeholders. Among these was the West Coast Regional Carbon Sequestration Partnership (WESTCARB), which included California among its partner states.

⁷ Stephens, J., Growing Interest in Carbon Capture and Storage (CCS) for Climate Change Mitigation, Sustainability: Science, Practice, and Policy, Fall 2006, Volume 2, Issue 2, <http://ejournal.nbii.org/archives/vol2iss2/0604-016.stephens.html>

2.2 Context of CCS in California

California is home to some of the most diverse, ecologically sensitive areas in the country as well as one of the largest populations. This has led to the paradox that while California has a history of serious environmental concerns it also has some of the most far-reaching environmental measures in the United States. Developments in the California environment, energy and climate arenas provide an important backdrop for considering the Carson Project.

2.2.1 Air quality and the environment ⁸

California has been battling the effects of air pollutants from stationary and mobile sources since the early 1940s. The state was the first to create an air pollution control district, the Los Angeles County Air Pollution Control District, and to establish statewide standards to control the emissions from motor vehicles. Efforts to further control air pollutants, especially from vehicles, have continued since that time. In the 1960s, then Governor Ronald Reagan created the California Air Resources Board (CARB) by merging the California Motor Vehicle Pollution Control Board and the Bureau of Air Sanitation and its Laboratory. In 1976, the South Coast Air Quality Management District (SCAQMD) was created under the auspices of the Lewis Presley Act. The SCAQMD is the agency in charge of controlling air pollution throughout Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. As acknowledged by the SCAQMD, it is “the smoggiest region of the US”.⁹

To address these air quality concerns, California implemented a series of increasingly tough emission standards for stationary sources, gasoline and diesel-powered vehicles, and fuels during the 1970s, 80s and 90s. Some of these provisions were adopted through CARB to apply throughout California and some were developed in conjunction with SCAQMD as part of the local air quality management plan.

This period was also marked by significant increases in the California population, which increased to about 30 million by 1990. As a result, despite the regulations, various sub-populations within the state continued to experience serious environment-related health problems. In 2000, a California-funded long-term children's health study showed the impact on children's lung function from exposure to high air pollution levels. Shortly after, the state passed standards to significantly reduce harmful particulate matter emissions from diesel-powered equipment, mandate zero-emission vehicles, reduce the impact from controlled burns at agricultural areas, reduce pollution from buses, and achieve other emission reductions. Yet, despite those measures, southern California consistently ranks as the most polluted in the nation, topping the American Lung Association lists for both ozone and particulate pollution. In 2007, Los Angeles ranked 4th and 3rd for long-term particle and ozone pollution respectively.

Since 2000, the American Lung Association has routinely produced a State of the Air report to assess the levels of ground level ozone and short and long-term particulate pollution in metropolitan areas across the country. Beginning with the first report, issued in 2000 but covering the period 1996-1998, air quality problems in the Los Angeles metropolitan area have dominated the rankings as the worst in the country. Los Angeles was rated as having the worst ozone levels in the country for all but a two-year period since 1996, and it was ranked worst for particulate pollution during the period 2000-2006 when the American Lung Association started including an assessment of particulate pollution in its report.¹⁰ These environmental impacts are not limited to sources located in California alone: emissions in Asia have been shown to contribute to pollution problems in California. According to a report by Ramanathan and colleagues in the Journal of Geophysical Research:

*On some days, almost a third of the air over Los Angeles and San Francisco can be traced directly to Asia. With it comes up to three-quarters of the black carbon particulate pollution that reaches the West Coast.*¹¹

While there may have been a significant benefit in terms of climate change emissions, the Carson Project also represented an incremental increase in conventional pollutants – and conditions in the area were especially ripe for criticism over such increases. First, the area within the SCAQMD was a constrained air shed by the time the

⁸ Information in this section is drawn from: CA.GOV, “History of California's Involvement in Air Pollution and Global Climate Change,” accessed June 2010 at: <http://www.climatechange.ca.gov/background/history.html>

⁹ South Coast Air Quality Management District, Home Page, accessed online September 1, 2010 at <http://www.aqmd.gov/Default.htm>

¹⁰ American Lung Association, State of the Air 2010 – History FAQ, found online 3 July 2010 at: http://www.lungusa.org/assets/documents/publications/state-of-the-air/sota2010_report-history.pdf

¹¹ Wall Street Journal, Huge Dust Plumes from China Cause Changes in Climate, 20 July 2007, printed on page B1

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Carson Project moved forward and therefore any additional increments of conventional air pollution would not be allowed without a compensating offset. Further, the area was under pressure to develop a management plan and regulations that would result in additional reductions in conventional pollutants and thereby help to bring the state into compliance with the requirements of the federal Clean Air Act Amendments.

2.2.2 Environmental justice

Concerns about Environmental justice (EJ) also played an important role in the Carson context. EJ had emerged as a national issue in the 1990s, especially in relation to concerns about the disproportionate impact of air pollution on certain populations. A report by the American Lung Association provides background and insight to these concerns:¹²

The burden of air pollution is not evenly shared. Poorer people and some racial and ethnic groups are among those who often face higher exposure to pollutants and who may experience greater responses to such pollution. Scientists have speculated that there are three broad reasons why disparities may exist. First, groups may face greater exposure to pollution because of factors ranging from racism to class bias to housing market dynamics and land costs. For example, pollution sources may be located near disadvantaged communities, increasing exposure to harmful pollutants. Second, low social position may make some groups more susceptible to health threats because of factors related to their disadvantage. Lack of access to health care, grocery stores and good jobs, poorer job opportunities, dirtier workplaces or higher traffic exposure are among the factors that could handicap groups and increase the risk of harm. Finally, existing health conditions, behaviors, or traits may predispose some groups to greater risk. For example, diabetics are among the groups most at risk from air pollutants and the elderly, Blacks/African Americans, Mexican Americans and people living near a central city have higher incidence of diabetes.

EJ concerns became a significant issue nationally and by 1992, the USEPA established its Office of Environmental Equity, and the Work Group on Environmental Equity had finished its report. Legislatively, a number of bills were introduced in Congress, including the *Environmental Justice Act 1992*. On 11 February 1994, President Clinton signed Executive Order 12898: *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to focus federal attention on the environmental and human health conditions of minority and low-income populations with the goal of achieving environmental protection for all communities. The Order directed federal agencies to develop EJ strategies to help federal agencies address disproportionately high and adverse human health or environmental effects of their programs on minority and low-income populations. As a result, USEPA undertook a series of high-profile actions to implement EJ policies at the federal level.¹³

Of note in the Carson context is the 2001 adoption by California of new environmental justice policies. These policies were designed to ensure the fair treatment of people of all races, cultures and incomes with respect to the development, adoption, implementation and enforcement of environmental laws, regulations and policies.¹⁴ This led to the establishment of a Global Warming Environmental Justice Advisory Committee to suggest ways for the CARB to implement the climate policies of AB 32, the *2006 Global Warming Solutions Act*, while maximising overall social benefits.

2.2.3 Energy

Broader energy issues were also an important factor in the Carson context. In 1974 the state passed the *Warren-Alquist State Energy Resources Conservation and Development Act* which, among other things, created the California Energy Commission (CEC) and directed it to certify the need for a power plant or power plant modification and the suitability of the plant's site before any power plant could be constructed or modified. Two years later this Act was amended to add provisions barring new nuclear plants from being built in the state unless it could be demonstrated that there was sufficient capacity to store spent fuel rods and dispose of nuclear waste in federal depository. The CEC was empowered to consider alternative energy options, including large-scale energy efficiency and renewable energy.

¹³ US EPA, Environmental Justice, Background Information, accessed online at: <http://www.epa.gov/environmentaljustice/basics/ejbackground.html>

¹⁴ Senate Bill 115, Solis, 1999; California Government Code § 65040.12(c).

For some, the new hurdles for locating power plants ushered in a cleaner energy future. For others, however, it could be perceived differently as companies began to purchase more power from outside the state. In 2008, California imported almost 30 per cent of its power from out-of-state power plants. About 45 per cent of the total power used by the state was generated using natural gas, 18 per cent was fuelled by coal, 14 per cent from nuclear, 11 per cent from large hydropower projects and the remaining amount of about 10 per cent was generated using other renewable energy. Whether intended or not, California embodied the 'flight to natural gas' concern expressed by President Bush in 2001 when he declined to adopt greenhouse gas controls, and the state had few options for making large-scale emission reductions. In 2007, the CEC began to restrict the ability of in-state utilities to sign contracts with out-of-state coal-fired power plants. A Los Angeles Times article covering this policy stated:

California, with the strictest pollution laws in the nation, has largely phased out coal-fired generators within its borders. But the state still buys about 20% of its electricity from coal-fueled power plants in other states.

The DWP [Department of Water and Power] buys 47% of its power from two massive coal-fired plants in Utah and Arizona that are major sources of carbon dioxide and other greenhouse gases. Those contracts expire in 2017 and 2027. Now, under state law, they cannot be renewed unless those plants find a way to pump their emissions underground, but the technology to do so is unproven.¹⁵

2.2.4 Climate change

California established significant policies and programs to study and address climate change. In 1988, the CEC was designated the lead agency on climate change. It helped to oversee the state's greenhouse gas emissions inventory and facilitated the development of the California Climate Action Registry, a non-profit emissions reporting organisation. This marked the beginning of a flurry of activity on climate change in California that interacted with events occurring around the world.

In 2002, California enacted three laws and adopted the implementing regulations to achieve greenhouse gas reductions from vehicles, improving the Climate Action Registry, and adopting a renewable portfolio standard (RPS). At the regional level, California joined Arizona, Utah, Washington and Oregon to adopt a Global Warming Initiative. As reported on the CA.Gov website describing the history of climate change activity in California, these measures were in contrast with a federal call for another decade of research on climate change and voluntary measures to address climate change.

In 2003, policy activity began to 'heat up'. The CEC established the California Climate Change Research Center, which issued more than 150 research reports during its first five years. (And at the federal level, one of the first bipartisan climate change bills was introduced by Senators John McCain and Joe Lieberman.)

In 2004, California added greenhouse gas controls in the emission reduction requirements for vehicles and Governor Schwarzenegger launched the Hydrogen Highway Network. The first statewide greenhouse gas reduction targets were adopted in 2005 through an Executive Order signed by Governor Schwarzenegger. And, in 2006 the Governor signed an agreement with British Prime Minister Tony Blair for California and the UK to collaborate on climate change initiatives.

More importantly, 2006 saw the most important climate change policies being developed in the state including the following legislation:

- AB 32, the *California Global Warming Solutions Act* of 2006 established economy-wide cap on California greenhouse gas emissions at 1990 levels by no later than 2020. CARB adopted these limits that year.
- SB 1368 required the Public Utilities Commission and the CEC to implement an emissions performance standard for all retail providers of electricity in the state. The law allowed a generator to use CCS to demonstrate compliance with these standards.
- AB 1925 directed CEC to study and make recommendations on CCS technologies.
- AB 118 further required alternative fuels and vehicle technologies.

¹⁵ CA CEC, 2008 Total Electricity System Power, accessed June 2010, http://energyalmanac.ca.gov/electricity/system_power/2008_total_system_power.html

¹⁶ Los Angeles Times: "State acts to limit use of coal power, To fight global warming, municipal utilities including the DWP will no longer be able to buy electricity from plants that burn the fossil fuel," 24 May 2007, Margot Roosevelt, Times staff writer. Accessed 29 June 2010

In 2007, a new legislative session started and in February, Assembly Member Huffman introduced AB 705. It directed the Division of Oil, Gas and Geothermal Resources (DOGGR), in consultation with the California Environmental Protection Agency (CalEPA) and the Geological Survey, to develop and adopt, by 1 January 2011, standards and regulations governing geological carbon dioxide sequestration. The timing and stewardship of AB 705 had the potential to lead to conflict. Under AB 1925, the state had just begun work on a study to assess the role of CCS in California and to develop recommendations. Further, the Global Warming Environmental Justice Advisory Committee had not formulated recommendations and did not appear to be involved in the proposed AB 705. And, finally newly elected Assembly Member Huffman had served as a senior attorney at NRDC at the time he won election. In California, bills are authored and introduced by elected Assembly Members, but it is common to refer to specific legislation as being 'sponsored' by an interested party. In the case of AB 705, it was sometimes referred to as being 'sponsored' by NRDC in hearings, informal discussion and the media.

3 Stakeholder mapping

Primary stakeholders and associated issues are grouped into three primary categories: project developers, government officials and environmental organisations. The latter are subdivided into national and state and local organisations.

3.1 Project developers

Sponsors and participants of the Carson Project were well recognised names in the global energy business. Joint sponsors were BP Alternative Energy, a global leader in decarbonised fuels projects; and Edison Mission Energy, a pioneer in Italy of first-of-a-kind integrated gasification combined cycle (IGCC) power plant and developer of independent power (coal, gas and renewable energy). Occidental Petroleum, the world's largest CO₂ EOR operator, was to be responsible for the EOR activities. Other participants included Fluor, GE Energy, URS and the West Basin Water District, a nationally known industrial water recycler.¹⁷

For these sponsors and participants, the project offered a business opportunity to take action in commercialising carbon capture and storage, seen as a critical tool in the effort to reduce the concentration of global warming gases in the atmosphere.¹⁸ The momentum that had built up in the state, culminating in a series of legislative steps favorable to the development of CCS, appeared to indicate an opportune time to introduce a first-of-a-kind commercial project that would integrate and commercialise cutting-edge technologies. The stated goal of the developers was to enable commercial deployment and establish regulatory mechanisms for CO₂, EOR and sequestration in California, and, globally, to establish the technical, environmental and commercial basis to replicate similar projects in the US and abroad.¹⁹

3.2 Government officials

Initial reactions from state and local officials were very positive. As noted previously, the project brought a strong set of tax benefits to Carson and, in addition, a \$90 million Federal Investment Tax Credit was recognised as a prestigious award. As discussed in Section 2.2.4, the legislature passed a series of bills that laid a foundation for the project and, until concern about CCS and EJ arose in the debate over AB 705, little opposition was evident. The focus on the positive aspects of the project, evident in media reports, overwhelmed signs of potential problems.

At the end of November 2006 therefore, the project team reported "strong local and state support".²⁰ By that time, the team had made contact with the key officials who would have been involved in the permitting and approval process if the project had progressed: USEPA Region IX Director staff, CEC Commissioners and siting staff, California Public Utilities Commission, West Basin Municipal Water District, California EPA, California Air Resources Board, City of Carson, Carson Redevelopment Authority, Carson Homeowners Association, Mayor of Los Angeles, State Lands Commission, City of Long Beach and Port of Long Beach.

¹⁷ Presentation by Carson Hydrogen Power at the WESTCARB Annual Meeting, Phoenix, AZ, 9 November 2006

¹⁸ Letter from Jonathon Briggs, Executive Director, Carson Hydrogen Power, to the Honorable Loni Hancock, Chair, California Natural Resources Committee, May 2007.

¹⁹ Presentation by Carson Hydrogen Power at the WESTCARB Annual Meeting, Phoenix, AZ, 9 November 2006

²⁰ Ibid.

3.2.1 State officials

Throughout 2006, the reactions of state officials to the proposed project appeared positive. CCS legislation was progressing; site permitting would involve a well established process for reconciling the state's need for electricity with local concerns; and the Governor, who had been invited to the announcement ceremony, voiced his pride in being selected to lead the nation: "I want to thank you for choosing California. This will be the first plant of its kind in the whole country and I think it is a perfect fit for our state."²¹

Numerous factors underlay the state support:

- Pride in playing a very visible leadership role nationally and internationally in following up on previous, noteworthy climate initiatives such as being the first state to adopt greenhouse gas reduction targets and signing the agreement with British Prime Minister Tony Blair in the same year as Carson was proposed
- Being a first in commercialising hydrogen power, which would provide a non-coal solution for California's energy needs, consistent with its clean energy goals
- Providing 500 MW of new generating capacity for Southern California at a time of possible future power supply shortages
- Improving air quality in the Los Angeles Basin, a major concern for the state, through the cleaner treatment of pet coke and reduced transportation emissions
- Taking a step beyond pilot plant construction in hosting a commercial enterprise that would eliminate four million tons of CO₂ per year from the atmosphere through the use of carbon dioxide sequestration
- Boosting the Southern California economy.

However, as deliberations over AB 705 occurred during 2007, some vocal stakeholders raised concerns about the timing, safety of CCS, and the potential for the Carson Project to exacerbate local EJ impacts. After three months, the sponsors tabled AB 705. This reaction to AB 705 may not have impacted the underlying business decision to cancel the proposed Carson Project, but it contributed to an overall sense that it would be more difficult to locate the project near Carson (see section 5).

3.2.2 Local officials

As noted in the list of contacts above, nearby local officials were also supportive: representatives of the cities of Carson (Mayor and Council), Los Angeles and Long Beach; the community within Los Angeles known as Wilmington and the Port of Long Beach all expressed support. Carson officials were especially enthusiastic about the project in the early stages – and this enthusiasm continued in that location, with strong disappointment voiced when the project was moved elsewhere. The primary reasons for the City's strong support were evident in the interviews:

- The tax increment from a \$1 billion investment in an area otherwise delegated to a brownfields landfill status (see Section 1.2)
- Job creation (1000 temporary and 150 permanent jobs)
- Creation of a new "wonderful" corporate citizen (BP) who could be expected to enhance the quality of the city through contributions to non-profit and charitable organisations.

The economic and other benefits were less obvious for the communities of Wilmington and west Long Beach. Both communities had residential sections in the land near the BP/Arco refinery, the likely location for the power generation and CCS plant. And, there was a lack of clarity about how they would benefit from the proposed EOR operations. Parts of the oilfields targeted for the EOR project were owned by a public entity but leased and/or operated by private companies, such as Occidental Petroleum. As the EOR plans were developed, complications over revenues from CO₂ purchase and concerns about potential subsidence issues arose locally.

²¹ BP Energy and Edison Mission Group Plan Major Hydrogen Power Project for California, News release, 10 February 2006. www.bp.com/hydrogenpower/

3.3 Environmental organizations (ENGOS)

Although it lasted only a few months, the state branches of national, state-based and local environmental organisations became very active in the debate over AB 705 and, as the debate progressed, the Carson Project became entwined in the controversy, essentially becoming, in the words of one media reporter, “a rallying point in the controversy over the bill”.

Given the progress by various states in working towards regulation of CCS, AB 705 may have seemed an innocuous bill – it called on the California DOGGR, the agency responsible for regulating oil extraction activities, to develop regulations in consultation with other agencies. The legislation to establish specific regulations covering underground storage was strongly supported by the California branch of the prominent NRDC, which was reported as being concerned about deployment of commercial sequestration in the absence of appropriate regulatory standards.²² It was also supported by the Union of Concerned Scientists, and Environmental Defense and locally by Clean Power Campaign and Environment California. However, as evidenced in the April 2007 Hearing Record,²³ AB 705 was strongly opposed by nine local and state-based environmental and EJ organisations. They raised concerns that the bill was premature because issues about the safety of CCS needed to be resolved and because the Environmental Justice Advisory Committee had not been involved in setting standards for CCS under AB 32.

3.3.1 National environmental organisations

As discussed in Appendix 1, national environmental groups played an active role in CCS although, as noted in Section 2.1.4, in 2005 they were sending mixed signals about CCS. Some large organisations, for instance NRDC, seemed to view CCS as a necessary tool for addressing climate change. Other large organisations, including Greenpeace and the Sierra Club, were more sceptical if not outright opposed to CCS, seeing it as potentially unsafe and a deterrent to moving rapidly to an economy based on renewable energy.

At the state level, NRDC did not take a position on the Carson Project. Although the presence of one of its national climate change staff at the ceremonial announcement (February 2006) along with other notables was interpreted by some as indicating support for the project, the organisation's spokespeople carefully distinguished between support for CCS technology, the need for regulation and the project *per se*. NRDC's support for CCS was based on the belief that a broad portfolio, including increased conservation and renewable energy, is needed to address the major problem of climate change. The state branch of NRDC found itself in the position of defending its position to local and state-based environmental groups in the legislative debates – first over AB 32, the *California Global Warming Solutions Act 2006*, which established an economy-wide cap on California greenhouse gas emissions at 1990 levels by no later than 2020, and subsequently in the debate on AB 705.

In a letter to the Chair of the California Natural Resources Committee, the state lead of NRDC's CCS efforts collaborated with four internationally recognised scientific experts to address the science of CCS and clarify some of the scientific issues raised by opponents during the AB 705 debate:²⁴

- CCS is needed to address climate change, viewed by an overwhelming majority of the world's scientists as “one of the most pressing and challenging environmental problems of our time”. There is no silver bullet and society will need all the tools at our disposal.
- A substantial body of evidence, knowledge and peer-reviewed literature on CCS exists. Areas where further research is needed have been identified but there is also a high consensus on the science.
- CO₂ is non-flammable and non-explosive. It is not accurate to portray it as a deadly and suffocating substance.
- CCS has been tried before. About 35 million tons annually are injected for EOR and several commercial and research projects worldwide capture and inject CO₂ in geological formations.

²² “Of Two Minds: Groups Square Off on Carbon Mitigation,” *Environmental Health Perspectives*, Volume 115, Number 11, November 2007, page 546.

²³ AB 705 Assembly Bill, *Bill Analysis*. : http://info.sen.ca.gov/pub/07-08/bill/asm/ab_0701-0750/ab_705_cfa_20070420_112942_asm_comm.html. See also the fact sheet, which listed NRDC as the source for further information: *AB 705 - A Regulatory Framework for Carbon Capture and Geologic Storage*. Assemblyman James Huffman. February 2007.

²⁴ Letter to the Honorable Loni Hancock, Chair, California Assembly Natural Resources Committee, 2 July 2007, from Dr. Sally Benson, Dr. Peter Cook, Dr. Howard Hertzog, Dr Susan Hovorka, and Dr George Peridas.

- The projects give us great confidence that CO₂ can remain permanently sequestered in geological reservoirs. The IPCC report concluded that the fraction retained is very likely to exceed 99 per cent over 100 years for appropriately selected and managed geological reservoirs.
- Useful conclusions on the safe operation of CO₂ injections can be drawn from industrial analogues.
- The incidents of naturally occurring CO₂ releases at Lake Nyos and Monoun (frequently cited by opponents as evidence of potentially disastrous effects that could result from CO₂ leakage) are very different from CO₂ sequestration sites.
- The referenced research project, known as the Frio project, did not show that CO₂ will eat through the rock and escape – in fact it verified the exact opposite.

3.3.2 Local and state environmental organisations

In Carson, Wilmington, and Long Beach, the project team worked with a number of local groups to explain the project and determine how it might benefit the communities. The project team expected to continue to work to build this kind of understanding and potential support during the rigorous siting process required by the CEC. It is important to note that a large percentage of new projects in densely populated areas of California are opposed. Typically a process ensues in which project developers work with community groups to design the project in such a way to address concerns and provide local benefits. The Carson team anticipated such a process and had initiated outreach into the surrounding communities.

The debate over AB 705 added a new dynamic to this outreach process. Nine environmental groups – two local community and seven state-based groups – raised concerns about AB 705. These groups were the Coalition for a Safe Environment, a Wilmington-based non-governmental organisation; California Communities against Toxics; California Safe Schools; California Environmental Rights Alliance; CLEAN; Del Amo Action; Greenaction; Desert Citizens Against Pollution; and, Society for Positive Action.

Initially, concerns focused on air emissions from the power plant; subsequently, the focus became opposition to sequestration. In mid- to late- 2006, the leader of the community-based Coalition for a Safe Environment, who subsequently took a leading role in opposing the project, raised concerns about the air quality impacts of the energy generation plans. The proposed project site in the South Bay was located in an area where oil refining played an important role in the economy but where “local politicians and activists have long denounced the refineries for the amount of air pollution they generate”.²⁵ A lawsuit filed by a coalition of community groups and environmentalists, including the NRDC, arose in relation to construction of new power plants in Southern California. The suit alleged that the South Coast Air Quality Management District, which oversees air quality in a four-county region, violated state laws when it approved rules the previous month that would allow new power plants to use emission credits from a pool that was formerly reserved for existing facilities such as hospitals and fire stations. Although the Carson Project had not filed a permit application or indicated that it might need to use credits from this pool, the media reported it as another example of the problem in the context of the lawsuit. The concern was that all of the new power plants would be built in or near a Hispanic or low-income community where there were already significant air pollution problems, and that the new plants would not be replacing any existing power plants.²⁶

Opposition became more vocal the following spring, when, in the legislature, discussion of the Carson Project became entwined in the short-lived but contentious debate over AB 705. All of this occurred before the project development team had filed a permit application – while still in the project design and site characterisation phase. As a result, as noted by one interviewee, AB 705 became the forum for debate over the Carson Project by default.

In this debate, the nine local and state-based environmental justice groups opposed CCS and the proposed lead role designation of the DOGGR (albeit in consultation with other agencies) in guarding environmental health. In their view, DOGGR's lead role came across as an effort to bypass the authority of the Global Warming Environmental Justice Advisory Committee established under AB 32. The groups' opposition to CCS technology was linked to its role in the broader energy debate over energy sources (and their support for 'green' power and opposition to the use of coal in particular), as well as to their concerns about environmental justice. This link is epitomised

²⁵ The narrative descriptions in this section of Carson, Long Beach and the South Bay area are based on information in Wikipedia, http://en.wikipedia.org/wiki/South_Bay_Los-Angeles

²⁶ “Suit Filed Over Power Plants. Groups Seek to Block Construction on Pollution Concerns,” Kristopher Hanson, *Press Telegram*, 24 October 2006.

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in the heading of a letter submitted in April 2007 by the Executive Director of California Communities against Toxics to the Chair of the Natural Resources Committee, which was subsequently posted on the internet: *Carbon sequestration: injection of toxic gases into poor communities or the salvation of the fossil fuel industry, or both?*²⁷

The author, who reportedly “helped galvanise activist opposition to AB 705”,²⁸ emphasised that “recent studies conclude that carbon sequestration could create alarming environmental problems, endanger communities and potentially be very costly to both ratepayers and taxpayers”. Specifically:

- CO₂ is a health hazard if it were to escape from sequestration, as illustrated by two events. A volcanic crater lake, Lake Nyos, “belched bubbles of CO₂ into the still night air” where it settled around the lake’s shore and killed 1,800 people and “countless thousands” of animals. A 1984 gas release at Lake Monoun which killed 37 people “devastated a local village and killed animals for miles”.
- Sequestration would be used to extract more carbon from the ground to be burned in gasoline that would emit more CO₂ into the air
- California oilfields are located in predominantly poor rural communities. The science and policy issues surrounding the burial of “extremely toxic gases” in environmental justice communities deserve a special select committee of the legislature to examine and report back to the policy committees
- There are huge costs involved in sequestration. The fossil fuel industry has shown no sign that it is willing to bear the liability of CO₂ leaks from underground storage. Presumably the cost, which would be akin to a huge natural disaster for a community should a leak occur, would be borne by taxpayers.

The EJ spokesperson who had earlier been quoted in an article over the air quality suit discussed above, the Executive Director of the Wilmington coalition became the most vocal opponent of the Carson Project. In a letter to the legislative committee, he expressed a number of concerns, which by that time had expanded beyond the environmental justice concerns over air quality raised in the lawsuit to include a list of 11 definitive statements about the “public health and environmental dangers of hydrogen production and carbon sequestration”, and 14 “other significant facts” (The first 11 statements in the letter are quoted verbatim).²⁹

1. Will create millions of tons of new CO₂ green house gases each year, increasing global warming
2. Will create tons of new toxic SOX and NOX air pollution each year
3. Will create hundreds of pounds of new toxic mercury and heavy metals air pollution each year
4. Will create tons of new toxic mercury and heavy metals in residual slag left over from refining coke each year
5. Will create hundreds of tons of residual slag left over from refining petro coke each year which will be transported to public land fills
6. Will require the transformation of CO₂ gas to CO₂ liquid which is acidic
7. CO₂’s acidic nature is corrosive to the underground environment, contaminating the ground and would eventually leach to the surface
8. When CO₂ escapes from underground to the surface it also changes from liquid to gas, it is 1.5 times heavier than air, does not readily disperse in the atmosphere, stays close to the ground and will kill every living human, animal and plant within 20 miles from asphyxiation
9. When CO₂ leaches up to the surface, it will contaminate underground fresh drinking water aquifers, lakes, rivers and the ocean

²⁷ *Carbon Sequestration: Injection of Toxic Gases into Poor Communities or the Salvation of the Fossil Fuel Industry, or Both?* Jane Williams, April 2007. See http://californiaprogressreport.com/2007/04/carbon_sequestr.html

²⁸ “Of Two Minds: Groups Square Off on Carbon Mitigation,” *Environmental Health Perspectives*, Volume 115, Number 11, November 2007, page 548.

²⁹ Hydrogen-petroleum Coke Power Plant Proposal, AB 705 CO₂ Geologic Sequestration.

10. Excessive amounts of CO₂ in the ocean causes acidification which destroys coral reefs, coralline algae, benthic organisms, foraminifera, pteropods, marine calcifiers (shellfish) and plankton
11. Southern California is an earthquake country with numerous faults. No company can guarantee the CO₂ will never escape and BP/ARCO & Occidental Petroleum will not provide billion dollar liability insurance coverage. The public will be stuck with the cost of lives, public health care, environmental restoration and disaster recovery.

4 Communications – public engagement

4.1 Communication/public engagement approach

The project team reported that its strategy was to stay out of the media early – until all the key stakeholders were fully briefed and had a better understanding of potential concerns and perceived benefits. Their outreach activities spanned about two years, beginning with a number of key contacts at the state and local level before the announcement in February 2006, to which more than 190 invitations were extended. Pre-announcement contacts were primarily with state and local officials as well as local groups that represented the community, including some of the populations traditionally the subject of environmental justice concerns. The team did not brief some of the state's leading environmental justice group spokespeople before the event.

The news release and announcement ceremony was the first, and very public, disclosure of the project. It immediately received media coverage and considerable fanfare as a result of the presence and statements from high-profile participants, including Governor Schwarzenegger. Outreach was later stepped up as the technical analysis proceeded and expanded to include a wide range of community leaders and groups.

By the end of 2006, the project team had made contact with the key federal, state and local officials who would play a role in moving the project forward.³⁰ The project team reported that “on the ground” outreach was undertaken during the last few months of 2006 and the beginning first two quarters of 2007, and the number of contacts expanded to several hundred. Outreach extended beyond Carson to include the surrounding communities of Wilmington and Long Beach, which were as close to the proposed plant and as likely to be impacted as Carson residents – yet would not receive the local tax benefit. Outreach included community leaders, environmental organisations, community Hispanic and Filipino organisations, churches and sports organisations. Outreach was also expanded to include a Hispanic team as well as a local community outreach team to incorporate the communities they were seeking to reach. They also cooperated with authors of a story book for children. A long meeting with a vocal EJ spokesperson was held in April 2007, as the debate over AB 705 was proceeding.

Other interviewees' comments generally corroborated the extent of outreach efforts outlined by the project team. Concern was expressed, however, that the team had “not done itself any good” by making a “grand announcement” before knowing where the CO₂ would be stored and before evaluating the extent of potential opposition to any new, air-polluting facility by selecting a site which was “notorious” for the presence of environmental justice activism. There was also a related concern that there had been a flavour of “Decide-Announce-Defend” in the early days of the project. To quote one interviewee:

So, I think they did their outreach, but it was already too late ... I mean the business people got together and said: “That will be a great location from a business point of view” and there was no consideration of the local dimensions, the local environmental and social dimensions ...

As you know, it was an afterthought and they decided on a location, they said: “OK, what can we do now to deal with the local reaction?” You know it was very much not a case of: “Do we think this is a good location in the first place and should we be considering alternatives because public outreach is an integral component to how we assign projects?”

In addition, one interviewee noted that the team had been unprepared to answer questions that could have been predicted to occur about the potential issues posed by orphan wells and/or increased emissions. And finally, one interviewee noted that pre-occupation with engaging high-profile support (State Governor, Tony Blair) had sometimes taken priority over maintaining close relationships with local officials.

³⁰ Presentation by Carson Hydrogen Power at the WESTCARB Annual Meeting, Phoenix, AZ, 9 November 2006

4.2 Corrective measures

Outreach activities centered on the Carson site tailed off during 2007. In interviews, company spokespeople stated that, in view of the uncertainty about the storage location, they made a conscious decision in mid-2007 to 'stand down' on the Carson Project until the fundamental technical and financial issues related to the storage site were resolved. They also emphasised that the timing of this with the AB 705 defeat was coincidental.

4.3 Media involvement

Apart from the announcement, the Carson Project received limited media coverage from the time of its public announcement until the local coverage of its abandonment three years later.

4.3.1 Project announcement and initial media reaction

Initial media coverage focused on the project announcement in February 2006. The announcement was made in a joint press release by BP and Edison Mission Group at a high-profile, public meeting. As noted by a staff writer from the *Los Angeles Times*, the project was "sufficiently important to warrant the attendance of John Bryson, Edison's Chairman and chief executive, and BP America CEO Ross Pillari, along with Gov. Arnold Schwarzenegger."³¹

Two aspects of the release are noteworthy. First was the emphasis on benefits that would accrue to the state compared with the local area surrounding the power plant. Second, was the focus on the technical advantages of a clean, first-of-a-kind power plant near BP's Carson refinery and fuel supply, with only a very general reference to the storage location.

The two-and-a-half-page media release cited a number of benefits that the project would bring to the state and its economy, including "providing 500 MW of clean generating capacity for Southern California at a time when state agencies are predicting possible power supply shortages during the coming years", as well as "eliminating four million tons of CO₂ per year from the atmosphere by sequestering [sic] underground". No mention was made of potential benefits – or potential disadvantages – from the more local perspective of those living nearby. The release acknowledged that final project decisions required more study, in addition to review by the California Energy Commission and the South Coast Air Quality Management District, discussions with stakeholders and electricity generating revenues. However, the specific location of the storage area was not identified and no details were provided about associated regulatory and stakeholder activities. The topic was reported as "BP is in discussions with Occidental Petroleum to develop options for sequestering the CO₂ in Occidental's California oilfields".³²

Governor Schwarzenegger's strong endorsement at the ceremony demonstrates the focus and tone of the announcement:

I want to thank you for choosing California. This will be the first plant of its kind in the whole country and I think it is a perfect fit for our State. With our Strategic Growth Plan, a commitment to Air Quality and innovative projects like this Hydrogen Plant, I know we can have clear skies, improve our quality of life and build a stronger, more vibrant economy for California.

4.3.2 Reported key stakeholders and issues

The first indication of concern in media coverage that followed the project announcement was a report in autumn that year on a lawsuit against the South Coast Air Quality Management District, in relation to construction of new power plants in Southern California, including the Carson Project.³³ It was not until the following spring that media coverage became more intense in the coverage of legislative activity around AB 705.

Development of the Carson Project and discussion of AB 705, which was intended to provide the regulatory framework for sequestration, overlapped both in time and in the presentation provided by the media reports reviewed by the research team. Frequently, reporting on the two events was intermingled. For the most part, the

³¹ "Edison, BP to Unveil Carson Power Project," *Los Angeles Times*, 10 February 2006

³² BP Energy and Edison Mission Group Plan Major Hydrogen Power Project for California, Press release, 10 February 2006. www.bp.com/hydrogenpower/.

³³ "Suit Filed Over Power Plants. Groups Seek to Block Construction on Pollution Concerns," Kristopher Hanson, *Press Telegram*, 24 October 2006.

media focused on statements from key stakeholders in the environmental community and the split between national and local groups on the carbon dioxide sequestration issues. In one instance, the extent of local opposition was grossly exaggerated to 70 activist groups (compared with the nine groups listed in the legislative record).³⁴

The media presented the NRDC's viewpoint that, while agreeing with opponents that "conservation and renewables should play a much larger part than CCS in mitigating global warming", CCS technology "is a necessary fallback technology because of the urgency dictated by the climate problem".³⁵ NRDC is also reported as commenting that: "The environmental justice people had a hard time separating CCS technology from their specific project."³⁶ However, this position was modified in a subsequent statement that: "Even though I sympathise with their concerns about siting of the plant, I think the arguments they put forward regarding the mechanics of sequestration itself were not valid." The media reported that opposition arose from the Coalition for a Safe Environment and California Communities Against Toxics. The project opponent most frequently quoted in the media was the Coalition's Executive Director, who claimed credit for killing the project. The reasons cited in the media for his opposition were similar to those cited very definitively in his letter to the legislative committee:^{37 38}

- CCS will further dependence on fossil fuels and hinder development of a sustainable society with renewable energy sources
- Oil sequestered in the Wilmington oilfields could escape through old, 'orphaned' oil wells
- Burning pet coke releases 'vast' amounts of pollutants into the air
- Creation of hydrogen poses a 'huge' fire hazard, which is made even more hazardous by location in the vicinity of an oil refinery in a heavily populated area
- Exposure to high concentration of CO₂ is fatal – and there are many examples of people and animals being killed in this way
- The stored CO₂ will be in a liquid form, called carbonic acid. It will eat through the limestone that encases the proposed oilfield and/or the cement that plugs nearby plugged wells, allowing it to escape
- If large quantities of CO₂ were to leak, it would remain concentrated in the already polluted Los Angeles Valley and constitute a public health disaster.

Rebuttal of some of these issues by the NRDC and project spokespersons was primarily cited in the legislative debate over AB 705, where discussion occurred for the most part.

No formal announcement was made of the decision to terminate the project, and the decision was not reported in the local media until May 2009. At that time, company spokespeople emphasised that the reason for moving to an alternative location was a purely business decision. Occidental Petroleum, which had planned to buy the gas for its drilling operations in the Wilmington Field, had determined that the geology was not suitable and had therefore decided not to buy it.³⁹

5 Analysis of communication and public engagement approach

It is tempting to judge this project as a failure because the decision was made to end efforts to develop the carbon capture facility in Carson and the storage facility in Long Beach. If this is the case, then the obvious course is to look at what the project developers could have done to achieve a different project outcome. After interviewing key stakeholders,⁴⁰ learning more about the physical conditions in the proposed project area, and considering the intense political backdrop, the authors tend to agree with a conclusion offered by one of the stakeholders: the right outcome was achieved, although maybe not for the best reasons. Implicit in this view is the idea that, while the

³⁴ "Promoters of CO₂ Storage Prepare to Meet a Wary Public," Darren Samuelsohn, Greenwire, 17 October 2007.

³⁵ "Of Two Minds: Groups Square Off on Carbon Mitigation," Environmental Health Perspectives, Volume 115, Number 11, November 2007, page 548.

³⁶ Ibid, p, 549

³⁷ Ibid, p, 549

³⁸ "Public Safety Victory in California over Pet-coke Plant Dispute," TEXAS VOX, posted by Public Citizen Texas, 19 May 2009.

³⁹ "Plans for Carson 'Green' Power Plant are Dropped" *Daily Breeze*, 17 May 2009.

⁴⁰ See methodology discussion in Section 1.

project team may have done some things well and others not so well, additional factors outside its control had an enormous role in the project outcome. The Carson Project demonstrates very clearly the complex nature of CCS siting and its integral link to the political and social context, including broader energy policy issues and associated controversies.

5.1 Factors affecting the outcome of the project

Although the researchers' focus was initially on evaluating the communication aspects of the case study, closer examination revealed that much more than effective communication is involved in a successful project outcome – where success is defined as achieving the initial mission of siting a power plant and sequestering carbon dioxide. The situation in Carson was additionally complicated by the challenge of being a first mover. Thus, while gaining from the momentum that had built up for “clean, green energy”, the project also encountered many associated challenges. This section attempts to pinpoint some of these factors.

1. The project team conducted extensive communication and outreach using a tiered approach.

Initially the team contacted decision makers and opinion leaders at the state and community level. They organised a project announcement event to which almost 200 people were invited. Within the ensuing year, they brought on communication personnel who had experience with various stakeholder groups, including Latin Americans and environmentalists, and initiated a series of several hundred one-on-one and small group discussions and presentations. However, after the announcement, communication efforts became overwhelmed by concerns about air quality and environmental justice in the power plant location, and, in turn, these rolled into concerns about the role of CCS in the broader energy arena, particularly in the debate over AB 705.

As a critique, public outreach could have been more integrated into initial project planning and management. Clearly the project team anticipated some of the concerns that arose in relation to the project. However, the project carried so many benefits that perhaps this clouded the evaluation of the locally driven concern over air pollution and the potential difficulty of locating a facility in an area well known for its air quality and environmental justice issues. This oversight was compounded by the delay in contacting and potentially gaining support from especially vocal environmental justice spokespeople and the absence of this important community voice at the celebratory announcement. As concern about air pollution rose, it became possible for activists to raise unanswered questions about the site of the plant and the storage, contributing to a withering of active support.

2. Concerns about air quality and environmental justice dominated environmental considerations in the greater Los Angeles area and appear to have initially trumped concern about climate change, the safety of CCS and the economy.

The project development team proposed a project that addressed several important environmental concerns. It used a locally generated by-product, reduced truck traffic, potentially assisted in avoiding subsidence in Long Beach, and avoided contributive emissions in Asia that had an impact on Californian air quality. In addition, it would have demonstrated that large scale CCS could be achieved on a commercial basis, countering some industry claims. Economically, the project drew federal support (tax and USDOE incentives), retained economic and employment benefits locally, and would have contributed a revenue stream in a depressed area. And the project would provide carbon-reduced energy within California.

But the proposal to locate in an area with pre-existing severe air quality problems and a history of environmental justice actions to address those conditions meant that any increase in criteria pollutants locally, even if somewhat countered by local and global benefits, was going to be a major concern. Indeed, the earliest media coverage of concern about the project focused on a lawsuit involving criteria/conventional air pollutant increases on local populations from the capture plant, not about the integrity of the storage facility or the benefits of the project.

3. The high visibility focus on a first-of-a-kind power plant dominated the message and thinking, perhaps making it more difficult to recognise how strong opposition to criteria pollutants would become.

As a first mover, the project benefited from the momentum that had been building for CCS. This worldwide momentum was especially notable in California, which had taken many of the needed 'first mover' steps to bring ideals to reality. There was thus strong interest from state leaders and incentives to developers and host communities from emerging financial incentive programs. However, it is telling that the news release for the public announcement of the project highlighted the power plant and carbon capture and downplayed the storage component. This release indicated that the team was in discussion over a storage location in Long Beach, not that the plan had been finalised to firmly include that location as part of the project. As the project progressed, the storage aspects were increasingly questioned. Significantly, while media attention highlighted opposition from environmental justice activists, problems that emerged with the technical and commercial viability of the storage ultimately led to selection of an alternative site.

Initially, stakeholder perceptions of the project seemed to focus more on criteria pollutants than climate change or sequestration, although as discussions over the storage component proceeded, concern over the criteria pollutants became vocal. As a result, when questions about leakage, the safety of storage, and the potential impact on subsidence were finally raised at a much later stage during the AB 705 debate, those who were already opposed on the grounds of pollution, environmental justice and linkage of CCS to continuation of fossil fuels were more inclined to be suspicious. The suspicion was strengthened by the lack of a specific site that had been adequately characterised to point to, and there was no strong partner in charge of storage to stand up and answer the concerns.

Also emerging as the technical studies began were issues about commercial and technical feasibility of storage in the Wilmington oilfield. It was these issues that the project team reported as ultimately leading to the search for an alternative location.

4. Efforts by others to clarify what regulatory framework would or should apply added an unwelcome complication. These efforts coincided with, but were unrelated to, the development of the Carson Project.

In theory, the Clean Air Act and Safe Drinking Water Act provided most of the regulatory framework to permit a power plant and an injection project. However, neither of these addressed climate change. Further, the USEPA had indicated that it thought additional requirements might be needed to regulate sequestration but had not yet proposed the rules for sequestration wells (later proposed as UIC Class VI rules). California had authority to implement the permitting program for injection related to enhanced oil recovery, but not necessarily for storage. As a result, there was not a clear cut set of regulatory safeguards and requirements for the project or a well defined process for progressing the project.

In theory also, California AB 705, the bill requiring DOGGR to develop regulations for carbon dioxide storage in consultation with other agencies, should have reduced this regulatory uncertainty. It did not. Coming on the heels of several bills that supported CCS as a climate option, the introduction of AB 705 was seen by environmental justice activists as an effort to prevent them from having a forum for consultation. Although the Carson team was not involved in the legislation, the Carson project became a symbol in what turned into a heated debate about the future of energy projects in California.

5. Connections to the national and international debate on climate brought favorable and negative attention to the Carson Project.

In particular, growing partisan politics over climate change led key interest groups to act somewhat opportunistically, pointing to technology projects as both distractions and potential solutions. This created a confusing backdrop for local stakeholders' consideration of CCS.

Ultimately, the decision to drop the Carson Project was influenced by a set of business considerations. Complications over the ownership structure of the intended storage location made it difficult to work through commercial terms for the purchase and injection of the carbon dioxide. At the same time, it became a visible symbol of a long-standing debate about the role of fossil fuels in the energy future of California. The Carson Project represents a significant attempt to move into uncharted commercial territory at a pivotal time in the development of CCS; the lessons may benefit future projects.

Appendix 1 – Additional information about the national context

A.1 National context of CCS

A.1.1 Political activity

In the United States, political activity addressing climate change continued to rise over the last half decade, although the American Institute of Physics credits US statesman Benjamin Franklin with one of the earliest recorded papers to raise concerns about climate change in 1784.⁴¹ Flash forward to 1977: Representative George Brown of California introduced HR 6669, the National Climate Act, which established a “National Climate Program to enable the United States and other nations to understand and respond to natural and man-induced climate processes and their implications.”⁴² This was followed in 1980 by a report entitled “The Global 2000 Report to the President of the United States” that was developed by the US Council on Environmental Quality and summarized current knowledge on climate change.⁴³ In 1988 the United Nations created the Intergovernmental Panel on Climate Change (IPCC) to develop a comprehensive review of the science and implications of climate change; the IPCC delivered its first report in 1990 highlighting the global importance of addressing climate change.⁴⁴

The first major activity by the United States might be seen as its support of UN's Framework Convention on Climate Change (UNFCCC) under the first Bush Administration. This support ultimately led to the negotiation of the Kyoto Protocol under the Clinton Administration in 1997. However, the country by no means united in efforts to address climate change. During the Kyoto negotiations, the Byrd-Hagel resolution was adopted by the US Senate, expressing the “Sense of the Senate” that the country should not ratify the Kyoto Protocol if developing nations did not also agree to targets or if achieving greenhouse reduction targets would harm the US economy.⁴⁵ The Byrd-Hagel resolution passed several years after Newt Gingrich and the “Contract with America” ushered in a major shift in the US congress. Democrats lost their majorities and more conservative Republican majority did not support adoption of climate policies that were perceived to be unwarranted and too expensive.

The presidential election of 2000 was hard fought, and the legitimacy of the outcome was challenged by many, primarily splitting along the lines of strong conservatives who supported the Supreme Court decision and strong liberals who did not. In regards to climate change and the role of CCS, battle lines continued to be drawn when shortly after being elected, President Bush withdrew his campaign pledge to support of clean coal technology research and the development of requirements to reduce, among other emissions, carbon dioxide. In March 2001, President Bush wrote a letter to Senator Hagel that, according to CNN, President Bush “noted that carbon dioxide was not considered a pollutant under the Clean Air Act and said a recent Department of Energy review had determined ‘that including caps on carbon dioxide emissions as part of a multiple emissions strategy would lead to an even more dramatic shift from coal to natural gas for electric power generation and significantly higher electricity prices compared to scenarios in which only sulfur dioxide and nitrogen oxides were reduced.’... The environmental group, Sierra Club, was outraged.”⁴⁶

The Pew Center on Climate Change, founded in 1998, is a bi-partisan organization focused on the issue reports that the “number of climate change-related legislative proposals increased from seven introduced in the 105th Congress (1997-1998) to 25 in the 106th Congress (1999-2000), to over 80 in the 107th Congress (2001-2002) to 96 in the 108th Congress (2003-2004). One hundred and six legislative proposals were introduced in the 109th

⁴¹ American Institute of Physics, The Discovery of Global Warming – bibliography by Year, accessed online July 3, 2010 at: <http://www.aip.org/history/climate/bibdate.htm>

⁴² Thomas, The Library of Congress, HR 6669 – CRS Summary, accessed online July 3, 2010 at: <http://thomas.loc.gov/cgi-bin/bdquery/z?d095:HR06669:@@D&summ2=m&TOM:/bss/d095query.html>

⁴³ Council on Environmental Quality, “The Global 2000 Report to the President of the U.S.” Washington, DC, U.S. Govt. Printing Office, 1980.

⁴⁴ IPCC, History, accessed online July 3, 2010 at: http://www.ipcc.ch/organization/organization_history.htm

⁴⁵ Thomas, Library of Congress, S.Res. 98, Text, accessed online July 3, 2010 at: <http://thomas.loc.gov/cgi-bin/query/z?c105:S.RES.98>

⁴⁶ CNN, Bush Reverses Position on Emissions Reductions, March 31, 2001, accessed online July 3, 2010 at: <http://archives.cnn.com/2001/ALLPOLITICS/03/13/power.plant.emissions/index.html>

Congress (2005-2006).”⁴⁷ Although several of these proposals included firm targets for greenhouse gas reductions, to date none of those bills has garnered enough votes to pass. Instead, the US congressional activity is characterized by a number of bills promoting clean technologies and further study of climate change. Many of these proposals included provisions for funding the research, development, and deployment of carbon capture and carbon dioxide sequestration. This has fueled debate that persists today about whether CCS is a real option for addressing climate change or a boondoggle.

A.1.2 Regulatory developments

CCS is comprised of three main suites of technologies, each of which is federally regulated under separate programs. The carbon dioxide capture portion is typically associated with air emissions, and although CO₂ is not yet a regulated gas, many have assumed that the model for regulating carbon capture can be found under air pollution control programs administered by the USEPA or delegated to States. Pipeline transportation is typically the purview of the Office of Pipeline Safety within the US Department of Transportation. And injection operations are regulated through the Safe Drinking Water Act's Underground Injection Control (UIC) program that is administered by USEPA or delegated to states.

Within the UIC program there are currently five classes of wells.⁴⁸ Class I wells are for the disposal of hazardous wastes, industrial non-hazardous liquids, or municipal wastewater. Class II wells are used for the production of hydrocarbons, the disposal of fluids related to hydrocarbon production, or the underground storage of hydrocarbons. Class II and IV wells do not pertain to CCS. Class V wells include all other wells not covered by Classes I-IV. Typically Class V wells are shallow or involve an experimental technology. Typically, Class I and Class V wells are administered by USEPA or a state environmental protection agency. Typically Class II wells are administered by the natural resources agency within a state. Oil and gas fields are regulated with a strong eye towards conserving or optimizing the natural resource, so while injection operations must not contaminate drinking water supplies, they face somewhat less stringent requirements than Class I injection wells.

As CCS gained prominence as a potential option for addressing climate change, the issue of regulatory oversight of carbon dioxide storage also gained prominence. At the heart of the discussion was a concern over who would regulate carbon dioxide storage, how stringent the regulations would be, and whether efforts to regulate CO₂ injection for sequestration would interfere with enhanced oil recovery operations using CO₂ that are currently permitted under Class II.

At the time of the Carson Project was announced, the regulatory path for carbon dioxide storage was not certain. USEPA had convened an internal workgroup in 2005 to review CCS. In 2005 this group sponsored two technical workshops on the CCS issues.⁴⁹ Later, in 2006, the Director of the Office of Ground Water and Drinking Water issued a letter to State and Regional UIC contacts indicating that USEPA was reviewing the issue of CCS and recognizing that the Regional Carbon Sequestration Partnerships (RCSP), a research program administered by the USDOE would likely be seeking permits for a series of pilot injection projects. In this communication, USEPA indicated support for the use of Class V Experimental permits for these pilot projects. USEPA continued to sponsor technical workshops on specific CCS issues. In 2007, USEPA clarified its position on CO₂ injection by issuing USEPA Joint Guidance UICPG#83 on using Class V Experimental Technology classification for permitting pilot projects. Interestingly, UICPG#83 was jointly issued by the Office of Ground Water and Drinking Water and the Office of Atmospheric Programs.

Stakeholders raised several concerns about the existing UIC regulations. The UIC program was designed to protect drinking water supplies, not to address climate change; therefore one concern was that program would not have authority to address potential CO₂ leaks that did not threaten drinking water supplies but nonetheless had potential to impact the atmosphere. Further, current injection efforts were either much smaller in scale than was envisioned for CCS or related to production operations in which reservoir pressures would be maintained not increased. This led to questions about whether the existing program was sufficient to adequately ensure that CCS would be safe.

⁴⁷ Pew Center on Climate Change, Legislation in the 109th Congress Related to Climate Change, accessed online July 3, 2010 at: <http://www.pewclimate.org/federal/congress/109>.

⁴⁸ See US EPA UIC Program: Classes of Wells - <http://www.epa.gov/safewater/uic/wells.html>.

⁴⁹ US EPA, UIC Program, Geologic Sequestration of Carbon Dioxide, accessed online July 3, 2010 at: http://www.epa.gov/safewater/uic/wells_sequestration.html.

Other concerns were also raised. During this period USEPA continued to host technical workshops in which it sought information from experts regarding carbon dioxide storage. This work culminated in USEPA publishing, in July 2008 proposed rules under the UIC program creating a new Class VI well for geologic storage of carbon dioxide. Since that time USEPA has published a Notice of Data Availability (NODA) for the proposed Class VI rules and they have conducted hearings, technical workshops and webinars. It is expected that USEPA will finalize the rule by 2011.

During the active period for the Carson Project, it was not clear if, how or when USEPA would establish a regulatory framework specifically for carbon dioxide storage. Lack of regulatory certainty was often cited as hurdle to the deployment of CCS projects even though the Carson Project was attempting to move ahead within the existing regulatory framework.

A.1.3 Regulatory developments – other states

Efforts to develop climate policy and to address CCS were active at the state level during this timeframe. No state was more active than California and efforts within the state will be discussed in section 2.2.

State Climate Change Activities

In 2003 the Governors of ten Northeast States announced an initiative to develop a regional carbon dioxide control program. This effort led to the development of the Regional Greenhouse Gas Initiative (RGGI) that became effective in 2009. At the same time, more than 20 states including New Mexico, Maryland, Pennsylvania, Rhode Island, Texas, Illinois, New York, Vermont, Washington, Montana, Iowa, New Jersey, Arizona, Wisconsin, Colorado, Michigan, Oregon, Minnesota and Hawaii adopted policies that required or strongly encouraged the development of renewable energy and energy efficiency programs (e.g., renewable portfolio standard (RPS), alternative energy portfolio standards). And, about 20 states, including the 10 Northeast States of RGGI, New Mexico, Arizona, Alaska, Illinois, Hawaii, Oregon, Utah, (and California) adopted programs that directly addressed climate change through reduction requirements or incentives. In addition, Washington implemented its rule requiring all new power plants to meet a carbon dioxide emission performance standard and allowing them to meet this standard using CCS. Importantly, during this timeframe New Jersey passed a law classifying CO₂ as a contaminant and several states rejected bids to develop new power plants (e.g., Kansas) that did not address climate change.

State CCS Activities

The states were also very active with regard to CCS. Some states were more focused on the environmental protection aspects of CCS and others expanded their focus to include a variety of issues that arose out of the world of commercial development of natural resources. By 2006 there was a growing discussion about several issues, including:

- *Property rights:* who owned the rights to the pore space in the subsurface and what happened if the mineral right rights were actively being used for mining, hydrocarbon production, natural gas storage or some other activity? In addition, questions arose about what was the relevant pore space, was it the extent of the modeled CO₂ plume, the area of elevated pressure in the subsurface or something else? Could efforts used to unitize oil fields where there were multiple owners be used in carbon dioxide storage?
- *Liability:* it was not clear if CO₂ would be deemed a commodity (it was being purchased for EOR) or a waste, and if a waste could it trigger RCRA liability? Also, the purpose of carbon dioxide storage is permanent isolation from the atmosphere. This timeframe begged the question of who would take responsibility over time if injected CO₂ leaked.
- *Regulatory authority:* There was a serious question about whether USEPA should regulate CO₂ injection or if it should fall to another agency. The Interstate Oil and Gas Compact Commission (IOGCC), established in 1935, is a 30-state government agency focused on the conservation of the nation's oil and natural gas resources while working to protect public health, safety and the environment. Recognizing the potential overlap between regulation of carbon dioxide for purposes of EOR and sequestration, the IOGCC initiated

⁵⁰ IOGCC, Resolution 02.122, 2002

a taskforce in 2002 to “take a lead role in the coordination of an effort to develop regulatory guidelines and/or guidance documents on carbon dioxide capture and storage.”⁵⁰ The IOGCC taskforce coordinated with the natural resource and groundwater protection regulators in its member states, geologists, USDOE and USEPA to develop a model statute and guidance document for carbon dioxide storage⁵¹ which found:

A key conclusion of that report was no other jurisdiction has the experience and expertise of the states and provinces in the regulation of oil and natural gas production and natural gas storage – factors critical to the effective regulation of the geologic storage of carbon dioxide.

Although the Task Force recognized in Phase I that states and provinces might have statutory and regulatory frameworks that could accommodate CO₂ injection and storage, they also recognized that some modification of those frameworks would likely be necessary, particularly for the post-operational phase for which no regulations existed.

A.1.4 Environmental groups (ENGOS)

The past decade has shown that the environmental community is not homogenous in its views on CCS— particularly at the national level. Further, even within specific environmental groups there may be subgroups with differing views on a topic. So, for example, within a single ENGO, those members focused on climate change might be cautiously supportive of CCS because of its promise to deliver large reductions, whereas others who are focused on environmental justice or biodiversity might be somewhat opposed because of the criteria pollutants and the impacts to habitat from mining coal. This potential for differing views was exacerbated by different views on how to best secure meaningful climate change policy, with some viewing CCS as a means to achieve climate change goals and others viewing it as undermining such goals by competing with cleaner energy sources. Some of these differences in perspectives were played out in the Carson arena.

Environmental groups can play a key role in the public perception of CCS. In 2005, the environmental community was sending mixed signals about CCS⁵² as demonstrated in the following quotations:

From an NRDC presentation:

“CCS: Deployment Must Begin Now

- *Further delay will increase climate protection costs.*
- *Further delay will not reduce technology costs.*
- *Impacts of CCS on electricity prices are modest.”*

From a Greenpeace Blog:

“Take “carbon capture and storage” for instance; the ‘suck it out of the sky and stick it under a rock’ approach. This process promises to trap CO₂ from the burning of fossil fuels and store it in the sea or under the Earth’s surface. Even if it delivers it won’t be ready for at least 15-20 years, it will increase the cost of power generation, reduce the efficiency of power plants and require long-term monitoring to make sure the CO₂ stays put. Whilst money is diverted into these future technologies in a bid to continue business as usual, proven renewable and energy efficiency technologies that are ready to use now lack investment from both governments and industry.”⁵⁴

⁵¹ IOGCC, CO₂ Storage: A Legal and Regulatory Guide for States, (2008) available online at: <http://iogcc.myshopify.com/collections/frontpage/products/co2-storage-a-legal-and-regulatory-guide-for-states-2008>

⁵² Stephens, J., Growing Interest in Carbon Capture and Storage (CCS) for Climate Change Mitigation, Sustainability: Science, Practice, and Policy, Fall 2006, Volume 2, Issue 2, <http://ejournal.nbii.org/archives/vol2iss2/0604-016.stephens.html>

⁵³ Hawkins, D., “CO₂ Capture & Storage – Just Do It!,” presentation to USEA, August 2005, accessed July 3, 2010 at: <http://www.usea.org/Programs/CFFS/CFFSErice/Presentations-Remarks/Hawkins%201100.pdf>

⁵⁴ GreenPeace Blog, August 2005 accessed July 3, 2010 at: <http://www.greenpeace.org/international/en/news/features/USAsiaPacClimatePact111/>

Case Study of the Carson CCS Project

Attributed to Sierra Club in an NPR story:

“Environmental groups are opposed to this research. Dan Becker with the Sierra Club thinks government should focus instead on reducing CO₂ emissions but, he says, the Bush Administration appears more interested in finding solutions that allow the fossil industry to continue polluting.”⁵⁵

A.1.5 Industry response

Industry response also was not uniform. There is anecdotal evidence that companies involved in EOR were expressing confidence in discussions in the halls of Congress and at the state level that CO₂ injection could be done safely and cost effectively. Likewise, the electric utility industry, representing the companies likely to have to implement CCS, expressed concern about the reliability and cost of CCS. While it may not be obvious, these perceptions are not mutually exclusive; rather, they reflect a conflation of the component technologies involved in CCS. There was a lot known about injecting CO₂ for EOR and a 35+ year history of such operations, while at the same time, carbon capture had not been applied at a large scale to power generation plants. Taken together, these technologies make up carbon capture AND storage.

An analysis of climate change policy by Deutsche Bank Research captured this divide as follows:

“There is no single industry position on climate change, given the broad and deep divergence among potential losers and winners from both climate change itself, and any regulatory efforts to address the problem in the United States. Debate over the scientific evidence as assembled by the IPCC has given way to disputes over the economic impact of the various intended remedies.”

Given the weak industry profile on the climate change issues, it is easy to see how some stakeholders might perceive efforts involving industry to develop CCS and other advanced climate technologies, such as the hydrogen car, as not very promising in the near-term.

A.1.6 Federal agency response

At the time of the proposed Carson project, federal action to encourage commercial deployment had begun. Under the USDOE's RCSP Program, seven regional partnerships had been established in 2003. Approximately 20 regional demonstration projects had scheduled nationwide, beginning in 2005. Although these were primarily small-scale tests sequestering a few thousand tons, their activities served to increase awareness and involvement by a wide range of stakeholders. Among these was the WESTCARB partnership, which included California among its partner states.

⁵⁵ NPR, Morning Edition, U.S. Eyes Burying CO₂ to Battle Climate Change, October 4, 2004, accessed July 3, 2010 at: <http://www.npr.org/templates/story/story.php?storyId=3917655>

Appendix 2 – Interview guide

Discuss informed consent with participant and ask to sign and return letter. Notify participants that they can stop the interview at any time. Notify and receive consent from participant that the interview will be audio-recorded.

1. Tell me a little about you, your prior experience and what brought you to the project?
2. [For those related to project INDUSTRY, GOVERNMENT, RESEARCHERS ETC]
What was your specific role in relation to the project XX? Why did you get involved in that role?

OR

[For others in the community: LOCAL COMMUNITY NGO's OTHERS ETC]
How and when did you first hear about the project?
3. How would you describe your relationship to the local community?
 - a. If multi-generational, going how far back?
 - b. Do you own, rent, or work in the subject community?
 - c. How long have you been in the community?
4. How would you describe/(characterize) the/your local community?
 - a. Close knit, rural, urban, in decay, vibrant, etc - can you provide some examples that demonstrate this?
5. What do you know about sequestration/carbon capture and storage - what is your level of expertise, experience with CCS (country specific)?
6. Did you know about sequestration/carbon capture and storage before or after learning about the project in your community? (LESS LIKELY TO BE ASKED OF PROJECT PERSONNEL, GOVERNMENT ETC)
7. What were the benefits that the developers communicated about the project?
 - a. How were they presented?
8. What do you think were the benefits of the project to the/your community?
9. How did the community perceive the benefits?
10. What do you believe were the main questions/issues raised by stakeholders in the community?
11. What is the community perception of the project developer?
12. Was community engagement a project priority? How was the community engaged? What information was presented about the project?
13. Can you think of an event or circumstance when things related to the project and how the public viewed it went very well?
14. Can you think of an event or circumstance when things related to the project and how the public viewed it went poorly?
15. Was there a particular event that marked a change in the level of public acceptance towards the project?
 - a. What happened?
 - b. [If INTERVIEWEE IS RELATED TO PROJECT]: How did you respond?
16. What other information would stakeholders have liked to have heard or seen?
 - a. Were there any unanswered questions?

Ask participants if they are willing to provide educational background information, how long lived in community, and other information they believe might be important to understanding their role in the community.

Appendix 3 FutureGen Project – United States of America

FutureGen Case Study

By Gretchen Hund¹ and Sallie Greenberg²



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²Illinois State Geological Survey – Advanced Energy Technology Initiative

In fulfillment of Task 1 for CSIRO on behalf of the Global CCS Institute:

International Comparison of Public Outreach Practices

Associated with Large Scale CCS Projects

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ILLINOIS STATE GEOLOGICAL SURVEY

UNIVERSITY OF ILLINOIS

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Glossary

American Electric Power (AEP)
 Carbon Capture and Storage (CCS)
 Carbon Dioxide (CO₂)
 Center for American Progress (CAP)
 Department of Commerce and Economic Opportunity (DCEO)
 Environmental Impact Statement (EIS)
 Environmental Impact Volume (EIV)
 Illinois State Geological Survey (ISGS)
 Integrated Gasification Combined Cycle plant (IGCC)
 International Non-Governmental Organisation (NGO)
 Megawatt (MW)
 National Environmental Policy Act (NEPA)
 Request for Proposal (RFP)
 US Department of Energy (DOE)

Executive summary

What is FutureGen?

FutureGen was created as a partnership between the US Department of Energy (DOE) and the FutureGen Alliance (Alliance) – a non-profit consortium of around a dozen coal companies and electric utilities with operations around the world.

FutureGen was designed as a competition for US communities to vie to be selected as the host site for a near-zero emissions power plant using carbon capture and storage (CCS). The Alliance is responsible for designing, building and operating the facility and led selection of the host site.

FutureGen would be a model for the integration of power generation and CCS while serving as an international research facility for energy and climate mitigation technologies. A central mission of the Alliance is research and the underlying intent for FutureGen is to share lessons learned broadly so that the technology can be replicated around the world to help address climate change.

Twelve states entered the competition to be selected as the host site for FutureGen. Two states emerged as the semi-finalists – Illinois and Texas – each with two sites in the running. Each of these states had strong teams working on technical issues and community engagement.

This paper is a retrospective view of the FutureGen project, which was initiated in 2006. (Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.) This report details the Alliance's effort and the Illinois FutureGen Team's community engagement activities and the perceived effectiveness of this engagement. The timeline is from July 2006, when the four semi-finalist sites were selected, through December 2007, when Mattoon, Illinois was selected as the final site, and ends one year later.

The research team conducted interviews with nine stakeholders from various perspectives to hear their views of the Mattoon community, how they became involved in FutureGen, and their perceptions of the project overall, the engagement process specifically, and the stakeholders involved. The report also includes a media analysis during this 29-month period – identifying the themes reported, how they changed, and the percentage of positive, negative and balanced or neutral coverage over this period.

Lessons learned

Unique to this case was that competition served as a motivator in the site selection process. The Illinois FutureGen Team was interested in identifying communities that met three types of criteria defined by the Alliance: (a) qualifying criteria, (b) scoring and best value criteria, and (c) final decision criteria. The successful sites were solid technical matches with the criteria but also were able to demonstrate community enthusiasm. Future project proponents may consider adding public acceptance as an explicit criterion in evaluating sites. Self-selection was found to be an effective community engagement ideal, which allowed communities to consider pros and cons of projects before project commitments and created a situation where the competing communities became invested in winning.

Cultivating community pride through this process was seen as an important achievement. Pride centered on being selected as the national and international focal point for hosting this new, research-based, integrated power plant of the future. Closely related were the altruistic benefits viewed by an early-adopter community in being at the forefront of energy research.

Stakeholders felt that cooperation and coordination were important in winning FutureGen. Communities that historically had not worked together were collaborating to ensure that FutureGen came to Illinois, regardless of which of the two semi-finalist sites was chosen. In addition, a neighboring community to Mattoon was to provide water for the plant and was home to a university; both were seen as important assets to the proposal. This level of cooperation was new to the participating and neighboring communities and continues beyond the scope of FutureGen.

Understanding specific and varied audiences was critical to stakeholder engagement. The Alliance, the state, and local project proponents spent time preparing for engagement by doing their homework and knowing the perspectives of stakeholders before engaging them. Key observations include that background, generational influences, and social characteristics of the community may provide increased stakeholder understanding. Seeking input from audiences about what information will be of interest to them and providing that information in

a timely manner can be beneficial to engagement. Allowing time for audiences to absorb information and keeping the lines of communication open to answer additional questions as they arise is essential.

Understanding where people got their information, providing accurate and consistent information were critical aspects of community engagement. Key strategies included:

- being prepared to provide information early and often
- providing consistent information created by multiple sources (often with varying perspectives)
- providing accurate information so that people are not left with false expectations.

Ensuring that stakeholders have access to technical experts, not just project proponents, to answer questions through multiple venues was important for building trust. Informal sessions provided stakeholders with the opportunity to become more familiar with the technical issues around a project. Engagement can also be powerful by using third-party scientists (not the project proponent) to describe how CCS works. Such experts can provide credibility, particularly if they represent an organisation in the region. The Illinois State Geological Survey (ISGS) was an example of this. The ISGS also used a three-dimensional physical table-top model of CCS which helped stakeholders visualise how CCS would work.

Using different engagement approaches, depending on audience, maximised the reach and diversity of stakeholders, and improved the level of free exchange in the dialogue. Early meetings were important in defining what issues stakeholders were most interested in and what information they found helpful. Meetings with groups from similar backgrounds provided an opportunity to engage with their peers and speak freely.

Transparency and access built trust by encouraging input and engaging stakeholders by providing information in a timely and open manner.

Public acceptance of a CCS project may have been facilitated by the project developer spending time in and getting to know the community. The Alliance held board meetings in Mattoon, opened an office in Mattoon, and attended community events which were appreciated by stakeholders interviewed.

The challenge of planning and implementing a long-term project (tens of years) in conjunction with shorter-term political periods (one to four years) is significant. Varying timeframes can be impacted by changes in funding, political agendas, policy decisions, local and national economic importance, and many others. For example, different administrations have different priorities and federal funding is allotted annually. Federal government commitment for multi-year projects can change based on available funds, political shifts, and other socio-economic concerns. It is important for project developers to recognise that this cyclical impact can be misunderstood and frustrating for local communities who have spent enormous resources in time and money to attract a project. At the time of this report, FutureGen's future is unsure as the current administration decides whether to move forward with support¹. No easy solution to this challenge exists, but similar projects may want to take into account the strain that this uncertainty can place on a community.

These lessons learned are intended to help future CCS project developers design stakeholder engagement processes. Stakeholder involvement is not a static approach or a box to be checked but a dynamic process to be used and evaluated throughout a project. By engaging stakeholders, a project proponent can understand what issues and concerns are critical to a community and consider them in designing the project. Stakeholder input can be viewed as a form of consulting that values local knowledge and can improve the design of a project.

¹ This paper is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.

1 Introduction

Carbon capture and storage (CCS) is viewed by many as an important tool in reducing anthropogenic carbon dioxide (CO₂) emissions. The United States Government decided to create a public-private partnership to develop a flagship commercial-scale project that would design, build and operate a world-class research-based power plant with CCS. This partnership, known as the FutureGen Alliance (the Alliance), was between the US Department of Energy (DOE) and a dozen electric utilities and coal companies from around the world. Furthermore, other nations signed on as partners to contribute to the research.

This report describes the stakeholder engagement processes that occurred during the most active years of the project – from when a list of twelve sites vying to be selected to host the site was narrowed to four (June 2006), through the selection of the final site in December 2007, and ending one year after this site was selected (December 2008). Interviews were conducted with many critical stakeholders in December 2009 asking them to reflect on their engagement and knowledge of the project during this period.

An analysis of media reports during this period was conducted to understand where the story was covered, how the project was depicted, and how the issues changed over time².

Finally, a set of lessons learned is provided to assist future projects focused on CCS. Insights into which engagement strategies worked well and what approaches could be improved or were not helpful are also included.

2 Location and site characteristics

The Alliance was created in September 2005. It established a competitive process for selecting the FutureGen site and issued a Request for Proposals (RFP) from potential host communities in March 2006 (Fed. Reg. 71, 145, 2008). By 9 May 2006, the economic development organisations of a dozen communities from seven states had responded, generally motivated by job potential, economic development and the opportunity to host a world-class research facility.

The Alliance used extensive siting criteria to evaluate the proposals³ and, in July 2006, selected four semi-final sites: two in Texas and two in Illinois. All four were in rural communities. Both Illinois sites are in central Illinois and near farming communities. One of the Texas sites is north-east of College Station in a cattle farming area but also near coal lignite mines. The other Texas site is near Midland/Odessa, an area known for oil and gas exploration. Of these four semi-final sites, the Alliance selected Mattoon, Illinois as the site for FutureGen in December 2007.

The Illinois Basin is recognised as a significant target for geologic sequestration (MGSC, 2005). The subsurface geologic basin covers 155,400 km² (60,000 mi²) and has the potential for enhanced oil recovery, enhanced coal bed methane recovery and storage in deep saline reservoirs. The target geologic unit for FutureGen is the Mt Simon Sandstone, an approximately 488 m (1,600 ft) thick heterogeneous sandstone. The Mt. Simon directly overlies Pre-Cambrian basement igneous rock and is overlain by a thick shale cap rock, the Eau Claire Shale. The Illinois Basin stratigraphic sequence also contains secondary and tertiary caprocks between the Eau Claire Shale and the surface (Kolata, 2005). The top of the Mt. Simon Sandstone at Mattoon is approximately 1,800 m (6,000 ft) beneath the surface. Groundwater in the area is derived from surface sources or from sediments 30 to 60 m (100 to 200 ft) beneath the surface (MGSC, 2005).

Mattoon is a rural community located in Coles County, Illinois in the Midwestern United States (Figure 1). The county land area is 1,320 km² (510 mi²) (US Census Bureau, 2010). Total population in Coles County as of 2008 was 52,259 (47.9 per cent male and 52.1 per cent female) and the City of Mattoon has a population of 18,291 (US Census Bureau, 2008). The median age is 30.6 years, with 13.5 per cent of the population over 65 years and 5 per cent under five. The median household income in the county is \$35,307 (US 2008 inflation-adjusted dollars), with 58.6 per cent of the population over 16 in the labor force (US Census Bureau, 2008). The primary industries in Coles County are education, health and social services, manufacturing and industry.

²This paper is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are reactions regarding the recently announced restructured FutureGen 2.0.

³ Over one hundred More than 100 criteria were used in evaluating the dozen sites.



Figure 1. Map of United States with outline of Illinois Basin, a subsurface geologic feature. Mattoon, Illinois (shown) is approximately 300 km (185 mi) from Chicago.

3 National context

There has been a growing interest in CCS in the United States over the past several years. The US Congress through the US Department of Energy's National Energy Technology Laboratory has an extensive carbon sequestration research program. The DOE Regional Carbon Sequestration Partnership program consists of seven partnerships distributed regionally throughout the United States.⁴ Each partnership is conducting carbon sequestration research through a phased research approach from characterisation to validation and deployment. The goal is to learn as much as possible through this research and development program so that technology systems can be applied broadly in different geologies. DOE recently expanded its program to include CCS research projects using non-power plant sources of CO₂.⁵ DOE has also funded the development of regional training centres so that the future workforce needed for CCS operations can be trained and ready to apply its skills.

Individual companies are also investigating the use of CCS in combination with projects. Much focus over several decades has been on enhanced oil recovery projects. Many private projects have been started from a scoping/feasibility standpoint and then halted when it was apparent that costs were going to be too high. FutureGen was intended to help spread the risk and cost among many companies as well as the DOE, by sharing information gained through the development, design, implementation and operation of a model plant with the international research community and industry partners.

⁴ http://www.netl.doe.gov/technologies/carbon_seq/partnerships/partnerships.html

⁵ http://www.netl.doe.gov/technologies/carbon_seq/index.html

4 Characteristics of the Project

Table 1. Main characteristics of the FutureGen Project (as originally designed)⁶

Nature	The FutureGen Project seeks to demonstrate the combination of Integrated Gasification Combined Cycle (IGCC) power generation with the technical and environmental safety of the geological storage of CO ₂ in a deep saline reservoir 2.2 km (1.4 mi) underground in Illinois, United States. A significant component of this demonstration project is the comprehensive monitoring and verification of the stored CO ₂
Scale/size	275 MW plant – providing electricity to 150,000 homes (FutureGen Alliance, 2008)
Cost	US \$2.2 billion (in 2009 dollars if it were built that year)
CO ₂	One million tonnes per year
Source of CO ₂	Power generation in 275 MW IGCC plant
Project duration	The project RFP was initiated in 2006 and a final site was selected in 2007. The project was delayed in January 2008 and is currently under re-evaluation. A decision is expected to be made in 2010 as to whether FutureGen will proceed
Pipeline	CO ₂ storage will take place on-site. A short pipeline to deliver CO ₂ from source to injection well will be on FutureGen property
Location choice	Mattoon, Illinois was chosen after reviewing 100 technical site selection criteria which included quality of reservoir, seals, available water source, and a multitude of other factors including criteria relating to public acceptance (FutureGen Alliance, 2006). ⁷ The Mt. Simon Sandstone is the target reservoir, which is 1,800 m (6,000 ft) beneath the surface and approximately 488 m (1,600 ft) thick at Mattoon. It is directly overlain by the Eau Claire Shale, a dense, impermeable caprock
Site selection	The FutureGen Alliance considered 12 proposals for site selection. Four semi-finalist sites were selected, two in Texas (Odessa and Jewett) and two in Illinois (Mattoon and Tuscola). Mattoon, Illinois was selected as the winning site in December 2007. Following comprehensive site characterisation, it was found that the site is well suited to the geological storage of CO ₂ . A full Environmental Impact Statement (EIS) was conducted and a Record of Decision was issued, finding that there are no environmental issues that would mean forgoing selecting any of the semi-finalist sites.
Regulations	FutureGen will require an Underground Injection Control permit from the Illinois Environmental Protection Agency (EPA). A Class I Non-hazardous permit has been applied for and is pending at the time of this report. An air permit is required for the IGCC power plant. This permit will be applied for through the Illinois EPA
Current status (July 2010)	Pending funding decision from US DOE
Website	http://www.futuregenalliance.org/ http://www.futuregenforillinois.com/

⁶ This paper is a retrospective view of the US-based FutureGen project initiated in 2006 through 2010. Not included in this discussion are newly proposed project components of the recently announced restructured FutureGen 2.0.

⁷ Specific criteria included landowners and their willingness to allow monitoring to take place – physical access, legal access, and subsurface access. Right-away access for transmission lines and land use were also included. One of the dozen sites that was not selected did not score as highly as others because "...there are two housing developments located within one mile of the power plant site (and onsite CO₂ injection wells), which raises land use compatibility concerns..." (FutureGen Alliance, 2006). In addition to these very specific criteria concerning land access and proximity to neighbors, the site evaluation report states "a primary goal of FutureGen is to build industrial and public acceptance for future near-zero emission, coal-fueled power plants of similar design characteristics

4.1 FutureGen Alliance

The Alliance is responsible for the design, construction and operation of a 275 MW integrated gasification combined cycle (IGCC) power plant and a plan to capture and store 90 per cent of the CO₂ – about one million metric tonnes a year. The Alliance is a non-profit organisation with a research mission of sharing lessons learned so that the technology can be broadly replicated around the world.

The Alliance, at the time of semi-finalist site selection, consisted of 10 members. The members, with their headquarters' location, included:

- Alpha Natural Resources, Inc., (Linthicum Heights, MD)⁸
- American Energy Power (AEP), Inc (Columbus, OH)
- Anglo American Services (UK) Limited (London, UK)
- BHP Billiton Energy Coal Inc (Melbourne, Australia)
- China Huaneng Group (Beijing, China)
- CONSOL Energy Inc (Pittsburgh, Pennsylvania)
- PPL Corporation (Allentown, PA)
- Peabody Energy Corporation (St. Louis, Missouri)
- Rio Tinto Energy America (RTEA) Services (Gillette, Wyoming)
- Southern Company (Atlanta, GA)

Within six months of the announcement, two more companies joined:

- E.ON U.S. LLC (Louisville, Kentucky)
- Xstrata Coal Pty Limited (Sydney, Australia)

One year later (December 2007), Luminant (Dallas, TX), a subsidiary of Energy Future Holdings (EFH) joined the Alliance, increasing the membership to 13. At this time, these companies provided energy to tens of millions of residential, business, and industrial customers in Asia, Australia, Canada, Europe, China, South Africa and the United States, among other regions. These 13 companies remained members until after the final site was chosen.

Since that time, a few companies have left the Alliance, citing different reasons for ending their membership. The Alliance has been recruiting new members throughout the project. Two companies have publically stated that they are likely to join should DOE decide to continue support of the project. The current list of companies includes:

- Alpha Natural Resources, Inc. (Linthicum Heights, Maryland)
- Anglo American Services (UK) Limited (London, UK)
- BHP Billiton Energy Coal Inc (Melbourne, Australia)
- China Huaneng Group (Beijing, China)
- CONSOL Energy Inc (Pittsburgh, Pennsylvania)
- E.ON U.S. LLC (Louisville, Kentucky)
- Peabody Energy Corporation (St. Louis, Missouri)
- Rio Tinto Energy America (RTEA) Services (Gillette, Wyoming)
- Xstrata Coal Pty Limited (Sydney, Australia)

4.2 Site selection

The Alliance, as the project developer, focused on the selection of a suitable site. More than 100 criteria were used in evaluating the dozen sites competing to be selected (FutureGen Alliance, 2006).⁹ Specific criteria included landowners and their willingness to allow monitoring to take place – physical access, legal access, and subsurface

⁸ At the time of site selection, the company was Foundation Coal

⁹ A full list of the 100 criteria was given to all of the competing communities to help them prepare their proposals. A team representing the Alliance visited each of the sites, met with the local proponents, answered questions about the criteria that were made public, and walked the sites. Once the full proposals were received by the Alliance, two independent teams were established to review them. One team focused on the subsurface with regards to appropriate storage sites and the other

access. Other criteria included right-of-way access for transmission lines and land use. One of the dozen sites that was not selected did not score as highly as others because: "... there are two housing developments located within one mile of the power plant site (and onsite CO₂ injection wells), which raises land use compatibility concerns ..." (FutureGen Alliance, 2006). In addition to these very specific criteria concerning land access and proximity to neighbors, the site evaluation report states: "A primary goal of FutureGen is to build industrial and public acceptance for future near-zero emission, coal-fuelled power plants of similar design characteristics (FutureGen Alliance, 2006)." The stakeholder involvement team of the Alliance was also daily tracking media reports from all dozen sites to gauge community support. The states and communities competing to host the project conducted community engagement on a more local level, building project proponent teams, identifying key stakeholders, and working with the communities to increase public awareness and gain public acceptance.

4.3 Regulatory framework

From a regulatory standpoint, the project followed the National Environmental Protection Act (NEPA) process and had an Environmental Impact Statement (EIS) conducted by DOE. After Secretary Chu took office, DOE issued the Final EIS and the Record of Decision which found that there were no environmental issues with the four semi-finalist sites (74 Fed. Reg. 35174 (20 July 2009)). The State of Illinois passed legislation to accept long-term liability for the CO₂ injected under the site, knowing that it would be carefully monitored to verify the size and location of the plume (IL SB1704, 2008). The State of Texas had previously accepted liability for injected CO₂ in the early stages of the FutureGen competition and Illinois followed suit. The Alliance still has to receive an Underground Injection Control permit from the Illinois EPA and an air permit for the power plant.

4.4 Stakeholder involvement

Stakeholder involvement in the FutureGen process began in 2006 and continues to the present. Due in part to the competitive nature of FutureGen, the community engagement process was conducted on multiple levels. Because limited stakeholder involvement has occurred during the past 2.5 years while DOE's support was being reevaluated, this case study covers the period from the selection of the four semi-final sites (July 2006) to one year after the selection of the final site in Mattoon, Illinois (December 2008).

Outreach and engagement efforts on the FutureGen process began very early and were conducted on multiple levels by multiple parties. Levels of stakeholder engagement included national, regional, and local. The parties involved in stakeholder engagement and outreach ranged across semi-finalist sites, occurring from the FutureGen Alliance project development team, regional and local economic development organisations, and third-party scientific experts and many others. The lessons learned reflect perspectives from the successful site in Mattoon, Illinois and from the FutureGen Alliance process as a whole.

4.5 Timing of milestones and key events

After the final site announcement in December 2007, the DOE withdrew financial support for FutureGen, citing escalating costs as the reason for this decision. The budget was initially \$1.1 billion but due to increasing construction costs and infrastructure issues, the cost rose to more than \$2.3 billion in 2009 (in 2009 dollars, not adjusted for inflation). Despite this setback, the Alliance, along with the State of Illinois and the Mattoon community, remained committed to keeping FutureGen active.

Throughout 2008, the DOE worked to restructure the project. During this period, Congress protected funding for FutureGen and decided to extend the cooperative agreement between the Alliance and DOE, leaving the decision up to the new President and the administration as to whether FutureGen should be built.

Discussions between the Alliance and the new DOE Secretary Chu and his staff began soon after the beginning of the Obama Administration in January 2009. During these discussions, several technology configurations were evaluated to determine the most appropriate design to reduce cost and technical risk. In July 2009, DOE and the

focused on the surface with respect to the IGCC plant and ensuring that the appropriate infrastructure would be available. The day of the announcement of the four semi-finalist sites, the Alliance posted the full evaluation report on the website which added to the transparency of the site selection process. This report, Results of Site Offeror Proposal Evaluation, 21 July 2006, Submitted to the US DOE by the FutureGen Alliance can be viewed at: <http://www.futuregenalliance.org/news/newsarchive.asp>.

Alliance reached an agreement to proceed with a reconfigured IGCC plant with CCS, to be built in Mattoon, Illinois. Earlier this year, the Alliance provided the DOE with cost plans to review. DOE is scheduled to make a decision about supporting the construction phase of FutureGen, by the end of September.

Figure 2 depicts the project activity timeline for FutureGen, based on activities undertaken by the various stakeholders. The Alliance issued the project RFP in March 2006. Environmental Information Volumes (EIVs) were prepared by the Alliance for each of the four semi-finalist sites (FutureGen Alliance, 2007a, 2007b, 2007c).¹⁰ Much of the power plant site information in the EIVs was provided by the site proponents based on direction by the Alliance; information regarding the subsurface geology for the four sites was developed by Alliance subject matter experts. The EIVs were provided to DOE for use in the Draft Environmental Impact Statement. The EIVs were originally provided to DOE on 1 December 2006. They were revised in April 2007 to correct minor inconsistencies and update geologic information based on new data. The review and candidate selection process involved more than 200 stakeholder interviews and four site visits (one to each semi-finalist site). Community and media monitoring were conducted by the Alliance throughout the entire time covered in this report. The Illinois FutureGen Team initiated ongoing public engagement during the site proposal preparation process. As early as August 2006, the Illinois Department of Commerce and Economic Opportunity (DCEO) and ISGS held public meetings to explain the FutureGen concept and answer questions about the IGCC plant and CCS. Meetings with separate stakeholder groups were held throughout this period, including meetings with farm bureaus, neighbors, teachers and the general public. The DOE hosted public hearings at the four semi-finalist sites as part of the EIS process. Before these meetings, an open-house was held for the community, featuring Alliance and ISGS staff at different locations in the room so that attendees could informally visit with each and ask questions. Posters and schematics were used to explain the project. In December 2007, the Alliance finished its evaluation of the four semi-finalist sites and chose Mattoon, Illinois. A report on its evaluation was uploaded that day on to the Alliance's website (FutureGen Alliance, 2007d).¹¹

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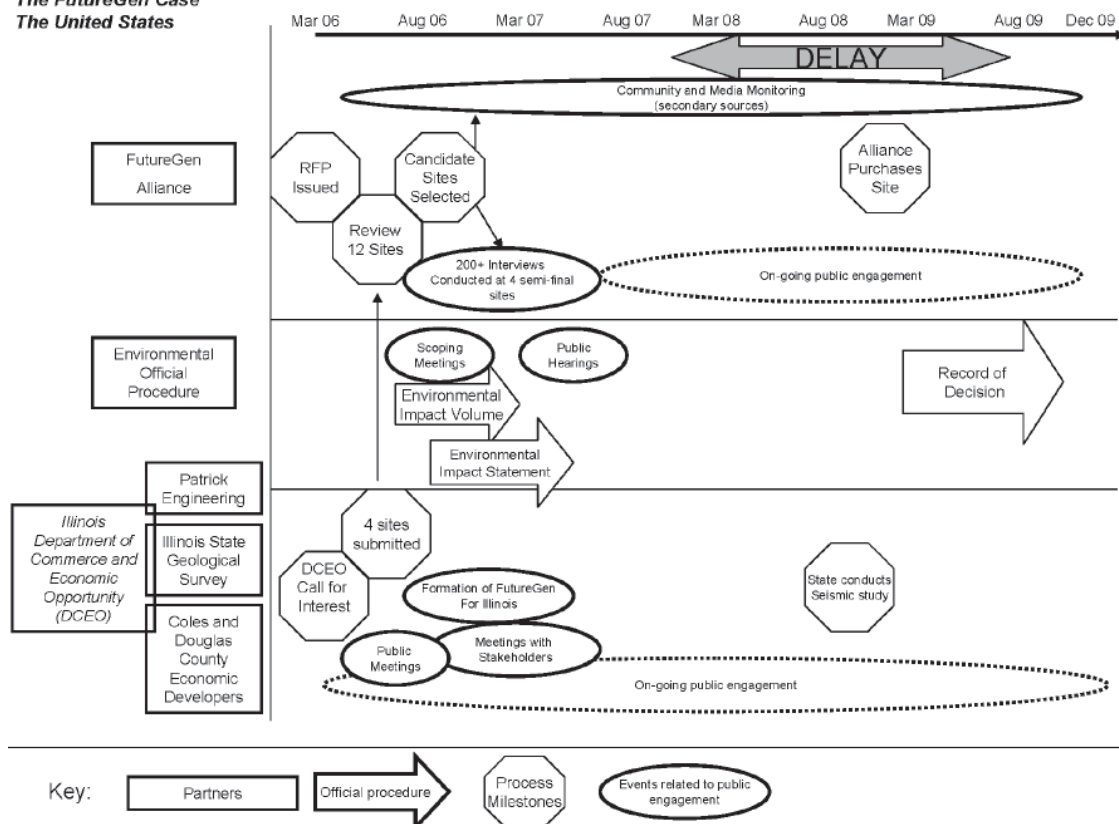


Figure 2. FutureGen milestones and events timeline¹²

¹⁰ See <http://www.futuregenalliance.org/news/evi.stm> to download the full EIV statements.

¹¹ See <http://www.futuregenalliance.org/publications.stm> to download the report.

¹² The events shown in this figure cover the time period of 2006 to 2009. Not included in this discussion are details and reactions regarding the recently announced restructured FutureGen 2.0.

5 Methodology

In November 2009, an international stakeholder engagement research team, funded by the Global CCS Institute, developed an interview protocol for an international comparison of five CCS projects and the public engagement surrounding projects in Australia (Otway, ZeroGen), the Netherlands (Barendrecht), and the United States (Carson, FutureGen) (Appendix A).

Primary and secondary sources of information about FutureGen and the public engagement process were used for this report. Primary source data was collected in December 2009 by the FutureGen research team, using the international team developed interview protocol, to obtain stakeholders' individual, retrospective opinions of FutureGen and their involvement in the project. Nine stakeholders were interviewed from the following perspectives:

1. Community project proponent
2. Neighbors of the proposed site
3. Community leaders – farm bureau and higher education representatives
4. State project proponent
5. National environmentalist

All but one interview was conducted in person (the other was conducted by telephone). The two-member FutureGen research team attended all interviews, which were recorded and transcribed. All interviewees were promised anonymity in that their names would remain confidential.

The following section summarises the responses from these stakeholders. It includes stakeholders' views of their community, how they became involved in FutureGen, and then describes the main perceptions of the project, the engagement process used and the people involved.

Secondary source data for this report was derived from Alliance (2006), Alliance (2007a, 2007b, 2007c, 2007d), MGSC (2005), unpublished reports, consultant prepared media analyses, and collected media articles.

6 Stakeholder interview responses

6.1 The community: A self-characterisation

Through the FutureGen site selection process, Mattoon, Illinois was chosen as the preferred location. Respondents were asked to characterize the community. Some described it as a stable to progressive community for its size and location, whereas a few felt the area's economy was stagnant with poor job potential. The lack of well-paying jobs was mentioned by each respondent as a major factor in the community. Concern was expressed that younger generations would not be able to find jobs nearby and would leave the community. Respondents characterised Mattoon as a "close-knit," rural community where "folks tend to know each other" and many residents are multi-generational, some being the third or fourth generation to live and farm in the area. Several have lived in the same home for more than 40 years.

Many of the industrial jobs left the community in the 1980s and 1990s. The community has gone through various stages of growth, stability and instability in the past 30 years:

"When I first moved here, I would describe it mainly as a kind of manufacturing, blue collar type of community. We've seen that change a little bit over the years with more of an emphasis now being put on educational climate and healthcare, a little less emphasis on manufacturing. Some by design, some not by design, we've lost some fairly large manufacturing facilities here in the Mattoon-Charleston area that has caused that metamorphosis to occur."

There was a period of little change in the 1980s to 1990s and then a community renaissance began in the late 1990s. The community has become more progressive with a concerted effort to reinvent itself:

"Starting in the late 1990s, early 2000s, you saw a little bit of a growth spurt, not big, but just a little bit of a mini-renaissance, so to speak, and I think that's continued until today. Of the 30 years that I've lived in Mattoon, I think Mattoon is more progressive today and has more upside than in any of the other 30 years I've lived here."

Economic development, growth, and change are active goals of the community:

"They're doing things all the time ... our downtown area just looked horrible. They are redoing the stores downtown, getting some new business in. Downtown got pretty bad."

There is a strong sense of civic pride in the community and recognition that even if FutureGen might not be beneficial on an individual basis, it does benefit the community as a whole. While residents recognise that growth and change may be necessary, there is criticism by some that Mattoon, like many small communities, can be "cliquish" and "if you are not in the clique, you don't get anywhere".

Educational resources are highly valued in the community. Participation and integration of higher level educational institutions, by way of a two-year community college and proximity to two of Illinois' major four-year universities, bring diversity into the community:

"There is a segment of the citizenry that's been here for a long time, not interested in change, not interested in moving beyond that which is comfortable and known. The leadership and the folks that they elect to represent them are progressive. I think [the university] helps."

The community economic development office is very active in considering projects that could bring economic growth to the area and worked with the State of Illinois, the City of Tuscola, the City of Charleston and other regional experts to attract the FutureGen project to Mattoon. Mattoon was sophisticated in its approach to FutureGen and its representatives did their homework and took steps to educate themselves early in the site selection process:

"Mattoon knew what to do. They could figure it out. They knew what steps they had to take. The community was very gung-ho, very proactive, very supportive. They wanted to do a good job. They wanted the project."

FutureGen was one of many projects that Coles County has tried to win in the past several years, including other clean coal projects that have yet to come to fruition. The economic development team often submits 'blind' bids for projects that involve little information and no specifics, except the criteria the project developer requires, such as transportation, water or land. FutureGen is one of the largest capital investments for which the community has been considered.

Acting on behalf of the community, the local development office uses agreed criteria and instinct to determine whether to seek projects. It considers the balance between community benefits, challenges, resource allocation (i.e. water and/or land resources), community fit, environmental impact (i.e. pollution potential), economic growth potential, and other factors to decide if a project will be good for the community.

"Take into consideration what the community would like to have as a corporate citizen and not pursue things that would be a detriment or would use up all of our water and create ten jobs."

6.2 How interviewees became involved in FutureGen

The stakeholders interviewed for this case study range from local to state economic development professionals, neighbors close to the selected site, influential community leaders, farm organisation and national environmental group representatives. The level and timing of involvement in FutureGen ranged from those who were involved from the very early proposal writing stages and actively sought to make Mattoon the successful site, to neighbors and other residents who felt that the project came to them. Some heard of FutureGen through the economic development process, some from the local newspaper, and others at stakeholder meetings.

Respondents highlighted choice as an important dimension regarding their involvement. They viewed the project as a competition that their community was vying to win. The State of Illinois was instrumental in bringing the opportunity of FutureGen to the economic development community, including those in Mattoon. The State engaged economic development teams by soliciting proposals and levels of interest for specific areas that met geological criteria as defined by the Alliance. County-based economic development organisations would then decide to participate in the competition or not. Each community that met site selection criteria could choose to participate in the competition.

By contrast, the neighbors and community members did not have as much choice because the community leaders decided to go forward with the bid for the project. Some stakeholders felt they were faced with a potential

decision that could affect their lives. They then had to choose whether to be resigned to that decision even if they were uncertain about what it would mean for them personally in the long run, or they could become involved. Alternatively, citizens could have formed opposition groups. Little active opposition was voiced through editorials to the newspaper. One neighbor tried to organize neighbors but was unsuccessful, according to interview respondents. Many reported an element of surprise when they first heard about the project. Many citizens learned of FutureGen through the media. Public meetings and stakeholder meetings were held later in the process as proposals were being written and submitted, and as questions were raised by specific groups.

Those actively seeking to bring FutureGen to the community were initially more informed about project details and in fact acted as a primary source of information about the project for community members such as the economic development board of directors, farm bureaus, educators and the general community.

At early stakeholder and public information meetings about FutureGen, community response to the project was highly positive, as was media support. However, initially some neighbors were strongly against the FutureGen project and wrote letters to the editor of the local newspaper and tried to rally neighbors against the project. This was characterised by some respondents as an uncooperative and potentially obstructive approach.

6.3 Main themes heard in the interviews

6.3.1 Knowledge and awareness gained over time

Respondents reported that, during the course of the four years, there has been a growth of knowledge and understanding throughout the Mattoon community about CCS, clean coal technology, climate change mitigation in general and FutureGen specifically.

With no previous knowledge of geosequestration or CCS, the local economic developers had to bring themselves up to speed on the subject very quickly to present the FutureGen concept to the executive decision-making body within days of the first information meeting hosted by the State. Their knowledge increased from thinking “sequestration was something you did with juries” to:

“I can now talk at length about it and the geology at our site and the safety of the process ... and compare permanent sequestration to EOR, or to coal-bed methane, or even to the four finalist sites – the difference in the geology that made sequestration here potentially more doable from a permanent and research perspective.”

The community “engaged fully on this project and many of them now know quite a bit about sequestration”. Community members email to each other reports related to sequestration or carbon emissions or anything remotely related to FutureGen, carbon, sequestration, or clean coal. The “awareness and intellectual capacity of this entire community now related to sequestration is a lot higher”. Community members were engaged, knowledgeable and aware of related information on a local, national and international scale.

There has been an increase in knowledge of carbon sequestration among the community including schools. “I think the awareness even at the community college, the State University, and the K-12 system is much higher here now.” Public meetings were held at nearby elementary schools. The principal opened the meetings and voiced his support for the project. Parents were informed about the meetings and attended to learn more. Some of those interviewed felt that this was important in raising awareness.

The economic development team and others from the Illinois FutureGen Team needed to learn the concepts associated with CCS quickly with enough detail to be able to convey project details to wide audiences. To accomplish this self-education, they reported garnering knowledge from meetings with the FutureGen Alliance, Department of Commerce and Economic Opportunity (DCEO), speaking with stakeholder groups, the ISGS, and public meetings held during the Environmental Impact Statement process. They read as “much as we possibly could because we knew that we were getting hit with these questions and we really wanted to understand it and be able to answer them”. They utilised trusted resources and project developers, as well as media and reports to gain and disseminate information (ter Mors, 2009).

Many of the neighbors learned about the project from the local newspaper and television. Some had a little knowledge about CCS before the announcement of the FutureGen project. Some were aware that natural gas is stored in the subsurface in the region. Respondents reported that neighbor knowledge and understanding

increased throughout the project from limited knowledge to understanding differences between the Illinois and Texas site locations and what gave Illinois a perceived advantage over Texas in some respects:

"Better than down there. Because of the oil wells? Is that one factor?"

"That's what we hear. We heard about the [oil exploration] holes."

Some neighbors' knowledge of CCS came from what they read or heard in the project process. Two related participants differed in their knowledge and opinions about CCS. The older doesn't believe CCS will work; the younger believes the project can succeed and his knowledge has increased over the course of the project. The younger man attributes this belief to having his questions answered through engagement opportunities. A piece of information particularly important to creating this confidence in the site was seeing seismic results showing the redundant shale seals in the area:

"I don't understand all the science behind it, but from what I've seen yeah I think it can work ... seeing the actual survey results where you can see down, okay there is one cap, there is the second, there's the third. Now the scientists and the engineers have to go out and be able to drill it, plug it and make sure it stays there."

The sense of learning over time was remarked upon by several respondents, who cited motivation to understand the personal impact of the project as an important driver for gaining information.

"I do have a little better understanding ... but it is because I can pick up a piece here, a piece there ... I want to figure out what will happen because you can sit right there and see the plant."

Those who were in a position where they were called upon to answer questions by the public and other stakeholders reported experiencing a shortened timeframe for coming up to speed about the project and its impacts. They highlighted the RFP process as a driver for knowledge building.

A State representative reported that they educated themselves about CCS in real-time as they worked with the engineering firm in putting together the FutureGen RFP responses for four sites. They also used connections with the ISGS.

"The [ISGS] helped with the seismic and they helped with ... what is this carbon capture and sequestration? To define it and to educate us about what it is, so that when we were talking with the public, we can say, it is not dangerous. That was huge because there wasn't any outline, any format, all of this was just being put together ... We had the RFP, but it didn't say anything about leases or how much you would pay for a lease or how much area a pipeline needed or how big a space they needed."

As new issues arose throughout the project, the project proponents had to learn and respond quickly. Additionally, there were many issues for which answers had not been determined. They reported a groundbreaking, front-runner component to the work they did with the consequence that they often had little to no information.

"Somebody brought up this issue about pore space ... it was the question of mineral rights, and I have mineral rights with coal and gas, but does that go all the way to the centre of the earth?"

Others reported that access to experts was essential to the learning process:

"Over the three-year period that we've worked on this project, I've had the opportunity to sit next to some of the experts at different meetings along the way, attend some of the town hall meetings that were held, and have a pretty good handle on what carbon capture or sequestration was all about and how it works. When I first started, I couldn't pronounce it."

6.3.2 Perceived benefits

An important duality exists with respect to perceived benefits of FutureGen locally, regionally, and nationally. A distinction is made between major and minor, local and distal, even direct and indirect. Respondents reported that the competitive nature of the FutureGen process created a scenario in which the community was in a position to assess individual and global benefits that stem from FutureGen. They reported that it is seen as being a research project designed to provide an example of what power generation will look like. The community is seen as having a stake in this and being part of the research being conducted.

"This is a project designed to be a model internationally for how nations and companies will generate their power going forward from this day on."

For some, the project was initially seen as a significant job creator, but that perspective changed over time, with current estimates being much lower than originally stated. However, rather than focusing on job numbers alone, some of those interviewed felt that an important feature of FutureGen was that it provided the community with a way to contribute to the region by revitalising the Illinois coal industry and provide global climate change research solutions to the world.

FutureGen offered the opportunity to be a part of something larger than themselves; being part of the solution. The people of Mattoon think this project is about addressing climate change and that "in general climate change is happening".

"The citizens here hold that in esteem more than the notion that this is just another economic development project that's going to come in and create jobs ... This really is a piece of where we need to go in terms of developing opportunities to use coal to power this globe. People here really support that notion that they're part of something much bigger than just Coles County."

The potential to participate in a project of international importance and common good were recurrent themes:

"I think they felt they were doing the right thing for the country."

"... generally understood that they were doing it for the right reasons, and were pretty savvy about it all."

The idea that FutureGen was going to "put Mattoon on the map" and that this small community could make a global contribution was very prevalent in the interviews. Even though the project may no longer be the first of its kind, "folks around here are engaged enough now. They've followed the ups and downs and ins and outs, and they know why ... they still believe that it's a first of its kind. It is going to break new ground."

Innovation and contribution to the future was considered a benefit. FutureGen was seen as creating a new kind of coal plant – "a near-zero emission coal plant ... a way of using coal cleanly" and a source of new technology and innovation, an "effective way of conveying a break with the past". Initially, the main benefit communicated was regarding the "clean coal" or "zero emission" power plant. The sequestration message "became more pronounced as time went on". Images associated with the project include a graphic on the website showing multiple flags from around the world representing locations of the different Alliance partners' global operations.

Pride and contribution are important components of the community perception of benefits as reflected by questions and comments about whether FutureGen will "be first":

"We were going to be the first ... I think GreenGen and China are going to beat us. I think that when it comes to actual projects the Summit project in Texas at that runner-up site may actually go online first."

Those interviewed felt that the community demonstrated "savvy" in understanding the project and seemed to understand risks to some degree and "were not interested in the [project] just to make money".

"They understood the risks and that they were pretty small environmentally, and that the benefits to the globe were pretty huge, and that the benefits for their own economy were pretty strong too; that people would be flying in from all over the world if this was built, and that this could really put them on the map in a way that being a federal prison site wouldn't."

The perceived side benefits of the FutureGen project focus on the local and regional areas. The community is north of coal-mining regions in Illinois, but some members of the community have ties to the coal industry through family or family history. However, the interviews revealed that climate change mitigation is seen as a major benefit, with a revitalisation of the coal industry, through clean-coal and the utilisation of Illinois coal, seen as a side benefit:

"To put Illinois miners back to work, they understand that – that is a nice side benefit, but I don't see that as being the driving reason behind their support; I think it is climate change."

"We have a surplus of coal. So it is close by, if we can use it anyway, I know it is a benefit. They are not going to use too much other coal, right?"

Originally, the FutureGen project had considered using coal from outside Illinois, which was seen as unfavorable by the local community.

The perception persists in the community that other industry and support systems will benefit from the location of the project in Mattoon.

"All the support, industry, systems and retail that are going to spring up ... and then the research opportunities that may be here and research firms that may locate here ... it is going to have a positive economic impact ... it is going to change the economic landscape."

The use of US-based resources was seen as another positive component of FutureGen and a belief that FutureGen would result in a decrease in foreign fuel sources.

Respondents mentioned that information about the benefits associated with the project came from the local newspaper, word-of-mouth, neighbors, and specific stakeholder meetings held for neighbors. Some reported a considerable amount of discussion among the neighbors about who sold their property to the Alliance.

The community, in their opinion, viewed the project with respect to the pros and cons associated with hosting the project. The respondents reported that most of the community wanted the project to come and a few did not. There are people who want growth in the community and others who do not:

"Some people here in Mattoon want the community to grow and others want it to stay the same".

In discussing benefits with some neighbors interviewed, a sense of mixed feelings was evident and some could not say if they thought the project would benefit the community because the price being paid was great. The connection between the farmer and the land he farms was apparent in this conflicted view of FutureGen:

"Why do we need to lose the good farm ground ... you have to give up something very valuable."

"For me predictions are 20, 25 years from now the world population is going to increase another 20 per cent. And where we going to grow all these groceries at? If we keep taking land out for, well there's 400 acres right across the road [FutureGen site]. I can sit here and I can see it. Prime farmland. Going to be gone."

The sense of loss and impact is apparent when the topic of compensation is discussed with stakeholders. Even though farmers are compensated for the land, there are other impacts, such as *"they tear up the arrangement of your ground"* and even though market value is paid for the farmland, there is income lost from years of farm productivity remaining:

"There is no income loss [compensation]. I can farm that another 20, 25 years. The market value of it will not offset the income that I can make off it in those years."

Yet, even in the midst of discussion about loss of land and impact of the project on them personally, the interviewees wanted to know about the progress of the project.

Additional side benefits noted by the respondents were regional and local cooperation that emerged as a result of the FutureGen competition process. The cities of Mattoon and Tuscola worked together closely and in support of each other to be successful candidate sites. The cities of Charleston and Mattoon also worked together to provide creative proposal ideas for the site submission – *"something unheard of in the past"*. The project also energised the community and *"brought about a new level of can-do type attitude:"*

"The aspect of being selected as the site in the United States, I think there is a big boost in Mattoon. It caused a lot of people to rally around on that particular issue, which we never really had before ... even if we don't get FutureGen."

6.3.3 Engagement

Different levels of engagement were used throughout the project. Respondents reported on being engaged in different ways and/or being responsible for driving some of the engagement approaches. From the interviews it was clear that some people chose to participate in the FutureGen process, others chose to observe, and still others waited and/or wanted to be engaged or brought in by the project developers. All respondents agreed that the

project developer, the FutureGen Alliance, and project proponents in the state and the community made public engagement a priority.

Engagement happened in many forums and different sized groups. Public meetings were held throughout the FutureGen process. Some were hosted by the local economic development team in partnership with the Illinois FutureGen Team with participation by the Alliance. These were information sharing meetings that aimed to describe the project and discuss questions from members of the community about the project. Official public meetings were also held later in the process as part of federal regulatory requirements under NEPA. These meetings were hosted by the DOE to describe the project and enable members of the community to comment.

Many of the public meetings were conducted at two new elementary schools on either edge of the community. By having meetings at the schools, a neutral environment in the community, there was ample display and meeting space, allowing students, parents and other community members to attend and actively participate.

"Having the schools involved, and having the public meetings at the schools brought it in focus for parents of kids in those schools, because they had to become engaged if they were going to take an active position on it, especially the school close to the site. I think that brought people to the table that might not otherwise have noticed as much ... They became educated about the project, then they supported it for opportunities it provides for their kids – not just employment and education, but also the opportunity to have this plant right there in proximity to many of the schools and Lakeland – the community college – and what that means for their kids' awareness of what is going on globally. It brings something right here in our backyard that makes them part of a global initiative and global concerns."

Most respondents mentioned the role that the media played in information dissemination and airing of public opinions. A lot of information appeared in the local newspaper that explained the project and science. Meetings were publicised in the local newspaper. Information provided included location of the project and *"what they were going to do"* about carbon sequestration and the power plant.

The Illinois economic development office, DCEO, was seen by most respondents as the coordinator of community engagement from the state level. The engagement process was described as very sophisticated and well managed. Specific individuals were mentioned as *"unstoppable, but always able to listen"* and providing *"honest communication on this project"*. Relationships within the state and organisations like the farm bureau were seen as important to the engagement process. Most respondents mentioned that such engagement resulted in these organisations receiving access to multiple sources of information that helped build trust – an important factor to community acceptance:

"I think a lot of that has actually to do with the Illinois State Geological Survey, which is you know, highly regarded in this state ... I think that the geological survey was a key part in saying yes, this is credible, we can do this, and this site will work."

A respondent reported that multiple engagement events by trusted sources were important in the FutureGen process, from Washington D.C. to local meetings:

"I think it is not an accident that the finalist sites were located in states with the strongest geological institutions: the Illinois State Geological Survey and the Texas Bureau of Economic Geology."

Issues and questions addressed through outreach materials and posters added perspective:

"A diagram or poster that put in real scale how deep 7,000 or 8,000 feet of material is below the ground, relative to the injection zone and the ground surface."

Most respondents noted that models were seen as important engagement and outreach tools because they:

"... made clear what [sequestration] is and how the injection and storage works ... it was just great outreach and it was outreach in a bunch of directions."

Information presented during engagement opportunities included project overviews, "individuals of particular expertise to talk about particular components of the project", and the ISGS sequestration model. Posters with geological information of the area, open question and answer sessions, the perception of experts' willingness to answer questions, and state support were all factors. Further, openness and transparency were stated as important variables in the FutureGen process, both in information delivery and in the selection process itself. A community leader stated:

"The open question and answer sessions were very beneficial, whether or not perception is reality, the fact that you are there willing to answer those questions in an open forum goes a long way."

There was a noted sense of pre-approval because the State of Illinois was involved and the "Department of Energy stamp of approval, which later was removed ..."

One neighbor felt that the community as a whole was engaged by developers and project proponents, but that he personally had not been directly engaged. He and his son stated they would have benefited from one-on-one engagement in a visit from the Alliance. The son, on the other hand, participated in stakeholder meetings held by the FutureGen Alliance representatives at the farm bureau, breakfasts, project information solicitation meetings and public meetings. As a function of engagement with project developers and scientists, he developed an understanding and trust in subsurface geology. He demonstrated confidence in the scientists and engineers to address technical issues.

Some respondents noted that many of the neighbors are curious, and use every opportunity provided for engagement, including the interview. They asked questions about the project status, chemical interactions of CO₂ and the reservoir, and the fate of stored CO₂. They want to know if the Alliance can "get enough countries and people involved" to support FutureGen.

Most respondents reported that the neighbors felt it was extremely important to have repeat opportunities to get information from multiple sources. Some neighbors were ambivalent when asked if there were enough opportunities in the process. They also pointed out there is a likely saturation point for information.

"yes, no, maybe ... how many of those public meetings can you have? You can have [one] every week and then it becomes the same old thing. [If] you are not presenting anything new, everybody quits coming. All of a sudden you've got something brand new going on, now nobody shows up ... but you throw one every six months and then six months later you've got 25 new things that you're going to throw out [there], well that's probably too much ..."

The need for determining a "happy medium" is a component of timing. Farmers brought up timing and season as important factors. Timing can take on two components for stakeholders: time of year and frequency of engagement.

"Well, and time of year, from us ... you hit me in harvest ... I'm not worried about your project. I've got my own projects."

Another significant engagement opportunity did not directly involve stakeholders, but was highlighted by a local community member as demonstrating respect for and interest in the community. Having the FutureGen Alliance hold its board meetings in Mattoon demonstrated its commitment. The respondent felt that it made a difference at least "from a perception standpoint" likely more than "from a functional standpoint". This strategy forged ties with the community and "made FutureGen seem more like it was Mattoon's and wasn't some private entity that was looking at making a profit off Mattoon".

In summary, perceived benefits fell into three categories: Global Leader, Innovation, and Local. The opportunity to be a global leader and part of something bigger than themselves was important to the community of Mattoon. The idea that FutureGen was a first of its kind power plant that held the promise to be part of the solution to climate change engendered community pride. The innovative nature of the FutureGen concept of combining new cleaner coal technologies, IGCC, combined with emissions-reducing technology of CCS heightened the benefit of hosting a first of its kind, research facility within the community. The export of this innovation to the world was also seen as a benefit. The local benefits were originally assumed to be job related, but the actual jobs to be gained was smaller than originally anticipated. However, the promise of jobs built social capital and unified areas in the region to collaborate and work together toward a common goal. The potential of FutureGen to revitalise the Illinois coal industry was recognised by many as an important regional/local benefit.

6.3.4 Questions and concerns

Questions and concerns expressed by community members centred on immediate and local impacts. Respondents felt that the main public stakeholder concern was health and environmental safety. Most concerns focused on perceptions of power plants, coal usage, water quality and subsurface conceptions of stored CO₂.

Respondents felt that neighbors are concerned about their immediate physical environment and how it will be impacted. Specific information about ash and odour was of interest. Nearby landowners feel a certain amount of uncertainty over the process and project and what it means for their future.

"We're just concerned about – where we're living here, everybody's not the same. You know, people in town, it doesn't affect them like it does us."

While expressing concern for their personal situation, these respondents recognise that FutureGen is *"probably a good thing for the community ... but it is hard to keep everybody happy"*. They have mixed feelings about the project: *"It is harder to keep everybody happy ... things change. It never stays the same."*

Yet others had a more national focus and emphasised institutions where there is a need for long-term responsibility:

"We have put a lot of emphasis on technology and research. We have put no emphasis on institutions like a geological sequestration utility that is out there trying to characterize 10 sites in the State of Illinois ... If they were to commercialise five of those, there would be an institution that if you see a CO₂ leak you could call."

State and local respondents working to promote FutureGen and other respondents discussing the project with community members reported that specific questions about the project included:

- Is it safe?
- Is it safe to bury this underground?
- Is it coming back up?
- Is it going to contaminate my water?
- How are they going to keep the CO₂ underground?
- Will the CO₂ leak back up through wells or cracks?
- Will there be dust or ash from the plant?
- Could the state get agreement from landowners to inject?
- Could the state win project competition?
- How dangerous is this going to be to us?
- What kind of environmental changes are we going to have?
- How much coal dust is going to be floating through the air?
- What type of chemical releases might happen?
- What is coming out in the gas through the stacks?
- How much noise is the coal shaker going to make?
- Coal generating plants are not the prettiest things. How much noise, dust, train traffic will there be?
- What happens in the event of an earthquake?
- Will we have a Lake Nyos-type event?

The respondents felt that the effort to transmit information about the project was very important for addressing questions and concerns and being able to:

"Make sure people understood how sequestration works and why geologists and geophysicists and scientists believe that it is safe, and the work being done in showing and demonstrating that this is the same formation that natural gas is stored in helped. People are comfortable with that. They know that occurs."

Respondents felt that information from trusted sources was a key component in providing this information.

6.3.5 Perceptions of the project developer and project proponents

6.3.5.1 Project developer perceptions – Many respondents viewed the FutureGen Alliance as the project developer and expressed "trust in the Alliance". The community wants the Alliance to succeed and supports its efforts. When the project was cancelled, the community responded with confusion and mixed emotions towards DOE and positively towards the Alliance:

"Folks around here were mad at DOE on behalf of the Alliance and the effort that the Alliance has put into the project, as they were on behalf of themselves [for losing the project]."

There is, however, some local scepticism of the Alliance because they are "big industry from outside the area". The Alliance is not seen as a local entity, "they see the Alliance as not living here," which affects perceptions of what happens if something goes wrong:

"If this is an experiment that goes bad, they [the Alliance] are not going to be here anyway."

Neighbors reported that some people have negative comments and feelings, but these have not taken hold in the community primarily because of transparency, openness and accessibility of the Alliance, Coles Together – the county economic development organisation – and the State of Illinois:

"The Alliance has been so accessible and because it has been such an open process. Anything that anybody ever wanted access to was provided to them, or information was shared at the Alliance's website or through links that they sent to them. I think the whole site-selection process being open was good. Nobody felt like anybody was trying to hide anything ... The openness has gone a long way to help folks understand that nobody's trying to hide anything and come in and build a project here that is going to be harmful and then leave. The stakeholder meetings were outstanding for getting in early and talking with people, answering questions, and just being accessible."

Community engagement was seen by all interview respondents as a priority for the Alliance and some of it was conducted through the NEPA process. Also seen as important were stakeholder meetings with specific groups from industry, academia and the farming community.

The frequency of meetings, occurring on a regular basis was noted, including those with special interest groups, along with presentations to US-based and international public service organisations such as Rotary Club, Kiwanis, High Twelve Club of the Masons, and the Exchange Club. Project proponents made "regular appearances making presentations and answering questions and being available".

One respondent expressed disappointment in the Alliance membership and companies not represented:

"The three largest emitters of carbon dioxide on the utility side are [American Electric Power] AEP, Southern and Duke and none of them are in the Alliance. The Alliance is supposed to add some other utility members, and maybe that will come from other places around the world, but if you don't have those three in the United States, what do you have? That to me says the project has some serious flaws. FutureGen is in need of sharpening its vision and rethinking what niche it is playing ... this is supposed to be a prototype. Eventually it is going to be sold to utilities, and you don't have the three big ones. That speaks volumes."

6.3.5.2 State government perceptions – Some respondents noted their trust in the state government representatives who supported the project. Some found the government more trusted than the companies because they were from the region.

"I think they trusted the [state] government because they knew who their legislator was and because they knew their legislator, they could go back and say, you said this. They trusted the government more so than the company ... because they were local people that they would see on the street. Those people are going to live in the community, as opposed to a company."

One feature of having regional experts and project proponents is the ability to convey honestly to others their personal thoughts about sequestration "in their backyard".

"Would I want it in my town? Yeah. I would not be opposed to having a sequestration site located in my backyard, not that I want to look out and see a power plant, but the location, the sequestration I wouldn't have a problem with. You have to realise that I live in the country and I can see the sun come up and the sun go down, so to have that power plant in the way, that would be a problem. But to have it sequestered, I wouldn't have a problem with that."

6.3.5.3 *Project proponent perceptions* – When asked who the project developer is, one interviewee responded that there are multiple possibilities including the State of Illinois, US Government, local community and the Alliance. The respondent thought that the community likely sees the local economic development representatives as the developer and that there is trust in those individuals.

“There were real grey areas there as far as who does what and who gets credit for what and who puts out the press statement and what does it say.”

One respondent viewed the project developer as a “very positive” organisation. He mentions individuals involved in the Alliance by name, an indication that the Alliance has developed contacts and relationships in the community. Key words he uses to describe the Alliance are: good quality, low key, likeable, believable and genuine. These characteristics are important in the community.

“They’ve had really good quality, low key, likeable people at the head of the lines which I think has helped a lot, especially in kind of a rural community. I think that has made them come across at least a lot more believable and genuine because I think the perception that you’ll get from most people is that they are interested in the project, they’re interested in what the project can do, they’re interested in Mattoon, they want to see the project succeed and be a very clean facility.”

He noted the structure of the Alliance as an important feature – that the project developer is a group of companies, not just one company. He felt the focus of FutureGen facilities had been on research more than just energy production for commercial purposes.

6.3.6 Positive and negative community perceptions

Most respondents saw winning the competition as the most significant positive moment of the FutureGen process. The day of the site selection announcement was a positive turn in public opinion. One neighbor attended the community-arranged announcement event at a local movie theatre with hundreds of other community members. His description of the public response includes earlier reference to cliques in the community:

“I think [the response] was enthusiastic. The crowd that was there was of course behind the project ... the sort of main clique ... in town that make things happen.”

The selection announcement “shut the community down for a whole day and people were celebrating. That theatre was packed with people who left their jobs and came over just to hear the announcement.” Positive perception was at an all-time high when the selection of Mattoon was announced.

“The biggest single thing was when we finally realised that by gosh maybe it will be built, but there were a lot of minor things leading to that. Articles in magazines, newspapers, articles in Farm Week, which every farmer in Coles County gets it, it’s a weekly deal, supporting this concept, pointing out why it was so important. The economy going south, the collapse of the economy, all of a sudden, this looks like a bigger deal than ever. And it is a bigger deal than ever with this bad economy. All that combined make almost a perfect storm for support for it at this point in time.”

Respondents thought that the Alliance would be swayed by political issues in making its site selection. Respondents thought that the community assumed the project would go to Texas because of the connection with President Bush. Community members were surprised when it did not.

The public meetings were also seen in a positive light because they brought attention to the potential of FutureGen. Legislators and senators attended meetings, which raised the profile of these meetings. One respondent thought that the public meetings were a “turning point”. Until that time people had a lot of questions, which were answered, and so understanding was built.

“I think that was the time that the community actually kind of turned the corner, and said yes, this is a pretty cool project ... only 5 per cent of the total community was there.”

About 500 people attended each of two meetings, “about 1,000 out of 20,000, you had a lot of opinion leaders there. You had a lot of people that might have been naysayers because they just are by nature. But once they found out a little bit more about it they kind of backed off.”

When asked about negative response to the project, several respondents pointed to the ups and downs of the project – on again and then off again – and not the project itself. One respondent could not think of a time when people did not support the project. However, he noted that the community was upset the day the project was shelved by DOE. There were political ramifications from the shelving of the project. The sentiment among community members was to keep the project alive until a new president was elected. Negative public perception about the project arose in conjunction with DOE removal of support.

One respondent noted that the unknowns associated with the project created negative response when the project was first announced. Some respondents mentioned that community members were mixed in their initial response to the project. Some were worried that it would not be possible to “*keep everything underground*”. Concerns were expressed about leakage through wells or cracks. Some were against the project because “*they don’t understand it*”. Yet others “*didn’t have any fears about it*”. One neighbor couple spoke to people on both sides.

“You throw a project out like this, you’re always going to see the negative first...we’re not going to look at the positive effects of the jobs [first].”

Respondents felt that addressing unknowns and providing information was important. Also important was allowing time for information to sink in.

“It takes time to digest. Everything that is being thrown out [there]. I guess for me that ‘Ah-ha’ moment was when we were sitting there in the Farm Bureau meeting and learning how much room there was in the underground formation to store CO2 and that what was going to be injected was just a drop in a pool...”

It was reported that a few neighbors close to the site felt very negatively about the project and wrote editorials while trying to “*get a support team against*” the project. Meetings were initiated with specific neighbors so that they could voice their grievances.

“They had a special meeting with him, so that he could say his grievances and they tried to educate about what [FutureGen] was ... they sat down and listened to him and let him have his opinions.”

6.3.7 Changes in perception: Ups and downs

Several respondents reported that community members are tired of the ups and down associated with winning the project, losing the project, thinking the project will come back and then it will not. The community is tired of highs and lows, which has caused a waning in interest. The potential to lose community support exists by dragging the project out too long. The community continues to show support and is interested in seeing the project built. Some noted the Alliance’s continued support as an important factor: “*I give the Alliance a lot of credit for picking a site anyway.*”

The community was significantly impacted by the swings from being the selected site to DOE distancing itself from the project. The continued support and interest in bringing FutureGen to Mattoon is reflective of the community engagement and support of the project.

“When the announcement was made that they got it – that was hugely positive. And then three weeks later when it was announced that they weren’t going to – that they were – that, yo-yo or up and down and back and forth ... and for them to be able to keep their support all the time was a real challenge, but most did.”

6.3.8 Personal touch important

Most respondents noted that trusted sources for conveying information were important. Those organisations viewed as trusted resources, such as ISGS, made a difference when people were sceptical of the state because of ethical issues related to the Governor at the time. Additionally, key individuals who became known to community members and leaders played a personal role in building trust and acceptance. This is seen on the project proponent side, which included economic development members of the community, state agencies and other regional experts, as well as the FutureGen Alliance, which made a point of establishing relationships, hosting meetings and being present in the community.

6.3.9 Political connotations

Respondents mentioned that there was a political response by Illinois politicians that gave the impression that they would not let the project die and that it would be taken up by a new administration. This was also juxtaposed against the earlier belief expressed by other interviewees that the project would go to Texas because George Bush was president.

7 Media analysis

Media articles were collected and reviewed daily from print, television, online and radio by the Alliance team over the entire project. These clippings were collected from national and international sources. Every quarter a firm hired by the Alliance would analyse the clippings and report on percentages of negative, positive, balanced or neutral reports and the main themes covered. Each quarterly report included specific titles and quotes that help describe a theme.

7.1 Media analysis 2006

The main themes reported during the announcement of the four semi-finalist host sites (July 2006) were that science will determine which site gets selected because of the rigorous evaluation criteria used and that these criteria were shared openly on the website. Also emphasised were the environmental benefits from using CCS and how the overall plant design is cutting edge and will be the point of reference for other plants/projects interested in addressing climate change. During the rest of the year, media reports had similar themes but additional points made were the economic benefits of the project and a focus to increase domestic energy sources.

The modest negative coverage during this second half of 2006 involved communities that weren't selected as one of the four semi-finalists, that there would be extra noise and rail traffic, the possibility of leakage of CO₂, a question whether the benefits would be as great as touted, and whether such a new, integrated facility could really be built. International coverage during this period of 2006 was quite modest.

7.2 Media analysis 2007

In 2007, media coverage was still quite positive or balanced, with negative stories representing less than 10 per cent of the total (Figure 3). The positive and balanced reports emphasised the same benefits as described in 2006. However, with only two states in the running for hosting FutureGen, there was less coverage and outward support from other states. The coverage was local or national. By the second quarter, the media reported on the public hearings as part of the EIS. By the fourth quarter, the final EIS was released and the Alliance selected Mattoon as the site (December 2007).

Also during this time were the United Nations climate talks in Bali, Indonesia. The new themes reported in 2007 included urgency of schedule, DOE concerns about costs and cost sharing with the Alliance in general, and DOE's decision not to issue the Record of Decision that declares that there are no environmental issues of concern associated with the site – a necessary document to allow the project to proceed. Also raised were issues concerning regulatory uncertainty and liability concerning CCS.

Given that this was a period of candidates running for President of the United States, there was also coverage of candidates' position on advanced coal technologies. During this time, there were reports on investors being reluctant to back IGCC technology given the high cost, and some utilities were cancelling their plans to build such plants. *The New York Times* published a report: "New type of coal plant moves ahead, haltingly" which said that DOE is making ambiguous statements about its commitment to FutureGen (Wald, 2007). *The Chicago Tribune* published a report: "Digging deep for a carbon emission solution" where FutureGen was mentioned in an overview of the interest in CCS and how it can help reduce carbon emissions (Goering & Greising, 2007).

The coverage around Mattoon being selected as the site was largely positive, with only 1 per cent negative. One article from the local Mattoon newspaper, *The Journal Gazette and Times-Courier*, ran the headline "FutureGen could end up like '80s supercollider", referring to concerns that the increase in cost could put the project in jeopardy (Riopell, 2007). International coverage increased during the second quarter of 2007 to between 12-15 per cent and held steady throughout the year and through the second quarter of 2008.

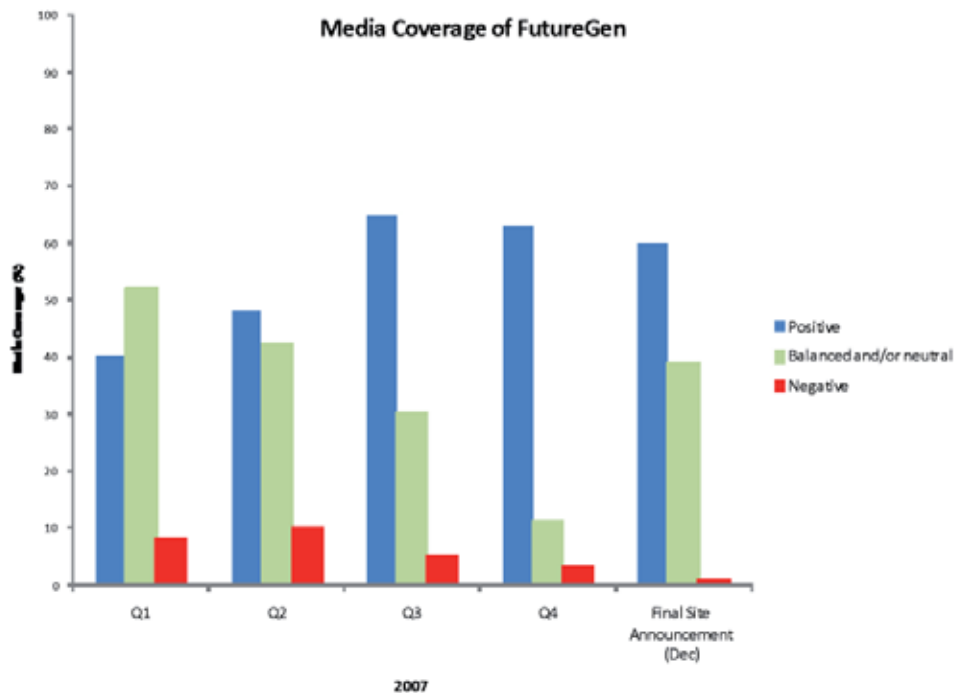


Figure 3. Total media coverage of FutureGen 2007. Includes print, television, online and radio, during Quarter 1 (N = 137), Quarter 2 (N = 105), Quarter 3 (N = 108), Quarter 4 (N = 489) and the final site announcement (N = 313). The final site announcement includes the day of the announcement (18 December) and the few days following until attention died down. Data drawn from quarterly media reports produced by FTI Consulting for the FutureGen Alliance.

7.3 Media analysis 2008

2008 was a year of uncertainty but most of the reports were still positive and balanced, with less than 20 per cent negative (Figure 4). Some coverage incorrectly reported that the original concept of FutureGen was dead. In the first quarter, DOE announced its intentions to restructure FutureGen to focus only on supporting the CCS component of a project and it issued a Request for Information. DOE stated that it planned to fund multiple projects and that the four finalists would be eligible but would need to reapply.

Also during this quarter, the US House of Representatives Science and Technology Committee asked for a General Accountability Office investigation into DOE's position on FutureGen to better understand concerns over cost escalations. During this first quarter, there were lots of statements of support for the original FutureGen project including from Governor Freudenthal of Wyoming (Neary, 2008) and Howard Herzog of the Massachusetts Institute of Technology (Biello, 2008). The Alliance put forward to DOE a proposed new cost structure to shift more of the inflationary costs to the Alliance. Reports that picked up this proposed change in cost structure included "*FutureGen developers propose cost change*" (Suhr, 2008), which was published all over the country.¹³

During this quarter there was coverage relating to the withdrawal of DOE funding. The *Wall Street Journal* ran a report: "*US Drops Coal Project*" quoting David Hawkins, director of the climate centre at the Natural Resources Defense Council, who said: "It is really hard to see it as anything other than bait-and-switch by the administration (Power, Smith, & Ball, 2008)." The *New York Times* report: "*Higher costs cited as US shuts down coal project*" quotes Illinois Senator Dick Durbin who said: "*Who can take the secretary seriously at this point? What community, what state, would make an application for a new plant after what we have just been through in Illinois?*" (Wald, 2008).

¹³ The Associate Press story ran in the following papers, television channels: *CNN Money, Chicago Sun Times, Dubuque Telegraph Herald, Bloomington Pantagraph, Belleville News Democrat, Springfield State Journal Register, MSN Money, BusinessWeek, Houston Chronicle, Journal Gazette and Times Courier, Munster Times, ForexTV.com, Conde Nast Portfolio, Forbes, The Southern*, and ABC7 Chicago.

Also CCS was getting more attention as being critically important in national climate policy and such stories were being covered around the world. Finally during this first quarter, new coal plants were being challenged more and more with climate policy being seen as more and more important.

Media during the second quarter of 2008 focused on efforts by the US Congress to keep the project alive. This quarter saw a shift from the focus on FutureGen being about a competition among states and sites to being a political battle fought in Washington D.C. The House of Representatives Science and Technology Committee held a hearing on 15 April with DOE officials to question them about their decision to end support for FutureGen.

Media coverage was split during this quarter between Washington D.C. and Illinois. One Washington D.C. publication, E&E News, ran many reports including: "*Senate appropriators work to save original FutureGen*" (Ling, 2008). DOE ended its cooperative agreement with the Alliance on 13 June and decided that the next administration should decide how to proceed. The Alliance issued a news release: "*FutureGen Alliance will continue to fight to keep FutureGen at Mattoon moving forward*" (<http://www.futuregenalliance.org/news/pressarchive.asp>) on 16 June, three days after Secretary Bodman testified before Congress that DOE had decided to withdraw from FutureGen.

Greenpeace issued its *False Hope* report during this quarter, arguing to stop CCS plants being built (Rochon, 2008). Carbon Control News and The Age (Australia) ran stories about Greenpeace's report that called CCS investments a "*boondoggle*". Barack Obama, as a Presidential candidate, was quoted as saying that cancelling FutureGen was a mistake. Hillary Clinton, as a candidate, supported CCS but did not mention FutureGen. Finally, foreign partners were upset by DOE's move to end its cooperative agreement with the Alliance. India severed its ties with the project and China expressed scepticism.

In the third quarter of 2008, media reports highlighted more action by Congress. Political negotiations and new funding sources were determined. A bill was passed with \$134 million being held for the FutureGen. Reports also covered the Southern Illinois University Clean Coal Review Board approval of a \$2 million award for FutureGen studies. The Alliance exercised its land purchasing options in Mattoon which made the community feel that the project was more of a reality. This coverage occurred during the height of the US and global financial crisis.

Internationally, media coverage dropped to only 5 per cent. One article in Bloomberg, "*Canada to move ahead on 'clean coal' plant after US's fails*", reported that Canada's Saskatchewan Power Corporation has sent out Request for Proposals to 10 companies to build what the report said was the world's first power plant with CCS. Canada, which will spend C\$1.4 billion (A\$1.47 billion) on the plant, will incorporate oil recovery in the plans to offset costs. It said this was a different approach than the US, which had cancelled a similar plant last year. The report said FutureGen was cancelled after costs soared (Whitten, 2008).

Uncertainty continued to be reflected in the media in the fourth quarter of 2008. There was plenty of speculation on how possible election outcomes would affect the future of FutureGen, and the quarter ended with several steps forward for the Alliance and a positive outlook for 2009. FutureGen at Mattoon was tied into the momentum of the campaign season and its future was consistently discussed as a priority policy decision for the next administration. A news conference announcing a final land purchase and successful seismic testing kept the story moving until the barrage of election stories took over.

Newly elected President Obama announced his selections for key energy posts; FutureGen was included in the larger discussion of the President's vision for a green energy economy. There was coverage of Steven Chu as the new DOE secretary and questions to him about what he meant by an earlier comment that coal was his "*worst nightmare*" (WSJ, 2008). Soon-to-be Secretary of Energy, Chu explained that if coal is to remain a part of the world's energy mix, then clean-coal technologies must be developed.

Certain environmental groups established their anti-coal message through strategic advertising, such as the "Reality" campaign. A regional environmentalist with the Clean Air Task Force wrote a letter to the local paper which stated: "*We have less time to address this than we thought. Coal must be part of the solution. FutureGen had to be done yesterday*" (Thompson, 2008).

Also during this quarter was an article in the IL Times (Nave, 2008) that mentioned how the Sierra Club, which typically tries to block construction of new coal-fired power plants, won't stand in FutureGen's way. James Gignac, Midwest director of the Sierra Club National Coal Campaign in Chicago, said he believes FutureGen should determine once and for all whether burning coal without accelerating global warming is technologically and financially feasible, and they will not take legal action to prevent FutureGen from proceeding if its air permits include limits on CO₂ emissions.

Other national coverage during this quarter included an Assoc. Press report (11 April) that quoted Howard Herzog from MIT: *"The biggest reason I think that FutureGen mattered was it was the most advanced along the way, and I think there is some time urgency. We start hearing from the scientific community that we need to put the technologies in place sooner rather than later."*

The think tank, Center for American Progress (CAP), headed by Obama's transition manager, John Podesta, released recommendations to Congress that praised FutureGen. The group called FutureGen *"the most advanced CCS project in the world"* and recommended that Congress revisit the project's contract. If the DOE were to support the project again, construction on FutureGen could begin in the next 12 to 18 months and (most importantly in the eyes of the group) create 600 to 700 jobs at the height of construction.

Other reports, such as one on NBC Nightly News, questioned the feasibility of CCS technology, using FutureGen as a poster child for what could have been instead of what could be under a new Democratic Congress and administration. Illinois remained vocal in favor of FutureGen.

Another negative story was a blogging post by Jeff Biggers (Biggers, 2008) called *"Dear Carol Browner: dirty coal will turn green recovery gray,"* in which he described FutureGen as *"shipwrecked"*. While he mentioned the Center for American Progress report *"Green Recovery"*, and its recommendation to the incoming Obama Administration to provide federal funding for FutureGen, he pointed out that Joseph Romm, a senior fellow at CAP *"declared last year that FutureGen was 'either doubly pointless or doubly cynical' given that the 'climate will have been destroyed irrevocably before FutureGen could have accomplished anything useful in the marketplace'."* International coverage was down during this quarter to less than 5 per cent.

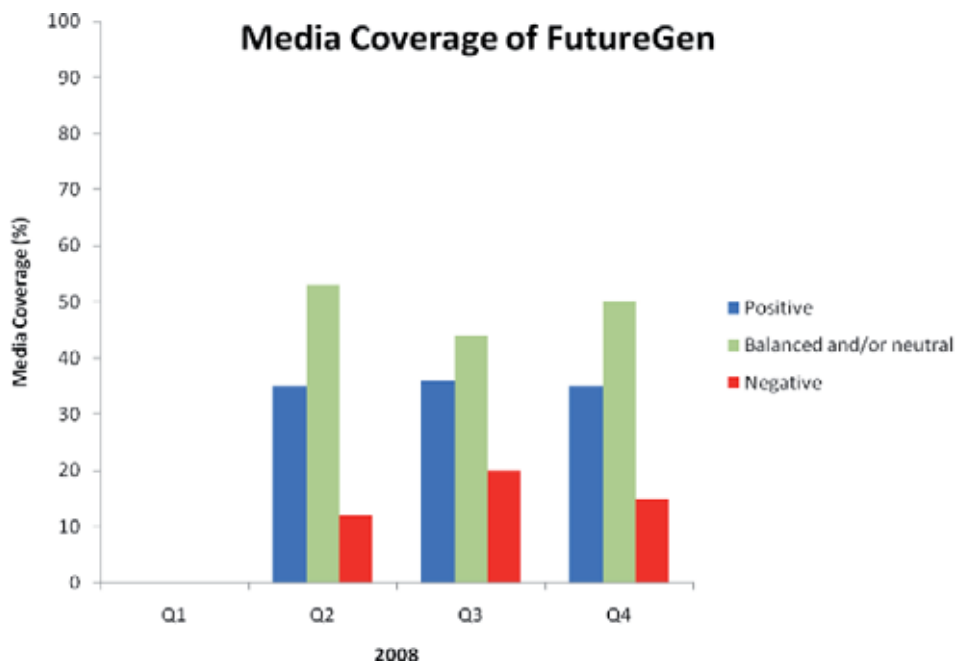


Figure 4. Total media coverage of FutureGen 2008. Includes print, television, online and radio, during Quarter 1 (N = 955), Quarter 2 (N = 202), Quarter 3 (N = 105) and Quarter 4 (N = 116) in 2008. Data drawn from quarterly media reports produced by FTI Consulting for the FutureGen Alliance.

8 Conclusions and lessons learned

Outreach and engagement efforts on the FutureGen process began very early and were conducted on multiple levels by multiple parties. Levels of stakeholder engagement included national, regional and local. The parties involved in stakeholder engagement and outreach ranged across semi-finalist sites, occurring from the FutureGen Alliance project development team, regional and local economic development organisations, third-party scientific experts and many others. The following lessons learned reflect perspectives from Mattoon and the entire FutureGen Alliance process.

8.1 Competition as motivation

Competition was a critical motivating component of the Illinois FutureGen process. From early in the process, the Illinois Department of Commerce and Economic Opportunity worked with local economic developers, state agencies, national and local NGOs, engineering firms, state and federal congressional leaders, the media, and many others to win FutureGen for the State of Illinois. Furthermore, communities had the opportunity to willingly participate in the competition through self-selection. Public acceptance was seen as important to the Alliance, as reported in the *Results of the Site Offeror Proposal Evaluation*, in selecting a site (FutureGen Alliance, 2006). However, it could have been more of an explicit criterion used in the site selection process.

Lesson learned: site selection processes involving competition and community self-selection can bring enthusiastic communities together with project developers. Project proponents may consider having public acceptance as an explicit criterion in evaluating sites.

8.2 Community pride and altruistic benefits

8.2.1 Cultivating community pride

Community pride and the awareness that hosting FutureGen would bring recognition to the community of Mattoon were important factors to most community members. Some actively sought to attract FutureGen and recognised the important economic development opportunities as well as the global impact of hosting a project designed to export technology to the world. Others were willing to consider and eventually accept the project because they recognised that FutureGen is good for the community and represents something larger than the individual.

Lesson learned: cultivating community pride through competition, self-selection, education, and engagement can be beneficial throughout the early planning, site selection and site operation phases of a project.

8.2.2 Recognising altruistic benefits

The recognition associated with the FutureGen project brought national and international focus to all communities who participated in the FutureGen selection process. The project focus on research over energy production was a key factor in the development of attitudes and acceptance. The residents of Mattoon “*wanted to be part of something larger than us*”. There was considerable pride expressed that this small Midwestern community would be known worldwide and visited by people from around the world. The idea that clean energy technology would be developed and tested in Mattoon using Illinois resources was quite powerful. Mattoon believed it was doing something to benefit the planet and for the common good.

Lesson learned: early adopter communities may value altruistic benefits associated with being at the forefront of energy research.

8.3 Cooperation and coordination critical

The State of Illinois moved quickly to compete in FutureGen. A coordinated State team was augmented by the local team of economic development leaders from both communities (Mattoon and Tuscola). The State and competing communities worked arm in arm with the stated goal of winning FutureGen for the state, recognising that benefits for one would benefit the other. The spirit of teamwork extended beyond the communities of Mattoon and Tuscola to neighboring cities. Competition between communities was minimal and rather than compete against each other, they sought to attract FutureGen to their region, recognising benefits for both communities if the project came to Illinois. Interviewees commented on how Charleston and Mattoon worked closely together in the proposal

(the communities together were to provide the water needed for the plant). The regional education community, consisting of three community colleges and three major research universities, joined together to support Mattoon and Tuscola by providing support proposals to develop curriculum for a workforce development program and find ways to integrate students into research.

Lesson learned: creating a collaborative, unified work team that is seamless across geographies (state, regional, local) and political boundaries is critical. Having strong leaders responsible for coordinating the players at the outset and throughout the process is also important.

8.4 Understanding specific and varied audiences

Stakeholders come to an engagement from different backgrounds and with different knowledge and perspectives. Some stakeholders welcomed change in their community, others did not. Change in the area represents a significant shift from agriculture to industrial land use. Neighbors expressed a need for time to absorb new information and the notion that their way of life would be altered aesthetically and in other unknown ways by the plant. Some differences expressed may be generational. The older generation may be less engaged and/or obtain information from different sources (newspaper and talking with other neighbors). Older people may, in contrast, have more time available to understand the issues and seek information. The younger generation may look to different trusted sources, such as farm bureau meetings, and may be more engaged because of working with a broader range of community members. Information conveyed needs to be adjusted accordingly.

Lesson learned: understanding specific and varied audiences is critical to stakeholder engagement. Background, generational influences and social characteristics of the community may provide increased stakeholder understanding. Seeking input from audiences about what information will be of interest to them and providing that information in a timely manner can be beneficial to engagement. Allowing time for audiences to absorb information and keeping the lines of communication open to answer additional questions as they arise is essential.

8.5 Understanding where people obtain information and providing accurate and consistent information

8.5.1 Understanding where people get information

It is critically important to know from where people gather information about a project. One source for the FutureGen project that was very important was the media. The local newspaper – *The Journal Gazette* and *Time-Courier* – has a reporter who followed the FutureGen story from the beginning. He became quite informed and wrote on the topic frequently. Members of the Illinois FutureGen Team and the Alliance team met with the editorial board and the reporter often to ensure they had the information they needed to cover the story. Neighbors who chose not to attend the meetings mentioned that they received much of their knowledge about the project through the local paper. Peer-to-peer networks were also critical in information sharing. For example, farmers are typically members of their local farm bureau where they meet to hear and share news. Also farmers would share information informally at breakfast exchanges and grain silos. The ISGS was seen as an objective source of information and attended meetings associated with all candidate sites in Illinois, not just Mattoon and Tuscola. Regardless of the source, interviewees stated that it takes time for information to sink in. Having multiple opportunities to gather information and ask questions is important.

Lesson learned: understanding where people get their information and being prepared to provide it early and often is an important strategy. Messages from multiple sources with potentially varying perspectives may carry more weight.

8.5.2 Providing accurate and consistent information

Early in the FutureGen process a very optimistic estimate of jobs created from the project was published in Illinois. The estimate included spin-off jobs as well as full-time, operational jobs. The Alliance conducted an estimate that yielded substantially lower jobs. The differences between the sets of numbers and the perception that the job

numbers were changing left some stakeholders feeling that they were misinformed. Part of the difference was between construction jobs during the building of the plant and full-time jobs once the plant was up and running. Stakeholders were pleased, however, with the estimate of the ripple effect in how the full-time positions will create jobs and fiscal activity in the community.

Lesson learned: release accurate and consistent information to avoid false expectations.

8.6 Ensuring access to experts

The Illinois FutureGen Team held meetings across the state, often including a member of the ISGS. Stakeholders appreciated having these trusted experts available to answer questions. Before the DOE official hearings on the proposed sites, the Alliance had experts available for a two-hour informal question and answer period where interested parties could visit different posters and displays to answer any questions they had. The ISGS also participated in these informal sessions and had their cross-sectional model of the regional geology.

Lesson learned: ensuring that stakeholders have access to technical experts, not just project proponents, to answer questions is important for building trust. Informal sessions provide stakeholders with the opportunity to become more familiar with the technical issues around a project at their leisure.

8.7 Using different engagement approaches

8.7.1 Engagement through meetings with similar stakeholders

Meeting with stakeholders early in the process was critical. Based on questions and concerns expressed at meetings, one-page fact sheets were updated to use in these meetings with a flow diagram of how the plant and CCS component would operate. Meetings with groups of similar types of stakeholders provided an opportunity for stakeholders to engage with their peers and speak freely. Groups included community leaders (e.g. public service organisations, city council), educators, prospective neighbors, farm bureau members, state government officials and media.

Lesson learned: Meetings with people with a similar background allows a free exchange of ideas and can result in a shared understanding of the project.

8.7.2 Engagement in different forums

A range of forums will enable a mix of stakeholders to be reached. Public meetings were held at the local elementary school to reach parents and to serve as a neutral place to discuss the project. Farm bureau meetings were an important place for discussing the project. Geologists, members of the Alliance team and local community development representatives were invited at different points to describe the project and answer questions from farmers. Lunches and dinners with community leaders were used to describe the project and encourage discussion. The FutureGen State team as well as Alliance outreach representatives met with these leaders. Neighbors were also invited to attend an information meeting early to discuss the project. Not all neighbors took advantage of the different forums and the project would have benefited from making more house calls to answer questions.

Lesson learned: use a range of forums to maximise the opportunity to reach a diverse set of stakeholders.

8.7.3 Engagement through demonstrations

Visually oriented stakeholders benefited from a physical geosequestration model designed and presented by the ISGS, an objective entity. By engaging with scientists and asking questions about CCS while viewing the model, stakeholders were able to envision what would happen to the stored CO₂.

Lesson learned: having third-party scientists (not the project proponent) describing how CCS works provides clarity, credibility, particularly if that organisation is regional and scientists are knowledgeable about it and live in the region.

8.8 Transparency is critical

Throughout the project, the development team was commended for having an open process where information was shared broadly, often through the Alliance website. The FutureGen site selection process was made explicit and public from the beginning. An extensive list of criteria was used in evaluating the sites. This information was posted on the website. Similarly, the Alliance posted the comparison of the four semi-finalist sites and its decision to select Mattoon as the site on the website as well. The media coverage of these announcements gave the Alliance much credit for “having science drive the decision” not politics. The Alliance outreach team answered questions to the best of their ability during site visits and followed up with answers that they could not immediately answer via the local economic development leads. Answers to frequently asked questions were posted on the website based on feedback received from stakeholders.

Lesson learned: transparency may build trust, encourage input and engage stakeholders by providing information in a timely and open manner.

8.9 Demonstrating community presence

Stakeholders generally felt positively towards the Alliance. They thought the concept of a not-for-profit organisation made up of the various companies was a break from the past. They understood how one company might be too risk averse to take on such a new power plant configuration with CCS. One interviewee expressed concern that the membership was a bit weak and that the larger utilities needed to join to make the partnership stronger. Several participants cited approval for the Alliance's focus on science not politics as the driver for the final site selection. The Alliance presence in the community – from having a local office to hosting board meetings in town – was noted by stakeholders as making a positive impression and reducing the idea that the Alliance represented outsiders.

Lesson learned: acceptance may be facilitated if project developers spend time in and getting to know the community.

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Appendix A – Interview guide

Project: International comparison of public outreach practices associated with large-scale CCS Projects

1. Tell me a little about you, your prior experience and what brought you to the project?
2. *[For those related to project INDUSTRY, GOVERNMENT, RESEARCHERS, ETC]*
What was your specific role in relation to the project XX? Why did you get involved in that role?

OR
[For others in the community: LOCAL COMMUNITY NGOs, OTHERS, ETC]
How and when did you first hear about the project?
3. How would you describe your relationship to the local community?
 - a. If multi-generational, going how far back?
 - b. Do you own/rent/work in the subject community?
 - c. How long have you been in the community?
4. How would you describe/(characterise) the/your local community?
 - a. Close knit, rural, urban, in decay, vibrant, etc. Can you provide some examples that demonstrate this?
5. What do you know about sequestration/carbon capture and storage? What is your level of expertise, experience with CCS (country specific)?
6. Did you know about sequestration/carbon capture and storage before or after learning about the project in your community?
7. What were the benefits that the developers communicated about the project?
 - a. How were they presented?
8. What do you think were the benefits of the project to the/your community?
9. How did the community perceive the benefits?
10. What do you believe were the main questions/issues raised by stakeholders in the community?
11. What is the community perception of the project developer?
12. Was community engagement a project priority? How was the community engaged? What information was presented about the project?
13. Can you think of an event or circumstance when things related to the project and how the public viewed it went very well?
14. Can you think of an event or circumstance when things related to the project and how the public viewed it went poorly?
15. Was there a particular event that marked a change in the level of public acceptance towards the project?
 - a. What happened?
 - b. *[IF INTERVIEWEE IS RELATED TO PROJECT]*
How did you respond?
16. What other information would stakeholders have liked to have heard or seen? a. Were there any unanswered questions?
17. Would you be willing to provide educational background information for the purposes of this research?
18. How long have you lived in the community?
19. Is there any other information you believe might be important to understanding your role in the community.

Appendix 4 Otway Project – Australia



Case Study of the CO2CRC Otway Project

Energy Transformed Flagship

Peta Ashworth, Shelley Rodriguez and Alice Miller
EP 103388

Prepared for Sarah Clarke
Global Carbon Capture and Storage Institute

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Front cover images courtesy of Tony Steeper, CO2CRC

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Executive summary

The purpose of this report is to examine and analyse community consultation, one of the major components of the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) Otway Project, a carbon dioxide capture and storage (CCS) pilot project in Nirranda South, Victoria, Australia. The report focuses on the engagement and communication strategies that have taken place between the project developer and stakeholders since the project commenced. The events that took place in relation to specific engagement and communication activities are examined and analysed, and a summary of consultation successes and failures within the project is provided.

In order to thoroughly evaluate the events that took place in relation to stakeholder consultation and engagement activities, various research methods were utilised and information was gathered, including desktop reviews, a media analysis and stakeholder interviews. Project developer activities including face-to-face meetings with key stakeholders and landholders, research into the community perceptions of CCS through interviews, surveys and focus groups as well as public meetings and the distribution of information packs, advertisements and newsletters were reviewed to gain a better understanding of communication and engagement practices applied by CO2CRC for the Otway Project.

As part of the Otway Project, one of CO2CRC's key needs was to gain community acceptance. A consultation plan put in place in early 2005 aimed to build successful relationships with stakeholders, inform and educate the community about CCS, ensure that landholders heard of the project from CO2CRC directly, and provide opportunities for transparent and joint communication. Collaboration with the community and stakeholders was considered critical in generating and building trust to gain acceptance of the project.

In examining the findings of the communication and engagement activities of the CO2CRC Otway Project, it was evident that a number of successful strategies had taken place. These included:

- Early proactive engagement with stakeholders to build trust and form working relationships, creating two-way dialogue.
- Undertaking social research in the community to establish a baseline understanding.
- Face-to-face meetings with key landholders and stakeholders. These meetings were informal and organised at convenient times to suit landholders. This was an important step in building relationships and trust between CO2CRC and the community, and in discovering issues and concerns relating to compensation and access to land.
- A local former school teacher was appointed as a liaison officer to build trust between CO2CRC and the community. The appointment of the liaison officer opened up the channels of communication between CO2CRC and the stakeholders and was crucial in overcoming and eliminating any barriers regarding concerns and issues raised by the community.
- The establishment of a community reference group was perceived as integral in communicating the issues and concerns of the community back to the developers. This reference group disseminated information to the community through open and transparent communication at public meetings, and in turn provided the developers with insight into major concerns and community issues.
- An open day, providing the public with a tour of the site followed by lunch and an open formal discussion. It was noted that the 35 people who attended then spoke of their experience to other community members, creating further discussion about the project.

The least successful aspects of the stakeholder and community engagement were:

- The lack of communication, respect and regard for landholders' properties by a seismic crew when seismic testing, which strained some relationships between CO2CRC and landholders. Efforts to repair damage were seen by some community members as inadequate and the communication process poorly handled.
- A landholder refused access to his property unless adequate compensation was given. Negotiations between the landholder and the developers were unsuccessful and ultimately, the land was acquired under land acquisition legislation. This action did not sit well with other local landholders and caused delays in the project development.

Case Study of the CO2CRC Otway Project

The CO2CRC Otway Project will provide many valuable lessons for successful deployment of CCS projects. The recommendations formulated from the successes and difficulties of stakeholder consultation and engagement activities can help to inform other CCS projects as they move from concept to deployment into communities.

1 Introduction

The CO2CRC Otway Project, developed and led by the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC), is Australia's first demonstration project of deep geological storage of carbon dioxide (CO₂). The project is undertaken by CO2CRC, in partnership with CO2CRC members, international collaborators from the US, Canada, New Zealand and Korea, and supported by the Australian Federal and Victorian State governments and the US Department of Energy. The project provides technical information on storage, monitoring and verification processes and associated technologies to help inform the development and deployment of a commercial carbon dioxide capture and storage (CCS) industry.

Located at Nirranda South in south-western Victoria, the AUS\$40 million project has injected more than 65,000 tonnes of CO₂ as of September 2009 into a depleted gas reservoir about 2,100 metres below the earth's surface. The CO₂-rich gas is compressed at extraction from a natural gas reservoir about 2.25 km from the injection site, and piped to the injection well. Findings to date are consistent with predicted modelling, with no evidence of leakage (CO2CRC, 2010a). The depleted gas reservoir is the Waarre C (sandstone) geological formation, underlain by two additional Waarre formations (B and A), which is then underlain by the Eumeralla Formation. The Waarre C sandstone is capped by the Flaxman Formation, which is in turn overlain by the Belfast Mudstone and the Paaratte Formation (CO2CRC, 2010b). As a pilot project, the CO2CRC Otway Project is considerably smaller in its injection volume compared to commercial-scale CCS projects, which aim to inject more than one million tonnes of CO₂ per year.

Following the success of the project to date, drilling at a second well near the existing CRC-1 injection site began in February 2010, with planning for injection testing underway. This second injection site will provide an opportunity for research to be conducted around non-structural trapping mechanisms and provide potential CO₂ injection capacity of up to 10,000 tonnes into the Paaratte Formation some 1.5 km underground.

2 Location

The project is situated off the Great Ocean Road between Nirranda South and Curdievale and borders the shires of Moyne and Corangamite in south-western Victoria, 228 km south-west of Melbourne and 40 km south-east of Warrnambool.



Figure 1 Nirranda, Victoria (Source: Google Earth)



In 2008, the estimated population for Moyne Shire was 16,405 while the Corangamite Shire's 2006 population was 17,270 (Australian Bureau of Statistics [ABS], 2009). The shires of Corangamite and Moyne are best characterised as rural districts with dairy farms and associated milk processing in the area. Nirranda, the community closest to the project, is a dairy farming community where families have lived and worked for generations. Those who stay in Nirranda usually leave school at about 15 years of age to work on the family farm. The nearest regional centre is Warrnambool, with an estimated population of 32,712 (ABS, 2009), is located on the Great Ocean Road and has a substantial tourist industry.

3 National context

3.1 Political context

Energy is big business in Australia, with energy-related sectors including electricity, mining and transport accounting for some 11 per cent of Australian gross domestic product (GDP) and about half of the total AU\$190 billion in Australian exports each year (DRET, 2010). The sector has installed much of the nation's capital infrastructure such as electricity plants, transmission links, refineries and production facilities and pipelines. About 120,000, or just over 1 per cent of all employed Australians, are directly employed in 'energy' primarily through the production and supply of stationary energy (such as electricity and gas), transport energy (mainly petroleum-based fuels) and energy for export. However, energy production using fossil fuels is very carbon dioxide-intensive and issues associated with anthropogenic climate change will need to be addressed (Ashworth et al. 2010).

Carbon dioxide capture and storage is relatively unknown in Australia, however with its heavy reliance on coal fired power for energy production, the technology and its development is being seriously considered across all levels of government. The CO2CRC Otway project began early in the life of CCS development and in many ways has been integral in influencing the way the CCS agenda has developed over time. More detail about the current national context and state of play for CCS can be found in Appendix B of this report.

4 Characteristics of the Project

Table 1 below summarises the main characteristics of the CO2CRC Otway Project.

Nature	The CO2CRC Otway Project seeks to demonstrate the technical and environmental safety of the geological storage of carbon dioxide consistent with government and community expectations through injection and storage of CO ₂ into a depleted natural gasfield two kilometres underground in south-western Victoria. A significant component of this demonstration project is the comprehensive monitoring and verification of the stored CO ₂
Scale/size	Demonstration project
Cost	AU\$40 million
CO ₂ amounts	65,000 tonnes of CO ₂ -rich gas has been stored via the CRC-1 well
Source of CO ₂	CO ₂ -rich gas (80% CO ₂ and 20% methane) is extracted from an existing gas well (Buttress) compressed and transported by pipeline
Project duration	Following research on the geological structures from 2003, work on the project began in 2005, with injection commencing in April 2008. Low key communication with individual landholders began in early 2004. More structured communication activities started in early 2005. Research at the site is likely to continue until at least 2015
Pipeline	Under an exemption from the Pipeline Act and consistent with the Victoria Petroleum Act, a 50 mm diameter 2.25 km long underground stainless pipeline was installed between December 2007 and January 2008. The pipeline is designed to withstand a maximum temperature of 50°C and pressure of 15MPa
Location choice	South-western Victoria was chosen because of the proximity and availability of relatively pure CO ₂ , its suitable geology and its potential storage site, offering the potential for a range of ongoing research into geosequestration
Site selection	CO2CRC geologists have been researching the geological structures of the CO2CRC Otway Project site since 2003. Following comprehensive site characterisation, they confirmed that the geology of the site is well suited to the geological storage of CO ₂ . To ensure that the project could proceed, CO2CRC purchased the petroleum tenements covering the CO ₂ well (Buttress) and the depleted gas field (Naylor)
Regulations	The CO2CRC Otway Project was successfully granted all regulatory approvals to produce, transport, inject and permanently store CO ₂ . Environmental, health and safety requirements have been defined using a combination of existing legislation including petroleum legislation through the DPI, water (Southern Rural Water), research, development and demonstration provisions of the Environment Protection Authority Victoria, and the Planning and Environment Act
Current status (June 2010)	Operational
Website	http://www.co2crc.com.au/aboutgeo/storage.html

4.1 Project activity timeline

CO2CRC Otway Project activities began in 2004, with the firm intent of developing a project in the Nirranda region. Following the decision to purchase the petroleum tenements in 2005, permits and licensing applications commenced and continued through to the last quarter of 2007. Baseline surveys to understand public knowledge, perceptions and understanding of CCS began in the last quarter of 2005. Post-injection monitoring continues to the present day.

A new well (CRC-1) was constructed in March 2007 with surface plant and pipelines completed within the same year. Injection (via CRC-1) commenced in the second quarter of 2008 and finished in the third quarter of 2009. Monitoring of the site will continue until closure and beyond as per the Victorian Environment Protection Authority licence conditions. Figure 2 below provides a timeline of significant activities already completed or being undertaken by the CO2CRC Otway Project since commencement in 2004.

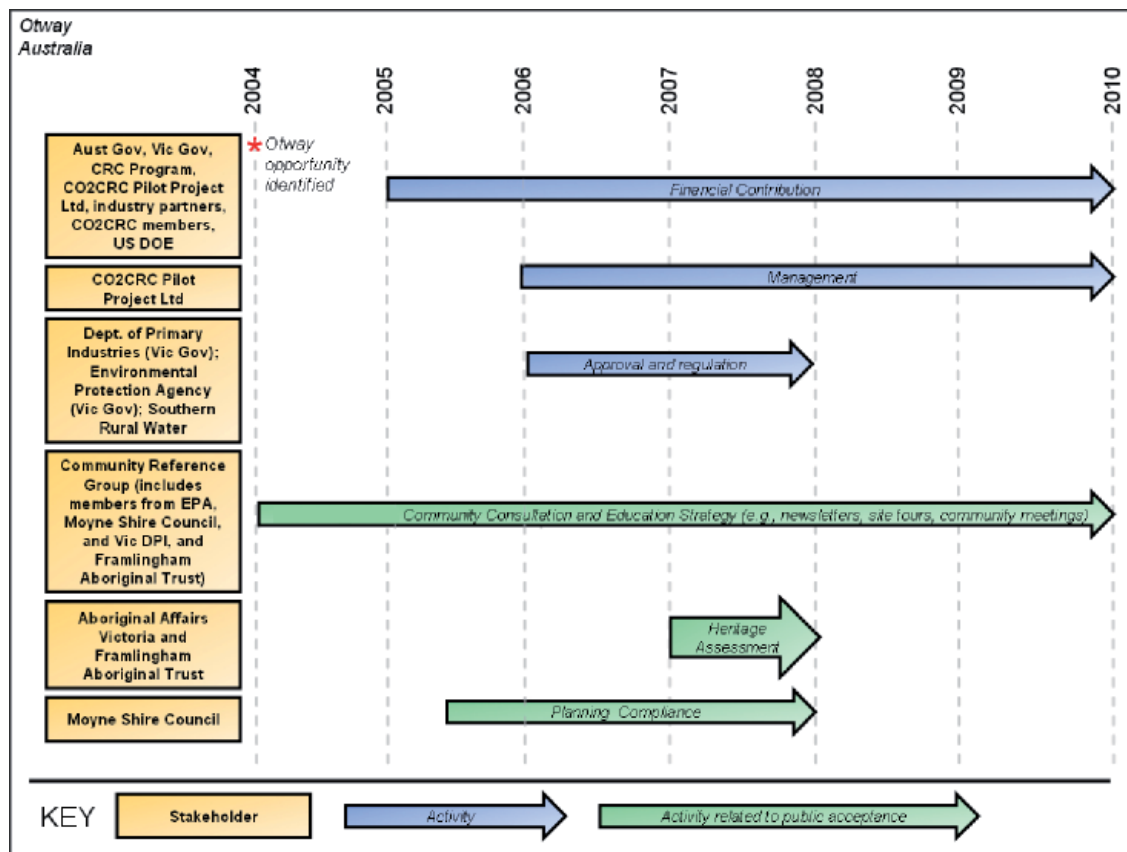


Figure 2 Timeline of activities for the CO2CRC Otway Project

5 Stakeholder mapping

5.1 CO2CRC

CO2CRC is a joint venture linking participants from Australian and global industry, universities and other research bodies from Australia and New Zealand, as well as Australian federal, state and international government agencies. Through CO2CRC, more than 100 researchers work on the full range of CCS research, capture of carbon dioxide, compression, transport and permanent storage in deep geological reservoirs. CO2CRC began in October 2003, building on an extensive program of geological storage research undertaken by the CRC for Petroleum GEODISC Program in the previous four years. CO2CRC was recently re-funded to 2015 by government and industry. In Victoria, CO2CRC researchers operate two other carbon dioxide capture demonstration projects.

The CO2CRC Otway Project is managed by CO2CRC Pilot Project Limited, now renamed CO2CRC Ltd. This company was incorporated in December 2005 as a not-for-profit company limited by guarantee with 10 founding members. CO2CRC Ltd is responsible for all operational aspects of the Otway Project.

The research focus of the project meant that CO2CRC was enthusiastic about becoming involved, especially given that the project is one of the first of its kind in the world. The academic and research communities are committed supporters, and participants are keen to access the findings of the CO₂ research.

Table 2 CO2CRC participants and supporters

Research Providers	Core industry and government participants	Supporting participants
Geoscience Australia	ANLEC R&D	Department of Resources Energy and Tourism
CSIRO	Anglo American	CANSYD Australia
Curtin University of Technology	BG Group	Meiji University
GNS Science	BHP Billiton	Process Group
Monash University	BP	University of Newcastle
University of Adelaide	Brown Coal Innovation Australia	US Department of Energy
University of Melbourne	Chevron	URS
University of New South Wales	Foundation for Science & Technology	
University of Queensland	Inpex	
University of Western Australia	Schlumberger	
	QR	
	Queensland Government	
	Rio Tinto	
	Sasol	
	Shell	
	Solid Energy Coals of New Zealand	
	Stanwell Corporation Limited	
	Total	
	Victorian Department of Primary Industries	
	Government of Western Australia	
	Department of Mines and Petroleum	

5.2 Government institutions

5.2.1 National

Department of Resources, Energy and Tourism

DRET is responsible for providing policy and other advice, to the Minister for Resources and Energy. It also has responsibility for administering relevant resource sector legislation and running various resource specific programs. Resources include coal and minerals and core petroleum sectors. DRET has responsibility for advancing the Australian Government's broader carbon capture and storage agenda, lower emissions coal agenda, and to provide input into the broader policy framework around CCS.

DRET administers about 21 pieces of legislation relevant to the resources sector, including the Offshore Petroleum Greenhouse Gas Storage Act, enacted in 2006 and amended in 2008, which provides an overarching regulatory framework for CCS within Australia and Australian waters.

In 2005, the Australian Ministerial Council on Mineral and Petroleum Resources (MCMPR) endorsed the Carbon Dioxide Capture and Geological Storage: Australian Regulatory Guiding Principles to establish a nationally consistent approach for the application of CCS. The Guiding Principles incorporates principles surrounding assessment and approval processes, access and property rights, transportation issues, monitoring and verification, liability and post-closure responsibility, and financial issues surrounding the application of CCS in Australia. In 2006, the Offshore Petroleum Greenhouse Gas Storage Act was enacted by the House of Representatives which has subsequently been amended and passed in November 2008 under the title Offshore Petroleum Amendment (Greenhouse Gas Storage) Bill.

DRET's involvement with the CO2CRC Otway Project is at arms length, providing substantial funding and requiring regular operational and financial reporting from the CO2CRC.

5.2.2 State

Victorian Government

The Victorian Government remains committed to exploring all possible means to ensure the ongoing viability of its coal mining industry. This requires introducing low emission technologies such as CCS to mitigate the state's annual excess of 60 million plus tonnes of greenhouse gas emissions from coal-fired power generation. As a result, the State Government has been actively supporting the development of CCS with industry and the research community. Two of the country's largest geological basins are located in Victoria: Gippsland Basin (oil and gas) and Otway Basin (gas and natural CO₂ reservoirs). These have been identified as having the highest geological CCS potential for Australia. The Victorian Government introduced the state's Greenhouse Geological Sequestration Act 2008 on 1 December 2009 and has been actively funding some of the Otway Basin projects. The Victorian Environment Protection Authority oversees all approval processes required by the CO2CRC Otway Project in relation to injection, storage and any noise that may result from the project's various activities (DPI, 2010a).

Victorian Department of Primary Industries (DPI)

The Victorian DPI is responsible for energy and earth resources, agriculture, fisheries and forestry in the state, It has a remit to ensure the sustainable, productive and competitive nature of these industries. It seeks to achieve this through the design and delivery of policies and programs that support these goals. The DPI provides incentives to encourage industry to seek new and innovative ways to adapt to climate change through low emissions technology, including CCS. The Victorian Government, through DPI, has been the first to develop legislation in Australia specific to carbon storage and has been a strong supporter of the CO2CRC Otway Project (DPI, 2010b). The CO2CRC Otway Project is regulated under Victorian environment, petroleum and water legislation administered through the Victorian DPI.

Project pipeline installations, well operations, pipeline gas transportation, project closure, decommissioning and any rehabilitation bond are covered under the Petroleum Act 1998. The Water Act 1989 provides strict guidelines and licensing requirements for any water used by the project. The Environment Protection Act 1970 focuses on operational activities such as the injection and storage of gases and the monitoring and verification processes

attached to these activities. It also provides for research and development project approval and pre-injection phase monitoring reporting as well as the project's Environment Improvement Plan. Management of incidents and their notification are covered under this piece of legislation as well as the management practices to protect against discharge or seepage onto land and management of groundwater and surface waters towards preventing discharge and discharge odour (Poletti, 2008).

The project also responds to the Greenhouse Gas Geological Sequestration Bill which legislates property rights and access, while managing the public health and environmental risks, long-term project liabilities and any monitoring and verification requirements. This Bill also imposes legal requirements upon the project developers to manage community consultation accordingly as well as ensuring local government involvement in any relevant decision-making processes (Poletti, 2008).

Southern Rural Water

Southern Rural Water manages the operation of irrigation, dams and licensing requirements essential to ensuring the sustainability of the southern districts of south-west Victoria. It supplies water for use in agricultural production and electricity generation in the region and ensures the water supply for regional townships, and rural and urban industry. All local access to groundwater for commercial and irrigation purposes is managed via Southern Rural Water and requires strict adherence to stringent licensing requirements under the Water Act 1989. In relation to the CO2CRC Otway Project, Southern Rural Water is charged with ensuring the protection of groundwater on behalf of the region's communities and landowners.

5.2.3 Local

Moyne Shire Council

The Moyne Shire is located more than 200 km from Melbourne in south-western Victoria. It covers 5,478 sq km including the Nirranda South region in which the CO2CRC Otway Project is located (Moyne Shire Council, 2010). The Moyne Shire Council seeks to provide "a safe, prosperous and vibrant community" for its 16,215 community members (Moyne Shire Council, 2010). Identified in the strategic plan within the Moyne Shire Council's 2008/09 annual report are environmental, planning and regulatory goals that seek to maintain and improve the region's natural and built environments, and to support and endorse development sensitive to regional locations, their environments, and cultural and indigenous heritage. The region is known as a hub for sustainable energy including wind, geothermal heat and natural gas, and recently saw the commencement of construction of a new gas-fired power plant at Mortlake (Moyne Shire Council, 2009). Other important industries represented in the shire according to the 2006 Census include agriculture, fisheries and forestry, the region's largest employer (2,315); retail (806); health and community services (730); manufacturing (650); construction (476); and mining (29), among others (ABS, 2006). Working closely with relevant state and national departments, including the Department of Planning and Community Development and the Department of Sustainability and Environment, the Moyne Shire Council is responsible for planning approvals of infrastructure, including buildings and roads, that support large and small construction, including those associated with the CO2CRC Otway Project.

5.3 Local community

5.3.1 Description

The local Moyne community is best described as being a traditional settlement of predominantly Anglo-Saxon background, with nearby Portland one of the earliest settled Victorian townships. The local and regional districts surrounding the project have a long standing farming heritage in dairy, sheep and cattle grazing, and general agricultural activities, as well as related service industries and some tourism. The close-knit rural community is underpinned by generational land ownership, strongly supported by community activity. Some stakeholders described the community as being somewhat parochial and conservative in terms of attitudes, with some third and fourth generations in residence.

Most people were considered to be aware of others' business to an extent that if something was happening on an adjacent or nearby property, or with a neighbour; such knowledge would be prevalent within the local community. According to one stakeholder, this knowledge of others' business is tempered by the fact that the locals "...don't live out of each other's pockets..."

Also indicating that this characteristic tended to help “to explain why the landowners are the way they are” and helped with liaising with landowners/farmers.

They all know the families' histories ... when something's happening to somebody's farm, they know how it's going to affect that person's farm as well ... it's quite an interesting community.

Due to the longevity of land ownership within the region, the locals appeared to be very knowledgeable about land and local environment issues, and were seen to be active researchers using the internet and other sources of information to assist in understanding concepts and other aspects of the project.

So we found them to be reasonably well informed, curious and asked all the right questions as part of their supporting the project.

5.3.2 Knowledge of CCS

With the exception of stakeholders exposed to the concept through their work activities, or work specialisation, stakeholder knowledge of CCS before the CO2CRC Otway Project was limited with several interviewees noting they were not aware of the process prior to exposure to the project. A stakeholder with limited prior knowledge noted:

Yes I did know about it, but I would say I would have known about it now for five years and I would say I went through the same journey that the community has gone through myself, because I remember having to attend the first community meeting when this project was given to me and I had a bit of anxiety myself, and I had to alleviate that anxiety to attend that first meeting.

Knowledge that existed before the project tended to be sourced through reading, hearing or viewing information about CCS in magazines, journals and other media forms. One interviewee with a media background considered information sourced via television documentaries should be seen with a degree of scepticism because questions could be raised about the accuracy of information presented via this medium. Yet another indicated that media coverage had the capacity to disconcert and distort understanding of CCS and that inaccurate and misleading information provided by the media “tends to be quite disturbing to some members of the community”.

Several of the interviewees noted that their knowledge of CCS had been gained as a direct result of involvement in the CO2CRC Otway Project, whether learned on the job or via individual investigation, and those interviewed appeared to have a basic understanding of the concept. Though aware that CCS was being investigated overseas as a result of reading the occasional magazine article or newspaper report, one stakeholder noted the concept had been pretty much unknown to him until he became aware of the CO2CRC Otway Project in March 2006. Similarly, one landowner indicated that his understanding of the concept was “very low”, stating that his exposure had been primarily through “reading the odd article in a journal or a magazine or seeing a special on TV about projects elsewhere in the world ...” This lack of knowledge prior to contact with the project was not uncommon among most stakeholders interviewed.

5.3.3 Establishing a baseline

Prior to any consultation, CO2CRC undertook some social research to establish a baseline understanding of what the local community knew about and thought of CCS. A quantitative phone survey was conducted across seven shires in the region with 300 participants (Figure 3). The aim of the research was to explore community attitudes



Figure 3 The seven shires surveyed

towards CCS; CCS in relation to other mitigation technologies; and the CO2CRC Otway Project. People in the region have been exposed to proposals for wind farms, paper mills and gas projects. Those interviewed ranged from young adults/singles, married with no children, married with young children, and retirees with no dependent children. Ages ranged from about 18 to 65. Most were employed as farmers, in home duties or in a semi-professional capacity.

In addition to the phone survey, focus groups and in-depth interviews were conducted in Nirranda, the community near where the project is occurring, and in Warrnambool, the larger regional centre.

CO2CRC invested a large amount of time visiting all local landowners who were likely to be impacted by the CO2CRC Otway Project, ensuring a general understanding of the project and enabling access negotiation to certain land essential to the project. Meetings were held between CO2CRC and the shire and several public meetings were convened to impart CCS information and enable relevant material to be disseminated via a selection of media outlets.

5.3.4 Local benefits

In addition to farming, the local region has been heavily involved in gas and oil exploration. When CO2CRC began to communicate with the local community about the project, according to one stakeholder there was a strong feeling that here was just another one of those *“big companies [that] are taking advantage of the area ... like they're making lots of money from it”*.

One stakeholder indicated that when it was emphasised that the project was not there to make money but to determine viability for future application, the local community began to see the benefits from more of an impact level, including that it could help to improve the local image, would draw scientific interest, and that the technology was complementary to existing renewable technology utilised in the area.

More specifically, one stakeholder noted that it established the south-west of Victoria as a centre for sustainable projects, putting Australia in the forefront of CCS technology that blends well with renewable technology in the area.

It's helped to establish in the south-west of Victoria, as a centre for sustainable projects, this being, dare I say, certainly the first significant carbon capture and storage in Australia and putting Australia at the forefront in that regard, but it's also now blended in very nicely with other projects such as wind farms, hot rock technology, gas-fired electricity turbines and wave power generators that are being looked at. So it's very much altered the complexion of the area and made it, given it a very distinct flavour of being positively interested in sustainable projects.

Some minor benefit was believed to have been negotiated for landowners where work was required to be carried out on their land; however this was perceived to be minimal, whereas adjacent landowners and the rest of the community would not have benefited substantially in any way. There was however a perception of *“indirect benefits to the community in terms of jobs, people coming to the site”*. The stakeholder also indicated that there had been considerable *“international interest in the project and people have been signing up especially to see the site”*.

One stakeholder considered a particularly positive benefit as being *“that it has certainly made a small section of the community in Moyne aware of the issue of carbon in a direct sense”*. This stakeholder felt that when taken in context with the usual daily concerns of the community, these types of issues do not feature too highly in their consciousness, stating that *“it tends to pass them by”*.

... whereas the benefit of this project is that for a select number of people it has really brought home the fact that there is a big issue out there that is real, that solutions are having to be found and here is a project that's working towards that ...

So I think this project has helped people understand that the whole issue of how we as a world are dealing with carbon has really opened people's eyes.

Benefits indicated by CO2CRC were considered to focus on climate change mitigation, a chance to make an impact should the trial be a success and the ongoing application potential of the process towards CO₂ emission mitigation at power generation stations elsewhere. One stakeholder noted CO2CRC emphasised the demonstration nature of the project, that it was a pilot project, and ensured that the community was aware that it was not about money making but rather to determine the viability of the technology. The potential international impact this could bring

was also indicated as a likely outcome that could benefit not just the local community but Australia and the rest of the world.

We would have communicated that it's important as a method or one of the ways of mitigating greenhouse gas emissions, so tackling climate change; that it was important research that would be used internationally. So there's an international focus.

According to one stakeholder, understanding this and the mitigation potential of the process appeared to influence how local members of the community saw their involvement:

They understand the benefits and they'll tell you ... like one landowner's actually said to me, I think this is my little bit that I'm doing for climate change.

One stakeholder connected with CO2CRC noted an important benefit to be the assurances of the security and safety of the underground water tables from contamination from any gas seepage or leakage resulting from CO₂ storage in depleted underground gas tenements. Another interviewee, not directly associated with the project, did not necessarily see this as a benefit, but rather as a reassurance.

5.3.5 Local perceptions of the project

From the earlier baseline research, 33 per cent of people stated some level of comfort with the project, with another 19 per cent suggesting they were neither comfortable nor uncomfortable. Some 38 per cent showed a degree of discomfort about the project while another 9 per cent did not know or felt they know enough to give a response. The major concerns they shared included whether it was safe for the environment/community (38%), leakage of carbon dioxide (33%), adverse effect of the geology (17%), and that CCS is a short term fix (13%) (Anderson, 2007).

In addition to the quantitative baseline research, the qualitative component revealed some differences between the local Nirranda community compared to those in the larger regional town of Warrnambool. In Nirranda, the concerns were limited to the impact on the local area while in Warrnambool residents were more concerned about how the project would affect the community at large. The major concerns in Nirranda included the timeframe for the project, the uncertainty associated with it and any limitations surrounding compensation.

The science of the technology behind the concept of CCS was perceived to be baffling to most community members initially. However, once the process became clearer and there was time to question project proponents to gain understanding, it enabled concerns to be allayed and instilled a more positive response to the project and greater acceptance of it. This was probably more readily seen in relation to concerns regarding water safety and security.

Well, after it was explained that the chances of that were less likely than being hit on the head by a spaceship or a piece of space junk, people were shown to understand then that CO₂ in the water was not a harmful consequence in any event. So there was I'd say almost like a 99 per cent acceptance of the project, it was very positive.

One stakeholder considered the engagement of a community liaison officer to communicate with the local community as a real benefit to CO2CRC and the local people. Anecdotally this is reinforced by the following comment:

In fact, one landholder who still, to my understanding, struggled until this community liaison person that we have, [name withheld], has stepped into the scene and she has been able to get across to him a little bit better that there is no commercial benefit from this project.

Another stakeholder noted that for some locals there was initially concern regarding the aesthetics and footprint that any construction might have in the community. However, as this did not appear to be the case, the lack of visual prominence of the project was perceived to be a benefit.

5.4 NGOs

At the time of the launch of the CO2CRC Otway Project, a number of non-government organisations (NGOs) were active in the early CCS debate. When the project was announced, the Australian Conservation Foundation was critical of the perceived 'dumping' of greenhouse gases underground and potential cost and safety issues of the project. However, over time engagement with these groups has helped to allay their concerns especially as inaction

on climate change has been prevalent at the global level. Recognition of the need for all new emerging technologies to be given a fair go seemed to ensure that the CO2CRC Otway Project was seen in a positive light.

More generally, NGOs in Australia tend to take a range of positions from those staunchly against any CCS projects because it is extending the life of fossil fuel-based power, to those that believe it should be tried and tested in this research and development phase to see if it truly has the potential as a serious mitigation option. However, all feel that this should not be done at the expense of renewables and that energy efficiency measures are also important (Ashworth & Parsons, 2009).

6 Communication – public engagement

6.1 Communication strategy

A key premise of all communication activities for the CO2CRC Otway Project was to ensure open, transparent and continuing dialogue with the local community. Additionally, there was a commitment to update early, before any information appeared in the media, to ensure there were no surprises for the community. It was important that the community was seen to be a priority for the project proponents. This was led by the CO2CRC Otway Project team but strongly supported by other interested parties including the state and federal governments.

6.1.1 Who

CO2CRC had oversight of all communication activities that took place in relation to the project. This was initially undertaken by the CRC Communications Manager and the Otway Program Manager. In late 2007, a Project Liaison Officer was appointed to assist in local communications and to be the main point of contact for any issues that may have arisen as the project progressed. In addition, internal technical experts working on the project were made available to meet community members and attend public meetings to provide information that was being sought.

In addition to the higher level policy engagement, the main stakeholder groups targeted included landowners, regional and town residences, the local water authority, local shire councils (Moyne and Corangamite) and indigenous groups.

6.1.2 What

Information provided by CO2CRC about the Otway Project was delivered through multiple community engagement processes. Interviewees noted that information provided was mainly factual, focusing on aspects surrounding the technology: how it works, why CCS is a necessary part of the portfolio of responses to climate change, and issues surrounding climate change and the urgency for a solution. This included all stages of the project from storage, monitoring and verification.

In addition to fact sheets and newsletters, almost all information was made available via the CO2CRC Otway Project website. This material was then used in various formats to target different audiences.

Other information that was made available through direct and indirect contact with affected stakeholders (telephone, letter, public notices) related to significant issues surrounding the project, such as seismic testing notices, property access requirements, and information about potential impacts to farming activities (stock rotation sequencing and impacts, water issues, contamination potential and safety issues). Information was also provided to help alleviate concern regarding potential CO₂ leakage and safety issues regarding underground tenement/aquifer ability to store CO₂ for long, unspecified periods.

Project progress was covered in flyers and the quarterly newsletter. Invitations to the general public were sent out via newsletter, flyers and the media for the open day in November 2009. Invitations are sent out for any convened community meeting along with advice of any special guest speakers/visitors. Other information related to background details about CO2CRC, the type of research being carried out, and partner organisations.

6.1.3 How

CO2CRC actively sought to understand the local community's attitudes and perceptions, running a social research program within the immediate area (Nirrandra South) and surrounding district (Warrnambool). Later, it appointed a market research organisation to further this research through survey and focus group processes. Public meetings

were convened and information kits sent to relevant stakeholders including the Moyne Shire Council, regulatory agencies and indigenous groups. In addition, information was made available regularly throughout the community via newsletter, a process that has continued since injection commenced in April 2008.

Upon establishing a baseline understanding of the local community, CO2CRC structured a communication plan that utilised various engagement forms, including meeting with local regulators, councils, businesses and landowners. These meetings were formal and informal. They ranged from individual meetings (kitchen table, coffee and chat, door-to-door) with landowners, to small and larger gatherings. For example, community reference group (CRG) meetings tended to be smaller, with key group members primarily in attendance (although they were always open to others), whereas public meetings tended to be substantially larger.

Larger meetings led by the Otway Program Manager and involving on occasion the Chief Executive and the Chairman of the Company utilised PowerPoint presentations to disseminate detailed information to the audience. Technical specialists from CO2CRC and research partners would provide support, speaking to various issues when required. At all closed and public meetings, information was provided via fact sheets, brochures and booklets, with attention drawn to the project website where more detailed scientific and general information could be found.

Information including project updates and research results was disseminated via a quarterly newsletter distributed to residents in the local and adjacent shire; fact sheets, brochures and booklets were distributed to the general public and local school children (age appropriate); and flyers were placed in business windows and on community noticeboards.

6.1.4 When

Table 3 Communication type and frequency

COMMUNICATION TYPE	AUDIENCE	FREQUENCY
Newsletter (mailbox drop and digital via email and available on the project's website)	All stakeholders	Three times a year or as required
Community Reference Group (open to public; advertised for two weeks prior; newsletter letterboxed to 1300 homes)	Identified stakeholders and interested public	Quarterly, now every six months or as required
Public meetings (advertised for two weeks prior; newsletter letterboxed to 1300 homes)	All local communities	Three times a year, now every six months or as required
Flyers, posters, brochures	Community meetings, formal and informal meetings, progress updates, special events	As required
PowerPoint presentations	Formal and informal meetings, public meetings	As required
Media coverage	Local, state and national journalists	Regular updates, special event announcements
Door to door	Local landowners	As required, more frequent in initial project engagement processes
Letters	All local residences (1300)	Initial notice of demonstration trial, to advertise CRG meetings and on an as-needs basis

6.1.5 Stakeholder reactions

Stakeholders noted that the local community showed significant interest in the project. This was illustrated by the attendance at initial and ongoing community meetings hosted by the developers to inform and update residents on the project's progress. At each of these meetings there was evidence of intelligent questioning (as indicated in 7.1.6 below) of CO2CRC. However, over time this interest dwindled as issues and concerns were allayed and/or resolved. Some 60 local community members were noted as having attended the initial community reference group meeting, with as little as two at the most recent meeting.

... the community initially had a lot of questions but, to the latter meetings, the number of questions have been reduced with even landholders answering the questions themselves to each other, which I think is wonderful to see.

6.1.6 Common questions

Stakeholder comment indicates that the local farming community in particular wanted to know about the science behind the technology. This is reinforced in the following statement:

People don't understand the science behind it. It sounds very, very risky and, until they sit down and learn about the nuts and bolts of how it works, they feel quite unsure. When they do hear about it, they feel a lot more comfortable.

This uncertainty appeared to raise substantial community and stakeholder inquiry, such as how the technology worked and how the process and the injection of CO₂ would be monitored. In addition to a need for scientific information, data collected from interviewees highlights many pertinent questions, examples of which are summarised below (in no particular order):

- Why are you doing it?
- Does it work?
- Is it safe?
- What dangers are associated with the technology?
- Will the storage crack and cause earthquakes or cause underground caverns to collapse?
- What are the chances of the CO₂ being released into the atmosphere accidentally?
- What are the likely outcomes of an accidental release of the CO₂?
- How will it affect underground and above-ground water resources?
- If it gets into the water, how will it affect soil and livestock?
- What happens if the CO₂ migrates into the groundwater table?
- What impact will there be to my business?
- How will this impact my farm (owner access)?
- How will this affect my land (contamination, maintenance)?
- What impacts will there be to my land in relation to access?
- Will it devalue my land?
- Will there be increased road traffic (impact livestock and road maintenance)?
- Will it impact livestock in terms of milking (transport disruption [noise] and quality)?
- Will there be lots of construction?
- Will there be big vents?
- Will there be noise and how will it be managed?
- What will the financial impacts be?
- What compensation will we get?

Of particular interest for those community members directly impacted by work carried out by CO2CRC on their land was the question of: *"What's in it for me?"*

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On the one hand, they are interested about saving the world, blah, blah. But at the end of the day, their bottom line is, what's in it for me and how does this affect me and my land?

One stakeholder noted that there were very real concerns initially regarding pressurised storage of the CO₂ underground with members of the community posing questions such as:

How can you reassure us that you're not going to crack and cause an earthquake or cause underground caverns to collapse?

It is interesting to note one stakeholder's comment about a member of the public, who was once an educator in the region, expressing concern about the idea of storing underground what she considered to be rubbish.

... one person did say to me that she had an issue with us storing our rubbish, like putting our rubbish back underground.

I don't have an opinion as such on it. I'm just here to represent the project and what they're doing. So we've won her over as well now, because now she realises that we're a scientific research project. But you know, she's happy with the project being there. I still don't think she's happy about us storing CO₂ underground but she is a lot more comfortable with the project, where it is and what we're doing, because it's near her place.

One stakeholder indicated that although many concerned questions were raised by the community there were also questions along the lines of "how can I help?" and "Well, what else can I do?" once the initial concerns were allayed.

6.2 Further communication/public engagement approach

6.2.1 Corrective measures

Most of the project's engagement activities and associated communications to the date of interviews conducted for this project appear to have been perceived as positive. Most community members felt that the issues that they raised were addressed and answers found to allay any concerns they may have had. However, an issue arose when one landowner did not want to grant access to his property. Despite numerous conversations with key technical experts, explaining the reasons for the project, the landowner remained adamant. As a result, the State Government had to resume the land on behalf of the state to enable appropriate access for the CO₂ well.

Some landowners experienced problems with gates being left open during field surveys and access and timing issues to certain properties. To overcome this, CO2CRC developed a procedure to manage access and clean-up of properties after seismic processes. In addition, an induction program provided a protocol for all individuals and organisations entering properties/sites to ensure adequate regard and understanding of local community expectations.

6.2.2 Appointment of a project liaison officer

Recognising the importance of having local community actively involved in the project, CO2CRC employed a local community member as the CO2CRC Otway Project Liaison Officer. The person was well known and respected in the community and had very good communication skills. Having lived in the area for most of their life meant they knew the majority of key stakeholders from around the project area very well. The appointment of the Project Liaison Officer proved to be a highly effective step, opening up all channels of communication substantially.

6.2.3 Media analysis

The CO2CRC Otway Project has been the subject of a wide range of media since its announcement. For this analysis, some 42 media items directly associated with the project were sourced from a mix of national, state and local print, radio, television, and website media. Articles were searched according to a set of terms identified in Table 4 below. Google's search engine and the ANZ Proquest Newsstand online database were used to obtain the articles. There are numerous other articles but given the retrospective component of this analysis, we have focused on those since 2006.

Table 4 Media analysis - search terms

Search terms

CCS
 Carbon capture and storage
 Carbon dioxide capture and storage
 Carbon storage
 Carbon capture
 Otway Project
 Pilot study
 CO2CRC
 Nirranda South
 Warrnambool
 Victoria

2006

Media coverage focused on the announcement and planned commencement of the project in 2007. Articles reviewed for this report provided a balanced overview of the project with mostly positive tones and some criticism from conservation groups, such as the Australian Conservation Foundation, regarding perceived dumping of greenhouse gases underground and potential cost and safety issues. The pilot project's ability to reduce greenhouse gas emissions, storage capacity, degree of specialisation behind the technology, and business opportunities for Australia, were also the focus of media attention during this period. Government financial support drew some discussion, regarding funds received and those pending. It was noted that the Otway Basin region had been highlighted for location of an injection site for storage of CO₂; however, no definite site had been announced.

2007

In 2007, media reports covered for this review appeared to be balanced or positive. Discussion focused on the project's progress, its approval via an EPA process, and a Nirranda injection site identified for consideration as the result of a local landowner offering her land voluntarily to the project. In Australia, a change in government resulted in opposing views emerging around timing of the technology being too late for climate change mitigation purposes. Dr Karl Kruszelnicki, Senate candidate, made some comments criticising CCS and raised the issue that the concept of clean coal was a misnomer. However, he withdrew some of his arguments when some of the statements were shown to be scientifically incorrect. Tony Mohr of the Australian Conservation Foundation questioned the validity of a pilot project that trialled underground storage of naturally occurring CO₂ when the technology's application would be for storage of industrial waste gases. Other safety and security risks associated with the technology were highlighted in several media items.

2008

Media articles reviewed were mostly balanced, with a strong positive theme. Then Prime Minister Kevin Rudd outlined his support of the GCCSI at the United Nations General Assembly and his support of the CO2CRC Otway Project, and the Chief Executive of CO2CRC was asked by the Prime Minister to provide the technical basis of CCS at the official launch of the Institute. Support was also forthcoming from the Corangamite Labour MP introducing draft legislation to permit burying of greenhouse gases from coal-fired power stations.

A major focus in 2008 was the project's launch (Australia's first carbon dioxide storage project), an emphasis on the calibre of the project's partners, and the level of support the project had garnered to date. The project's aims and benefits over the ensuing two years were also discussed. The official opening attracted dignitaries from the US, New Zealand, Japan, India, and South Korea, all of which were noted as being countries with significant coal-fired electricity generation industries. Positive discussion focused on the project's success in demonstrating the safety of geosequestration, its innovative monitoring systems and its success in reaching the 10,000 tonnes injection milestone, marking the commencement of the next phase of the project. Potential for New South Wales to link with the project in Victoria for geosequestration of CO₂ was also the subject of a media release during this period. Coal industry support for the low emissions technology as a means of mitigating climate change and from an investment

perspective were also covered. Discussion around the significance, or otherwise, of the size and relevance of the project compared to other global projects, was an area of discussion as were concerns regarding financial viability of clean coal technology and its impacts on existing Victorian power generation stations.

Concern was raised by the Australian Greens regarding the financial commitment the technology was receiving at the expense of other low emissions technologies. They pointed out that LNG had an advantage over clean coal because it produced about 30 to 50 per cent less CO₂ than coal. While criticism was also forthcoming from Greenpeace, the Australian Greens noted the project's capacity to impact on climate change mitigation was negligible and suggested that the project was a public relations play by the coal industry and government to deflect attention from a perceived failure to address the underlying causes of climate change.

2009

In 2009, media reports focused on the milestone of the CO2CRC Otway Project successfully storing 50,000 tonnes of CO₂ underground. This achievement led to much consideration by CO2CRC and its key stakeholders of the developments of the project including a possibility to extend the project to better understand the storage potential of differing rock types. Most articles outlined that the allocation of \$2 million to the second stage of the project would be used for injecting and storing CO₂ into a second well and the importance of this stage in continuing to monitor and evaluate the potential for new trapping techniques.

Positive discussion by the Australian Government was evident, with Federal Treasurer Wayne Swan announcing \$4.5 billion funding for a new clean energy initiative aimed at supporting low emission technologies including CCS demonstration projects. On a global scale, Kevin Rudd publicly promoted the GCCSI and CO2CRC Otway Project at the G8 summit in Rome.

A few articles focused on the cost of clean coal and how it is perceived as an expensive illusion which is postponing the adoption of alternative renewable energy sources. In light of this, other experts agreed that an appropriate mix of cost-effective energy technology solutions such as renewable and CCS need to be found.

Safety and security risks were highlighted in most articles pertaining to the CCS technology but the benefits and continuing success of the storage of CO₂ at Otway were also covered. Overall the coverage was positive and focused heavily on the successes of the CO2CRC Otway Project and future developments.

7 Analysis of communication and public engagement approach

Community engagement appears to have been a major priority of CO2CRC both at the initial stages and throughout the continuing project. This is best illustrated by the number of times project proponents knocked on doors, held meetings with individuals around kitchen tables, sat down over a cup of tea, met councils and held community information meetings, timing for which was negotiated to suit landowners and business people. The engagement process involves people throughout CO2CRC including the Chief Executive, Project Manager, Communication Manager, researchers and the Liaison Officer.

Flyers are placed in places of interest, in shop windows and at business premises and on public noticeboards, advising of milestones and other aspects of the project. As well as newsletters being distributed to every home in the local and surrounding districts several times a year, public advertising and media coverage is used to disseminate information to the community. Whenever possible, significant information is provided to locals in individual personalised letters to prevent unpleasant surprises via the media.

7.1 Five critical factors that affected the outcome

The project is ongoing at the time of writing and has continued to expand across a range of activities. However, there are some key findings that can be extracted from the overall communications activities to date that help in the development of a well structured communications plan. These include:

1. Gaining a baseline understanding – the appointment of a market research company to conduct focus groups and coordinate a survey across the region enabled the Communications Manager to gain a good understanding of how the local community perceived CCS. This then helped to inform the ongoing communication materials and processes that were used to engage across the region.

2. Early, proactive engagement – there was a concerted effort to ensure that engagement with the community was a priority. Every effort was made to communicate openly using jargon-free language with community members, and to enable residents to identify with the project representatives. CO2CRC representatives consciously attempted to 'lose the suits' for their engagement activities, as indicated by one stakeholder who implied community members appreciated such efforts,

... rather than some sort of slick PowerPoint show that's done by somebody in a suit with a tie.

3. Establishing trust – was seen to be a critical step for the project. It was also a priority to ensure this trust was maintained throughout the project. Ongoing open and transparent communication was seen as critical to achieve this goal. As well, a fundamental component for developing trust was to ensure the dissemination of accurate and up-to-date information at all times.

4. Appointment of Community Liaison Officer from the local community – originally it had been envisaged that most of the communications could be handled from the main office in Canberra, however CO2CRC quickly recognised that this was not going to be the case. As a result a paid local representative was appointed to the position of CO2CRC Otway Project Liaison Officer, which is the main point of contact for the project. This was a very successful development and the Liaison Officer is very well respected in the area, as illustrated below:

So when you're talking about the project and what we're proposing, I think when it comes from somebody that's out of the community, they're sort of thinking oh well what is their motive? They're just trying to get their project up and running. When it comes from someone that's within the community, they're a bit more, a bit, yeah they, there's a bit more trust there I think.

5. Development of protocols for engaging with local landowners – although most issues with landowners were minor, there were some issues when researchers or technicians left gates open after entering a site. To overcome any negative feelings or unnecessary repetitions of such events, CO2CRC reacted promptly to develop formal processes in relation to access and site clean-up. Such efforts were appreciated by the local community.

7.1.1 Pitfalls

Several incidents relating to seismic surveys were perceived in a negative light. The first was when the use of dynamite was considered as part of seismic survey processes on properties. This was a major concern for landowners and the idea was quickly reviewed and the process reconsidered.

Several concerns were identified in relation to these early seismic surveys, which set the tone for later surveys as potentially difficult. Issues included distortion of land surfaces through the use of vibrating platforms that left major imprints in the ground, some as deep as half a metre or more, in one case causing an accident where one unsuspecting landowner fell off his quad bike. Fences were cut to gain access to land instead of using gates; where gates were used they were left open allowing stock to wander free; flag pegs were left in the ground and caused damage to agricultural equipment and livestock.

The damage caused to the relationship between the landowners and the developer was significant: "... none of them were happy at all." Efforts to repair the damage were seen to be inadequate, and communication surrounding the incident was considered to have been very poorly handled.

The seismic survey two years ago. Yeah and again, I wasn't involved in that, I came in afterwards and realised just how badly that was handled I think and yes, as I said, to visit nine different landowners and eight of them say, you're not well, oh, seven of them saying, you're not coming back on our land. I would view that that was a particular event that went very poorly.

Efforts since to repair and establish a better relationship with landowners appear to have been more successful. A recent survey, conducted just before the interviewing process for this report, found that there were still issues but that relationships have improved.

Look, all surveys haven't gone without any problems, there've been a number of problems over the last two or three days. And the best part is that because we've got the good relationship with them, they're tolerant. They're okay, they understand that accidents may happen, they work with us. The landowners work with us as the researchers work with the landowners to make sure that we find solutions and we work things out and it's working ...

Another incident that appears to have concerned some people was the compulsory land acquisition of a parcel of land from one landowner's property. The landowner refused access or use of his land, without what he considered to be adequate compensation. As this piece of land was crucial to the demonstration trial's success, ultimately the land was acquired by the State Government under land acquisition legislation. This surprised some local landowners.

They compulsorily acquired a parcel of land off one of the landowners to do some stuff because he was causing a lot of stink. Yeah, that was sort of looked at with a bit of, you know, cat's bum, I suppose.

Okay, well that was a very bad situation for all parties involved because the CO2CRC wasn't able to negotiate an agreement with that particular gentleman [pause] and basically the government had to step in and take a few measures to address that situation, which is the absolute last resort for government.

As a result, the landowner had continued to maintain his distance from the project. However, it is interesting to note this situation was another considered to have been substantially improved with the commencement of the local liaison officer who has apparently worked hard to establish a relationship with the landowner and to reinforce the non-profit aspect of the project.

I mean all along we were trying to explain to him that [pause] this is not a commercial project, but that wasn't getting across. But the last conversation I had with the community liaison officer is that he now understands that, which is a big step to take, I think.

Though perceived to be a difficult moment within the progression of the project, one that could have easily derailed the trial, the stakeholder involved in the ongoing negotiations with the landowner indicated that this event, along with others, should not necessarily be seen as a negative, but also as a positive. Indeed the stakeholder noted that the issue opened the eyes of CO2CRC and its representatives to what could go wrong and allowed measures to be established to prevent any similar situation recurring.

Early in the project's progress, the developer identified requirements for planning which it tabled with the Victorian Government. As a result, zoning changes were implemented under the Planning Act to meet these requirements. According to the representatives from the project this process was completed early and without issue. However, this perception is at odds with other stakeholders interviewed who indicated that a lack of understanding of the complexities of planning created some problems between the project's scientists and planners. The lack of understanding being experienced on both sides highlights the importance of two-way communication and the need to ensure all processes, whether they are science or policy, be adequately explained to the uninitiated. In this case it appeared that some problems arose when project requirements conflicted with local council planning that could not be quickly and easily remedied. However, the issue was minor and was resolved amicably.

They were sort of saying: "Well, don't you get it, this is important?" "Yeah, so is everything else." [Laugh] yeah right, so anyway the planning controls got changed eventually to meet their needs but probably not within the timescale that they expected because under a legal process set down by parliament, which is law, there are steps that need to be gone through and so that's probably where things didn't go so well and perhaps public perception of their credibility and their expertise might have suffered a bit at the time.

7.1.2 Successes

One stakeholder indicated that the seismic survey in 2009 was particularly successful where approval was gained from all but one of 15 or so landowners to allow seismic testing to be conducted on their land. This was apparently a major breakthrough in terms of community engagement and reflective of the level of trust that the liaison officer had managed to establish within the community. This was considered to be a direct result of the liaison officer being recruited from within the local community.

The community reference group and community meetings appear to have been successful with good levels of regular attendance perceived as evidence of their popularity. Several stakeholders identified the official launch of the project in April 2008 as being particularly successful with various federal, state, industry and other dignitaries attending along with invited members of the local community. The launch marked the day injection of CO₂ into the CRC-1 well began.

It was a blustery day in 2008, in April of 2008, very strong winds, extremely cold but still a lot of people came in and I thought it was a very successful opening, even the ministers came in by helicopter even though it was kind of dodgy to land at that time because the winds were so strong, but we did have good support and largely everybody who was invited actually did make the effort despite the elements.

An open day in October 2009 was also considered a success. It was the first time the site had been opened to the public since the launch. The day included a tour, informal meeting and a sausage sizzle. About 35 members of the public attended and it is perceived that these individuals would have spoken of their experience to others in the community.

I think the open day went very well and it meant that those 35 people went out and spoke to other people who then spoke to other people.

Another stakeholder indicated that the project appears to have been a success from a local perspective, from “the flicking of the switch by the minister up until now”. The fact that there had been no major issues with the demonstration trial itself meant that it was pretty much a matter of “no news is good news.”

The community reference group was seen to influence success, with one stakeholder noting that:

The evolution of it's been great, because I've seen them sort of questioning the project team and then, what's really refreshing is to see the audience themselves answer their own questions.

The project launch was also perceived to be a major success because it was able to draw attention to the project on a global level, with multiple media covering its progress (some 80 or so pages of coverage at the time), which apparently pleased the then Deputy Secretary immensely.

Our Deputy Secretary was in China at the time and he was... one of the comments he made was he was “really thrilled to see our minister on a Chinese paper and announcing this project”.

Another aspect perceived positively in the local community was that the head of CO2CRC visited the area many times to meet the community and stakeholders and to discuss issues and concerns. Historically, companies coming into the area tend to engage the services of consultancy firms whose representatives act on behalf of the company, so community members don't believe they are talking to the right people. With CO2CRC, they believed they were and this made a difference.

... sanitised answers because the people giving the answers don't really know the depth, whereas one of the nice touches of this project is, this is the guy that heads up the whole thing and he has flown here especially to talk to you tonight, and he's a human being and he's got one head and he's telling you as it is, and here's the rest of the team who have spent half their lives travelling the world and doing this but they're here tonight to sit down and talk to you and they're relaxed and it's nice and casual and that works well ...

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Appendix A – Interview guide

Project: International comparison of public outreach practices associated with large-scale CCS Projects

1. Tell me a little about you, your prior experience and what brought you to the project?
2. *[For those related to project INDUSTRY, GOVERNMENT, RESEARCHERS, ETC]*
What was your specific role in relation to the project XX? Why did you get involved in that role?

OR

[For others in the community: LOCAL COMMUNITY NGOs, OTHERS, ETC]
How and when did you first hear about the project?
3. How would you describe your relationship to the local community?
 - a. If multi-generational, going how far back?
 - b. Do you own/rent/work in the subject community?
 - c. How long have you been in the community?
4. How would you describe/(characterise) the/your local community?
 - a. Close knit, rural, urban, in decay, vibrant, etc. Can you provide some examples that demonstrate this?
5. What do you know about sequestration/carbon capture and storage? What is your level of expertise, experience with CCS (country specific)?
6. Did you know about sequestration/carbon capture and storage before or after learning about the project in your community?
7. What were the benefits that the developers communicated about the project?
 - a. How were they presented?
8. What do you think were the benefits of the project to the/your community?
9. How did the community perceive the benefits?
10. What do you believe were the main questions/issues raised by stakeholders in the community?
11. What is the community perception of the project developer?
12. Was community engagement a project priority? How was the community engaged? What information was presented about the project?
13. Can you think of an event or circumstance when things related to the project and how the public viewed it went very well?
14. Can you think of an event or circumstance when things related to the project and how the public viewed it went poorly?
15. Was there a particular event that marked a change in the level of public acceptance towards the project?
 - a. What happened?
 - b. *[IF INTERVIEWEE IS RELATED TO PROJECT]*
How did you respond?
16. What other information would stakeholders have liked to have heard or seen?
 - a. Were there any unanswered questions?
17. Would you be willing to provide educational background information for the purposes of this research?
18. How long have you lived in the community?
19. Is there any other information you believe might be important to understanding your role in the community?

Appendix B – National context

CCS agenda

Australia is deeply involved with the international movement to progress the deployment of CCS as a key mitigation strategy for fossil fuel-based industries. Considered internationally as one of the world's leaders, Australia is known for its multi-level governmental approaches to progressing the technology's deployment. However, like many new and emerging technologies, CCS remains relatively unknown across the larger Australian society with some perceived risks.

Global CCS Institute

The commitment of Australia to progress a CCS agenda is probably best represented by the establishment of the Global CCS Institute (GCCSI). The GCCSI was announced by the Australian Government in September 2008 and formally launched in April 2009. Its objective is "to accelerate the commercial deployment of CCS projects to ensure their valuable contribution in reducing carbon dioxide emissions". The Australian Government has committed AUD\$100 million annual funding for five years. The aim is for the GCCSI to work collaboratively with a range of government, non-government and industry organisations to achieve deployment of CCS.

Department of Resources, Energy and Tourism

The Department of Resources, Energy and Tourism (DRET) has responsibility for CCS within its portfolio. Its work has been instrumental in formulating Australia's position on CCS while developing Australia's reputation as one of the leading countries to advance the technology. This is mainly seen through its advanced regulatory policies and other initiatives such as the GCCSI and the Carbon Storage Taskforce (CST). More recently DRET is also helping to develop the Energy White Paper, which will set the strategic planning for the range of technologies to be developed for Australia over the coming years.

Representatives from DRET are also actively involved in the Carbon Sequestration Leadership Forum (CSLF). Australian representatives are well respected within the CSLF as they are considered critical advisers to countries that have been delayed addressing regulatory and communication issues.

State governments

Several state governments are active in supporting the deployment of CCS. Those most active have a heavy dependence on the coal industry for coal production, export and power generation. Each state government department has various responsibilities ranging from ensuring appropriate regulations for CCS projects are developed, to ensuring local community concerns are heard by project proponents to minimise any negative perceptions arising in relation to the projects.

State governments are also responsible for Environmental Impact Assessment activities in relation to projects that will be operating in their state. Until now, nominations for CCS Flagship projects needed their state government backing and it is expected that if selected, state governments will also be responsible for working with industry partners of the projects to ensure a high standard of communication and outreach is delivered.

In Victoria, the Department of Primary Industries (DPI) has been active in hosting public meetings in relation to their acreage release. Not all of these were positively received and opposition to the concept was evidenced in several discussions. Acreage release is a national program governed by the Commonwealth Petroleum (Submerged Lands) Act 1967; the State of Victoria Petroleum (Submerged Lands) Act 1982; and the Victorian Petroleum Act 1998 for onshore lands. The program provides for annual release of parcels of land for petroleum and greenhouse gas storage purposes (DRET, 2009; DPI, 2010c). In addition, the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (ratified November 2008) also provides for acreage releases for "geological storage of greenhouse gas in offshore waters under Commonwealth jurisdiction" (DRET, 2010). In March 2009, the Minister for Resources and Energy Martin Ferguson announced a release program covering 10 offshore regions for the purpose of exploration of greenhouse gas storage. The Gippsland and Otway Basins were included in this release program.

Australian Coal Association

The Australian Coal Association (ACA) is the peak industry body of the Australian black coal producers. Its members are predominantly based in Queensland and New South Wales, but some can also be found in Western

Australia and Tasmania. The ACA has been integral in progressing CCS by establishing the Coal 21 Program in 2003. This was an early partnership between power generators, coal producers, unions, government and research bodies. This collaboration initiated the Coal 21 Fund, which was established to raise more than AU\$1 billion over 10 years from 2006, to support the development of CCS and other low emission technologies. Funds are being raised through a world first voluntary levy self-imposed by black coal producers in Australia.

National Low Emissions Coal Council

The National Low Emissions Coal Council (NLECC), established in July 2008, brings together key stakeholders to develop and implement a national low emissions coal strategy. This includes research and development, accelerating the deployment and commercial development of low emission coal technologies including CCS. More recently it made recommendations to the Minister based on early experiences working with members of the Carbon Storage Taskforce, a Federal Government initiative involving a range of government, industry and research representatives.

National deployment plans

In addition to the CO2CRC Otway Project, a number of Australian CCS projects have been on the table at various times over the past few years. Possibly the most significant commercial example is the Gorgon project. The AU\$43 billion Gorgon Project, in which Chevron, ExxonMobil and Shell are the main participants, is located at Barrow Island in Western Australia (Chevron, 2010). It is the largest geological sequestration project of its type worldwide. Construction of the LNG facility commenced in 2009 and will take about five years to complete. To date a data well has been drilled and a major study of the subsurface has begun. The project involves the storage of CO₂ in a low permeability saline aquifer beneath Barrow Island. With a potential life of 40 years, the project anticipates the secure sequestration of 3.3 million tonnes of CO₂ per year, or 125 million tonnes over the life of the project.

More recently the CST, chaired by Keith Spence (a former executive of Woodside Petroleum in Western Australia), and incorporating representatives from the coal, power generation, petroleum and pipeline sectors was convened on behalf of the Minister for Resources and Energy, Martin Ferguson. The main objective of the CST was to develop a National Carbon Mapping and Infrastructure Plan in Australia. It sets out the priorities required to accelerate CCS deployment in Australia and is working closely with the NLECC to develop communications and outreach activities for CCS.

In addition, the Australian National Low Emission Coal Research and Development (ANLEC R&D) was announced in June 2009 as the research and development arm of the NLECC. Its goal is to implement a national program for low emission coal research and development to address research priorities identified in the NLECC strategy. It aims to address the critical research issues for CCS deployment in an Australian context, particularly in relation to the advancement of the 2015 to 2020 demonstration projects. As such, public awareness and related communication activities around CCS projects is likely to form part of the research projects they undertake.

Government funding

As part of the Budget announcements in May 2009, the Australian Government pledged \$2.425 billion over nine years for the CCS Flagships program. This included \$2 billion in new funding for development of low emissions coal technologies and to support two to four industrial-scale CCS projects. As a result of a competitive process, on 8 December 2009, Minister Ferguson announced a shortlist of four CCS projects. The proposed projects (in no particular order) were:

1. CarbonNet Project – An integrated multi-user capture, transport and storage infrastructure project with CO₂ from electricity generation, located in Victoria's Latrobe Valley which aims to store between 3 and 5 megatonnes of CO₂ per annum, captured from coal-fired power plants in the region
2. Collie South West Hub – An integrated multi-user capture, transport and storage infrastructure project, located south-west of Perth which aims to store up to 3.3 megatonnes of CO₂ per annum, captured from surrounding industry including coal-fired power plants
3. Wandoan Power Plant – An integrated Gasification Combined Cycle (IGCC) with CCS, located north-west of Brisbane, generating 334 MW and aiming to store up to 2.5 megatonnes of CO₂ per annum
4. ZeroGen Power Project – A CCS pilot project, located west of Gladstone in Queensland, generating 400 MW and aiming to store up to 2 megatonnes of CO₂ per annum.

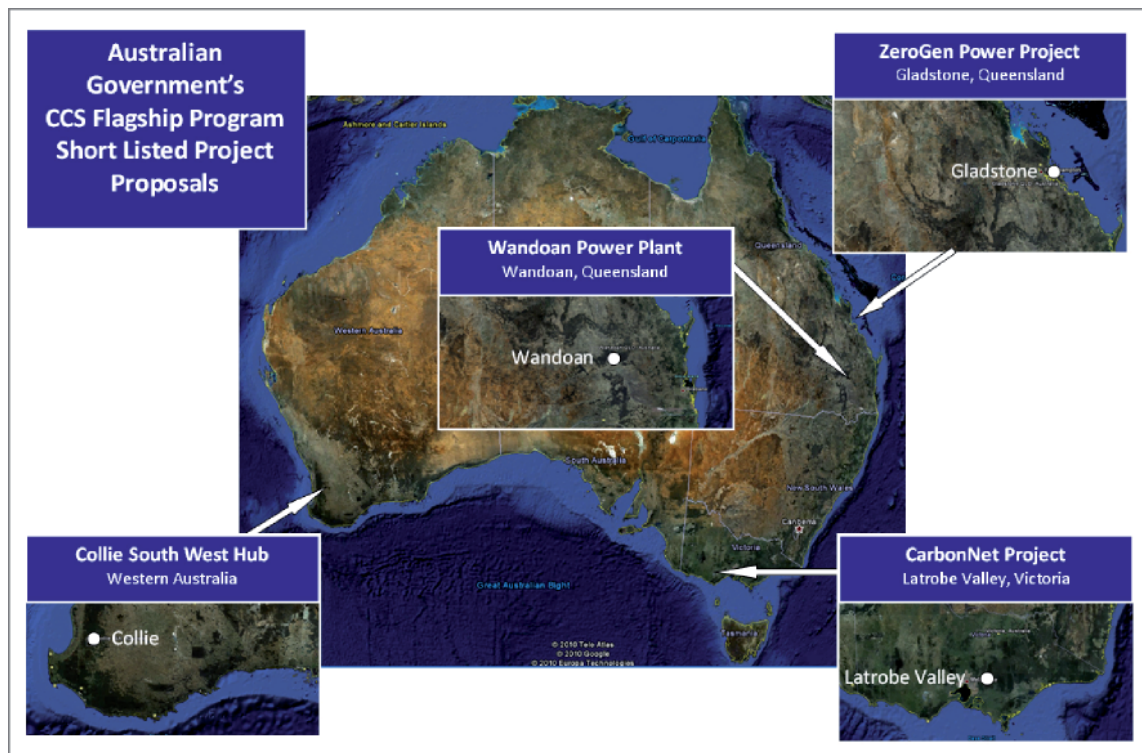


Figure 4 CCS Flagship Program short listed projects (Source: Google Earth)

Regional/national emissions targets

On 27 April 2010, then Prime Minister Kevin Rudd announced that the Australian Government had made a decision to delay the implementation of the Carbon Pollution Reduction Scheme (CPRS) until the end of the current commitment period of the Kyoto Protocol, which is the end of 2012. He cited delayed global action and the absence of bipartisan support for the CPRS as the main drivers for postponing the scheme. However, the Australian Government remains committed to action on climate change and national emissions reductions targets, with mitigation being considered the cheapest option for action on climate change. In support of this, the Government announced that it would boost the existing investments in clean and renewable energy as well as provide greater support for energy efficiency measures.

Appendix C – CO2CRC Otway Project media analysis

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
2006 Dec-06	Unknown	Otway's carbon plan cleared	Geelong Advertiser	Web	CO2CRC Otway Project	Otway project due to commence 2007 has gained \$6.1M in Federal grants on top of \$30M already sourced. Enable CCS to make deep cuts into ghg emissions from coal-fired power stations and develop new business opportunities for Australia. CCS process to include long term monitoring. Drilling to begin in early 2007 with injection to commence middle of the year. Separation of gases will occur in second stage. A first for Australia.	Dr Peter Cook, CEO, CO2CRC
2007 Jan-06	Barry Fitzgerald	\$30m greenhouse store plan; CARBON DIOXIDE RESERVOIR DEEP UNDERGROUND CRITICS ALLEGE DUMPING	The Age, Melbourne	Web	CO2CRC Otway Project	CO2CRC Otway Project confirmed for Victoria Otway Basic region; site yet to be confirmed; some consider Port Campbell and Peterborough as possible locations. Project will involve 40 Australia and overseas researchers; plans to inject by end of 2007 (potential 100,000 tonnes over 1 to 2 years); "Geosequestration has its critics. The Australian Conservation Foundation has referred to geosequestration as "greenhouse dumping" and others worry about the technology's safety and cost..." \$83.5M funding for pilot project from Victorian Government.	Dr Peter Cook, CEO, CO2CRC;
2007 May-07	Ellen Whinnett; Emily Power	Farmland to be used for greenhouse scheme Pilot plan to bury gas	Herald Sun	Web	CO2CRC Otway Project	Landowner volunteer land for CO2CRC project in Vic, trial in Nirranda township on the Great Ocean Road. Natural gas pulled from well at Buttress and sequestered into injection site at Nirranda. Process nominated by Stern as an option for coal energy industry to explore. Project well advanced towards proving safe storage of natural gas. Mohr said, "It is drawing a bit of long bow to suggest this is the pilot plan for clean coal in Australia,"	Dr Peter Cook, CEO, CO2CRC; Peter Batchelor, State Energy Minister; Tony Mohr, climate change campaigner

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Aug-07	Jewel Topsfield	EPA approves carbon capture plan	The Age	Web	CO2CRC Otway Project	Approval of Otway by the EPA. Process of CCS in Otway Basin; risks associated with CCS.	EPA Victoria Executive Director Bruce Dawson
Sep-07	Olga Galacho	Carbon project close	Herald Sun	Web	CO2CRC Otway Project	Progress of Otway; difficulties of government supporting clean coal technologies; progress of construction of Otway.	CO2CRC Chief Executive, Dr Peter Cook; Rio Tinto Executive Andy Lloyd.
Nov-07	Williams Nicole	Myths blackening technology drive for clean carbon	The Courier - Mail	Print	CO2CRC Otway Project	Response to Dr Karl's comments on clean coal as "a furphy"	Karl Kruszelnicki (Senate candidate), CO2CRC, International Panel on Climate Change, Al Gore, Sir Nicholas Stern
Dec-07	Olga Galacho	Carbon's rocky road	Herald Sun	Web	CO2CRC Otway Project	UN Climate Change Conference in Bali; change in government causes different opposing views to emerge in relation to geosequestration including the views that CCS is too late to be considered a meaningful form of mitigation; Other projects underway for clean coal technology	Climate Institute Executive Erwin Jackson; CO2CRC Chief Executive, Dr Peter Cook; Deputy Convenor of Australian Association for the Study of Peak Oil, Ian Dunlop; Premier John Brumby
Feb-08	Lauder Simon	Clean coal research hits tax hurdle	The World Today	Radio	CO2CRC Otway Project	Financial viability of clean coal	Dr Peter Cook, Chief Executive (CO2CRC)
Mar-08	Fred Brencley	Carbon catchers launch coal's brightest hope	The Age	Web	CO2CRC Otway Project	Launch of the Otway Basis project; the enormity of project in comparison to other global carbon storage plants; partners and supporters of the project.	Climate Change Advisor Professor Ross Garnaut; CO2CRC Chief Executive, Dr Peter Cook
Mar-08	Unknown	Media Release: CO2CRC	MediaNet Press - Release Wire	Web	CO2CRC Otway Project	Media release announcing NSW strong potential for linking to CO2CRC Otway Project in Victoria.	John Kaldi (chief scientist of CO ₂ CRC)
Mar-08	Ferguson Gregor	Test project aiming to bury global warming threat - LIQUEFIED NATURAL GAS: THE CLEANER ALTERNATIVE - APPEA 2008 - A SPECIAL ADVERTISING REPORT	Weekend Australian	Print	CO2CRC Otway Project	Otway project	Belinda Robinson (CEO, APPEA)

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Apr-08	Peacock Matt	Going underground: carbon dioxide storage experiment	7:30 Report - Australian Broadcasting Corporation	TV	CO2CRC Otway Project	Cape Otway demonstration	Dr Peter Cook, Chief Executive (CO2 CRC), John Boshier (National Generations Forum), Iain MacGill (Electrical Engineering, UNSW), Dr Mark Diesendorf (Environmental Studies, UNSW)
Apr-08	Peter Williams	CO ₂ plant 'a step towards' clean coal	AAP Bulletin Wire	Web	CO2CRC Otway Project	CO2CRC is demonstrating the safety of CCS using an innovative geotechnical monitoring process. Based in Nirranda near Warrnambool, CO ₂ will be compressed, transported and injected to underground storage site in Otway Basin. 100,000 tonnes to be injected. Opening attended by reps from Japan, India and USA. \$40M funding from Fed and State Governments. Greens noted project was small and would contribute little to CC mitigation, implied a PR stunt by the coal industry Govt.	Peter Cook, Chief Executive, CO2CRC; Martin Ferguson, Minister for Resources and Energy; Christine Milne, Greens Energy Spokesperson
Apr-08	Matt Peacock	Critics turn up heat on clean coal claims	ABC News Online	Web	CO2CRC Otway Project	Government pinning hopes on Otway Project for future coal generated emissions reduction. Concerns regarding FutureGen; acknowledgement of risks associated with the technology.	Martin Ferguson, Resources Minister; John Boshier, National Generations Forum; Iain MacGill, University of NSW; Ralph Hillman, Australian Coal Association; Mark Diesendorf, University of NSW; Elizabeth Nosworthy, ZeroGen Spokesperson
Apr-08	Michaela Farrington	Gases to be buried, innovative project launched	Geelong Advertiser	Web	CO2CRC Otway Project	The official launch of the Otway basin project; aims and benefits of the project over the next two years.	CO2CRC Chief Executive Dr Peter Cook

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Apr-08	Witherspoon Sarah	Carbon test starts Underground storage plan to cut emissions	Herald Sun	Print	CO2CRC Otway Project	Australia's first CCS plant (Otway)	Dr Peter Cook (CO2 CRC), Mark Wakeham (Environment Victoria)
Apr-08	Morton Adam & Murphy Mathew	No clean future' for old generators	The Age	Print	CO2CRC Otway Project	Future of Victoria's old power stations	Peter Cook (CO2CRC)
Apr-08	Murphy Mathew & Morton Adam	Green group worry over new gas storage facility	The Age	Print	CO2CRC Otway Project	Environmental impact of Otway project	Dr Peter Cook, Chief Executive (CO2CRC), Mark Wakeham (Environment Victoria); David Karoly (Melbourne University)
Apr-08	Unknown	Media Release: Cooperative Research Centre for Greenhouse Gas Technology	MediaNet Press Release Wire	Web	CO2CRC Otway Project	The official launch of the Otway basin project; aims and benefits of the project over the next two years; achievements of project.	CO2CRC Chief Executive Dr Peter Cook
Apr-08	Williams Nikki	Emissions between a rock and a hard place	Newcastle Herald	Print	CO2CRC Otway Project	Coal industry investment in emissions reduction	International Energy Agency; Nikki Williams (CEO, NSW Minerals Council)
Apr-08	Wilkinson Marian	Experiment on clean coal to bury waste	Sydney Morning Herald	Print	CO2CRC Otway Project	Otway project opening	Dr Peter Cook, Chief Executive (CO2CRC),
Apr-08	Marian Wilkinson, Environment Editor	Experiment on clean coal to bury waste	Sydney Morning Herald NSW	Web	CO2CRC Otway Project	Open day for Otway Project, Martin Ferguson will open injection with international reps from US, Japan, South Korea and India. China not reps. Reps from Otway Project Consortium and coal industry attended official evening event prior to launch. Cook confident in safety of tech, world first. Milne (Greens) unhappy with lion's share of low emissions technology funding going to clean-coal.	Dr Peter Cook, Chief Executive, CO2CRC; Martin Ferguson, Minister for Resources and Energy; Christine Milne, Greens Energy Spokesperson
Apr-08	Anonymous	Carbon storage trial hailed	The Mercury	Print	CO2CRC Otway Project	Opening of Otway project	Martin Ferguson (Resources and Energy minister)

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Apr-08	Boyer Peter	Neat political 'solutions' not the answer	The Mercury	Print	CO2CRC Otway Project	Failure to address underlying causes of climate change	None
Apr-08	Clarke Sarah	First carbon capture plant open for business	The World Today	Radio	CO2CRC Otway Project	Opening of Otway project	Dr Peter Cook, Chief Executive (CO2CRC), Phil Freeman (Conservation Foundation), Nikki William
Apr-08	Orchison Keith	Coal's challenge is respectability - CLEAN ENERGY - SPECIAL REPORT	Weekend Australian	Print	CO2CRC Otway Project	Australia's development of clean coal technology	John Kaldi (chief scientist of CO2CRC)
Apr-08	Unknown	CO ₂ plant lauded as step towards clean coal	AAP General News Wire	Web	CO2CRC Otway Project	The opening of the Otway project; how clean coal can be deemed viable; the views of the Green party and the coal industry in regards to CCS being viable solution for climate change.	Resources and Energy Minister Martin Ferguson; CO2CRC Chief Executive Dr Peter Cook; Greens Energy Spokesman Christine Milne; Minerals Council of Australia chief executive Mitch Hooke
May-08	Hammer Chris	Greenpeace rejects 'clean coal' as too little, too late	The Age	Print	CO2CRC Otway Project	Greenpeace criticism of clean coal	Greenpeace report entitled "False Hope", ACA
Jul-08	Unknown	10,000 tonnes of CO ₂ successfully stored in Otway Basin	AAP General News Wire	Web	CO2CRC Otway Project	Otway reaches milestone of storing 10,000 tonnes of CO ₂ ; CCS process; commencement of next stage of project.	CO2CRC Chief Executive Dr Peter Cook.
Jul-08	Tony Prytz	10,000 tonnes goes two kilometres underground gas project working	Geelong Advertiser	Web	CO2CRC Otway Project	Otway reaches milestone of storing 10,000 tonnes of CO ₂ ; CCS process and various monitoring techniques; commencement of next stage of project.	CO2CRC Chief Executive, Dr Peter Cook.
Sep-08	Jeff Whalley	Rudd backs Otway plan	Geelong Advertiser	Web	CO2CRC Otway Project	Kevin Rudd publicizes his support of the GCCSI at the United Nations General Assembly as well as the CO2CRC project; Support from Corangamite MP in Labour introducing draft legislation to allow burying of GHG by coal fired power stations.	CO2CRC Chief Executive, Dr Peter Cook; Federal Corangamite MP Darren Cheeseman

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Apr-09	Margot O'Neill	Clean coal fails to capture critics	Lateline - ABC News Online	TV	CO2CRC Otway Project	Prime Minister Kevin Rudd to unveil the Australian-based global carbon capture and storage institute. Critics claim clean coal expensive illusion deflecting alternative renewable energy sources. Problems perceived: lack of commitment from governments and industry, two major projects cancelled in the period leading up to the media article, and cost being so high.	Richard Denniss, Australia Institute
Apr-09	Unknown	Media Release: CO2CRC	MediaNet Press Release Wire	Web	CO2CRC Otway Project	Otway reaches milestone of storing 50,000 tonnes of CO ₂ ; good potential to extend project further to investigate new areas of research including testing rock types to better understand their storage potential.	CO2CRC Chief Executive, Dr Peter Cook;
Apr-09	Morton Adam	Greenhouse burial trial a success, scientists claim	The Age	Print	CO2CRC Otway Project	50,000 tonnes successfully stored underground in the Otway Basin; minor equipment problems, but the most crucial aspects of the trial were working - it has stayed in the ground, and behaved as expected (Dr Cook); governments and industry pinning their hop	CO2CRC Chief Executive, Dr Peter Cook;
May-09	Antony Funnell	Carbon Capture and Storage	FutureTense - ABC Radio Online	Radio/ Web	CO2CRC Otway Project	Wayne Swan announces to The House plans for government to invest \$4.5 billion in new clean energy initiative, low emissions technologies, demonstration of carbon capture and storage at industrial scale from coal-fired power plants. Peter cooks looks at how it works, what it can be used for, looks at non coal options, costs. 2020 government requires 20 demo plants. Not stand alone with other energy options - mix. CO2CRC working towards regulatory framework building.	Barry Hooper, Chief Technologist, CO2CRC; Wayne Swan, Aust Fed Govt Dr Peter Cook Chief Executive, CO2CRC
Jun-09	Cameron Cooper	Underground solution	Weekend Australian	Web	CO2CRC Otway Project	Employment prospects of CCS projects nationally including Otway and the Callide Oxyfuel initiative.	CO2CRC Chief Executive, Dr Peter Cook

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Jul-09	Jeff Whalley	Otway plan talk of the G8	Geelong Advertiser	Web	CO2CRC Otway Project	Kevin Rudd publicizes his support of the CCS demonstrations in Victoria with Barack Obama; Lobby groups in Geelong encourage city to reduce carbon output through finding alternative energy sources.	Corio MP Richard Marles; Committee Executive Director (Committee for Geelong) Peter Dorling
Aug-09	Unknown	WA: Gorgon to lead nation's biggest carbon injection effort	AAP General News Wire	Web	CO2CRC Otway Project	Economic benefits of the Chevron led Gorgon project at Barrow Island, WA versus the tonnes of CO ₂ that needs to be separated during process; The plan to sequester CO ₂ at Barrow Island; Otway as a successful trial; possible risks identified with CCS technology	CO2CRC Chief Executive Peter Cook; Curtin University Petroleum Engineering Head Professor Brian Evans; Curtin Business School Professor Ronald Ripple.
Nov-09	Shane Fowles	Extra \$2 million for carbon project	The Warrnambool Standard	Web	CO2CRC Otway Project	\$2 million committed to the second stage of the Otway Basin project; 2nd stage involves injection of CO ₂ into a second well; important stage in the process as potential to store large amounts of emissions;	Energy & Resources Minister Peter Batchelor;
Dec-09	Unknown	Government commits extra \$2 million to Otway Basin trial	Media News Wire	Web	CO2CRC Otway Project	\$2 million committed to the second stage of the Otway Basin project; 2nd stage involves injection of CO ₂ into a second well; important stage in the process as potential to store large amounts of emissions; Brumby Labour government committed funds to other CCS research to identify areas of potential storage through 3d modelling as well as Pre and Post Combustion projects run through ETIS.	Energy & Resources Minister Peter Batchelor;
Dec-09	Wendy Zukerman	Bury the problem to solve it, in part	The Australian	Web	CO2CRC Otway Project	\$2 million committed to Victorian Government to CCS; Trials at Hazelwood and process of CCS; new funding will be used for new trapping techniques	CO2CRC Chief Executive Dr Peter Cook; CO2CRC Chief Technologist Barry Hooper
Feb-10	Unknown	Next phase of Otway Basin drilling project underway	Drilling Exploration	Web	CO2CRC Otway Project	Drilling of second well has commenced; evaluation and refining methods of trapping co ₂ is main aim of CO2CRC; new platform for the ongoing research into storage.	CO2CRC Chief Executive Dr Peter Cook;



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Appendix 5 ZeroGen Project – Australia



Case Study of ZeroGen Project

Energy Transformed Flagship

Peta Ashworth, Shelley Rodriguez and Alice Miller

EP 103387

Prepared for Sarah Clarke
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Front cover photograph sourced from Howard Morrison, ZeroGen.

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Executive summary

ZeroGen Proprietary Limited (ZeroGen) is a Queensland Government initiative to develop, construct and operate an Integrated Gasification Combined Cycle (IGCC) and carbon dioxide capture and storage (CCS) power plant and storage facility in Central Queensland, Australia. With a budget of AU\$4.3 billion, the project's goal is to sequester 60 million tonnes of CO₂ waste gases over the lifetime of the project to assist in reducing Australia's greenhouse gas emissions. Carbon dioxide will be sourced from the yet to be constructed 400 MW power generation facility.

This case study report seeks to provide insights into stakeholder perceptions of past and present communication and engagement practices conducted by ZeroGen in relation to its IGCC with CCS project in Central Queensland. Desktop reviews, a media analysis and stakeholder interviews were conducted to inform the case study. Feedback was sought to establish an understanding of ZeroGen's communication strategies and public engagement practices including what information was provided, how and when it was delivered, and to whom. Stakeholder perceptions of the different components of these communication and engagement processes were also assessed.

Due to the ZeroGen project being in its early stages, no significant or potentially divisive incident was identified by stakeholders as sufficient to cause major discontent or concern. However, from a local perspective, some operational aspects of ZeroGen's engagement in communities targeted in the pre-feasibility study were identified as requiring attention. All issues were addressed by ZeroGen during engagement and were perceived to have been well managed. Issues identified related mainly to property access and associated safety and risk issues surrounding stock movement as a result of poor access management. Timing of engagement events was also identified as an issue with engagement schedules not sensitive to landowners' non-specific hours of work. Corrective measures undertaken by ZeroGen to address these issues appear to have met the needs of affected stakeholders.

Stakeholders identified five critical factors as contributing to the success of the project to date. These are:

1. The development of a clearly defined stakeholder plan
2. The execution and evaluation of a stakeholder management plan
3. An understanding of current political climates across all levels of stakeholders
4. An awareness of extraneous issues that might impact upon communication and engagement processes
5. Positively addressing all stakeholder requests and including them in project decisions where appropriate.

Specific successes revealed in the case study included overcoming communication barriers with a landholder. This was done by acknowledging the landowner's rights to manage access to his land, using respectful engagement practices such as ensuring permission for all entry onto the landowner's property, providing compensation as relevant, and where possible engaging the landowner in activities that might otherwise have been carried out by contractors. For example, building a road and platform on the landowner's property.

Another success story identified was a speedy and professional response to complaints received from landowners and residents after an incident where a contractor damaged a local road after accessing the property. The road had only recently been graded. ZeroGen was noted to react swiftly to the local council's request to repair the damage to the road; a response that was perceived by some stakeholders as a positive measure of the developer's good intentions towards the local community.

1 Introduction

Climate change and its causes are major concerns from a global and national perspective. The Australian Federal Government has provided its support for the development and deployment of low emission energy technologies to mitigate climate change. This is best evidenced through the various funding programs that have been implemented for advancing low emission energy technologies over the past decade. One such technology, carbon dioxide capture and storage (CCS), has received substantial support from all levels of government within Australia. The Queensland State Government has provided substantial financial support towards the development of CCS through the establishment of its wholly owned company, ZeroGen Proprietary Limited (ZeroGen).

In 2003, after extensive research and analysis, Stanwell Corporation Limited (Stanwell), concluded the best technology for coal-based, low-emission electricity generation was IGCC with CCS. As a result, Stanwell initiated the ZeroGen Project. In March 2006, ZeroGen Proprietary Limited was incorporated as a subsidiary of Stanwell. Ownership of ZeroGen and the project was transferred to the Queensland Government in March 2007. ZeroGen's mission is to enable the accelerated development and rapid deployment of low emission coal technology at a cost that will preserve Queensland's competitive advantage as a power generator and ensure the continued mining, export and use of Australian black coal. The Queensland Government committed to funding up to a total of AU\$102 million to cover costs for the feasibility study of the project and operational expenses of the company.

In December 2007, ZeroGen was advised of a strong sentiment within the Clean Coal Council to 'steepen the risk curve' of the project to accelerate the development of a commercial-scale IGCC with CCS plant by 2020. In response to this request, the project was reconfigured in March 2008 into a two-staged approach. This involved the deployment of a 120 MW gross capacity IGCC with CCS plant (Stage 1) in 2012, and a 450 MW gross capacity IGCC with CCS plant in 2017 (Stage 2). A pre-feasibility study including an Environmental Impact Statement (EIS) on Stage 1 was commenced.

During development of Stage 1, discussions and funding exploration initiatives in Japan presented ZeroGen with a new opportunity from which an accelerated pathway for the development of a commercial-scale IGCC with CCS plant might be achieved, while addressing the principal technical integration risk. Mitsubishi Corporation (MC) and Mitsubishi Heavy Industries (MHI) proposed the construction of an IGCC plant with a gross capacity of 550 MW with CO₂ capture and without the need to construct the smaller Stage 1 plant.

ZeroGen consequently issued Requests for Proposals to other IGCC technology providers to allow those providers the opportunity to submit a proposal to develop a commercial scale demonstration project which might be competitive with the MC/MHI proposal. Formal proposals were received from General Electric (GE) and Shell.

On 16 October 2008, the ZeroGen Board resolved to further investigate this opportunity through a scoping study. The Board requested that this scoping study report, together with supporting documentation, be submitted to the Queensland Government, Australian Coal Association Low Emission Technologies Limited (ACALET), and the Clean Coal Council in early December 2008.

At a meeting of the Queensland Clean Coal Council in June 2009 the new project configuration – being a single commercial scale 530 MW was ratified and a pre-feasibility study on that configuration commenced. The pre-feasibility study is to be finalised on 30 July 2010. ZeroGen has also made application for national Flagship project status and funding. This application was submitted on 30 June 2010, and is under consideration by the Federal Government.

ZeroGen aims to progress the technology's development and commercial deployment, work with policy makers to develop the appropriate regulations and build stakeholder knowledge and understanding of the technology.

The purpose of this report is to present findings from the case study that reviewed stakeholder perspectives and beliefs surrounding the various communication and engagement practices ZeroGen has employed throughout the project's development to date. This report highlights the communication and outreach activities of the ZeroGen project from its inception to the time of writing. Desktop reviews and stakeholder interviews were conducted with a number of stakeholders to inform the case study. A full list of the questions used for the interviewing process can be found in Appendix A.

2 Location

In March 2008, the Bauhinia, Duaringa, Emerald and Peak Downs shires, and a small portion of the Jericho shire, merged to form one large regional shire known as the Central Highlands region in Queensland. The independent Woorabinda Aboriginal shire is also located within the Central Highlands regional boundaries. The Central Highlands region is 100 km west of Rockhampton, the closest major regional city with an estimated population of 114,105 as at 30 June 2009 (Australian Bureau of Statistics [ABS], 2007).

Various locations have been investigated as potential sites for the 400 MW power generation plant, slag storage sites, and underground geological storage fields required for the project. To date, no location has been announced, however the final site is likely to be near coal supply and established rail infrastructure, have access to water while still being close to geological storage fields.



Figure 1 Map showing surrounds of ZeroGen project (Source: Google Earth)

3 National context

3.1 Political context

Energy is big business in Australia, with energy-related sectors including electricity, mining and transport, accounting for some 11 per cent of Australia's gross domestic product (GDP) and about half of the total AU\$190 billion in Australian exports each year (Department of Resources, Energy and Tourism [DRET], 2008a). The sector has installed much of the nation's capital infrastructure such as electricity plants, transmission links, refineries and production facilities and pipelines. About 120,000 Australians are directly employed in 'energy', primarily through the production and supply of stationary energy (such as electricity and gas), transport energy (mainly petroleum-based fuels) and energy for export. However, being such an intense carbon dioxide-emitting industry, and in view of the current issues surrounding anthropogenic climate change, a solution needs to be found towards reducing Australia's greenhouse gas emissions (Ashworth, Littleboy, Graham & Niemeyer, 2010).

3.2 CCS agenda

Australia is deeply involved with the international movement to progress the deployment of CCS as a key mitigation strategy for fossil fuel-based industries. Considered internationally as one of the world's leaders, Australia is known for its multi-level governmental approaches to progressing the technology's deployment. However, like many new and emerging technologies, CCS remains relatively unknown across the larger Australian society with some perceived risks.

Global CCS Institute

The commitment of Australia to progress a CCS agenda is probably best represented by the establishment of the Global CCS Institute (GCCSI). The GCCSI was announced by the Australian Government in September 2008 and formally launched in April 2009. Its objective is "to accelerate the commercial deployment of CCS projects to ensure their valuable contribution in reducing carbon dioxide emissions". The Australian Government has committed AU\$100 million annual funding for five years. The aim is for the Institute to work collaboratively with a range of government, non-government and industry organisations to achieve their deployment goals.

Department of Resources, Energy and Tourism

DRET has responsibility for CCS within its portfolio. Its work has been instrumental in formulating Australia's position on CCS while developing Australia's reputation as one of the leading countries to advance the technology. This is mainly seen through its advanced regulatory policies and other initiatives such as the GCCSI and the Carbon Storage Taskforce (CST). More recently, DRET is also helping to develop the Energy White Paper which will set the strategic planning for the range of technologies to be developed for Australia over the coming years.

Representatives from DRET are also actively involved in the Carbon Sequestration Leadership Forum (CSLF). Australian representatives are well respected within the CSLF as they are considered critical advisers to countries that have delayed addressing regulatory and communication issues.

State governments

Several state governments are active in supporting the deployment of CCS. Those most active have a heavy dependence on the coal industry for coal production, export and power generation. Each state government department has various responsibilities ranging from ensuring appropriate regulations for CCS projects are developed, to ensuring local community concerns are heard by project proponents to minimise any negative perceptions arising in relation to the projects.

State governments are also responsible for Environmental Impact Assessment (EIA) activities in relation to projects that will be operating in their state. Until now, nominations for CCS Flagship projects needed their state government backing and it is expected that if selected, state governments will also be responsible for working with industry partners of the projects to ensure a high standard of communication and outreach is delivered.

Australian Coal Association

The Australian Coal Association (ACA) is the peak industry body of the Australian black coal producers. Its members are predominantly based in Queensland and New South Wales, but some can also be found in Western Australia and Tasmania. The ACA has been integral in progressing CCS by establishing the Coal 21 Program in 2003. This was an early partnership between power generators, coal producers, unions, government and research bodies. This collaboration initiated the Coal 21 Fund, which was established to raise more than AU\$1 billion over 10 years from 2006, to support the development of CCS and other low emission technologies. Funds are being raised through a world first voluntary levy self-imposed by black coal producers in Australia.

National Low Emissions Coal Council

The National Low Emissions Coal Council (NLECC), established in July 2008, brings together key stakeholders to develop and implement a national low emissions coal strategy. This includes research and development, accelerating the deployment and commercial development of low emission coal technologies including CCS. More recently it made recommendations to the Minister based on early experiences working with members of the Carbon Storage Taskforce, a Federal Government initiative involving a range of government, industry and research representatives.

3.3 National deployment plans

A number of Australian CCS projects have been considered for future deployment at different times over the past few years. Possibly the most significant commercial example is the Gorgon project. The AU\$43 billion project, in which Chevron, ExxonMobil and Shell are the main participants, is located at Barrow Island in Western Australia (Chevron, 2010). It is the largest geological sequestration project of its type worldwide. Construction of the Liquid Natural Gas (LNG) facility commenced in 2009 and will take about five years to complete. To date, a data well has been drilled and a major study of the subsurface has begun. The project involves the storage of CO₂ in a low permeability saline aquifer beneath Barrow Island. With a potential life of 40 years, the project anticipates the secure sequestration of 3.3 million tonnes of CO₂ per year, or 125 million tonnes over the life of the project.

More recently the CST, chaired by Keith Spence (a former executive of Woodside Petroleum in Western Australia), and incorporating representatives from the coal, power generation, petroleum and pipeline sectors, was convened on behalf of the Minister for Resources and Energy, Martin Ferguson. The main objective of the CST was to develop a National Carbon Mapping and Infrastructure Plan in Australia. The CST summary report was recently released and the complete report is soon to be finalised. It sets out the priorities required to accelerate CCS deployment in Australia and is working closely with the NLECC to develop communications and outreach activities for CCS.

In addition, the Australian National Low Emission Coal Research and Development (ANLEC R&D) was announced in June 2009 as the research and development arm of the NLECC. Its goal is to implement a national program for low emission coal research and development to address research priorities identified in the NLECC strategy. It aims to address the critical research issues for CCS deployment in an Australian context, particularly in relation to the advancement of the 2015 to 2020 demonstration projects. As such, public awareness and related communication activities around CCS projects is likely to form part of the research projects they undertake.

3.4 Government funding

As part of the Budget announcements in May 2009, the Australian Government pledged AU\$2.425 billion over nine years for the CCS Flagships program. This included \$2 billion in new funding for development of low emission coal technologies and to support two to four industrial-scale CCS projects. As a result of a competitive process, on 8 December 2009, Minister Ferguson announced a shortlist of four CCS projects (DRET, 2010a). The proposed projects (in no particular order) were:

1. CarbonNet Project – An integrated multi-user capture, transport and storage infrastructure project with CO₂ from electricity generation, located in Victoria's Latrobe Valley, which aims to store between 3 and 5 mega tonnes of CO₂ per annum, captured from coal-fired power plants in the region
2. Collie South West Hub – An integrated multi-user capture, transport and storage infrastructure project, located south-west of Perth, which aims to store up to 3.3 mega tonnes of CO₂ per annum, captured from surrounding industry including coal-fired power plants
3. Wandoan Power Plant – An IGCC with CCS, located north-west of Brisbane, generating 334 MW and aiming to store up to 2.5 mega tonnes of CO₂ per annum
4. ZeroGen Power Project – A CCS pilot project, located west of Gladstone in Queensland, generating 400 MW and aiming to store up to 2 mega tonnes of CO₂ per annum.

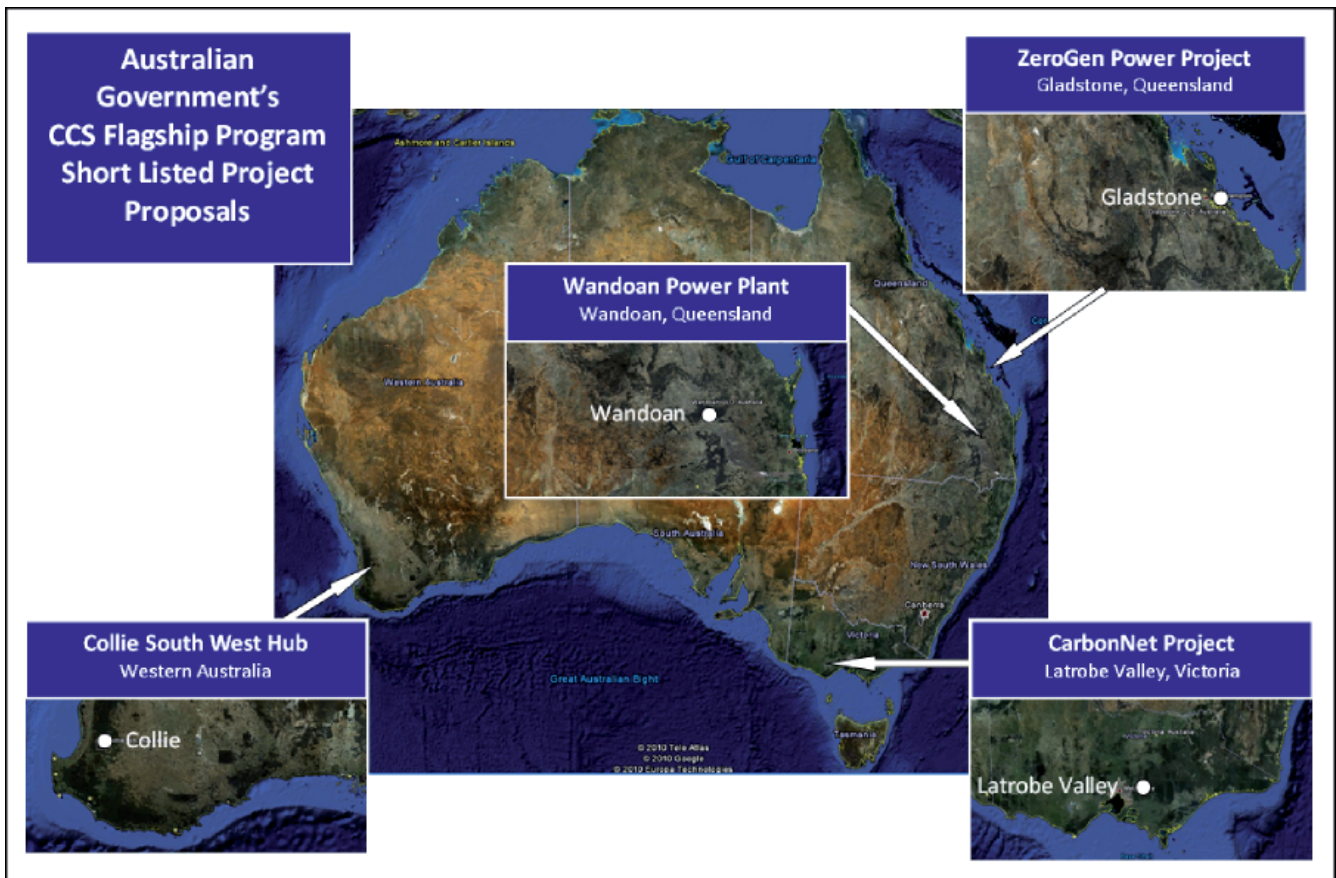


Figure 2 CCS Flagship Program short listed projects (Source: Google Earth)

3.5 Regional/national emissions targets

On 27 April 2010, then Prime Minister Kevin Rudd announced that the Australian Government had made a decision to delay the implementation of the Carbon Pollution Reduction Scheme (CPRS) until the end of the current commitment period of the Kyoto Protocol, which is the end of 2012. He cited delayed global action and the absence of bipartisan support for the CPRS as the main drivers for postponing the scheme. However, the Australian Government remains committed to action on climate change and national emissions reductions targets, with mitigation being considered the cheapest option for action on climate change. In support of this, the Government announced that it will boost the existing investments in clean and renewable energy as well as provide greater support for energy efficiency measures.

4 Characteristics of the project

Table 1 below summarises the main characteristics of the ZeroGen Project.

Nature	ZeroGen's objective is to develop a commercial scale, IGCC with CCS project in Queensland to operate by 2015-17. The current project consists of three phases: the pre-feasibility study, feasibility study and plant operation. Upon construction, the plant will generate 400 MW of low emission base-load electricity for the Australian energy market
Scale/size	An IGCC 400 MW (530 MW gross) power generation plant and CCS facility (ZeroGen, 2008a). To be located on about 300 ha and infrastructure to support gas (natural and captured CO ₂) and water pipelines, rail, transport, conveyor and power lines (DRET, 2010b).
Cost	AU\$4.3 billion
CO ₂ amounts	60 million tonnes potential total sequestration
Source of CO ₂	A yet to be constructed 400 MW (530 MW gross) power generation facility integrating a coal gasification power plant (ZeroGen, 2008a).
Project duration	Scoping for the current project format commenced in December 2008. Before then, work revolved around plant scale and configuration. In 2009, the Queensland Clean Coal Council approved the project proceeding to a pre-feasibility study on an industrial scale IGCC with CCS project. Anticipated commissioning of the plant is between 2005-17
Technology type	Integrated Gasification Combined Cycle with Carbon Capture and Storage (IGCC-CCS)
Pipeline	Pipeline studies have been performed as part of the pre-feasibility study
Site selection	The site selection for the final plant and storage facility is yet to be announced. The pre-feasibility study has considered a number of options, and will recommend a preferred configuration.
Location choice	The Emerald area is considered to be ideal for the location of the power plant in meeting stakeholders' requirements that the plant be operational by 2015. The Northern Denison Trough, which has been the focal point for the storage investigations, has been assessed as not being able to sustain the required injection rates required for the project. The storage location is nominally the Surat Basin.
Regulations	Declared by the Queensland Coordinator-General as a significant project requiring an EIS under section 26(1) (a) of the <i>State Development and Public Works Organisation Act 1971</i> (SDPWO Act). The Federal Government has determined that the project constitutes a controlled action pursuant to the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act). Accordingly, the project will be assessed under joint agreement by the Australian and Queensland governments (Queensland Department of Infrastructure and Planning [DIP], 2010)
Current status	Feasibility study

4.1 Project activity timeline

The ZeroGen project has concluded its pre-feasibility study after which a site is expected to be announced for the location of a 400 MW coal-powered electricity generation plant. At this point the next phase of the demonstration project will commence. ZeroGen has begun various stages of the study including the community consultation and public engagement program in early 2006 and, later that year, the cultural heritage management program. Both programs are scheduled to continue into 2011 (ZeroGen, 2008b). At the same time as the cultural heritage management program began, ZeroGen commenced drilling investigations in the Northern Denison Trough. ZeroGen to date has drilled 12 wells, taken more than 7,000 m of core for analysis, and conducted CO₂ injection and water injection tests as part of its assessment program in the Northern Denison Trough. A pipeline study began shortly after drilling investigations started and is scheduled to continue into 2011.

After a merger of local councils in the third quarter of 2008, the Central Queensland community consultation program commenced. This consultation program followed activities that had been undertaken with each council individually before the amalgamation. This consultation process is scheduled to continue into 2011 (ZeroGen, 2008b). In late 2009, the Australian Government Department of Environment, Water, Heritage and the Arts determined the project was “controlled action under the Environmental Protection and Biodiversity Conversation Act 1999 (Cwth) (EPBC Act),” (DIP, 2010) and issued controlling provisions under several sections relating to threatened species and communities and migratory species. In December 2009, the Queensland Coordinator-General declared ZeroGen to be a project of significance for which an EIS was required. Draft terms of reference for the EIS were issued and following three months of public consultation, final terms of reference were issued in March 2010 when ZeroGen began its Environmental Impact Statement (EIS). Public consultation will continue throughout the EIS process. For a visual representation of the project’s milestones to date, see Figure 3 below.

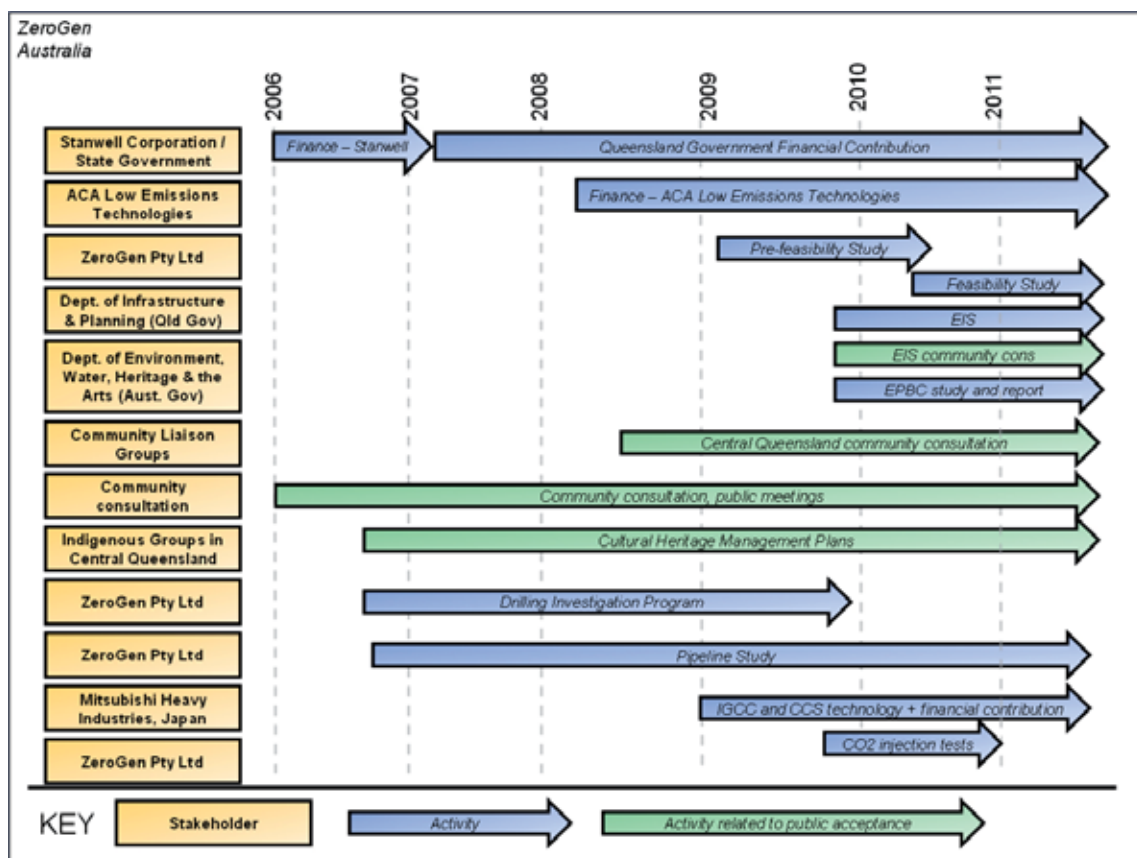


Figure 3 ZeroGen timeline of activities

5 Stakeholder mapping

Stakeholders of the ZeroGen demonstration project include representatives from various government departments (federal, state and local), industry, investors, partners, service providers, the scientific community, community groups and organisations, environmental and conservation non-government organisations, landholders, the media and any other national and international organisation interested in the technology.

5.1 Project developers

A Queensland Government-owned company, ZeroGen, was established in 2006 as a subsidiary of Stanwell Corporation, an electricity generator also belonging to the Queensland Government. ZeroGen now operates independently of Stanwell Corporation. ZeroGen's project partners include the Queensland Government, the ACA Low Emission Technologies Ltd (ACALET), Mitsubishi Corporation and Mitsubishi Heavy Industries.

5.2 Government institutions

5.2.1 National

Department of Resources, Energy and Tourism

The Department of Resources, Energy and Tourism (DRET) is responsible for providing policy and other advice to the Minister for Resources and Energy. It is also responsible for administering relevant resource sector legislation and running various resource-specific programs including coal, minerals and petroleum. DRET has responsibility for advancing the Australian Government's broader CCS agenda, its low emissions coal agenda and to provide input into the broader policy framework around CCS (DRET, 2009).

DRET administers about 21 pieces of legislation relevant to the resources sector, including the Offshore Petroleum and Greenhouse Gas Storage Act 2006 (Amended 2010), which provides an overarching regulatory framework for CCS within Australia and Australian waters.

In 2005, the Australian Ministerial Council on Mineral and Petroleum Resources (MCMPR) endorsed the Carbon Dioxide Capture and Geological Storage: Australian Regulatory Guiding Principles to establish a nationally consistent approach for the application of CCS. The Guiding Principles cover assessment and approval processes, access and property rights, transportation issues, monitoring and verification, liability and post-closure responsibility and financial issues surrounding the application of CCS in Australia (DRET, 2008b).

5.2.2 State Government

The Queensland Department of Mines and Energy develops and manages the policy and regulatory frameworks that support the energy industry in Queensland. This includes the April 2007 agreement to reduce greenhouse gas emission by 60 per cent of national emissions by 2050 (against 2000 greenhouse gas emissions levels). The Queensland Government's Climate Smart 2050 strategy incorporates Smart Energy Policy initiatives especially developed to assist in meeting this target. Included in these initiatives are a \$10 million Geosequestration Site Identification program, a \$900 million investment to demonstrate clean coal technology, the Queensland Gas Scheme (which seeks the diversification of the state's energy mix towards a greater use of gas), and new electricity generation. Through funds provided under the clean coal technology investment initiative, ZeroGen IGCC is one of two projects seeking to demonstrate IGCC and storage as an effective greenhouse gas emissions mitigation process for the state's energy sector (Queensland Department of Mines and Energy, 2010).

In December 2009, the ZeroGen Project was declared to be a "significant" project by the Queensland Coordinator-General, requiring an EIS under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). This process is managed by the Environmental Protection Agency.

5.2.3 Local council

The Central Highlands Regional Council (CHRC) has an aim to "enable sustainable regional growth" for the local region (CHRC, 2010). To achieve this goal, the CHRC identifies its priorities as marketing and promotion of the region, building the regional skill base, and stimulating business and infrastructure development. With a population that is expected to grow 2.1 per cent per annum from its 2008 level of 29,244 to 46,872 in 2031, the Central

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Highland region is under pressure to expand. The 2006 Census indicates a large proportion of the region's employable people (68 per cent) who are 15 years or older have a qualification of some form. Some 18 per cent have a degree, 4 per cent have an advanced diploma or diploma and almost 47 per cent of individuals have a certificate qualification, statistics that are likely to increase consistent with population growth (CHRC, 2010).

Such regional expansion is considered to be strongly influenced by the area's largest employer, the mining industry, primarily coal and gas. The mining industry, which represented 26 per cent of the area's 17,186-strong labour force in 2008, continues to grow in the region. Contributing \$2.4 billion to the Central Highlands' 2008 Gross Regional Product, mining activity – such as studies and construction programs – represents a further \$2.24 billion of investment planned for the region to 2013. In addition, community and transport infrastructure combined add another \$99 million of investment to the region for the same period. Energy infrastructure investment of \$28 million for the Blackwater/Emerald line study is due to conclude in 2011 (CHRC, 2010). Investments substantially support and continue to sustain the local Central Highlands' community.

Coal-fired electricity generation provides base-load electricity to local communities in the region; electricity generation that is sustained through local coal mining activity. With climate change mitigation high on the national agenda, there is incentive for CHRC to support projects that seek to demonstrate mitigation technology that has the capacity to reduce greenhouse gas emissions and to prolong coal-driven electricity generation into the future (CHRC, 2011).

5.3 Local community

5.3.1 Description

A rural district, the Central Highlands Region comprises many small towns and covers 54,000 square kilometres. It has a population of 29,244, with Emerald and Blackwater the two main town centres (CHRC, 2010). The local community is described in local government, media and by interviewees as vibrant, close knit and diverse, with industries including mining and coal, citrus, cotton, grapes, cattle and sheep. The region is perceived to be in a growth phase, with mining considered the strongest influence on this growth, and is the largest employer in the area. However, the diversity of industry is also perceived to positively impact this growth. When asked to describe the local community, one stakeholder associated with the project noted:

So it's a diversified region and that's its great strength. As I said, we don't just rely on one particular industry. If there's a downturn in industry, you know the communities will generally survive.



Figure 4 Geographic location of Central Highland Area. Source: Morrison, H. 2009

Similarly, a local community stakeholder indicated that the region was experiencing substantial growth, stating the following:

Yeah, I think you're right, it's very much in a growth phase. There's an enormous lot of housing going in and rentals are going up on property.

Emerald is considered a regional hub in the Central Highlands. With a population of about 12,000, it is considered the largest rural residential settlement in the region (CHRC Profile). Emerald is perceived to be a thriving community with strong coal, mining and resources industry representation. It is also considered to be a mining town in a state of growth.

It's a thriving community, it's probably majority coal mining but it's also a hub so there's a lot of government departments here so there's a fairly good infrastructure for supporting the agricultural economy as well.

It's thriving, it's increasing in size all the time, like when I first came here there was only a population of about 4,000 in the town itself, now we're out to about 16,000 in town and they're predicting that we could go 30 to 50,000 depending on what happens with the Galilee Basin.

Blackwater is a smaller community, with a population of about 6,000, and is the second largest residential settlement in the region. Also considered a mining town, it is described as being predominantly rural. With the influx of miners into the local community, one interviewee indicated that the township appeared to be in a state of transition from a 'community' to a collection of 'individuals'.

I found Blackwater...I wouldn't say depressed but I would say, because over time different things have happened, the mining there went right off the boil...about the time of our last meeting and things weren't looking very positive in the community...the community seemed to be less of a, by their own admission, becoming less of a community and more of individuals if you like. So seeing sporting clubs and all those other things start to fail as more workers become fly in fly out.

Springsure on the other hand is a very small rural community with a population of only 1,150 individuals.

"Not large by any stretch of the imagination, it's only a very small town..."

5.3.2 Knowledge of CCS

Stakeholder perceptions and attitudes are often influenced by the level of individual knowledge surrounding a given topic. In terms of ZeroGen, knowledge of CCS varied across stakeholders. For local community members, prior knowledge was noted as limited or non-existent before exposure to the project. Working knowledge of the concept was also limited in this group.

Well, very simply, I suppose it's you know capturing CO₂ and using it. Well, you store it. Capture the CO₂ and then store it and then produce energy, I suppose. That's as simple as I can understand it. I'm a mere mortal.

That it's a step we're moving towards, for reducing our footprint. Capturing rather than spewing, you know, carbon dioxide out into the atmosphere, putting it, sequestering it underground where it hopefully will stay.

An overall understanding that CCS was a process for capturing CO₂ was apparent, however understanding of the technology itself was limited; for one interviewee, knowledge of CCS was associated with carbon capture through agricultural activities.

No, I've got a basic knowledge. And I'm probably familiar also more so with carbon capture through cropping practices, you know stubble retention that sort of thing through agriculture rather than through CO₂ emission from power stations.

Where knowledge was limited before awareness of the project, sourcing of information became of interest to several interviewees.

Okay, didn't know too much about it until we started with your (CSIRO) meetings about four years ago. Have been keeping tabs on it through things like New Scientist and there's been a little bit of stuff in the newspaper over the past few years.

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We subscribe to a handful of different magazines of that style and they all mention it at some point or other. New Scientist, COSMOS, what are a couple of the other ones? You got ... the Australian Geographic, that type of stuff.

For those more closely involved in the project, knowledge of CCS was felt to be above average to high, having been exposed to the concept through the project. Some indicated prior knowledge due to earlier experience or professional interest, while at least two noted that they had no knowledge of CCS before involvement with ZeroGen.

But I would say that I generally understand the process, how it has to work, how it has to be adapted to different types of, you know, sort of at the front end, whether it be a power station, or LNG or whatever they want to put it with. So I'd say it is probably higher than the average person but I'm certainly no expert.

... I was probably two steps up on a layman because of my association with the project, but I'd say I probably know quite a lot. I know enough to have educated discussions with geologists on the topic now.

One interviewee highlighted how becoming involved in the project resulted in a desire to research and gain knowledge of the process to increase her ability to converse on the subject in general discussion.

Day to day interactions, conversations with technical folk, asking lots of questions and lots of reading articles. So I had to become educated in order to manage that area and that involved me primarily asking lots of questions, but also doing a fair bit of background reading.

5.3.3 Local benefits

From a local community perspective, minimal local benefits were perceived to have been generated from the project to date. This belief is mainly due to an understanding that the project's nature, as outlined in the recently completed pre-feasibility study, permitted little benefit to be derived apart from some small economic gains generated from contractual and visitor activity directly associated with the study.

... the benefits can depend on where they put it. In terms of direct economic benefits I mean... to get this sort of thing up and running and prove that it works or show that its cost efficient will be beneficial to everybody in the long run. But short-term benefits, I think that'll hinge on where they actually put it.

Longer-term benefits are anticipated should an IGCC/CCS plant become operational in the region. Such potential benefits are perceived to include population increases and corresponding housing industry growth; job creation, both direct and indirect; infrastructure improvements to roads and transport options and improved health services through the provision of dedicated doctors in local regions.

In addition, social impact benefits were considered important for the local government authority, including construction and earthworks, base-load electricity supply, increased local investment, sustainability of the local coal industry and corresponding improvements to the local economy emanating from these benefits.

So there's jobs, investment, the sustaining of the coal industry and also the fact that we, they had a project in their own backyard which could be world leading in terms of developing this technology.

But the benefit was really about supporting and sustain[ing] of the coal industry ... Blackwater primarily is a coal town.

The benefits were about base-load electricity, supporting their way of life, supporting their agricultural businesses, giving jobs and opportunities for their kids.

Recent feedback received by ZeroGen indicates local support because of the perceived regional development and any increased skill development that may result from a project such as ZeroGen being located in the Central Highlands.

Environmental development was also perceived as a potential longer-term benefit for the region, and the corresponding international kudos resulting from the region being seen to lead the world in CCS technology. As well, the potential for the region to become a global technology hub, and the reputational benefits this might bring, were considered important.

For the local MPs it was about job investments and the sustaining of the local economy, but at the same time developing a world's best technology that would demonstrate CCS and make Rockhampton, Central Queensland area, a global hub.

But when you actually point out the interests and the benefits from their way of life, not so much climate change, they're a little bit sceptical about climate change, but mainly their way of life and the economic development, that was a benefit. The other thing was just as an Australian organisation, having a go; they saw that as a key benefit.

From an indigenous perspective, limited benefits were perceived in relation to the project itself as “native title is extinguished on the proposed site”, however cultural heritage remains. Any benefits that might be perceived were tempered by the need for respect: respect of land, of indigenous rights and of the environment. Tangible benefits were perceived as secondary, though still important, such as investment and jobs.

But in terms of the benefits to the indigenous people, it was about the environment more importantly and probably, and similar to that was the opportunity to secure some form of employment should the project be successful.

The fundamental interest of the project per se was that we had to respect that they were the traditional owners of that country.

There was no association with any spiritual aspects of CO₂ being injected in the ground, but more the spiritual aspects of building infrastructure and more importantly just the respect of indigenous people.

5.3.4 Grievances

From a local community perspective, grievances appear to be mainly in relation to access to property, lack of respect of landowners' rights, damage to property (land and livestock), damage to local infrastructure (roads and thoroughfares), property acquisition, lack of compensation, uncertainty of project outcome, and security and safety concerns both immediate, relating directly to the pre-feasibility study, and in the future, relating to operational aspects of any IGCC/CCS plant that might eventuate in the region. The following comment by one local community stakeholder supports this concern regarding damage to council roads caused by ZeroGen contractors after accessing private properties:

But we had some rain up in the area and some of the contractors or whoever they were doing work for ZeroGen drove out of a property and onto a council road that had, really, it had just been fixed up, graded, this is a gravel road and drove it when it was pretty wet and ruined it.

Housing availability and increased prices appear to be another issue of concern for the local community; past and present mining activity being negatively attributed to the region's current housing shortage. Concern was raised about the possibility of the situation being exacerbated through additional population increases resulting from an IGCC/CCS plant being operational in the region.

So there was big issues socially about people leaving the community to work on the mine site and those people coming into, say, Emerald, they will, driving the prices of rentals up through the roof.

Another concern identified was the practice of mining companies in the region establishing independent communities separate from the local community. Mines and other operations apparently set up portable camp sites on company property rather than integrating workers into the local community.

That's a lot of people moving in and out of the area and it's been a difficult thing ... I'm not on committees any longer, but I feel strongly that some of these mines are building camps onsite and I'm very much against that. That should be part of the community. I think you should expand the town and be part of the community.

Timing of meetings appears to have been an issue that was not particularly well managed in the early stages of engagement, with attendance very low due to the long working days experienced in rural districts. Upon realising that calling meetings were being scheduled too early, meetings were scheduled later in the evening to enable community members, landowners in particular, to attend.

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The first meetings we had I think we were making at 6 o'clock. And with the types of community you have up there, you've got the farmers, or whatever, they were saying with their work day is not a good time for them. They wanted to have them that little bit later.

Other concerns related to external issues, which negatively impacted on engagement activity or inexplicitly influenced community and stakeholder fears. For example, natural and man-made disasters or incidents that occurred overseas pricked community members' fears about the possibility of similar incidents happening in relation to CCS. These issues are pondered in the quotes below. Note, 'mudflow in Indonesia' refers to the 28 May 2006, PT Lapindo Brantas' (Lapindo) mud volcano eruption in East Java, Indonesia. Lapindo, a gas drilling company, was held liable by the Indonesian government for causing the mudflow eruption while drilling a natural gas well. The mudflow continues today and it is unknown when this might cease (Fointuna, 2010).

Yeah we had a night where we had a community session and the circus was actually next door to us ... and we didn't have many people turn up because obviously the circus was in town. And of those people that did turn up, there was a recent incident that had nothing to do with us as a project, but it was the mudflow in Indonesia. There was an incident where some drilling had taken place in Indonesia and there was a catastrophic failure, and then basically all this mud was flowing out of the ground uncontrollably.

And it also coincided with a movie that Bruce Willis was in about asteroids coming to the earth and all this sort of stuff, the catastrophic type of movies. And these external events sort of coalesced into a group of people who had real concerns about what would happen to the CO₂ in the ground, if an asteroid landed and smashed into the ground, and would the CO₂ come leaking out?

Concern regarding the security of any underground storage of CO₂ was another issue that became apparent through the interviewing process.

... there was a bit of concern about piping the gas to a nearby field here near Emerald, the escaping of it, because people know about the natural escapes in, say, Western Victoria and some parts of South Australia where the gas escapes naturally. Some people were aware of that sort of thing.

5.3.5 Local perceptions of the project

Local community perceptions appear to be mixed, with stakeholders indicating positive and negative feelings resulting from their experience of the project so far. One particular stakeholder's feedback could even be considered ambivalent.

... I couldn't really say what the community's impression is of ZeroGen at this time ... but this incident last week got sorted straight away, so that was a positive.

One community stakeholder noted that there had been no significant incidents that he had been aware of surrounding the project.

There's no reports of it not working or there being a blowout or an explosion or anything happening out there because something has gone astray.

A sentiment that was supported by another stakeholder directly associated with the project who indicated that over the three years that ZeroGen had been progressing the project, there had been "no great ups and downs" instead indicating that it had been a steady process that had been quite cordial, "neighbourly almost".

... they're out doing the community engagement and it would be, at least, pleasing for the community that people were at least out talking to them and telling them what's going on. So I would think that that would be a positive ...

Another stakeholder indicated that the developer had shown interest in the local community such that it had sponsored several local activities and were seen at local events, something that was perceived to be positive because it showed commitment to being visible and present within the community.

That's right, they had a presence up there. Whether it was through sponsorship, and not doing some big corporate sponsorship, just a few hundred dollars here and there, just helping out local organisations where they could, and actually going and attending things in their own time.

Future perspectives should the project progress appeared positive, however past experience of disappointment in being overlooked for substantial projects have resulted in strong scepticism within the local communities. This was particularly so for the Stanwell district according to one stakeholder who noted that community members showed concern about the prospect of allowing their hopes to be built only to have them dashed.

I think it was generally, it was positive. It was positive at the outset, but with a bit of suspicion. And the reason for that is that Stanwell had been involved in a very large infrastructure project that was a proposal previously, only two years previously that collapsed.

Well, when it was Stanwell, and I think you know it still sort of has this association, that's where the scepticism came from, because of those other few projects that had been proposed but not gone ahead where Stanwell proposed projects. They've got a big energy park up there. So I think they were a little bit sceptical but they knew the State Government was involved since day dot. So I think that gave it a bit more credibility as well.

Another positive identified by a stakeholder highlighted the potential for support of the local coal industry should the project progress beyond a study to an operational plant.

I think there was a sense of excitement that the coal industry was looking like it's a very positive move for the coal industry. I don't recall any serious ... I think there was questions asked about this safety and release locally, but apart from that I don't think there was any at all.

5.4 Non-government organisations

Several national non-government organisations were involved in the national consultation when the Ministerial Council of Minerals and Petroleum Resources was developing regulatory guidelines for CCS. This assisted with several of the leading environmental NGO organisations becoming more accepting of the need for trials of CCS at a more commercial scale. In fact, at several instances, Greg Bourne, the CEO of WWF, proactively discussed the role for CCS in an energy portfolio. Bourne formally endorsed the ZeroGen project via written correspondence in June 2010.

When the ZeroGen project was announced, there was some opposition to the proposal, in particular some local conservation groups expressed concerns and doubts about the feasibility of CCS as well as the potential for damage to local ecosystems. It has been interesting to see that over time some of those NGOs have become more positive about the need to trial CCS at scale to see if it can be considered part of the mitigation options for Australia and the world. However, this would not have been achieved without proactive engagement directly from the project proponent or other engagement work examining climate and energy technology solutions with other NGO representatives at the table.

6 Communication – public engagement

ZeroGen reinforced its desire to demonstrate leadership through goals that seek to achieve honest and transparent dialogue with project stakeholders within relationships based on mutual respect (ZeroGen, 2008b). This position was reiterated in an interview with a stakeholder associated with the project who indicated that effective two-way communication was an acknowledged priority of ZeroGen's stakeholder communication and engagement plan and that rather than be lost in the quintessential technical and engineering aspect of the project, it was essential that *"public acceptance was recognised as a fundamental issue that transcended all of our [ZeroGen's] activities"*.

6.1 Communication strategy

Taking into account ZeroGen's philosophy above, it is interesting to note that feedback from some community members indicates that awareness of CCS is still low.

I could probably walk out of this door here now and talk to some of the guys here and talk about CC, you know, carbon capture, and they wouldn't know what I was talking about or they would say they know but they weren't aware of anything happening in the Highlands.

Comments from other stakeholders indicated that a very specific and deliberate communication strategy was undertaken by the developer with direct emphasis on engagement processes that permit information dissemination

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back to the community, and encourage dialogue between the developer and stakeholders. Emphasis was noted on the need to build strong relationships between the developer and the community.

So if you were genuine about building that relationship and genuine about, especially with that type of community, then you've got to be honest, you've got to be genuine and you've got to be legitimate.

The level of communication and engagement undertaken to inform and consult with stakeholders was described in detail by one stakeholder associated with the project. From the developer's perspective the following list of communication and engagement processes were imperative for effective stakeholder engagement:

- Develop a comprehensive stakeholder plan
- Approach stakeholders from a staged perspective (involved determining different level stakeholders from a national, state and local perspective, and grouping according to specific interest e.g. economic, infrastructure, financial, commercial, sustainability, lifestyle, etc)
- Ensure all stakeholders, particularly landowners (whose properties were crucial to the project's pre-feasibility study objectives) were treated with respect at all times
- Ensure respect of property privacy issues
- Ensure respect of rights, keeping distance until invited, seeking permission
- Engage directly with stakeholders
- Engage with all levels of stakeholders, including high end stakeholders through to local mum and dad stakeholders
- Engage local bureaucracy – keep them 'in the loop'
- Provide work for stakeholders when able (landowners)
- Compensate for access when possible, damage to and use of property
- Seek stakeholder input regarding site selection on properties (drill pads)
- Provide tangible assets for private use after project completion
- Go above and beyond engagement, ensure don't settle for the easy option
- Engage the local indigenous community, and ensure respect of land and culture at all times
- Articulate the local benefits
- Articulate the wider benefits – state, national, global and economic
- Investigate and became familiar with local culture.

So we really made sure, first and foremost we had a stakeholder plan, secondly that stakeholder plan was executed by the entire team and elements, key elements of that stakeholder plan involved understanding the interests of the respective segments of the stakeholder communities in the respective communities that were dealt with.

6.1.1 Who

The Stanwell Corporation initially, then ZeroGen, have maintained control of all community engagement activity specific to the project. To facilitate its communication plan, ZeroGen recruited the services of a stakeholder manager with a professional and personal background in community engagement who moved from Stanwell when ZeroGen began operation separate to the electricity generator.

Early in the project, to assist with the initial Environmental Impact Statement (EIS) community relations, ZeroGen engaged a public relations communication firm to undertake research with a focus on determining the most relevant stakeholders, local opinion leaders, influential community groups, formal and informal local networks, and relevant local businesses. In addition, the consultant assisted with ongoing communication on behalf of the developer, acting as a liaison between ZeroGen and its stakeholders. Following the change in direction from a pilot and demonstration project to a straight demonstration project, ZeroGen has developed and introduced a new Stakeholder Engagement Plan and appointed a dedicated Stakeholder and External Relations Manager to manage the plan in-house.

Identified stakeholders included landowners and regional and town residents (Emerald, Blackwater and Springsure), local government organisations (local shire councils, now amalgamated into the Central Highlands Regional Council) and state departments such as the then Department of Primary Industries (now a division of the Department of Employment, Economic Development and Innovation), and the Department of Environment, Resource and Energy's Water Division. Other stakeholders include indigenous groups, NGOs (primarily AgForce: a lobbying organisation representing rural producers) and environment and conservation organisations were also identified as key stakeholders for the pre-feasibility study. In addition, ZeroGen, along with the University of Queensland and CSIRO, has lodged an Education Investment Fund (EIF) application with the Federal Government with a view to ensuring ongoing knowledge and skill development surrounding IGCC and CCS technology. Locally, ZeroGen engages with schools and teachers as part of its education and communication program.

6.1.2 What

The stakeholder being engaged and the process being used strongly influenced what was presented and discussed in the various communication and engagement processes. This is best reflected in the strategic thinking done by the project proponents before any discussions with stakeholders. The following stakeholder comment relates to initial engagement strategies used when the project was investigating pilot options, prior to its current demonstration only focus.

And at the time what we tried to do, I believe successfully, was to align the interests of the stakeholders within Blackwater who are primarily dependent on the coal industry, with the interests of the project which was all about developing a technology without which the coal industry or a thermal power generation would not have a future.

Information relating to ZeroGen's pre-feasibility study was presented to stakeholders through a variety of communication and engagement processes. In the initial stages communication involved high-end discussions with key decision-makers with information presented via a PowerPoint presentation and a project proposal. Information included in the presentation and proposal related to the concept, the technology behind it, what CCS was and how it worked, its necessity for mitigating climate change, and detailed information relating to the project scope. This information was delivered via fact sheets, website, face-to-face meetings, public conferences, industry groups and national and international conferences, and included as part of ZeroGen's education and communications program.

At a community engagement workshop conducted by CSIRO, factual information was provided on the science of climate change and the broad portfolio of alternatives for low emission energy generation, including CCS. Information was delivered via an independent expert engaged in low emissions technology research. The information was developed as part of a collaborative project with the Queensland Government, the Centre for Low Emission Technology, CSIRO's Energy Transformed Flagship, the Australian Coal Association Research Program, the University of Queensland, Stanwell Corporation and Tarong Power. A participatory action research approach was used so that participants could set the agenda of the second workshop which was scheduled six months after the initial session. Those that attended both sessions showed a shift in the sophistication of their questioning of CCS and also their attitudes to it.

We walked home with a bag full of paperwork and all that sort of stuff so we sat down and read all that ...

Communication and engagement processes at the local stakeholder level were undertaken via individual meetings or public forums such as community liaison meetings and community meetings. These meetings took the form of informational sessions at which an overview of the project was made available, providing details about ZeroGen, its partners in the project, fast facts, the project aims, and the anticipated benefits the project would bring to stakeholders.

Obviously we would try to provide as much information as we could about the technical side of things without making it too technical. But we would always have supporting materials as well, like fact sheets and posters that people could take home with them. And we would try to provide it in a simple, not dumbing it down by any means, but clearly very simple ways that we could get the message across without overloading it from the technical side of things.

In addition, information was made available about CCS, how it worked, the reasons for its use and application, why it is necessary, and its proposed contribution towards climate change mitigation. Other information included details relating to potential test well drill sites and seismic testing required for best site selection, and an overview

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of how IGCC works in combination with CCS. Drill samples and other physical examples of the technology and its processes were set up on tables at meetings as a form of education interaction. The ZeroGen website also hosts a Frequently Asked Questions page which addresses more commonly posed questions surrounding the project and the technology that supports it.

In addition, local issues such as social and environmental impacts, and cultural and indigenous implications were significant in the communication and engagement processes with respective stakeholders. As well as information specific to CCS, information communicated included scheduling and timeline details, project updates and survey findings. Property access was a major communication issue requiring constant attention.

6.1.3 How

Various engagement and communication methods were used throughout the pre-feasibility study. Methods included meetings with key stakeholders in the study's early stages, either with individuals or small groups, at which PowerPoint presentations were given and the concept proposal provided. Ongoing engagement included meetings that were a mix of face-to-face encounters or group forums such as those used for the Community Liaison Group meetings and open public meetings.

We'd stand up in front of a PowerPoint presentation. We had posters on the walls. We sometimes had tables with drilling rock samples. A bit like an educative seminar as well as an information transmission. Always tried to make it a bit touch and feel, and with a number of speakers. So I would normally speak more particularly on the drilling program. Someone else would speak to the environmental areas, because we were going through an EIS process, explain how that worked and that sort of thing.

In the early stages of engagement with key stakeholders, the Stanwell Corporation was requested by the Queensland Government to engage an independent expert to hold a series of workshops in the Emerald, Blackwater and Springsure regions to provide information to local community members about CCS and to gain an understanding of local perceptions and attitudes towards the technology. CSIRO and the Centre for Low Emission Technology were engaged for this process. They did this using a participatory action research approach and the feedback was extremely positive.

We also made a point of having them go up and give a presentation to people as part of their research. To inform them about CCS as part of a broader portfolio, and informing them from an expert's position, I guess you'd say. And then they obviously followed that up with another meeting six months later or something like that, the same people ... and there was no representatives there from the project per se, but that was independent information session that we found very, very effective.

There were guys from DPI, Department of Primary Industries. Some school teachers, some other people of like interest...

ZeroGen also use a Community Liaison Group comprised of community nominated representatives of local leaders, a group of technical and scientific experts, and ZeroGen representatives. The object of the Community Liaison Group was to provide the community with a forum at which its representatives could raise questions or issues relating to the study that were then directly managed by a developer representative at the meeting. Information provided and questions answered could then be disseminated to the community through word of mouth. In addition, FAQs could be reviewed online via the ZeroGen website.

We set up a Community Liaison Group where we actually encouraged the community to nominate amongst themselves a body of leaders to facilitate and be the interaction between us, the project developer and the community.

And then the approach was really as I said, that grass root community meetings, getting people up there to have a chat, have a cup of tea. Meeting with people one on one.

Public meetings were convened at a time to suit local landowners who were contacted via open invitation through the post and via public notices in the local newspaper. These meetings took place in multiple locations (Emerald, Blackwater and Springsure) at which presentations were given and open question and answer sessions conducted. Different media were used to present information including posters, brochures and fact sheets.

Well, I understand there were public open meetings they had in some of the communities that people were invited to attend, and I guess it was advertised locally.

And some of those communities are reasonably small, so it wouldn't be hard to get word out that the meeting was on...

We'd have a short presentation; we'd have all the senior people from the team there as well to help with our credibility and to show our commitment to it.

Project milestones and other newsworthy issues were sent to local newspapers and relevant publications and, where appropriate, via government announcement. For example, information relating to the EIS and other project notices of interest to local community stakeholders.

... the item that's in today's paper is about; it's an open call to the public to submit comments with regard to environment, the EIS, the environmental impact statement.

In 2008, ZeroGen launched a project website and a toll free number to enable ease of access to project information. Individual letters and emails (in later stages of engagement) were also used to communicate with stakeholders.

We didn't really use emails at all as a way of engaging, it was all done by letters predominantly. Over the past few years this has been changing. More and more people are happy for us to contact them by email. I guess the way you would say was the grassroots approach.

6.1.4 When

Table 2 Communication frequency

COMMUNICATION TYPE	AUDIENCE	FREQUENCY
Newsletter	All stakeholders	As significant milestones were met. More frequently at the beginning
Community Liaison Group	Identified stakeholders only	Although a few meetings were held quite close together at the beginning, now they are held more on an ad hoc basis until the project moves to the next level
Community meetings (public)	All local communities	Held early in the life of the project
Flyers, posters, brochures	Community meetings, formal and informal meetings, progress updates, special events	As-needs basis
PowerPoint presentations	Formal and informal meetings, public meetings	As-needs basis
Media coverage	Local, state and national journalists	Regular updates, special event announcements
Door to door	Local landowners	As required, more frequent in initial engagement process
Letters	All local residences	Initial informational notice of demonstration trial, then on an as-needs basis
Email	Select stakeholders	By request
Website	All stakeholders	Launched in 2008, stakeholder initiated access

6.1.5 Stakeholder reactions

When stakeholders were questioned about whether community engagement was a priority for the developers, responses were varied. There was some indication from local community members that little community engagement occurred during the period of the pre-feasibility study undertaken for the initial pilot project, and that what engagement was undertaken was not adequately signposted. One local community stakeholder noted:

I would be surprised if anybody knew who ZeroGen was. We only know Stanwell because of their power station down near ... Stanwell. So they probably haven't pushed themselves too hard in the community at this stage.

We know things are happening but you know you hear about it once every three or four months and it's usually a paragraph or two and that's about it.

There was no sort of ongoing discussions or anything in the paper that I could recall which is basically the centre of communication for the township so ... you guys were there and there was a handful of people turning up to the meetings but other than that I don't think there was anything much else going on.

This perception however was not universal, with other comments implying that community engagement did occur on a regular basis, both individually and communally, and that the process appeared to be crucial to the success of the study. This may relate to the position of the individual who was interviewed. Those more critical and influential to the project obviously were more targeted than the wider community.

I came into it a few months after the whole process had happened. It [community engagement] was really driven by the ZeroGen team in partnership with the Phillip Group team.

So [name removed] started coming up and talking to us about the project and you know just giving us background information, whatever, about what ZeroGen was doing and Stanwell and all that sort of stuff. I don't remember the exact dates we met, but it would be going back a few years.

6.1.6 Common questions

Questions identified by stakeholders were extensive and varied. Some focused specifically on CCS and the technology that supported it, while others related to local physical, social and economic impacts. In particular, questions covered issues surrounding feasibility, viability, technology relevance, economic opportunity, infrastructure creation and maintenance, property access, financial compensation, safety and security, and responsibility and liability.

So there was a multitude of questions at the first phase when they didn't have much of an understanding of the technology or the project. And then there were other questions more related to the process later on as we got into the EIS process.

Examples of questions identified through the interview process are noted, in no particular order, in the table following.

Table 3 Common questions arising from the engagement processes

Common Questions

1. What is CCS?
2. What is the technology behind it?
3. What can you do with CO₂? What other uses?
4. Is it safe? What are the safety issues associated with the technology?
5. How do you safely store CO₂?
6. How deep does the CO₂ need to be stored?
7. How do you safely transport CO₂?
8. What if there is an accident?
9. Can the CO₂ come back up?
10. Does the project have support of environmental groups?
11. Is the project a 'done deal'?
12. Is it going to proceed?
13. How much will it cost?
14. How will it be funded, where are you going to get the money from?
15. Will they [stakeholders] have a say in the ownership of the project?
16. What will be the impact on the community?
17. How will indigenous land rights/land use agreements/cultural issues be dealt with?
18. What compensation will be offered? What form will this take?
19. How often will the community be engaged?
20. Who is driving the project?
21. Who are the decision makers?
22. Who will manage the project?
23. Will decision makers and management be accessible?
24. What is the timeframe for the project?
25. What are the steps towards approval?
26. How wide will the easements for the pipeline be?
27. What are the steps in terms of approvals?
28. How big was the footprint of the proposed site?
29. Will compulsory acquisition be used to acquire land?
30. From where will materials be sourced for construction?
31. Will locals be employed? If so, when?
32. How many will it employ? When can we plan for it?
33. Will outside labour be brought in?
34. What will be done about housing?
35. Will the developer be paying for accommodation to be built?
36. How will access to properties be managed?
37. What will be the impact to their land?
38. How will traffic be managed?
39. Will rigs be used on their land?
40. How many rigs will be used?
41. What HSE plans will be used in relation to rigs?
42. Will facilities taken on to properties be washed down?
43. Could we use the rigs to drill for water?
44. What is the profile of the project going to be in relation to the region?
45. Will it impact carbon emissions significantly if at all?

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Due to the nature of the project, some questions were not possible to answer because they related to the operational management of an IGCC/CCS plant and its corresponding issues.

Yes, you're talking about jobs, okay when? When can I plan for? So they're keen to see something happen and they want timelines and things like that, which is difficult for us because we're doing a pre-feasibility study which says we're exploring the potential to do something.

However, interview feedback indicates that where possible, questions were answered at the time of asking, or taken on board and responded to directly, or at the next Community Liaison Group or public meeting. It was noted that wherever possible, analogies were used to assist in the answering of questions that were difficult or complex in nature such as an explanation of CCS itself.

The process was to draw the analogy with other gases or fluids that have been successfully stored within the earth for millions of years, these being natural gas, oil and to draw the parallel between what we were exploring for, which is the geology similar to that, and you've got an analogy of iron gas that's been there for millions of years and what we're looking for is a similar receptacle, if you like. And that is very much the case, particularly near where we are, because we're on the edges of the Santos gasfield.

Another factor highlighted as important relating to managing stakeholders' questions was ensuring an avenue for questioning that permitted the silent majority to express their concerns. This was facilitated through the use of question cards that could be completed and sent to the team for response permitting the anonymity of the originator of the question.

... they were able to write in the cards questions and those questions would be collated at the end of a session and anonymously...read out to the public and they would be responded to.

When asked of the difficulties in responding to community questions in relation to the ZeroGen project, one stakeholder indicated the most difficult questions to respond to were those relating to the certainty of the project, associated costs, and working evidence of the technology:

I think it is really the questions that you just can't answer that some people do struggle with like: How much it is going to cost? Is it definitely going to go ahead? When will it go ahead? Those types of things.

One thing that I think we didn't do was really show other projects where CCS has been used or where integrated gasification has been used as well.

6.2 Further communication/public engagement approach

6.2.1 Corrective measures

Due to the project being at the earliest, pre-feasibility study phase, there are few corrective measures to speak of other than addressing communication and access issues which arose due to a lack of understanding of local culture. Specifically, meeting times were moved from 6 pm to 7.30 pm to allow landowners to be able to finish their work day and have dinner before attending. The way contractors access and leave properties, as well as manage damage to private and public property, is the other issue.

6.2.2 Media analysis

Information was sourced from various media for this analysis including print, radio, television and the internet, with a total of 37 items reviewed. Because this is a retrospective examination of the media, some earlier articles have not been located despite various searches and requests to the project developers, however a range of topics that were covered from 2006 until now have been included. Articles were searched according to a set of terms identified in Table 4 following. Google's search engine and the ANZ Proquest Newsstand online database were used to obtain the articles. The 2006 excerpt from the Queensland Parliament reporting demonstrates how the project was first announced. See Appendix C for a full list of media reports sourced for this media analysis.

Table 4 Media analysis - search terms

Search Terms	
CCS	Emerald
Carbon capture and storage	Springsure
Carbon dioxide capture and storage	Rockhampton
Carbon storage	Queensland
Carbon capture	IGCC
ZeroGen	Integrated Gasification Combined Cycle
Stanwell	Stanwell Corporation

2006

Early media reports discussed the project as being linked to the Stanwell Corporation, Queensland coal-fired electricity generator, located in Stanwell in the outer regions of Rockhampton from where it was originally anticipated CO₂ gases from coal burning would be transferred to the injection site yet to be announced. Various components of the project were covered in different media, including the two technologies to be combined in the final project operational phase, IGCC and CCS. Information about how the technology worked, why it was being considered as a mitigation option and the type of geological structure necessary for storage were also discussed. Various locations were considered in the media as being options for the plant, with the Springsure region being the most commonly considered.

In October 2006, the Federal Government announced \$125 million funding for two CCS-related demonstration projects: the Fairview Power project designed to extract methane from coal, and the Callide Power Station retrofitting of CS Energy's oxy-fuel demonstration project. Shell announced its participation in the development of ZeroGen's IGCC/CCS power plant to be built by Stanwell Corporation, and located near Rockhampton in central Queensland with CO₂ to be stored in aquifers deep underground near Emerald.

Project Announcement

Ministerial Statement

Great Barrier Reef Clean Coal Trial

Hon. PD BEATTIE (Brisbane Central—ALP) (Premier) (9.51 am): The Great Barrier Reef is Queensland's jewel in the crown—an extraordinary natural wonder that brings visitors and researchers from all over the world. This summer, the Great Barrier Reef Marine Park Authority has already reported serious bleaching of reefs around the Keppel Islands and bleaching around Heron Island, Lady Elliot Island and offshore from the Whitsundays. The reef has suffered two major coral bleaching events, the first in 1998 and a second more serious event in 2002. In that year between 60 per cent to 95 per cent of the reef was affected and around five per cent was severely damaged or lost.

The Marine Park Authority continues to monitor the condition of the reef but it serves as a warning to all governments that we must take action. Yet the federal Minister for Industry, Tourism and Resources, Mr Ian Macfarlane, has dismissed climate change. Fortunately, his colleague the federal Minister for the Environment and Heritage, Senator Ian Campbell, has publicly stated on many occasions that climate change is a massive threat to the reef—and the senator is right. The Prime Minister, I and other state and territory leaders have agreed that greater action must be taken on addressing climate change. It was one of the many issues on last Friday's COAG agenda. If the Prime Minister and his environment minister are serious about the issue they need to ensure Mr Macfarlane understands the facts about climate change and the serious nature of its consequences.

The Queensland government is moving to help alleviate this threat which could jeopardise the jobs of 63,000 people and the \$5.8 billion that the reef generates for our nation's economy. We are supporting the development of new clean coal technologies. I am pleased to announce today that in a first for Australia the Queensland government owned Stanwell Corporation Limited is about to begin a feasibility study and test drilling in the Springsure-Emerald area. Stanwell is taking the lead in the research and development of clean coal technologies. That means long-term job security for Queensland's strong coal industry and for the thousands of families who depend upon it. Test drilling will begin in May in the Denison Trough to evaluate the area.

During the test water will be injected deep underground into sandstone reservoirs to determine their quality. As part of the testing around 60 tonnes of carbon dioxide—about three tanker loads—will be injected into the well. This is the clean coal technology process. The test will allow the company to determine the long-term feasibility of two cutting-edge technologies: firstly, a process to covert coal into gas, removing carbon dioxide to produce a high-hydrogen fuel used to generate power; and a second technology that captures and compresses carbon dioxide to allow it to be stored underground. If the tests prove successful Stanwell will build a demonstration facility that will combine carbon capture and safe storage of carbon dioxide, which will be a world first.

Stanwell is seeking funding from the federal government's Low Emissions Technology Demonstration Fund and I look forward to working with the Prime Minister to make the internationally significant project a reality. This research could guarantee the future of Queensland's coal industry. There is no point in having 300 years supply of coal if we cannot sell it to the world. We all understand the pressures that are created through climate change. This science and research project will give us an opportunity to protect that industry and also protect the environment.

Queensland Parliament, 2006

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2007

In 2007, media coverage was mixed. Discussion around pipeline lengths from capture points to storage points caused concern with the coal industry, sceptical in regards to the distance the CO₂ had to travel from the ZeroGen power plant to the geological storage site some 250 km away. This in turn resulted in discussion of a national common user pipeline plan for CCS to support CO₂ capture via all technologies.

Also in 2007, ZeroGen featured negatively in a public dispute between then Queensland Premier Peter Beattie and then Federal Resources Minister Ian Macfarlane. In a report headed: "Clean Coal Project Fails" covered by The Australian on 30 May, Minister Macfarlane claimed that ZeroGen had collapsed due to failing to show investors that it had a commercial future, and this was why the Federal Government would not support it.

More positively, Chris Wheeler, ZeroGen's Project Manager, announced that a community meeting would take place in Gladstone organised by the Gladstone Institute of Engineers. This meeting aimed to outline the successes to date of the first round of drilling near Springsure, reinforcing that ZeroGen was making progress in the capture and storage of carbon dioxide.

At the same time there was a change in government at the federal level, and a new Prime Minister with a focus on climate change was elected.

2008

In 2008, media reports focused on potential difficulties in raising funds to support the development of the technology, which was considered to be required to avoid dangerous climate change. It was reported that ZeroGen had undergone a reconfiguration process so that it would be able to produce more power in a short timeframe so as to be more attractive to industry and government. Media reports looked at the capability of the technology to effectively remove up to 90 per cent of CO₂ from gas waste from the plant. Discussion also focused on the viability of the technology from a cost perspective, an issue that was debated by the Australian Greens political party, which considered that public funds should not be devoted to clean coal technology.

Announcement of community briefings were also the subject of media coverage in 2008, commencing in Stanwell, moving to Blackwater, Springsure and Emerald. The ZeroGen Stakeholder Manager, Chai McConnell, indicated that the demonstration power station could be operating by 2012 with lessons learned from stage one incorporated into stage two processes. McConnell was also noted as indicating 2017 as the year the plant would become operational.

Concerns raised by Rockhampton Regional Councillor Sandra O'Brien regarding transporting of waste gas via trucks from Stanwell to outlying areas in the Emerald region instead of the initially indicated pipelines were prominent in local media at the time. Other concerns included information that the project would not be able to deliver 90 per cent reductions of CO₂ from waste gas as indicated rather 70 per cent reductions were cited by the media.

Environmentalist Dr Tim Flannery expressed his doubts over efforts being extended by the Queensland Resources Council towards developing low emissions technologies for electricity generation in Queensland. This was rebutted by Michael Roche of the Queensland Resources Council who indicated that the coal industry had committed about \$600 million over 10 years in support of the low emissions technology including two demonstration projects, ZeroGen and Callide.

The stalled nature of the United States Department of Energy's FutureGen Project caused substantial concern and was well represented in media reports in 2008, with anticipated setbacks to the technology's development cited to be three to five years. This concern was reiterated in the media over the closure of the Western Australian joint CCS trial by BP and Rio Tinto due to geological formations at the Kwinana trial site being inappropriate for long-term CO₂ sequestration. These events were considered bad omens for ZeroGen, which was yet to break ground on its plant construction, whereas it was noted that other large scale low emissions technology, such as solar, wind and geothermal, were available and ready to go.

Minister Ferguson's comments regarding the importance of CCS for the long term sustainability of coal-fired power generation was reported on as an indication of the government's support of the coal industry as opposed to climate protection. The government announced that clean coal power plants would be possible and several would be in operation by 2020. Per tonne costs for carbon and capture were also topics of discussion with \$40 to \$45 per tonne being considered.

Media coverage in this period also included the release of Professor Ross Garnaut's report on climate change. The report was commissioned in 2007 by the Australian federal, state and territory governments, and endorsed acceleration of research, development and commercialisation programs for low emissions energy-generation technologies. Both Callide and ZeroGen were seen as central to this process.

2009

In 2009, media coverage was again mixed but predominantly positive. Concerns were raised by the Federal Opposition's Greg Hunt regarding the need for demonstration plants such as ZeroGen to be required to purchase paid carbon permits under the proposed Carbon Pollution Reduction Scheme. It was indicated that there was potential for projects such as ZeroGen to fail as a result of carbon permit costs being too high to justify operation. Hunt accused the Government of not supporting clean coal in Australia. Job losses were cited with other concerns including the company being wound down at the time. Assurance was provided by Minister Ferguson that projects such as ZeroGen would be exempt from this program. The Government was noted as having provided \$100 million towards the formation of the Global Carbon Capture and Storage Institute in 2008.

The media actively covered the Weller Review conducted on behalf of the Queensland Government to assist in determining more productive ways in which the government should manage its various funding and grant programs. The review noted that an independent study should be conducted to determine if the coal industry should take over the ZeroGen project. The media noted that the Queensland Natural Resources Minister, Stephen Robertson, indicated that the government was considering winding up the project. Tony Maher, of the Construction, Forestry, Mining and Energy Union, was reported as implying that a move to wind up the project would be detrimental and that he would condemn such a move. The State Government indicated that the project required additional funding from the Federal Government for it to continue. These concerns were reiterated in several media articles with the main focus on the substantial cost of a project such as ZeroGen and the potential loss of taxpayers' money already spent on the project.

In this same period, Carbon Energy announced it would be storing waste gas emissions from its Surat Basin operations in Southern Queensland within 18 months, with ZeroGen's Central Queensland site identified as the potential recipient of transported waste gases.

Media announced that the Federal Government would spend \$120 million on low emissions power plants, with funding being allocated to four projects including ZeroGen. This funding was considered essential to assist the projects due to the level of competition traditional power plants imposed. The Queensland Government, having already invested \$102.5 million into ZeroGen and other demonstration projects, was noted to welcome the Federal Government support. Mining unions were also reported to be in favour of the Federal Government's investment, Tony Maher indicating that it was a boost for Queensland regional areas. He said that time was a factor, with a need for the technology to be proven before 2015.

Media coverage towards the end of 2009 indicated that the region west of Gladstone would be the site for ZeroGen's new IGCC/CCS power plant, noting that the area had been earmarked to play a role in Australia's low carbon future. Queensland was once more being considered as being placed to become a world leader in clean coal technology. After the Queensland Government Coordinator-General declared ZeroGen a significant project, an EIS was announced to be undertaken, with construction indicated to possibly commence in 2012 with the plant operational by 2020.

2010

Media coverage in 2010 was primarily positive. Coverage focused on the EIS being undertaken in Central Queensland for the ZeroGen project, and various options for siting the plant in the Emerald/Blackwater region. Japan's Mitsubishi Heavy Industries move for involvement in the project was well covered, as was a pre-feasibility study being undertaken by ZeroGen. In February, the Queensland Government announced that a draft terms of reference on environmental investigations surrounding ZeroGen, had been released for comment and, if approved, would result in some 2000 construction jobs for regional Queensland. Gladstone's Regional Council was reported in March to endorse the terms of reference. As part of the EIS process, ZeroGen conducted public consultation on the draft terms of reference involving government agencies, environmental NGOs, local government and individual community members from the region under study. This included areas from Biloela to the east of the state to

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Emerald in the west. Meetings and briefings were held in multiple locations including Biloela, Blackwater, Emerald, Comet, Brisbane, Rockhampton and Mackay and these were covered in various local media.

About the same time as the draft terms of reference release, concern was raised in the media by the Banana Shire Council regarding ZeroGen's failure to comply with a State Government discussion paper on sustainable development and land resources, citing competing land uses and the need to ensure balanced outcomes was not taken into consideration. The council was noted as implying that the government had allowed policy to be impacted by the developers and the mining industry. Concern was emphasised due to the timing of a meeting to discuss the submission with the council.

The Australian Greens were reported to consider clean coal technology as a 'scam' that pandered to the mining industry and unions, and that the process would not stand up to scrutiny and extensive testing. In early 2010, media comment included the December 2009 Copenhagen UNFCCC's summit refusal to include clean coal in its CDM funding mechanism. In April, the media covered John Cotter, AgForce president's firm objections to the technology, noting his uncertainty about its safety and potential negative impacts on underground water resources. Around this time, media also covered findings released by Houston and the College of London universities which indicated that it was impossible for one small coal-fired power plant to effectively reduce CO₂ emissions sufficient enough to make any impact on climate change, saying that CCS technology would take up time but result in little and was a potentially dangerous diversion.

The high cost associated with the development and deployment of CCS was once more in the media towards the end of the first half of 2010 with comparisons drawn between current financial support of low emissions technologies such as clean-coal plants as opposed to solar plants. The media reported that eight solar plant projects would receive \$15 million for studies (five with sites), with two winners to receive one-third funding from the Queensland Government. NSW however, had committed \$120 million for a state solar bidding program, while Victoria had committed more than \$100 million to the technology's development, and a further \$50 million for Silex Systems to build a solar plant near Mildura. It was reported however, that no large scale solar plants were planned for Queensland but that the state had committed \$300 million to develop clean-coal power stations.

Local activity in the Emerald and Springsure regions attracted media coverage when students and teachers attended two events that provided educational opportunities for gaining knowledge around sustainable practices and climate change mitigation, with representatives from industry, research and other organisations, including ZeroGen, in attendance.

7 Analysis of communication and public engagement approach

7.1 Five critical factors that affected the outcome

The following five critical factors have been identified as contributing to the success of the project to date.

1. Develop clearly defined stakeholder plan – great importance was placed on identifying all of the stakeholders that may have an influence on their project and prioritising them accordingly. Once the stakeholders had been identified, the next priority was to identify their interests and define the best way to manage and engage them, particularly considering what had preceded the project specific to that local community.
2. Execute and evaluate the stakeholder management plan – once the appropriate levels of engagement had been identified, it was critical to execute the plan and continually monitor and evaluate its effectiveness. Ongoing monitoring allowed potential significant events to be avoided and the stakeholder management plan was kept on track.

So we really made sure, first and foremost we had a stakeholder plan, secondly that stakeholder plan was executed by the entire team and elements, key elements of that stakeholder plan involved understanding the interests of the respective segments of the stakeholder communities in the respective communities that were dealt with.

3. Understand the current political climate at all levels – ZeroGen found it essential to understand more than the overarching national perspective. Specifically, the state and local context was very important as any unforeseen or unplanned issues can be quite destabilising – particularly when local agendas tend to override national objectives. In the case of ZeroGen, the Queensland state shire amalgamations created substantial angst within the shire councils earmarked for demise and any association with the state government, particularly to the

Premier, had strong negative connotations. Being aware of these issues, ZeroGen took an independent stance when communicating with the local councils and communities.

4. Be aware of extraneous issues – some issues can have a negative impact and deflect the positive nature of the engagement process. For example, being unfamiliar with local community event scheduling caused a community engagement meeting to be poorly attended when the circus came to town. Similarly, an initial lack of knowledge of the working commitments of the local community, specifically landowners, made early evening meetings non-events. Fear-inducing incidents whether real, related or unrelated to the technology, or a celluloid creation or re-enactment, need to be taken into consideration particularly when media coverage of these events coincides with community engagement processes. Indeed, issues that can have strong destabilising effects can be as far removed as a newly released natural disaster movie, which in the case of ZeroGen, caused local community members to become unduly concerned and to question responsibility/liability issues in the event of an accident or disaster.
5. Positively address all stakeholder requests and include them in project decisions if appropriate – highlighted as an important tool for ensuring open and effective communication with stakeholders and local community members and a great mechanism for keeping open all communication channels. Through consultation, ZeroGen was able to involve one of the landholders in decisions about where to locate some required infrastructure, which turned a more negative stakeholder into a supporter of the project.

7.1.1 Pitfalls

There would appear to be disparity across stakeholders' perceptions regarding the level and visibility of engagement and communication undertaken by the project developer. Some interview participants indicated a definite lack of awareness of any community or public engagement, knowledge of meeting schedules and no knowledge of any advertisements or invitations to meetings. Although this may be negatively interpreted and suggest that community engagement was not a project priority, it may also be that it was not seen as a need or priority within the community.

The lack of planning for competing local events was also a pitfall that could be avoided and worthwhile for other projects to consider. Some of this may be overcome by having a local person on the project team so that they can contribute their knowledge of local events.

7.1.2 Successes

Issues surrounding access to a particularly important key landholder's property were approached in such a way that enable the developer to successfully engage and achieve the desired outcome of gaining access to his property to conduct relevant tests. The engagement process, though not public, was observed and discussed within the community from a distance. The approach used by the developer was seen to demonstrate respect for the landowner and his property. By not attempting to enter the property and meeting the landowner at his property gate, the developer gained the respect and trust of the landowner and his peers.

And so what we did was to make sure that our engagement strategy was in line with my values and their values, and so things like not setting foot on their property without informing them and certainly, we actually got them to pick us up, 'cause he said, "I don't want you on my property, I'll sit down with you and I'll meet you at the gate," and so we met at the gate. And through doing that, we built this really positive relationship with him.

So he came out and walked the country with us and that was really instrumental, because if people knew that given that this is one of the premier properties in the region, they were watching that as a barometer.

As a result, the developer was able to obtain permission to access the property to carry out works related to the project. In addition, the developer negotiated compensation for access to water and for the landowner's services in constructing a road on his property for the project's benefit. The developer also sought input from the landowner regarding the location of a drill pad and pipeline required on the site. The landowner was able to build the drill pad himself and negotiated to retain the pad for his own use once the drill was demolished.

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... We negotiated a deal where we got the landholder who had a bit of a down period to use his machinery and to get his guys involved in building roads, and building the pad.

Why bring in a whole bunch of external contractors when if you've got a D6 lying there and you've got time, you pay that landholder appropriate rates and whatever, and they do it for you, they do a great job and they control their land you see.

Managing the relationships with key stakeholders was also a success. This is best evidenced by the positive and effective response to a council request for repairs to damage to public roads. Following access to a property over a particularly wet period, a contractor substantially damaged a recently graded public road and so ZeroGen was quick to respond and fix the problem.

I can tell you about an incident last week where...and it was to do with ZeroGen. But we had some rain up in the area and some of the contractors or whoever they were doing work for ZeroGen drove out of a property and onto a council road that had, really, it had just been fixed up, graded, this is a gravel road and drove it when it was pretty wet and ruined it. So the people, the ratepayers, rang up us complaining and so we got onto ZeroGen and they've organised for the council to get it fixed and they'll pay the bill.

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Appendix A – Interview guide

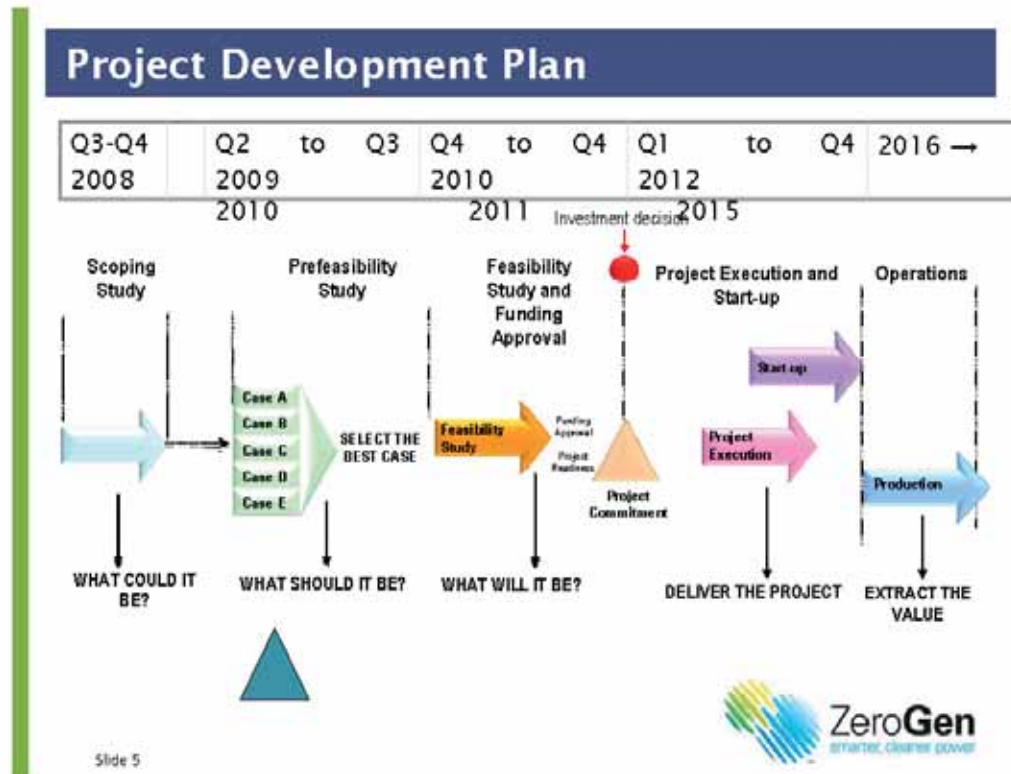
Project: International comparison of public outreach practices associated with large-scale CCS Projects

1. Tell me a little about you, your prior experience and what brought you to the project?
2. *[For those related to project INDUSTRY, GOVERNMENT, RESEARCHERS, ETC]*
What was your specific role in relation to the project XX? Why did you get involved in that role?

OR

[For others in the community: LOCAL COMMUNITY NGOs, OTHERS, ETC]
How and when did you first hear about the project?
3. How would you describe your relationship to the local community?
 - a. If multi-generational, going how far back?
 - b. Do you own/rent/work in the subject community?
 - c. How long have you been in the community?
4. How would you describe/(characterise) the/your local community?
 - a. Close knit, rural, urban, in decay, vibrant, etc. Can you provide some examples that demonstrate this?
5. What do you know about sequestration/carbon capture and storage? What is your level of expertise, experience with CCS (country specific)?
6. Did you know about sequestration/carbon capture and storage before or after learning about the project in your community?
7. What were the benefits that the developers communicated about the project?
 - a. How were they presented?
8. What do you think were the benefits of the project to the/your community?
9. How did the community perceive the benefits?
10. What do you believe were the main questions/issues raised by stakeholders in the community?
11. What is the community perception of the project developer?
12. Was community engagement a project priority? How was the community engaged? What information was presented about the project?
13. Can you think of an event or circumstance when things related to the project and how the public viewed it went very well?
14. Can you think of an event or circumstance when things related to the project and how the public viewed it went poorly?
15. Was there a particular event that marked a change in the level of public acceptance towards the project?
 - a. What happened?
 - b. *[IF INTERVIEWEE IS RELATED TO PROJECT]*
How did you respond?
16. What other information would stakeholders have liked to have heard or seen?
 - a. Were there any unanswered questions?
17. Would you be willing to provide educational background information for the purposes of this research?
18. How long have you lived in the community?
19. Is there any other information you believe might be important to understanding your role in the community?

Appendix B – Project development plans



Source: Morrison, 2009

Appendix C – ZeroGen Media Analysis

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited	
2006	Oct-06	Angus Peacocke	Cleaner coal project for central Qld	ABC News Online	Web	ZeroGen	Central Qld to have clean coal project built using ZeroGen technologies to be located somewhere near Springsure with CO ₂ coming from Stanwell	Gary Humphries, Stanwell Corporation
	Sep-06	Unknown	Shell joins QLD clean coal project	Australian Journal of Mining (ABIX abstracts) Reed International Books Australia Pty Ltd	Web	ZeroGen	Shell to be involved in power plant implementing CCS with ZeroGen to be located near Emerald	n/a
	May-07	Nigel Wilson, Energy writer	Clean coal project fails	The Australian	Web	ZeroGen	Claims by Fed Govt Resources Minister that ZeroGen had failed; disputed by Peter Beattie; ZeroGen failed requirement for Low Emissions Technology Development fund as unable to show commercial viability.	Ian Macfarlane, Resources Minister (Industry, Tourism and Resources Department), Peter Beattie, Queensland Premier
2007	May-07	Andrew Trounson, Infrastructure	Coal sector in big pipeline push	The Australian Nationwide News Pty Ltd.	Web	ZeroGen	Aust Coal Assoc pushing for a national common-user pipeline plan for CCS to support CO ₂ capture via all technologies; some concern over potential length of pipelines	Mark O'Neil, CEO, Australian Coal Association; Peter Cook, CO2CRC
	Sep-07	Unknown	ZeroGen to outline latest on clean coal technology project	The Sydney Morning herald - ABC News Online	Web	ZeroGen	Community meeting in Gladstone re: Update of ZeroGen project.	Chris Wheeler, Project Manage, ZeroGen
	Mar-08	Parnell Sean	Clean-coal project leads world	The Australian	Print	ZeroGen	ZeroGen project details	Tony Tarr (CEO, ZeroGen), Kellie Caught (WWF)
2008	Mar-08	MacDonald Robert	ZeroGen upbeat on future	The Courier - Mail	Print	ZeroGen	ZeroGen financing	Tony Tarr (CEO, ZeroGen)
	Mar-08	Parker Derek	ZeroGen aims to be global first - CLIMATE CHANGE	Weekend Australian	Print	ZeroGen	ZeroGen project	Christine Milne (Greens), Chai McConnell (ZeroGen)
	Apr-08	Unknown	Clean coal developer to brief central Qld communities	ABC News Online	Web	ZeroGen	ZeroGen Announcing of briefs with Central Queensland communities of feasibility study	Chai McConnell

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
2008 Apr-08	Unknown	Councillor airs gas trucking concerns	ABC News Online	Web	ZeroGen	Local Rockhampton councillor concerned about the trucking of gas from Stanwell to Springsure and Emerald. Considers waste gas should be piped as originally planned.	Sandra O'Brien
May-08	Christine Milne	Stuck in the coal age, when the solar century has already begun	ABC News Online	Web	ZeroGen	Clean coal technology prioritised by Govt for funding over other low emissions technology; Clean coal prioritised over solar energy storage research, means tests on solar installs cause industry to fail; where is urgency, more funds to defence then low emissions technology	Wayne Swan; Martin Ferguson
May-08	Orchison Keith	ZeroGen aims to be first with clean coal power	Weekend Australian	Print	ZeroGen	ZeroGen project in Qld	Kelly Thambimuthu (CEO, cLET), Preston Chiaro (CEO, Rio Tinto Energy and Minerals Div)
Aug-08	Peter Rosier, Civil Engineer	Calculations	ABC News Online	Web	ZeroGen	Provides calculations for CO ₂ emissions; sequestration capacity and solar energy	Bureau of meteorology
Aug-08	Hammer Chris	Earlier start for clean coal power	The Age	Print	ZeroGen	ZeroGen moving commercial clean coal date forward	Heather Bridie (ZeroGen), Paul Breslin (ACIL Tasman)
Sep-08	Jessica Darnbrough	Flannery wrong on coal climate response	Australian Mining Reed Business Information	Web	ZeroGen	Michael Roche (Qld Resources Council CEO) flawed by Dr Tim Flannery's ascertains that the Qld Coal Industry has done nothing to address support low emissions technology, citing Calide and ZeroGen and approx \$1B of support going forward.	Michael Roche, CEO Qld Resources Council; Dr Tim Flannery, Palaeontologist
2009 Jan-09	Unknown	Clean coal project 'will fail' under emissions trading scheme	ABC News Online	Web	ZeroGen	Carbon Pollution Reduction Plan ZeroGen failing due to Rudd Government seeking to impose carbon permits; Qld Govt committed \$100M; Kevin Rudd supports; Greg Hunt accuses Commonwealth Government of turning back clean energy on technology	Greg Hunt, Opposition Environment Spokesperson; Professor Ross Garnaut; Martin Ferguson, Resources and Energy Minister
Jan-09	Unknown	Qld mulls wrapping up clean coal project	ABC News Online	Web	ZeroGen	An independent Weller review recommends a study be conducted into whether the ZeroGen project should be handed to the Coal Industry or wound up altogether. Supported by Natural Resources Dept and condemned by Unions	Natural Resources Minister Stephen Robertson; Tony Marr from the Construction, Forestry, Mining and Energy Union

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
2009 Apr-09	Johnstone Craig	State to bail out of clean coal project	The Courier - Mail	Print	ZeroGen	ZeroGen	Weller Review, Stephen Robertson (Energy Minister), Anna Bligh (Qld Premier)
2009 Apr-09	Johnstone Craig	Clean coal idea needs federal cash	The Courier - Mail	Print	ZeroGen	Future of Qld Gov's ZeroGen project	none
2009 Jul-09	Fidelis Rego	Study considers Surat carbon capture scheme	ABC News Online	Web	ZeroGen	Commencing scoping and front-end engineering in Central Queensland	Andrew Dash, Chief Executive
2009 Dec-09	Unknown	Clean coal on way in Queensland	The Northern Star APN Newspapers Pty Ltd	Web	ZeroGen	Qld on track to be clean coal technology world leader, environment assessment initiated, Qld Govt plans to build \$4.2M ZeroGen plant near Gladstone. Construction planned to begin in 2012.	Stephen Robertson, Minister for Mines and Energy
2009 Dec-09	Unknown	Govt funding for a carbon capture plant	The Observer (Gladstone) APN Newspapers Pty Ltd	Web	ZeroGen	ZeroGen short listed for Govt Flagship Funding to be sited close to Gladstone proposing to build IGCC/CCS low emissions coal power plant in central Qld by late 2015. ZeroGen well placed to be first commercial-scale IGCC/CCS plant in the world.	Tony Tarr, CEO, ZeroGen
2009 Dec-09	Mitch Grayson	Funding allows clean coal viability study	ABC News Online	Web	ZeroGen	Federal Government funding \$120m towards viability studies for CCS. With traditional competitors, project needs additional support to be viable.	Tony Tarr, CEO, ZeroGen
2009 Dec-09	Unknown	Pilot plants to test carbon capture viability	ABC News Online	Web	ZeroGen	Funding from Federal Government for testing viability of CCS technology	Martin Ferguson, Energy and Resources Minister
2009 Dec-09	Maria Hatzakis	Union backs clean coal investment	ABC News Online	Web	ZeroGen	Union welcomes Federal Governments decision to invest in clean coal, jobs! Union supports move.	Tony Maher, President, Construction, Forestry, Mining and Energy Union,
2009 Dec-09	Shelley Old	Clean coal project gets 'significant' status	ABC News Online	Web	ZeroGen	Project declared a "Significant Project" requiring EIA. Hinchliffe notes Qld on track to be world leader in technology.	Stirling Hinchliffe, Minister for Infrastructure and Planning
2010 Apr-10	Sam Burgess	Search on for greenhouse gas storage sites	ABC News Online	Web	ZeroGen	Qld Govt asking for tenders to explore potential underground storage sites for GHG from coal-fired power stations. A mapping exercise only, plenty of issues to address including environmental impacts and existing property rights for surface use of land. 20 years before tech operable. AgForce president unsure if tech is safe for underground water resources, John Cotter stated his objections firmly.	Stephen Robertson, Mines and Energy Minister; John Cotter, AgForce President

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Jan-10	Unknown	Power station on cards for CQ	Central Queensland News APN Newspapers Pty Ltd	Web	ZeroGen	EIA starts Feb 2010, poss construction of power plant either Dingo, Blackwater or Comet (poss options); possible jobs creation to result; Mitsubishi joins project; has proven tech no longer need to demonstrate; Stanwell 2012 now shelved, econ blow to Rocky; should benefit however with new siting; pre-feasibility study findings will determine final site.	n/a
Apr-10	Unknown	Natural resources expo	Central Queensland News APN Newspapers Pty Ltd	Web	ZeroGen	NRM Expo at Emerald Showgrounds draws students to learn about natural resources and their uses. Representatives from industry, research and other organisations, including ZeroGen would be present with interactive displays on show.	Sue Sands, NRM Expo Spokesperson
Jan-10	Unknown	Australia construction report: detailed analysis of the Australia infrastructure sector	M2 Presswire Normans Media Ltd	Web	ZeroGen	Mitsubishi joins ZeroGen, signed a \$3.4B agreement under which Mitsubishi will conduct a feasibility study for 530MW (gross) power plant for commercial operation by Sept 2015. Contract signed 22 June 2009.	n/a
Jan-10	Keith Orchison	ZeroGen busy pursuing carbon sequestration --- PUBLIC SECTOR	The Australian Nationwide News Pty Ltd.	Web	ZeroGen	ZeroGen received support from fed govt announced grant short-list. Being a Fed election year, CCS projects support highly controversial in Qld, Greens are striving to win a Senate seat, call process a "scam" pandering to mining industry and unions, will not stand up to rigorous testing; Copenhagen refused clean coal in green energy projects funding scheme.	Michael Roche, CEO Qld Resources Council; Stephen Robertson, Qld Energy Minister; Tony Tarr, CEO, ZeroGen; Martin Ferguson, Resources Minister
Jan-10	Adrian Taylor	Clean coal a maybe for CQ	The Morning Bulletin (Local Rockhampton News)	Web	ZeroGen	Environmental impact study for Central Qld. Project joined by Mitsubishi Heavy Industries (Japan), no long require demonstration as Mitsubishi already proved the technology in Japan. New site towards Springsure no longer Stanwell, economic blow to Rockhampton.	Federal Minister for Resources, Martin Ferguson, Queensland Resources Council
Feb-10	Unknown	Govt wants to hear about cleaner coal	The Morning Bulletin APN Newspapers Pty Ltd	Web	ZeroGen	State Govt seeks feedback on draft terms of reference on environmental investigations on ZeroGen proposal. If approved generate 2000 construction jobs and Qld become world clean coal technology leader. ZeroGen first in world to build commercial scale power plant with CCS if technology proved. Construction due commence 2012 for operation in 2015.	Stirling Hinchcliffe, Minister for Infrastructure and Planning

MM/YY	Author	Title	Publication /Source	Media	Company	Focal Topic	Evidence/Expert cited
Feb-10	Unknown	BRIEFS	The Morning Bulletin APN Newspapers Pty Ltd		ZeroGen	State govt seeking feedback on terms of reference.	n/a
Mar-10	Unknown	EIS terms endorsed	The Observer (Gladstone) APN Newspapers Pty Ltd	Web	ZeroGen	ZeroGen terms of reference on environmental investigation endorsed by Gladstone Regional Council during the week.	Craig Butler, Gladstone Regional Council spokesperson (development)
Mar-10	Unknown	Banana council slams influence of big developers	Central Telegraph APN Newspapers Pty Ltd	Web	ZeroGen	Banana Shire Council raise issue regarding ZeroGen project not adhering to State Govt discussion paper on sustainable development of land resources, including competing land uses, to ensure balanced outcomes. Considers developers had too much influence at state policy level that had created conflict with agricultural use of land, particularly acquisition of land. Concerned over meeting held only the day before submissions due.	Cr Vaughn Becker, Banana Shire Council; Matthew Glover, Development and Environmental Services Director
May-10	Kerrie Sinclair	Left in the dark on solar	The Courier-Mail Nationwide News Pty Ltd.	Web	ZeroGen	Compares current financial support low emissions technologies such as clean-coal plants as opposed to solar plants. \$15M committed to solar plant projects (8 in total with 2 plants to win a third funding from state); whilst NSW has committed \$120M, Victoria \$100M plus a further \$50M for Silex Systems to build near Mildura. No large scale solar plant plans for Qld but \$300M committed to develop clean-coal power stations.	Anna Bligh, Queensland Premier; Stephen Robertson, Queensland Energy Minister
Apr-10	Kerrie Sinclair	Carbon plan just hot air - US study says Australia is headed in wrong direction	The Courier-Mail Nationwide News Pty Ltd.	Web	ZeroGen	Cites Houston Universities findings that one small coal-fired power plant would require a small USA state sized reservoir to store carbon produced by it. CCS not practical. UCL called for Australia to rethink CCS. "(CCS) is potentially a dangerous diversion, soaking up time, resources and funding that could be better and more readily applied to achieving a low carbon future." Cites Fed and Qld State govt investment into technology.	Michael Economides, Professor of Chemical and Biomolecular Engineering, Houston University; Stefaan Simons, Professor of Chemical Engineering and Director of UCL's Centre for CO2 Technology, University College London



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