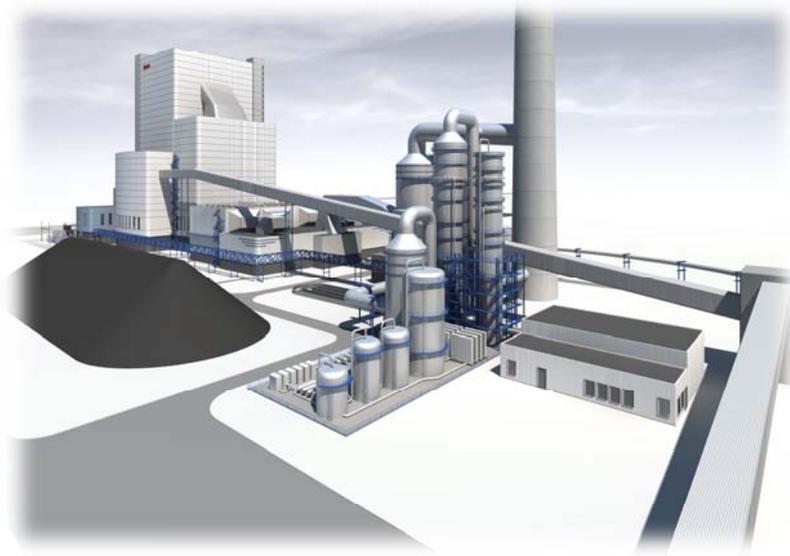


Permitting Process

Special Report to the Global Carbon Capture and Storage Institute



Maasvlakte CCS Project C.V.

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The permitting process
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Executive Summary

ROAD is the Rotterdam Opslag and Afvang Demonstratieproject (Rotterdam Capture and Storage Demonstration Project) and is one of the largest, integrated Carbon Capture and Storage (CCS) demonstration projects in the world. The main objective of ROAD is to demonstrate the technical and economic feasibility of a large-scale, integrated CCS-chain.

ROAD applies post combustion technology to capture the CO₂ from the flue gases of a new 1,100 MWe coal-fired power (Maasvlakte Power Plant 3) in the port and industrial area of Rotterdam. The capture unit has a capacity of 250 MWe equivalent and aims to capture 1.1 million tonnes of CO₂ per year. The capture installation is planned to be operational in 2015.

The captured CO₂ will be transported through a pipeline: 5 kilometres over land and 20 kilometres across the seabed to the P18-A platform in the North Sea. The pipeline has a transport capacity of around 5 million tonnes per year. ROAD plans to store the captured CO₂ in depleted gas reservoirs under the North Sea. These gas reservoirs are located in block P18 of the Dutch continental shelf, approximately 20 kilometres off the coast. The depleted gas reservoirs are at a depth of around 3,500 meters under the seabed of the North Sea and have an estimated storage capacity of approximately 35 million tonnes.

The ROAD project has dedicated Permitting and Regulatory Affairs Officers respectively focusing on the coordination (internal and external) of the overall permitting process and on the active follow-up of the relevant regulatory framework on EU and national levels. Integration of those functions into the project team strengthens a multidisciplinary perspective of the organization and creates cross-functional teams.

The key lessons learned from the permitting process have been:

- An open process between the applicant and the relevant authorities, in which the first findings are shared, is important to maintain the momentum of the (permitting) process.
- A prerequisite for the success of the project is that the authorities feel involved in the project.
- The Ministry of EA&I, despite its initial reluctance, was a big help in coordinating the permitting stakeholders and showing them that the project has national relevance. Wherever a National Coordination Scheme is present, make use of it for this kind of projects involving multiple permitting stakeholders. Nevertheless, as initiator it is important to stay involved in coordinating the permitting authorities.
- Permitting authorities not only want to be informed on procedures, but also on contents, as early as possible. Convene early with the permitting authorities to discuss matters as a) how many commentary rounds should be included in the permitting process; b) what points are relevant for them; c) who will be contact person and d) how information exchange will take place. This builds up mutual commitment and trust.
- Make sure your contact persons at the permitting authorities are committed and accountable. Some of the delay in this project was caused by contact persons who did not have enough time or knowledge to assess the permitting documents. Make sure the project has the support at their manager's level so you could lobby for more dedicated contact persons if necessary. Demand that the coordinating permitting authorities use their power and responsibility to address lagging permitting authorities so the process is not held up by them.
- Keep the project under time pressure as to keep the authorities focused and meet regularly to be able to address issues as they evolve. Build up mutual commitment and accessibility of the authorities to enable tackling issues in between meetings over the phone or by e-mail.

- Showing that the project does everything within its power to reach the deadlines. It is hence important to take the initiative in all meetings, while keeping everybody involved, but also support authorities with technical help to fulfill their obligations. Finally, accept that the authorities take the safe route as accuracy is more important than speed.
- Technical information lacking at early stage. The FEED study for the project was completed in an early stage. However, not all technical (detailed) information (on emissions) was available. Because this is the first time a large scale CCS project is designed, there are few standards available (pilots give some information but are not always trustworthy for scale-up). This means that it is difficult to fill in permit applications early in the procedure. It would be more pragmatic to get permits and being allowed to adjust later on, within established limits.

The key lessons learned from the regulatory process have been:

- Close cooperation with authorities and regulators in an early stage of the project is essential due to the complexity of CCS regulation. CCS legislation is new so the process needs to be developed from scratch.
- For a CCS project it is important that authorities and regulators are proactive and take their responsibilities regarding CO₂-storage. Issues should be addressed in a coordinated way, in order to avoid a significant delay of the legislative and regulatory process.
- Without an open and flexible regulatory approach it is very unlikely that CCS demonstration projects will be developed.
- Often a specific legal and regulatory framework on capture, transport and storage technologies is missing or in development: this demands pro-activity, flexibility and close interaction with regulators and authorities. Managing expectations of stakeholders and developing a clear project vision are a prerequisite in that regard.

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1. Introduction

In July 2009, Maasvlakte CCS Project C.V. ('MCP') submitted its project proposal to the European Commission, to apply for funding under the framework of the European Energy Program for Recovery ('EEPR'). This marked the start of the 'ROAD project' ('Rotterdam Opslag en Afvang Demonstratieproject'; Rotterdam Storage and Capture Demonstration project).

Because the ROAD project is the first of its kind in The Netherlands, applying for all the necessary permits is one of the most challenging part of the project. CCS projects face complex and time consuming permitting processes, linked to the implementation of the European CCS Directive and the wide range of permitting authorities to deal with. Also, because of funding requirements, time is limited to obtain all the definitive permits before the Final Investment Decision (FID) date.

In this report, the permitting process of the ROAD project is first described and then evaluated, starting with the description of current legal and regulatory frameworks to the specific evaluation of the ROAD's permitting process approach. This report aims to help similar projects (CCS projects using post combustion capture technology) to identify the attention points and needed conditions to get a successful permitting process. Note that this report describes the ROAD permitting process as it was in October 2011.

The structure of this report is as follows:

- The project factsheet, providing a high level overview of the ROAD project, is presented in chapter 2.
- Chapter 3 to 5 start with the description of the current legal and regulatory frameworks for CCS in The Netherlands, from capture to storage.
- Chapter 6 handles topics specific to CCS and/or the ROAD project, including ROAD's permitting approach and permitting hurdles.
- Chapter 7 summarizes key permitting lessons learned and experiences acquired by ROAD

This report is part of the knowledge to be shared under the Funding Agreement between the Global Carbon Capture and Storage Institute ('Global CCS Institute') and Maasvlakte CCS Project C.V.

2. Project factsheet

2.1 Project Overview

ROAD is the **R**otterdam **O**pslag and **A**fvang **D**emonstratieproject (Rotterdam Capture and Storage Demonstration Project) and is one of the largest integrated Carbon Capture and Storage (CCS) demonstration projects in the world.

2.1.1 Project objectives

The main objective of ROAD is to demonstrate the technical and economic feasibility of a large-scale, integrated CCS-chain. In the power industry, to date, CCS has primarily been applied in small-scale test facilities. Large-scale demonstration projects are needed to show that CCS is an efficient and effective CO₂ abatement technology within the next 5 to 10 years. With the knowledge, experience and innovations gained by projects like ROAD, CCS could be deployed on a larger and broader scale: not only on power plants, but also within energy intensive industries. CCS is one of the transition technologies expected to make a substantial contribution to achieving climate objectives.

2.1.2 Partners

ROAD is a joint project initiated by E.ON Benelux N.V. and Electrabel Nederland N.V. (GDF SUEZ Group). Together they constitute the limited partnership Maasvlakte CCS Project C.V. The intended partners of ROAD are GDF SUEZ E&P Nederland B.V. for the CO₂ transport and TAQA Energy B.V. for the CO₂ injection and permanent storage. The ROAD project is co-financed by the Government of the Netherlands, the European Commission within the framework of the European Energy Programme for Recovery (EEPR) and the Global CCS Institute.

2.1.3 Project specifications

ROAD applies post combustion technology to capture the CO₂ from the flue gases of a new 1,070 MWe coal-fired power (Maasvlakte Power Plant 3) in the port and industrial area of Rotterdam. The capture unit has a capacity of 250 MWe equivalent and aims to capture 1.1 million tonnes of CO₂ per year. The capture installation is planned to be operational in 2015.

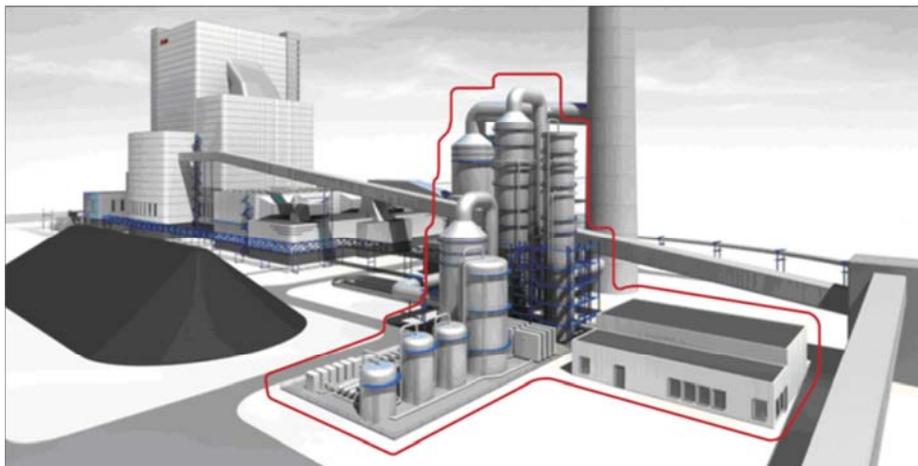


Location of the ROAD project CCS chain: Rotterdam port and industrial area and North Sea



Location of the capture unit: Maasvlakte Power Plant 3 (photo: E.ON)

From the capture unit the CO₂ will be compressed and transported through a pipeline: 5 kilometers over land and 20 kilometers across the seabed to the P18 platform in the North Sea. The pipeline has a transport capacity of around 5 million tonnes per year. It is designed for a pressure of 175 bar and a maximum temperature of approximately 80 °C.



250 MWe capture unit (post-combustion)

ROAD plans to store the captured CO₂ in depleted gas reservoirs under the North Sea. These gas reservoirs are located in block P18 (P18-6, P18-4 and P18-2) of the Dutch continental shelf, approximately 20 kilometers off the coast. The depleted gas reservoirs are at a depth of around 3,500 meters under the seabed of the North Sea. The CO₂ will be injected from the platform into depleted gas reservoirs. The estimated storage capacity is approximately 35 million tonnes.

2.1.4 Rationale for Rotterdam port and industrial area

The Rotterdam port and industrial area have a number of advantages that create favorable conditions to implement a CCS demonstration project like ROAD. The Rotterdam port and industrial area have many CO₂ point sources. Several new power stations prepared for the application of CCS (capture ready) are under construction. The Port of Rotterdam is relatively close to a large number of (almost) depleted gas reservoirs on the continental shelf under the North Sea, allowing for a small transport distance. These gas reservoirs meet the physical and geological properties for CO₂ storage and will become available in the next few years (from 2014 onwards). The Netherlands has a lot of knowledge and experience with both oil and gas extraction and storage of gas in aquifers and gas reservoirs. In addition, the complete CCS-chain is remote from residential areas.



P18-A platform at the North Sea (photo: TAQA)

2.1.5 Facts & Figures

Base installation: E.ON Maasvlakte Power Plant 3 (Rotterdam, The Netherlands)

- Output : 1.070 MWe
- Efficiency : 46%
- Operational : End 2012
- Capture ready

Capture Plant

- Technology : Post-combustion
- Capacity : 250 MWe equivalent
- Capture rate : 90%
- CO₂ captured : ~ 1.1 megatonnes / year
- Operational : 2015

Transport

- Pipeline
- Diameter : 16 inch
- Distance : 5 km onshore, 20km offshore
- Capacity : Gas phase : 1.5 megatonnes/year
Dense phase : 5 megatonnes/year
- Design specifications : 175 bar, 80 °C

Storage

- Depleted gas reservoir : P18
- Operator : TAQA
- Depth : 3,500 meters
- Estimated capacity : ~ 35 megatonnes
- Available : 2014

2.1.6 Planning

The high level schedule of the ROAD project is as follows:

14 July 2009	:	Application submitted for funding under European Energy Programme for Recovery
September 2009	:	Project selected for funding by European Commission
May 2010	:	Ministerial order Dutch funding published
	:	Grant Agreement signed by European Commission and ROAD Project
September 2010	:	Front-End Engineering Design studies Capture Plant completed
	:	Starting note Environmental Impact Assessment published
June 2011	:	Submitting Environmental Impact Assessment, permit applications
Q4 2011	:	Final Investment Decision
Q4 2011	:	Start execution phase (procurement, construction, etc.)
2014	:	CCS chain mechanically complete
2015	:	Start of operation CCS chain
2015-2019	:	Demonstration operation phase CCS chain
2020	:	Start commercial operation CCS chain

2.2 Maasvlakte CCS Project C.V.

The initiating parties of the ROAD project are E.ON Benelux and Electrabel Nederland / GDF SUEZ Group. Together they constitute the limited partnership Maasvlakte CCS Project C.V.

2.2.1 E.ON Benelux

E.ON Benelux concentrates on the production and supply of electricity and gas to private customers and business customers in the Netherlands and Belgium. E.ON Benelux is primarily an electricity-generating company; the company can trade internationally and has its own professional sales organisation. The company was established in 1941 and since 2000 has been part of E.ON Energie AG. E.ON Benelux's power stations with a total capacity of 1,850 MW are located in the province of South Holland, the economic heart of the Netherlands. The company has approximately 600 employees. E.ON Benelux is based in Rotterdam.

2.2.2 Electrabel Nederland

Electrabel Nederland is a leading player in the Dutch energy market and part of the GDF SUEZ Group. With six state-of-the-art production locations and a total capacity of 5,103 MW Electrabel is the largest electricity producer in the Netherlands. Electrabel is a supplier of electricity and gas to both private and business customers. Electrabel Nederland has 1,250 employees.

2.3 Intended Partners

Intended partners of Maasvlakte CCS Project C.V. are GDF-SUEZ E&P Nederland B.V. for the CO₂ transport and TAQA Energy B.V. for the CO₂-injection and the permanent storage under the sea bed of the North Sea.

TAQA Energy

TAQA Energy is part of the Abu Dhabi National Energy Company PJSC (TAQA), an energy company that has worldwide interests in power generation, combined heat and water, desalination, upstream oil & gas, pipelines, services and structured finance. TAQA has a workforce of 2,800 employees and is located in Abu Dhabi, The Hague, Ann Arbor: Michigan, Aberdeen, Calgary and Amsterdam. In addition, TAQA has sustainable partnerships with companies in Africa, the Middle-East, Europe, North-America and India. TAQA is listed at the Abu Dhabi Securities Exchange (ADX).

In the Netherlands, TAQA Energy explores and produces gas and condensates from wells located onshore in the Alkmaar region and offshore in the Dutch North Sea. TAQA also operates a gas storage facility in Alkmaar and has interests in Dutch North Sea pipelines. 200 people work for TAQA directly and indirectly in the Netherlands both onshore and offshore.

GDF SUEZ E&P Nederland

GDF SUEZ E&P Nederland is one of the largest operators in the Dutch sector of the North Sea. With more than thirty production platforms and 300 employees, it is at the basis of the provision of energy to the Netherlands and several other countries.

Since its first successful drilling results in the Dutch North Sea, approximately forty years ago, GDF SUEZ E&P Nederland has grown into a leading operator. It has ample expertise and experience, always chooses the safest option and is continuously working towards the development of new techniques and improved methods. Continuity is ensured through exploration, takeovers and acquisition.

2.4 Financial contributors

The ROAD project is co-financed by the European Commission within the framework of the European Energy Programme for Recovery (“EEPR”), the Government of the Netherlands and the Global CCS Institute.

In response to the economic crisis, the European Council and the European Parliament adopted the Commission proposal for a European Energy Programme for Recovery (“EEPR”) in July 2009. The EEPR funds projects in the field of gas and electricity infrastructure as well as offshore wind energy and CO₂ capture and storage (CCS). In total 12 CCS projects applied for assistance under the EEPR. In December 2009, the European Commission granted financial assistance to six projects that could make substantial progress with project development in 2010. These projects will receive overall funding of € 1 billion under the EEPR.

3. The current legal and regulatory framework - general

This chapter covers the general legal and regulatory framework that applies to the entire project.

The ROAD project is the first in the Netherlands to deliver knowledge and experience from a fully integrated CCS chain. The experiences and lessons that can be drawn from this process are described in the relevant sections below. In addition, on 14 June 2011 ROAD organized a workshop on stakeholder management during the ROAD project. During this workshop the following key lessons and experiences were formulated, amongst which:

Experiences and key lessons learned:

- An open process between the applicant and the relevant authorities, in which the first findings are shared, is important to maintain the momentum of the (permitting) process.
- A prerequisite for the success of the project is that the authorities feel involved in the project.

3.1 The European CCS Directive

The European CCS Directive is part of the European Union's Climate Policy meant to limit the emissions of CO₂ in the atmosphere and to store the captured CO₂ permanently underground¹.

Regarding the capture of CO₂, the Directive stipulates that new combustion plants with a capacity higher than 300 megawatts have enough space to capture and compress CO₂ if suitable storage sites are available and if transport networks and modernization of the plant in order to capture CO₂ are technically and economically feasible ('capture readiness' requirement). Moreover, regarding the transport of CO₂, the Directive provides rules for access to the CO₂ transportation network and the quality of the CO₂ to be transported. Further, the Directive sets out requirements for the application, procedure and content of the storage permit. Finally, the Directive contains provisions regarding the transfer of responsibility for the stored CO₂ to the Competent Authority after the end of the CO₂-storage procedure.

The CCS Directive has been implemented in the Dutch Mining Act, the Mining Decree and Mining Regulation². With a view to the implementation of the CCS Directive, the key question was whether the Directive would be implemented as-is or whether the Dutch Government would add national CCS provisions to the legislative proposal. The Directive gives a general regulatory framework to ensure permanent containment of CO₂ and, where this is not possible, eliminate possible negative effects and any risk to the environment and human health. The Directive also introduces several key elements such as a monitoring plan, financial security provisions, provisions for the handover of responsibility and the financial mechanism, but only gives a high-level description of these elements. The interpretation of these elements is up to the Member States.

The EC Guidance Documents for the implementation of the CCS Directive gave no sufficient clarity and are primarily applicable on storage in aquifers. More importantly, the final versions

¹ Directive 2009/31/EG of the European Parliament and the Council from 23 April 2009 concerning the geologic storage of carbon dioxide and the change of Directive 85/337/EEG of the Council, Directive 2000/60/EG, 2001/80/EG, 2004/35/EG, 2006/12/EG and 2008/1/EG and Regulation (EG) nr. 1013/2006 from the European Parliament and the Council.

² *Parliamentary Papers I*, 2010/2011, 32 343, A.

of the Guidance Documents were not published yet when the Dutch legislative proposal was drafted and discussed in Parliament. The Dutch Minister of Agriculture, Economic Affairs and Innovation decided to implement the Directive in its entirety with no additional national provisions or any further interpretation of the key elements (monitoring plan etc.). In fact, the legislative proposal was an almost literal translation of the English-language Directive. Most stakeholders agreed with this open and flexible legislation. ROAD fully endorsed this approach because each CCS project has its own specific characteristics and in order to have a proper assessment of a project proposal, a tailor-made approach is essential. The requirements for the storage of CO₂, set by the Government, should be based upon the specific characteristics of each storage site. This means that the key elements of the CCS Directive will be mainly addressed in the storage permit.

Experiences and key lessons learned:

- For the regulatory affairs team, operating with caution in the early stages of the project is essential due to political aspects of CCS and the complexity of CCS regulation. CCS legislation is new and needs to be drafted from the start and approved by Parliament.
- Without open and flexible legislation (tailor-made approach) it is very unlikely that CCS demonstration projects will be developed.

The legal requirements that the ROAD project must comply with as a result of the changes in the Mining Act, Mining Decree and Mining Regulation will be described in Section 5.3.

3.2 European Emission Trading System (EU-ETS)

Emission trading is trading in emission rights (see the Box: European Emission Trading System for an explanation).

Box: European Emission Trading System

European Emission Trading System

In the Kyoto Agreement (1997), industrialized countries agreed to reduce the emissions of greenhouse gases. In the EU, a CO₂ emission trading system came into force on 1 January 2005. Each industrialized country has an emission ceiling. Based on the national space for greenhouse gas emissions, companies were also assigned emission rights. The companies can trade the rights: a company that takes measures that result in not fully using all of its emission space can sell the unused emission rights to others. Starting in 2013 emission rights will no longer be assigned, but will be auctioned. This market instrument could make it worthwhile to take measures against climate change, including storing CO₂ instead of emitting it.

The entire ROAD project must fulfill the requirements of the European Emission Trading System (EU-ETS). This applies to the capture installation as well as the transport network and the storage location. Each of these installations, networks and locations must have a CO₂ emission permit from the moment that it is operational. In order to receive a CO₂ emission permit, a CO₂ monitoring plan needs to be submitted to the competent authority. In broad strokes, a CO₂ monitoring plan includes the following:

- Determination of the yearly CO₂ emissions;
- Compilation of a yearly emission report (measurement, recording and reporting);
- Validation activities (e.g., calibrating the instruments);
- (Internal) quality assurance.

The capture of CO₂ means that the emitting party has to purchase fewer emission rights. If CO₂ leaks (from any part of the chain), then it needs to be monitored until no further leakage can be detected. A leak leads to the handover of emission rights.

Box: Emission Permit Procedure

Emission Permit Procedure

For the three emission permits (capture, transport and storage), the uniform public preparatory procedure under Section 3.4 of the General Administrative Act needs to be followed. The applicant must prepare a monitoring plan before submitting the application. After the application and the monitoring plan have been submitted, the competent authority, the Dutch Emission Authority, grants a draft permit. For a period of six weeks, any person or qualified organisation can submit comments regarding the draft permit. After the competent authority assessed the comments, the authority grants the final permit. The time for the entire procedure, from the submission of the application to the granting of the final permit, is six months.

The final permit can be appealed by affected parties to the Administrative Division of the Council of State. The total appeal process can last about a year and a half to two years.

3.3 Environmental Impact Assessment for the required permits

Before certain government decisions concerning the implementation of environmentally sensitive activities, such as permitting, can be adopted, the Environmental Management Act requires that an Environmental Impact Assessment (EIA) is carried out³. The EIA was prepared according to the the EIA Decree applicable at the time. The following EIA activities relevant to the ROAD project are described⁴.

Table 1: Overview of decisions requiring an EIA during the ROAD project

EIA Decree Category	Activity Requiring EIA	ROAD Project	Decision
C 22.1	The construction, change or expansion of a facility meant for the production of electricity, steam or warmth, with a thermal capacity of 300 or more megawatts	Capture facility with a thermal capacity of more than 300 megawatts	All-in-one permit for physical aspects Water Permit
C 5.3	The construction of facilities or buildings in, on or above the seabed, or under the seabed where the activity has an area of 1 ha or more	The construction of a pipeline on and in the seabed– over a length of more than 1 km through the dunes and in the sea – with an area of more than 1 ha	Water Permit
C 18.5	The building of a facility meant for the dumping or underground placement of non-dangerous waste, where 500,000 or more cubic meters of non-dangerous waste shall be dumped or stored	Storage of 1.1 million tonne of CO ₂ per year, injected into reservoirs	All-in-one permit for physical aspects Storage Permit

³ Through systematic and objective research, the expected environmental effects of the designated activities can be determined. The information collected for the EIA helps ensure that the environmental impacts are not undervalued compared to other interests in the decision making.

⁴ The EIA Resolution has been amended on 1 April 2011. The activities from categories C 5.3 and C 18.5 no longer require an EIA due to this amendmend.

The environmental impact for the capture, transport and storage of CO₂ have been assessed in the EIA. For a description of the EIA procedure, please see the Box: EIA Procedure.

Box: EIA Procedure

EIA Procedure

1. Announcement of the Project and Notice of Scope and Level of Detail

The draft Notice of Scope and Level of Detail was drawn up by the applicant, after which the competent authority draws up the Notice of Scope and Level of Detail. This document describes which alternatives are possible for the operation, which impacts it could have on the environment and how these impacts will be researched in the EIA.

2. Notice

The competent authority gives notice that the decision is being prepared and announces the public consultation for the Notice of Scope and Level of Detail.

3. Consultation and Advice on the Notice of Scope and Detail.

The competent authority consults the governmental agencies and advisors who should be involved in the scope and level of detail of the EIA. The Notice of Scope and Level of Detail was available for inspection on 24 September 2010.

The consultation in this phase was meant to gain insight into the affected parties' ideas of what should be studied in the EIA. The Notice of Scope and Level of Detail and the comments from the consultation were submitted to the Commission for EIAs ('Commissie-m.e.r.' in Dutch). The Commissie-m.e.r. is composed of independent experts in different disciplines. This commission submitted advice to the Authority on the content of Advisory Scope and Level of Detail for the composition of the EIA.

4. Advisory Scope and Level of Detail

The appropriate authority, on the basis of the consultation comments and the opinion of the Commissie-m.e.r., established the Advisory Scope and Level of Detail of the proposed EIA. This document states which alternatives and which environmental themes and impacts must be covered in the EIA. The Authority took the advice and incorporated it into the Notice of Scope and Level of Detail. This Notice was given in January 2011.

5. The Environmental Impact Assessment (EIA)

The applicant then draws up the EIA; there is no time limit for this procedure. The point of departure for the EIA is the Advisory Scope and Level of Detail. The EIA is submitted to the competent authority.

6. Publication of the EIA and Request for the Draft Decision

The competent authority publishes the EIA and the request for the draft decision and opens both for comments.

7. Consultation

The EIA is open for comments for six weeks. Commenters have the possibility to react in writing to the quality and completeness of the EIA.

8. Advice of the Commissie-m.e.r.

The Commissie-m.e.r. assesses the EIA on completeness and quality and submits an opinion to the competent authority. In the ROAD project, the Commissie-m.e.r. also submitted a (positive) interim assessment in May 2011. The applicant incorporated remarks from that assessment in the EIA.

9. Decision

When the EIA process is completed successfully, the competent authority gives its decision on the project and the conditions under which the project may be start.

10. Evaluation of the Environmental Impact after Completion

The decision contains an evaluation procedure, which was begun by the applicant in the EIA. It is assessed during and after the completion of the project whether the environmental impacts remain within the limits given in the decision. It is customary to publish the results of these evaluations in an evaluation report.

4. The current legal and regulatory situation: capture

This chapter covers the law and regulations that are applicable to capture. The permits needed for the capture facility are not described in Section 4.1 of the National Coordination Scheme. This means that each permit needs to be separately applied for and follow its own procedure.

4.1 All-in-one permit for physical aspects

Environment

The MPP3 will be an ultramodern power plant with a total electrical capacity of about 1,070 MWe. It will burn coal and secondary fuel sources (biomass).

In generating electricity, gases are released that contain combustion products, including CO₂, a known greenhouse gas. In the existing facility, this CO₂ will be released untreated into the atmosphere. The ROAD project will capture the CO₂ and permanently store it under the sea floor, which will contribute to the reduction of the greenhouse effect. The flue gases from the power plant are partially made up of CO₂. To most efficiently capture this CO₂ from the gases, a technical process is needed in the capture facility. The facility discussed here will be in the E.ON facility on the eastern side of the MPP3.

The capture activities are not covered by the existing all-in-one permit for physical aspects for the production of power in the MPP3. To make the capture facility as environmentally sound as possible, the General Environmental Conditions Act ('Wabo' in Dutch) requires an amendment to the existing all-in-one permit for physical aspects. The recently requested all-in-one permit for physical aspects – environmental permission, for the ROAD project will fall under this amendment.

Building

The capture installation falls under the current designation 'Utility' in the zoning plan 'Maasvlakte 81' of the City of Rotterdam. This means that the planning situation does not need to be changed before the building of the capture facility. An all-in-one permit for physical aspects – construction permission, is required by the 'Wabo' for the construction of buildings⁵. The capture facility is a building and therefore requires an all-in-one permit for physical aspects.

Box: Wabo procedure

Wabo Procedure

Both the environment and building sections of the all-in-one permit for physical aspects for the capture facility follow the expanded procedure according to the Wabo. After the request is submitted, the appropriate authority, in this case the Province of Zuid-Holland, holds a consultation for the draft environmental permit. For six weeks, any person can submit comments regarding the draft all-in-one permit for physical aspects. The final all-in-one permit for physical aspects is then granted by the authority. The time for the procedure, including the draft phase and until the final all-in-one permit for physical aspects is granted, is six months, with one possible extension of six weeks. The final all-in-one permit for physical aspects can be brought before the courts by affected parties and appealed to the Administrative Division of the Council of State. The total appeal process can last one and a half to two years.

⁵ According to the model ordinance of the Association of Dutch Municipalities, a building is, "Any construction of any size made from wood, stone, metal or another material, that in the designated place, is in direct or indirect contact with the ground, is directly or indirectly supported in or on the ground, and is meant to function in that place."

Experiences and key lessons learned:

- The General Environmental Conditions Act came into effect on 1 October 2010. This Act introduces a single permit application for all actions taken in the environment. The Act also introduced digital submission of permit applications through a web-based service (the 'online environmental desk'). Since both ROAD's consultants and the authorities had previously only worked with both the Act and the web-based service in a controlled environment or during courses, there were a number of ambiguities in the Act and bugs in the web-based service to be resolved.

4.2 Water Permit

Cold water will be used in the capture process to cool the freed gases. The water needed will be taken from the Europe Port via the existing cool water supply pipe for the MPP3. The warmed water will be discharged via a new separate pipe and released with the cooling water from MPP1, MPP2 and MPP3 into the Princes Margriet Port (Maasvlakte 2).

For operations in water systems such as the release of materials into a water body, the Water Act requires a water permit. For the discharge of heat and a small amount of non-environmentally damaging substances from the capture facility, a water permit is therefore required.

Box: Water Act

Water Permit Procedure

For the water permit for the discharge of cooling water, the uniform public preparation procedure under Section 3.4 from the General Administrative Act applies. After the request is submitted, the appropriate authority, the Ministry of Infrastructure and Environment, holds a consultation for the draft water permit. For six weeks, any person can submit comments regarding the draft water permit. The final water permit is then granted by the authority. The time for the procedure, including the draft phase and until the final water permit is granted, is six months.

The final water permit can be brought before the courts by affected parties and appealed to the Administrative Division of the Council of State. The total appeal process can last one and a half to two years.

Experiences and key lessons learned:

- The Water Act contains a coordination clause that provides for a coordinated application for the water permit and the environmental permit described in Section 3.1⁶. Under the Wabo, the coordination is not (yet) arranged for the digital application form, which means that agreement must be reached between the two authorities for both permits.

4.3 Nature Protection Act 1998 permit

Two European Directives, the Bird Directive and the Habitat Directive, help to protect Europe's most important natural assets⁷. Among other provisions, special areas are designated as protected. Together, these areas, known as Bird and Habitat Directive Areas, form the Natura 2000 network. The special areas are also known as Natura 2000 areas.

The legal protection of the Natura 2000 areas is regulated by the Nature Protection Act 1998. Any actions or projects in or near a Natura 2000 area that have a negative impact on the

⁶ Article 6.27 of the Water Act.

⁷ Directive 1997/409/EEG from the Council from 2 April 1997 on the conservation of wild birds (*PbEG* 1997, L 103) and Directive 1992/43/EEG from the council from 21 May 1992 on the conservation of natural habitats and wild flora and fauna (*PbEG* 1992, L 206).

conservation objectives of that area require a Natural Protection Act 1998 permit (in Dutch, 'Nbw 1998' permit).

The procedure wherein the CO₂ will be removed from the gases uses materials that include N-connections (e.g., amines, such as MEA). These materials will be reused within the capture facility. A very small amount will remain in the gases and be deposited via atmospheric deposition into sensitive areas within the nearby Natura 200 areas of Westduinpark & Wapendal, Solleveld & Kapittelduinen, Voornes Duin, Duinen Goeree & Kwade Hoek and Voordelta (dune and delta habitats).

As a result of the atmospheric deposition of N-connections, the conservation objectives of the natural values of the aforementioned Natura 2000 areas will be negatively affected, which means that an Nbw 1998 permit is needed.

Box: Nature Protection Act 1998 Procedure

Nature Protection Act 1998 Procedure

The procedure for the Nbw 1998 permit begins with an application which the appropriate authority, in this case the Province of Zuid-Holland, must process within 13 weeks, with one possible extension of 13 weeks. Affected parties can object to the final Nbw 1998 permit. Subsequently they can appeal to the Administrative Division of the Council of State. The total appeal process can last one half to one year.

Court Order

On 4 May 2011, the Administrative Division of the Council of State (ABRvS in Dutch), ruled on the Nbw 1998 permit needed for MPP3⁸. On appeal, the ABRvS repealed the Province's decision (revised on 3 November 2010) regarding the Nbw 1998 permit. The ABRvS found that the position of the Province, that the expected effects of the MPP3 would be insignificant because they would result in a loss of less than one percent of the area of the habitats involved, could not be accepted. According to the ABRvS, the use of the one percent boundary failed to meet both the obligation to measure how the conservation objectives would be met by using that significance and the obligation to determine the significance of the effects in light of the specific environmental characteristics and conditions of the area covered by the plan or project. Further, the requirement to limit the effects to less than one percent through various measures would not lead to another decision because there is no justification for why the accepted effects of less than one percent are not significant.

The capture facility also requires an Nbw 1998 permit. The emissions from this facility are combined with those from the MPP3. This combination means that the application for the Nbw 1998 permit for the capture facility can only be submitted in a later stage of the process because the repealed Nbw 1998 permit for MPP3 must first be reissued. After the Nbw 1998 permit for the MPP3 is reissued, the application for the Nbw 1998 permit for the capture facility can be submitted.

Experiences and key lessons learned:

- Before the project starts, a time line is determined for the (permit) procedure process. It is difficult for the applicants to follow this time line in the case of legal uncertainties as a result of court orders.

⁸ Administrative Division of the Council of State 4 May 2011, nrs. 2009013/1/R2 and 200901311/1R2

5. The current legal and regulatory situation: transport

This chapter covers the legal and regulatory situation that applies to the transport part of the project.

The pipeline will be connected to the capture installation on the E.ON grounds. A compressor will be used to compress the captured CO₂ to the desired pressure for transport. From the capture facility, the CO₂ will follow the existing utilities access corridor. Where the pipeline reaches the future Yangtze Port and the coastline, it will be laid under the Yangtze Port and the mouth of the Maas River by means of a borehole. Once it reaches the sea, the pipeline will be laid on or in the sea floor for a length of about 20 kilometres long. The pipeline will follow an existing TAQA gas pipeline for a great deal of its length, at a distance of 100 meters, until it curves to the west. Finally, the pipeline will be connected to the platform.

Note that the pipeline (and Platform 18-A) lies within the twelve-mile zone (12 nautical miles is approximately 22 km). This area belongs to the territorial sea of the Netherlands according to Article 1 of the Act on the Limits of the Territorial Sea. The CO₂ pipeline does not, therefore, cross any land or sea border. Dutch law applies to the area where the CO₂ pipeline is situated.

5.1 National Coordination Scheme

In contrast with the permits needed for the capture facility, the permits and approvals needed for the CO₂ pipeline and the storage facilities fall under the National Coordination Scheme (see the Box: National Coordination Scheme for an explanation)⁹. The storage permit is not included in the scheme.

Box: National Coordination Scheme

National Coordination Scheme

According to Article 141a of the Mining Act, the procedure referenced in Article 3.35, first paragraph, introduction and section c, of the Spatial Planning Act, applies to:

- a. (...)
- b. a mining facility for the storage of materials
- c. pipelines exclusively or primarily meant for the transport of minerals or the transport of materials in connection with the exploration or production of minerals or the storage of materials with use of a mining facility as described in (...) section b.

This means that the National Coordination Scheme from the Spatial Planning Act applies in this case. The public consultations and approval of permits needed for the transport (and storage) of CO₂ as named in the National Coordination Scheme Implementation Decision for energy infrastructure projects are coordinated by this scheme. For the ROAD project, the permits this applies to include the all-in-one permit for physical aspects, the water permit and the Flora and Fauna Act exemption.

Through the coordination scheme, the permit process becomes one procedure. This means that comments can be submitted for all draft permits at one time and the appropriate authority decides on all permits at once.

All procedures that can be coordinated fall under the uniform public preparation procedure as per Section 3.4 of the General Administrative Act. After the application has been submitted, the Ministry of Economic Affairs, Agriculture and Innovation determines the term for the drafting of the draft permits and final permits and provides for a coordinated notification and disclosure process. The competent authority remains involved in the coordinated procedure and decides on the various applications and permits. All (draft) permits are granted at the same time. For six weeks, any person can submit comments regarding the draft permits. After that, the final permits are granted by the competent authority.

The final permits can be appealed by affected parties once, in one procedure, to the Administrative Division of the Council of State. The total appeal process can last one and to one and a half years.

⁹ Article 141a from the Mining Act in conjunction with Article 3.35 from the Spatial Planning Act.

5.2 State Zoning Plan

As described above, the transport of CO₂ falls within the scope of the Mining Act. This means that planning permission for the laying and use of the CO₂ pipeline becomes possible, in principle, through a State Zoning Plan¹⁰.

A State Zoning Plan is not needed when the current zoning plan provides for the laying of the pipeline. The laying of (a part of) the CO₂ pipeline is actually contrary to the provisions of the current zoning plans 'Maasvlakte '81' and 'Maasvlakte 2'. This means that a State Zoning Plan needs to be approved to grant planning permission for the CO₂ pipeline.

Box: State Zoning Plan Procedure

State Zoning Plan Procedure

The procedure for the State Zoning Plan runs concurrently with the National Coordination Scheme when the scheme includes the necessary permits¹¹. The State Zoning Plan is prepared and sent to the municipalities, water authorities and provincial services involved for consultation. Next, the draft Zoning Plan is presented for public consultation to allow any person to submit comments against the draft. After that, the appropriate authorities, the Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and the Environment, grant the State Zoning Plan. Finally, affected parties can appeal to the Administrative Division of the Council of State. The total appeal process can last one and to one and a half years.

5.3 Environmental Impact Assessment for the State Zoning Plan

An amendment to the current zoning plan is needed for the laying of one section of the pipeline. In addition, the appellation 'CO₂ pipeline' needed to be added to the utility access corridor. Therefore, as explained above, a State Zoning Plan will be drawn up. This plan is required by the Environmental Protection Act and the EIA Act to be supported by an Environmental Impact Assessment. According to the EIA Act that applied during the preparation of the EIA, the following activities require an EIA¹²:

Table 2: EIA requirements for the Zoning Plan

EIA Decision Category	Activity requiring EIA	ROAD Project	Plan
C 5.3 (and D 8.1)	The construction of facilities or buildings in, on or above the sea floor, or under the sea floor where the described activities have an area of 1 or more ha	Construction of a pipeline on and in the sea floor: - over a length of more than 1 km through dune area and in the sea -with an area of more than 1 ha	Zoning Plan

¹⁰ See again Article 3.35 in conjunction with Article 3.28 from the Spatial Planning Act. A State Zoning Plan is a zoning plan at the national level that is determined by the Ministry of Economic Affairs, Agriculture and Innovation, together with the Ministry of Infrastructure and Environment. The State Zoning Plan is, just as municipal zoning plans, set to ensure good spatial planning. If the State Zoning Plan is not approved, the pipeline will not be allowed.

The Act mentions a 'zoning plan', but because this is determined by the ministries, and thus at a national level, this section will refer to it as a 'State Zoning Plan' to maintain clarity.

¹¹ A zoning plan will be determined for a section of the pipeline, because of which, this project falls under Category 2.1 from Attachment 1 of the Crisis and Recovery Act. The essence of this Act is that new and/or amended procedures will be in force to work on employment and sustainability. The measures in the Crisis and Recovery Act are mostly to speed up processes. For the ROAD project, the applicability of the Crisis and Recovery Act means that judicial procedures are shorter and that appeals can only be lodged by affected parties who have been negatively affected by the aforementioned activity.

¹² As of 1 April 2011, the EIA Decree has been changed. The activities from categories C 5.3 no longer require an EIA under this change but do require an evaluation.

For the ROAD project it was decided to combine the EIA described in section 2.3 with the EIA required for the zoning plan. Therefore, only one EIA that was submitted followed the procedure described in the Box: EIA procedure. Further, the EIA for the State Zoning Plan was subjected to public consultation at the same time as the draft zoning plan.

5.4 Water Permit

A permit is required by the Water Act for a use of water works that performs a function in, on, above, over or under the works, creates or maintains a work, or deposits, places or lays down solid substances or objects or lets them remain in place, other than those uses in agreement with the function of those works¹³.

The pipeline crosses a dyke as it goes over the land to the North Sea. The pipeline will then be laid in the floor of the North Sea (surface water body). The dyke and the North Sea qualify as water works. Because the pipeline will not be laid in agreement with the normal function of those works, which is providing a barrier and the storage of water, a water permit is required for the laying and use of the pipeline.

The water permit is covered by the National Coordination Scheme and therefore follows the procedure described in the Box: National Coordination Scheme.

5.5 Railway Act Permit

The pipeline will be laid near the railway on the Maasvlakte and crosses this railway four times.

The Railway Act governs the construction, maintenance, access and use of the railways in the Netherlands, as well as traffic over those railways. In order to prevent physical damage to the railways and to assure safe rail traffic and the uninterrupted transfer of travellers and goods, a permit is required to carry out certain activities in, near, on, above or under the railway. Therefore, a permit is required by the Railway Act for the laying of the pipeline near the railway in the (First) Maasvlakte.

The Railway Act Permit falls under the National Coordination Plan and therefore follows the procedure as described in the Box: National Coordination Plan.

5.6 Flora and Fauna Act Exemption

The Bird and Habitat Guidelines contain not only a provision for territorial protection, but also a provision for species protection. Both provisions are also implemented in the Flora and Fauna Act, which regulates a large number of species of plants and animals. These species cannot be disturbed, hunted, caught or killed, among other things, as described in the prohibitions of this Act. When these prohibitions are violated, an exemption is required.

There are species strongly protected by the Flora and Fauna Act present in the area needed for the laying and use of the pipeline, such as the bee orchid and the root vole. These species might be disturbed by the laying and use of the pipeline and therefore an exemption is needed.

The Flora and Fauna Act exemption falls under the National Coordination Scheme and therefore follows the procedure described in the Box: National Coordination Scheme.

¹³ A water works is a surface body of water, storage area, dyke or supporting work.

6. The current legal and regulatory situation: storage (including platform)

This chapter describes the legal and regulatory situation for the storage part of the project (including the platform).

The CO₂ will be stored using the existing natural gas production platform 'P18-A', operated by TAQA Offshore B.V. (TAQA). Wells were drilled to a depth of 3,500 meters from platform P18-A to three reservoirs, designated as P18-2, P18-4 and P-18-6. At present, only P18-4 will be used for storage, so a permit will only be applied for for this reservoir. The existing well (borehole) will be used and needs to be adapted for the switch from gas production to CO₂ storage.

6.1 All-in-one permit for physical aspects

TAQA has an (mining) environmental permit for the use of the platform for natural gas production. The transport and injection activities related to the storage of CO₂ are not covered by this existing permit. Therefore, an all-in-one permit for physical aspects (environmental permission for a facility/mining building) is required to allow the activities to proceed.

The all-in-one permit for physical aspects falls under the National Coordination Scheme and therefore follows the procedure as described in the Box: National Coordination Scheme.

6.2 Storage Permit

In the last stage of the ROAD project, the captured and transported CO₂ will be permanently stored in a depleted gas field.

A permit is required by the Mining Act for the storage of materials at a depth of more than 100 meters. As CO₂ is considered a 'material', a storage permit is required for its permanent storage.

The CCS Directive has now been transposed into the Dutch Mining Act. Also the Mining Decree and Mining Regulations have been amended to reflect these changes. With these changes, the substantive requirements of the storage permit are changed from the requirements that applied under the Mining Act before the transposition of the CCS Directive. Because a storage permit for CCS projects would need to be amended based on the requirements of the new Mining Act, it was decided to request a 'new style' storage permit. The permit application adhered as closely as possible to the bill to amend the Mining Act (implementation of the CCS Directive) because the substantive requirements that the application must fulfill were not yet fully known at the time of the application.

Besides the change in the substantive requirements, the procedure for obtaining a storage permit has also changed. The storage permitting procedure does not fall under the National Coordination Scheme and will require the new procedure¹⁴. This procedure is described in the Box: Storage Permit Procedure New Style.

¹⁴ The Ministry of Economic Affairs, Agriculture and Innovation has the power under Article 141c of the Mining Act to place permits needed for projects that do not automatically fall under the National Coordination Scheme under that program. The Minister of Economic Affairs, Agriculture and Innovation is now determining whether he will make use of this power.

Box: Storage Permit Procedure 'New Style'
Storage Permit Procedure 'New Style'

The granting of a storage permit for the permanent storage of CO₂ follows the uniform public preparation procedure in Section 3.4 of the General Administrative Act. After the submission of the application, competing parties are provided with 13 weeks to submit a competing request.

After the application is submitted, the competent authority, the Ministry of Economic Affairs, Agriculture and Innovation, sends the application for consultation to the State Supervision of Mines. Next, the competent authority grants the draft storage permit. After that, the draft storage permit is presented to the European Commission for consultation. They have four months to provide (non-binding) advice. Finally, the final storage permit is granted by the competent authority.

The procedure, including the draft phase and ending with the granting of the final storage permit, lasts ten months. This term can be extended with a maximum of six additional months.

Affected parties can appeal the final storage permit to the Administrative Division of the Council of State. The total appeal process can last one and to one and a half years.

Experiences and key lessons learned:

- For a CCS project, it is important that authorities are proactive and take responsibility for storage. Issues should be addressed in a coordinated way, to avoid letting concerns around uncertainties and/or the setting of precedents slow down the process.
- While developing the specific storage permit conditions, the competent authority should take into account that CO₂ storage is new and that demonstration projects are necessary to speed up the commercial development of CCS, as should the EC when they provide advice. This does not imply that safety and environmental conditions should be reduced. Instead, there should be a balance between the benefits and costs of the permit requirements to ensure that they are realistic and necessary.

6.3 List of required permissions and permits

Table 3 provides a summary of the required permissions and permits described in the previous chapters. It describes the legal basis for the permissions and permits, the competent authority that grants the permissions and permits, and the party who is required to apply for the permission or permit.

Table 3: Regulatory Overview for the ROAD Project

Legislative requirement	Law	Appropriate Authority	Applicant
General			
Environmental Impact Assessment	Environmental Protection Act	Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and Environment; Province of Zuid-Holland (delegated to DCMR (Environmental Protection Agency for the Rotterdam Area))	Proponent
Emission permits (for capture, transport and storage)	Environmental Protection Act	Dutch Emission Authority	Proponent
Capture			
All-in-one permit for physical aspects	General Environmental Conditions Act	Province of Zuid-Holland (delegated to DCMR (Environmental Protection Agency for the Rotterdam Area))	Proponent
Environmental Permission			
Building Permission			
Natural Protection Act Permit	Nature Protection Act 1998	Province of Zuid-Holland	Proponent
Water Permit	Water Act	Ministry of Infrastructure and Environment (delegated to the State Water Authority, Department South Holland)	Proponent
Transport			
State Zoning Plan	Spatial Planning Act	Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and Environment	Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and Environment
Environmental Impact Assessment	Environmental Protection Act	Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and Environment	Ministry of Economic Affairs, Agriculture and Innovation and the Ministry of Infrastructure and Environment / Proponent
Water Permit	Water Act	Ministry of Infrastructure and Environment (delegated to the State Water Authority, Department Zuid-Holland)	Proponent
Railway Permit	Railway Act	ProRail	Proponent
Flora and Fauna Act Exemption	Flora and Fauna Act	Ministry of Economic Affairs, Agriculture and Innovation	Proponent
Storage			
All-in-one permit for physical aspects	General Environmental Conditions Act	Ministry of Economic Affairs, Agriculture and Innovation	TAQA
Storage Permit	Mining Act	Ministry of Economic Affairs, Agriculture and Innovation	TAQA

7. The permitting process specific to the CCS project

7.1 Discussion of differences compared to normal power projects

The National Coordination Scheme

In principle, the National Coordination Scheme applies to a normal (traditional) energy project of any size, such as the building of a new power plant or a new 380 kV high voltage wire. Most of the permits needed for the project are thus bundled with the planning permissions into one coordinated procedure. The planning permission is done via a (national) permission plan. This means that the permits are granted at the same time as the (national) planning permissions are approved and can only be appealed to the courts one time.

A CCS project is usually comprised of three parts: capture, transport (pipeline) and storage. The National Coordination Scheme only applies to the last two parts, namely transport and storage. It does not apply to the capture facility; traditional permit procedures apply to it instead.

Storage Permit and Emission Permit

The storage of CO₂ has a different process than that required by a normal energy project. For example, other parties are given the opportunity to submit a competing application. Also, the European Commission gives an opinion on the draft storage permit. Furthermore, the storage of CO₂ requires a storage permit which does not, in principle, fall under the National Coordination Scheme. It follows instead a very different procedure.

Furthermore, the CCS project is situated by a CO₂ emitter that needs or has a permit for the release of gases¹⁵. The CCS project will cause the emitter to release less CO₂. This has consequences for the emissions permit and the periodically determined emission release rights.

Offshore

In contrast with a normal energy project, CCS projects will often be largely on or under the North Sea. An injection platform within the 12 mile zone requires an all-in-one permit for physical aspects and one outside this zone requires an all-in-one permit for physical aspects (environmental permission for a mining facility).

7.2 Identification of legislative and regulatory gaps

Liability and Financial Security for Storage

The CCS Directive and the amended Mining Act require, in short, that financial security needs to be provided for the full period of injection to the moment that the competent authority takes over the responsibilities. The storage permit needs to contain at least the amount of financial security (or an equivalent provision) (Article 31d, first paragraph, Introduction and under n, in the amended Mining Act). Because there are now no concrete indications in either the Directive or the Act and the European guidelines are inconclusive, the financial security clause and the transfer of responsibility led to a discussion with the competent authority. Financial security has now been set in the draft permit. A solution must still be found for uncertainties associated with the takeover of responsibility.

¹⁵ Chapter 16 of the Environmental Protection Act.

The National Coordination Scheme

The National Coordination Program does not apply to the capture part of the ROAD project. This means that the permits required for the capture facility follow different procedures and timelines. Further, the possible appeals are pending in different courts. This leads to inefficiencies and uncertainties in the project.

7.3 Impact of regulatory uncertainties

Timing, budget and resources

The National Coordination Scheme is, as already said, in principle not applicable to the capture facility. The Ministry of Economic Affairs, Agriculture and Infrastructure can decide to bring these permits under the National Coordination Scheme. In the beginning phase of the ROAD project, the question of whether the capture facility could fall under the National Coordination Scheme was considered. In the end, the Ministry denied the proponent's request to include it because the Ministry, in short, is of the opinion that it would not lead to a faster process.

Further, an environmental permit is required for various projects within the ROAD project. This new permit was requested from the appropriate authority through a digital application form. The technical imperfections in the online environmental desk led to delays in the planning for the submission of the application for the environmental permit. These delays had no effect on the overall planning of the ROAD project.

Furthermore, the ROAD project chose to submit an application for the storage permit based on the amended Mining Act. In doing so, the substantive requirements that the application must fulfill were as compliant as possible with the changes in the Mining Act and the CCS Directive. In addition, the level of detail required for the storage permit application was done according to the amended Mining Act. This meant that ROAD carried out a lot of pioneering work to put together the application for the storage permit. The scale of work required for the storage permit application in the new style did not have much influence on the overall planning timeline, but it did have an influence on the budget and the total number of people working on the permit application.

Finally, on 4 May 2011, the Nbw 1998 permit for the MPP3 was denied by the Administrative Division of the Council of State. This denial meant that the application for the Nbw 1998 permit for the capture installation needs to be amended and submitted at a later stage. Although the permit process was not delayed, these amendments did have consequences for the budget.

7.4 Development of information during FEED in relation to permissions

A sensitive issue with amine-based post combustion capture technologies is the emission of the amine, its degradation products (in particular nitramines and nitrosamines) and ammonia. Because different process designs and different amines will result in different emission profiles, the impact of the technology (and thus solvent) selection could potentially have a high impact on permitting as well as public engagement.

The supplier eventually selected proposed the use of monoethanolamine (MEA) as solvent. MEA is the most extensively characterized solvent for post combustion capture applications. MEA degradation studies, identification of degradation products, liquid analysis of pilot plant samples and pilot plant emissions monitoring campaigns have been performed by a wide range of industrial technologists and academics all over the world. Also, the parent companies have experience with MEA as solvent on a pilot scale. Although the use of MEA does not avoid all

emissions, the extensive knowledge base enables effective emission management. Countermeasures can be targeted at the expected degradation products in the expected quantities. Furthermore, this publicly available knowledge is a reliable source for the permitting authorities to base their permitting decision on.

Experiences and key lessons learned:

- Openness of product information is very important for a good agreement with the appropriate authority
- Comment on whether there is a lesson learned for technology suppliers in regard permitting of their process/solvent; that there is either for more open disclosure on their solvent, or a methodology is needed to give regulators a pathway to permitting amine-based solvents; this is a key risk for technology providers, from the perspective of a project proponent, and a significant barrier to selection of the technology by a proponent.

7.5 Cooperation between Project developers and regulatory bodies

7.5.1 ROAD's approach

ROAD's permitting team is responsible for managing the Environmental Impact Assessment (IEA) procedure and the permitting application process of the ROAD project. The permitting team coordinates all the relations with the most relevant competent authorities: the Ministry of Economic Affairs, Agriculture and Innovation, the DCMR Rijnmond Environmental Agency, the Department of Construction and Transport of the City of Rotterdam, the Province of Zuid-Holland, the State Water Authority of Zuid-Holland, the State Water Authority of the North Sea and the Netherlands Commission for Environmental Assessment. The members of the permitting team come from the parent companies E.ON Benelux and Electrabel Nederland, supplemented by the intended partners TAQA Energy and GDF SUEZ E&P and is supported and advised by an independent technical consultancy firm.

The Regulatory Affairs (RA) team is responsible for identifying all relevant legislative dossiers and managing these dossiers in such a way that the ROAD project can become operational. Not only the identification of legislative dossiers is important, monitoring the regulatory risks and opportunities is at least as important. Furthermore, Regulatory Affairs tries to support all relevant stakeholders to develop an effective legislative and regulatory framework for deploying large scale CCS projects in the Netherlands. RA shares knowledge and experience with a great diversity of stakeholders. RA is defined within the Stakeholder Management Group as a separate section, but cannot operate without close collaboration with other members of the ROAD project. In particular, there is great overlap with communication and permitting.

The team of Regulatory Affairs started with mapping the dossiers that were on the agenda of the Dutch and European Parliaments. In addition, after consulting the Regulatory Affairs staff of the parent companies and a number of key stakeholders (politics, government and industry), the list of dossiers was complemented with dossiers that were not (yet) on the Parliamentary agenda, but could have a significant impact on the project in the nearby future. As the list contained many different dossiers, prioritizing was essential. Many dossiers, such as renewable policies, emission trading system, etc., have an important indirect effect on CCS. However, after prioritizing ROAD agreed to only monitor these indirect dossiers and share our view and input to the Regulatory staff of the stakeholders (in particular the parent companies), instead of actively manage these dossiers ourselves. The key dossier that was identified and we decided to manage ourselves, was the implementation of the CCS Directive, while it has the largest impact on the ROAD project.

The next step, after the mapping and prioritizing of the dossiers, was to map the stakeholders. It was remarkable that a lot of stakeholders with very different interests were identified, both local, regional, national and international. However, not all the stakeholders were closely involved in the implementation process of the CCS Directive (especially the NGO's did not actively participate in the process). Once RA had a good overview of all dossiers, stakeholders and interests, ROAD set out its position on these dossiers using position papers, internal discussions and external research. ROAD contacted stakeholders, tried to convince them of its position and formed coalitions.

7.5.2 Permitting timeline

In November 2009, ROAD sent out a request for proposal to four environmental consultancy firms for a proposal on the EIA and permit applications. As said before, this request for proposal included a preliminary overview of the expected permits. Based on this, the firms submitted a proposal including a planning. The permit overview, the consultancy proposal and the planning together could be considered the permitting procedure plan. The outline of this plan was as follows:

- Permit overview: the overview changed little during the project. The consultant was asked to check the overview at the beginning of his assignment and propose adjustments if necessary;
- Consultancy proposal: the consultant outlined the necessary studies that would underlie the EIA and the permit applications, one draft version and the necessary input for the studies and the permitting documents. The list of effect studies included the following items:
 - Acoustics (on land and under water)
 - Air (emissions, dispersion and deposition)
 - Ecology (both habitats and endangered species)
 - Cooling water dispersion
 - Soil
 - Geology (for storage part only)
 - External safety
- Planning: the originally proposed planning was:
 - February 2010: submission of the EIA Notification;
 - April 2010: submission of the first, general EIA chapters and receipt of the EIA Guidelines as based on the EIA Notification;
 - July 2010: submission of the chapters on considered alternatives;
 - September 2010: submission of the underlying studies and draft EIA and permit applications;
 - December 2010: submission of the final EIA and permit applications;
 - April 2011: draft permits open to comments from ROAD and public;
 - June 2011: final permits open to appeal

In January 2010, a first consultation with the EPA taught ROAD that the project would probably qualify for coordination by the State. This means that lower-ranking authorities are directed by the Ministry of EA&I and in case of non-cooperation, the Minister of EA&I can overrule and take over the permitting procedure from the provincial or municipal authority. In addition, in case spatial planning actions are needed, the Ministry of EA&I could undertake these and, again, overrule lower-ranking authorities and zoning plans. In October 2010, it became clear that the Ministry was willing to take this coordinating role in the 'National Coordination Scheme' for the Transport, Platform and Storage parts of the ROAD project. The Capture part stayed outside the Scheme since the capture plant did not exceed the level of 300 MWe equivalence of CO₂ capture (i.e., the capture unit captures the equivalent of 250 MWe in CO₂). The Ministry arranged meetings with all the permitting authorities that could play a role. This involvement of

the Ministry of EA&I and its Office for Energy Projects seriously helped ROAD in mapping the wide range of permitting authorities. The Ministry organised meetings and started informing the permitting authorities about the procedures being involved. In October 2010, the Ministry and ROAD organised two public hearings where the Ministry, the EPA, PSH, SWA, ROAD and its consultants gave information to the public on the ROAD project. The joint organisation of these evenings helped to form strong bonds between the Ministry and ROAD.

In February 2010, the execution of the permitting procedure plan started (one month late). The first action (the permit overview check by the consultant) did not yield new insights and the overview was deemed exhaustive. Next, a meeting on the National Coordination Scheme was planned. Since this Scheme was relatively new at the time, internal discussions on the necessity of this Scheme evolved. In addition, the Ministry of EA&I seemed reluctant to take the coordinating role under the Scheme, as a recent CCS project was mothballed and general elections in June 2010 and subsequent formation of a new government until October 2010 did not provide the ideal background for decision making.

Still, the Ministry started to convene meetings to inform the permitting authorities about the procedures. As of August 2010, ROAD and its consultant were also present during these meetings to give background information on the project. The desire of the permitting authorities not only to be fed with information on procedures but also with information on the contents of the project led to the organisation of a 'ROAD show' in November 2010. At this ROAD show, ROAD and the Ministry of EA&I jointly informed the permitting stakeholders on the project. In the parallel sessions, ROAD asked the permitting stakeholders about the points that should be addressed in the permitting procedure. By asking these questions, ROAD made sure to include the relevant points in the documents, and the permitting authorities felt taken into consideration in the process. This strategy of actively involving the permitting authorities in drafting the EIA and permit applications proved to be an important factor in the success of the permitting process. It led to a strong commitment of the permitting authorities to the final versions of the applications and the EIA since they had significantly discussed and contributed to former versions.

ROAD immediately started working on the EIA Notification after starting the project. However, since ROAD's own ideas about the project were still evolving, it proved hard to 'freeze' the Notification. It took until July 2010 to submit a final draft to the Ministry of EA&I. The Ministry came back with a number of comments, one of which was that the Notification had to be a common document under the auspices of both the Ministry and the Province of South Holland. After implementing these remarks, ROAD resubmitted the final version of the EIA Notification in September 2010. From then on, both the Ministry and the Province were the two main stakeholders in the EIA process. On several occasions ROAD pointed out the coordination powers and responsibilities of these two stakeholders, thereby letting them effectively address lagging or absent permitting authorities falling under their responsibility, which sped up the permitting process. ROAD used this only a few times, but always with the desired effect of renewed focus on the project within the addressed permitting authority.

After submission of the EIA Notification, work could be focused on gathering the necessary information for the underlying studies. This proved to be difficult, since engineering studies had just recently started. This was solved by starting the studies using preliminary data, and adapting the studies as results from the engineering studies came in. Alongside, ROAD wrote the first general chapters of the EIA and discussed these with the Ministry of EA&I and the Province in November 2010. Just before submitting the draft EIA, permit applications and

studies in December 2010, the Province, supported by other permitting stakeholders, demanded a second round of commenting: after a first draft in December, a second (final) draft at the end of January. The permitting authorities wanted to be certain that their remarks would have landed correctly in the documents before they would receive the final documents. This meant that submission would be delayed from February 2011 until March 2011. Despite this delay, ROAD found it important to give the permitting authorities the comfort they needed, and granted this additional round of comments. Most permitting authorities promised to give comments as fast as possible. This mutual commitment was illustrative of the good mutual understanding that had evolved between the permitting authorities, ROAD and its consultant by that time. This mutual respect also resulted in the accessibility of the permitting authorities, which was very high and easy for ROAD and its consultants. This made it easy to address issues in between official meetings directly with the contact persons at the permitting authorities. Despite this extra round of comments, the permitting authorities wanted an extra ‘safety valve’ in the process. In February 2011, they proposed to send the EIA to the Commission on Environmental Impact Assessments. This Commission, being part of the Ministry of Infrastructure and Environment, normally gives important advice to the authorities on the quality of the EIA after drafting the permit. The authorities, again led by the Province of South Holland and the Ministry of EA&I, wanted to submit the EIA to the Commission on EIA before final submission of all permitting documents. In this way ROAD could take advantage of the Commission’s views, implement these, and submit an EIA that could easily receive consent of the Commission. ROAD decided to take this proposal into account and submitted the EIA to the Commission in April 2011. While the Commission was studying the EIA, ROAD further improved the EIA’s consistency and removed some last loose ends. The Commission hearing was in May 2011 and there it appeared that the Commission was very satisfied with the EIA. The Commission’s comments were mostly minor, with two major comments on the underpinning of the capture technology and the monitoring of this technology. ROAD submitted the EIA and the permit applications after implementing the Commission’s comments in June 2011.

7.5.3 Regulatory affaires timeline

CCS was already a relative important political topic when ROAD started in 2010. The Members of Parliament, their assistants and the involved ministries were therefore important stakeholders for the ROAD project (see “GCCSI special report on Stakeholder Management ROAD”). ROAD started to inform some political assistants of the Members of Parliament (MPs). Due to the busy agendas of the MPs, they simply cannot have sufficient knowledge of all dossiers. Informing their assistants is an efficient way to express the opinion of ROAD on certain dossiers. Additionally, in June 2010 elections for the Dutch House of Representatives (Second Chamber) took place. After these elections, some MPs did not return in Parliament or did not return as a spokesman for energy dossiers. The new MPs needed to orient themselves on numerous dossiers. Informing their assistants was therefore much more efficient than contacting the MPs themselves. As mentioned above, the civil servants of the involved ministries (especially the Ministry of Economic, Agriculture and Innovation) were important stakeholders. In our experience, they are very approachable and willing to discuss the development of CCS at any time. Within the ministries, a lot of different sections are involved. There is also an interdepartmental Task Force for CCS. ROAD encountered cooperation to develop CCS in the Netherlands by supporting the ROAD project.

In November 2010, ROAD and the Ministry organised a meeting for all involved permitting authorities to acquaint them with the goals and contents of the project, the tight schedule and to hear from them where they would place the accents in the permitting procedures. During the lunch and parallel sessions, the ROAD employees, the permitting consultants and the public servants could get acquainted and exchange information on the project. From there on, ROAD

took over the role of keeping the overview of involved permitting authorities from the Ministry of EA&I.

Starting in November 2010, the Ministry of EA&I also took the lead in drafting the State Zoning Plan. This was necessary to make the passage of the CO₂ pipeline through dunes, embankments and a waterway possible. The Ministry of EA&I took the lead in developing this zoning plan, consulting its stakeholders and keeping them informed. ROAD supported and is supporting the Ministry through participation in the mandatory SEA. This report will therefore refrain from going into depth on stakeholder management for the State Zoning Plan.

The legislative proposal for the implementation of the CCS Directive was discussed in Dutch Parliament in 2010 / 2011. Regarding the CCS Directive, it was obvious from the start that the Dutch Government fully supported the development of CCS, through the support of demonstration projects. The gas and oil industry however seemed a bit reluctant as CCS could form a threat to their core activities. Some NGO's oppose CCS mainly as they oppose coal fired power plants and state that power companies use CCS to legitimize coal fired power plants. However there are also other NGO's who (unexpectedly) support the development of CCS. Considering the implementation of the CCS Directive, the key question was whether the Directive would be implemented strictly or that the Dutch Government would add national CCS provisions to the legislative proposal. The Directive gives a general regulatory framework to ensure permanent containment of CO₂ and, where this is not possible, eliminate possible negative effects and any risk to the environment and human health. The Directive introduces several key elements such as a monitoring plan, financial security provisions, provisions for the handover of responsibility and the financial mechanism. The Directive only gives a high-level description of these elements. The interpretation of these elements is up to the Member States. The Guidance Documents (300 pages) give no sufficient clarity and are primarily applicable on storage in aquifers. Above all, the final versions of the Guidance Documents were published when the Dutch legislative proposal was already drawn and discussed in the Parliament. They were published too late to support the Dutch Government with the implementation of the Directive. The Dutch Ministry decided to implement the Directive strictly (no additional national provisions). In fact, the legislative proposal was an almost literal translation of the English Directive. The proposal did not contain any further interpretation of the key elements (monitoring plan etc.). ROAD fully endorsed this approach while each CCS project has its own specific characteristics and in order to have a proper assessment of a project proposal, a tailor made approach is essential. Most stakeholders agreed upon an open and flexible legislation. The requirements for the storage of CO₂, set by the Government, should be based upon the specific characteristics of each storage site. A tailor made approach per project is necessary for a successful deployment of several CCS demonstration projects. This means that the key elements of the CCS Directive will be mainly addressed in the storage permit.

8. Summary of key lessons and experiences

The following experiences and key lessons learned in obtaining permits gained from permit applications and legislative procedure could be drawn from the permitting process in the ROAD project.

8.1 ROAD's experiences

As apparent from the lists of permitting authorities, the range of permitting authorities we deal with in this project is wide. From the above-mentioned authorities, the EPA and the Ministry of EA&I are the most important. This, and a number of factors, made the permitting process in this project complex and time consuming:

1. The competent authorities mentioned in the table are from all four layers of government that exist in the Netherlands: local (municipalities), regional (water authorities), regional (provinces), national (ministries and national advisors). These authorities need to align their permitting amongst each other.

2. Five new environmental laws came into effect during the permitting process, which led ROAD to sometimes shift its policy, or the permitting authorities to come with new demands. These four new laws were:

a. Decision on the National Coordination Scheme Energy Infrastructure Projects. This Decision came into effect at 1 March 2009. Although this is before the initiation of the ROAD project, only ROAD's consultant had experience with the National Coordination Scheme. In addition, the Regulation on the National Coordination Scheme, that mandates the practical side of the Decision, the Electricity Act and the Mining Act, only came into effect at 1 April 2010, when ROAD was well underway. Under the National Coordination Scheme, the Ministry of EA&I may take over the permitting process from lower ranking authorities. In addition, a coordinated public review of all permits falling under the Scheme, in combination with the Crisis and Recovery Act (in effect since 31 March 2010), may lead to faster rulings in court cases.

b. Act on Modernising the Environmental Impact Assessment, which changed the EIA procedure. After the law came into effect at 1 July 2010, one could choose from two procedures: one for regular and one for complex projects. Because one should have some knowledge in advance on the outcomes of the studies in order to choose the simpler path, ROAD took the safer option and chose the procedure for complex projects, including the optional advice by the Commission on Environmental Impact Assessments, since the opinion of this Commission is always weighed heavily in court cases;

c. Mining Act, which came into effect at 1 July 2010. This renewed Mining Act makes it necessary to submit an additional storage plan within a month after issuing the storage permit. This, together with the revision of the Mining Act that came into effect on 25 June 2011 (as mandated by the European Directive on Geological Storage 2009/31/EC), leads to a more complex permitting process for the storage permits, with review rounds by the European Commission, public review and the option by other companies to put forward competing permit applications. In addition, there is not a lot of policy around storage of CO₂ yet. The storage permit for P18-4 is the first of its kind in the Netherlands, and the accompanying storage plan was therefore under extreme and detailed scrutiny of the Ministry and its advisors. This demanded a lot of work by ROAD, its consultant and TAQA.

d. The Act on General Conditions in Environmental Law came into effect on 1 October 2011. This Act, of which the coming into effect was already postponed twice, introduces a single permit application for all actions taken in the environment. The Act also introduced digital submission of permit applications through a web-based service. Since both ROAD's consultants and the authorities had only worked with both the Act and the web-based service in a controlled environment or during courses, there were a number of unclarities in the Act and bugs in the web-based service to be solved. Later in the permitting process, the new permitting process actually helped since the Act also mandates the several permitting authorities to coordinate their permitting.

e. The last law coming into effect and affecting ROAD was the Decision on the Environmental Impact Assessment (1 April 2011). This Decision was changed to reflect rulings by the European Court of Justice. Although it led to some work for ROAD and its lawyers to assess the impact on the permitting process, it soon emerged that the impact was negligible.

8.2 Key lessons learned

The permitting process

- An open process between the applicant and the relevant authorities, in which the first findings are shared, is important to maintain the momentum of the (permitting) process.
- A prerequisite for the success of the project is that the authorities feel involved in the project.
- The Ministry of EA&I, despite its initial reluctance, was a big help in coordinating the permitting stakeholders and showing them that the project has national relevance. Wherever a National Coordination Scheme is present, make use of it for this kind of projects involving multiple permitting stakeholders. Nevertheless, as initiator it is important to stay involved in coordinating the permitting authorities.
- Permitting authorities not only want to be informed on procedures, but also on contents, as early as possible. Convene early with the permitting authorities to discuss matters as a) how many commentary rounds should be included in the permitting process; b) what points are relevant for them; c) who will be contact person and d) how information exchange will take place. This builds up mutual commitment and trust.
- Make sure your contact persons at the permitting authorities are committed and accountable. Some of the delay in this project was caused by contact persons who did not have enough time or knowledge to assess the permitting documents. Make sure the project has the support at their manager's level so you could lobby for more dedicated contact persons if necessary. Demand that the coordinating permitting authorities use their power and responsibility to address lagging permitting authorities so the process is not held up by them.
- Keep the project under time pressure as to keep the authorities focused and meet regularly to be able to address issues as they evolve. Build up mutual commitment and accessibility of the authorities to enable tackling issues in between meetings over the phone or by e-mail.

- Showing that the project does everything within its power to reach the deadlines. It is hence important to take the initiative in all meetings, while keeping everybody involved, but also support authorities with technical help to fulfill their obligations. Finally, accept that the authorities take the safe route as accuracy is more important than speed.
- Technical information lacking at early stage. The FEED study for the project was completed in an early stage. However, not all technical (detailed) information (on emissions) was available. Because this is the first time a large scale CCS project is designed, there are few standards available (pilots give some information but are not always trustworthy for scale-up). This means that it is difficult to fill in permit applications early in the procedure. It would be more pragmatic to get permits and being allowed to adjust later on, within established limits

The CCS Directive

- For the regulatory affairs team, operating with caution in the early stages of the project is essential due to political aspects of CCS and the complexity of CCS regulation. CCS legislation is new and needs to be drawn-up from the start and approved by Parliament.
- Without an open and flexible legislation (tailor-made approach) it is very unlikely that CCS demonstration projects will be developed.

The General Environmental Conditions Act

- The General Environmental Conditions Act came into effect on 1 October 2010. This Act introduces a single permit application for all actions taken in the environment. The Act also introduced digital submission of permit applications through a web-based service (the 'online environmental desk'). Since both ROAD's consultants and the authorities had previously only worked with both the Act and the web-based service in a controlled environment or during courses, there were a number of ambiguities in the Act and bugs in the web-based service to be resolved.

The Water Permit

- The Water Act contains a coordination clause that provides for a coordinated application for the water permit and the environmental permit described in Section 3.1.¹⁶. Under the Wabo, the coordination is not (yet) arranged for the digital application form, which means that agreement must be reached between the two authorities for both permits.

The Nature Protection Act 1998 permit

- Before the project starts, a time line is determined for the (permit) procedure process. It is difficult for the applicants to follow this time line in the case of legal uncertainties as a result of court orders.

The Storage Permit

- For a CCS project, it is important that authorities are proactive and take responsibility for storage. Issues should be addressed in a coordinated way, to avoid letting concerns around uncertainties and/or the setting of precedents slow down the process.
- While developing the specific storage permit conditions, the competent authority should take into account that CO₂-storage is new and that demonstration projects are necessary to speed up the commercial development of CCS, as should the EC when they

¹⁶ Article 6.27 of the Water Act.

provide advice. This does not imply that safety and environmental conditions should be reduced. Instead there should be a balance between the benefits and costs of the permit requirements to ensure that they are realistic and necessary.

Development of information during FEED in relation to permissions

- Openness of product information is very important for a good agreement with the competent authority.
- Comment on whether there is a lesson learned for technology suppliers in regard permitting of their process/solvent; that there is either for more open disclosure on their solvent, or a methodology is needed to give regulators a pathway to permitting amine-based solvents; this is a key risk for technology providers, from the perspective of a project proponent, and a significant barrier to selection of the technology by a proponent.

How to obtain the necessary environmental permits for an offshore CCS project?

Five steps:

1. Completing the overview of procedures
Getting an overview of the formal procedures, the authorities and the first estimate scheduling of the procedures (permits, including conditions for an EIA and spatial planning).
2. Preparing the documents
Draft versions prepared by the companies, aligned with technology and equipment supplier and reviewed by the authorities, to make sure the documents meet all requirements.
3. Formal procedure
Authorities, including the EIA committee, consider/handle all submitted requests and after public consultation decide on the permit conditions and updated spatial planning.
4. Since this whole chain is the first of his kind, the EIA committee has advised a preliminary check (“Voortoets”) on completeness and compliance with earlier directions. This informal stage takes additional time (2 months) but is also supported by ROAD.
5. Legal procedures
After permits have been granted, legal procedures can be expected. Court procedures may take a long time but – taking the preparations into account – there is no fear of losing the permit.

Organization

It is important to set up the organization, the internal organization (the project and parent companies) as well as the external organisation (the authorities):

1. Setting up the internal organization:
 - MCP as a new entity of E.ON and Electrabel;
 - MCP/ROAD organizational structure (4 departments and a board for daily business);
 - aligning with E.ON Benelux as owner of the new build power plant MPP3 and thus being the formal applicant for the capture part of the permit;
 - subcontracting GDF SUEZ for transport and TAQA for storage; and
 - subcontracting Royal Haskoning for support to arrange EIA, spatial planning and permit applications.

2. Setting up the external organization:
 - arranging regular meetings with the central authorities (Ministry of Economy, Agriculture and Innovation);
 - arranging regular meetings with local authorities;
 - determining the applicable procedures; and
 - National Coordination Scheme, to coordinate on a national level large scale developments with nationwide implications. For CCS, this is only applicable for transport and storage. The request by ROAD to include the capture part in the coordination of the EA&I was denied by the minister.

Conclusions and recommendations

1. *Content* – Often a specific legal and regulatory framework on Capture, Transport and Storage technologies is missing or in development: this demands pro-activity, flexibility and close interaction with regulators and authorities. Managing expectations of stakeholders and developing a clear project vision are a prerequisite in that regard.

2. *Context* – CCS projects are driven by technology and can easily be caught up in technological tunnel vision. One of the biggest threats is losing track of stakeholders' views and interests. Instead CCS project should develop an outside in perspective, taking into account stakeholders' expectations. By developing a stakeholder dialogue they create two-way communication with stakeholders that are relevant to the implementation of the project.

3. *Process* – As a consequence of diverse technologies in the CCS chain spread over different areas, multiple governments and authorities are involved in the project. This demands an integral stakeholder management approach comprising functions such as regulatory affairs, permitting and public outreach.

Abbreviations

CCS	Carbon Capture and Storage
EA&I	Economic Affairs, Agriculture & Innovation
EC	European Commission
EEPR	European Energy Programme for Recovery
EIA	Environmental Impact Assessment
EPC	Engineering, Procurement and Construction
EU	European
FEED	Front-End Engineering Design
FID	Final Investment Decision
Global CCS Institute	Global Carbon Capture and Storage Institute
GDR	Group Decision Room
HSE	Health, Safety and Environment
Institute	Global Carbon Capture and Storage Institute
MCP	Maasvlakte CCS Project C.V.
MEA	Monoethanolamine
MPP3	Maasvlakte Power Plant 3
MPs	Members of Parliament
NGO	Non Governmental Organization
RFI	Request For Information
RFP	Request For Proposal
ROAD	Rotterdam Opslag en Afvang Demonstratieproject