

# The screening and scoping of Environmental Impact Assessment and Strategic Environmental Assessment of Carbon Capture and Storage in the Netherlands

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Received 31 May 2007; received in revised form 31 July 2007; accepted 9 August 2007

Available online 26 December 2007

## Abstract

The Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) are procedural tools which have as goal to assess and evaluate possible environmental effects of, respectively, a proposed project or policy plan. The goal of this article is to explore possible bottlenecks in applying both the EIA and SEA procedures on Carbon Capture and Storage (CCS) activities in the Netherlands, as experience is currently minimal or lacking. In this study we focus mainly on the institutional and procedural aspects of the screening and scoping phases of both procedures. This is achieved by reviewing EIA and SEA procedures for analogue projects for the three distinctive process steps of a CCS project, namely the power plant with capture, the transport and finally the underground storage of the CO<sub>2</sub>. Additionally, EIA and SEA or similar procedures on CCS in other countries are reviewed and the legal framework for the Dutch EIA and SEA is studied. This article shows a concise overview of the EIA and SEA procedure in the Netherlands and the relation between both procedures. Based on our findings we have constructed a conceptual taxonomy for the scope of both procedures for CCS in the Netherlands. This taxonomy conceptualizes the possible integration of assessing the environmental impacts for tiered levels of decision making. This integration might be needed for first CCS projects as decisions on the strategic (spatial planning) level are currently absent for CCS in the Netherlands. Perpendicular to such integration is the integration of linked activities in the CCS chain and their alternatives, into one procedure. We argue that it would be beneficial to combine the separate EIA procedures for CCS activities into one procedure or at least provide close linkage between them. This issue should be carefully considered by regulators, competent authorities and project initiators in an early

*Abbreviations:* AoG, Advises on the Guidelines (by the NCEIA); CCS, Carbon Capture and Storage; CO<sub>2</sub>, Carbon dioxide; ECBM, Enhanced Coal Bed Methane; EGR, Enhanced Gas Recovery; EIA, Environmental Impact Assessment; EIS, Environmental Impact Statement; EOR, Enhanced Oil Recovery; EU, European Union; IGCC, Integrated Gasification Combined Cycle; kt, kilo tonne (metric); LNG, Liquefied Natural Gas; NAM, Dutch Oil Company (Nederlandse Aardolie Maatschappij); NGCC, Natural Gas Combined Cycle; NCEIA, Netherlands Commission for the Environmental Impact Assessment (Commissie MER); NWMP, National Waste Management Plan; Mt, Mega tonne (metric); SBUI, National Structure Plan for Pipelines; SEA, Strategic Environmental Assessment; SEV, National Structure Plan for the Electricity Supply; UGS, underground gas storage.

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stage to avoid delaying legal procedures in the future. For the same reason also early involvement of public, interested parties and the Netherlands Commission for the Environmental Impact Assessment in the scoping phase of the procedures is desired.

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*Keywords:* Carbon Capture and Storage; Spatial policy; Strategic Environmental Impact Assessment; Regulation; Implementation

## 1. Introduction

It is widely accepted that the emission of CO<sub>2</sub> which is formed with the combustion of fossil fuels, contributes to the greenhouse effect and consequently to global warming. In the Dutch 4th National Environmental Policy Plan the capture of CO<sub>2</sub> and its storage in the underground (CCS) is considered to be a third option (additional to energy conservation and renewable energy technologies) that may be applied to reduce anthropogenic CO<sub>2</sub> emissions into the atmosphere substantially (VROM, 2001). In the most recent coalition agreement between the parliamentary groups of the Lower House targets were formulated to reduce Greenhouse Gas (GHG) emissions by 30% in 2020 compared to the level in 1990. This may provide a strong incentive to employ Carbon Capture and Storage in the Netherlands (CDA et al., 2007).

The EIA procedure is a procedural tool, which has as goal to assess and evaluate possible environmental effects of a proposed project and its reasonable alternatives, which can have significant effects on the natural and man-made environment (Wood, 2003). A related procedure is the Strategic Environmental Assessment (SEA), which has as goal to include environmental impacts into strategic decision making by administrative bodies. More specifically, it applies on strategic decisions in governmental policies, plans and programs.

Given that plans are currently being drafted for CCS (pilot) projects, there is a growing need for clarity on administrative, juridical and environmental implications of these projects (see also (Mace et al., 2007)). Furthermore, possibilities for participation of the public in both the SEA and EIA procedure may play an important role in the public acceptance of CCS plans and projects. This emphasizes that understanding is needed on how to apply both the EIA and SEA procedure in the case of CCS.

International experience with the application of both procedural tools on CCS activities exists and is growing with the planning and implementation of CCS (demonstration) projects worldwide. In the Netherlands experience is minimal though growing with the initiation of several EIA's for power plants, which in the future may

be equipped with CO<sub>2</sub> capture installations (Commissie MER, 2006c, 2006d, 2006e). Another initiative, taken by the Dutch Oil Company (NAM) and supported by four provinces<sup>1</sup>, is also adding to the knowledge base: the AMESCO<sup>2</sup> project. It has the goal to produce a paper which can be used as a reference guide for future EIA's for underground CO<sub>2</sub> storage activities. This 'generic' EIA is being drafted to "prevent identical environmental studies being performed for each location" (Provincie Drenthe, 2006). Also, there is substantial experience gained with EIA procedures on projects which can be considered as analogues to CO<sub>2</sub> capture, transport and storage.

The goal of this article is to explore possible bottlenecks in applying both the EIA and SEA procedure on CCS activities in the Netherlands and suggest future actions to resolve these. Finnveden et al. (2003) distinguishes three elements of an SEA: institutional arrangements, the procedure and applied methods. To scope this study we follow this differentiation. A detailed overview of environmental impacts due to the application of CO<sub>2</sub> capture, transport and storage in electricity generation is not within the scope of this article and will be the subject of future work. In this article we will focus mainly on the institutional and procedural aspects of both the EIA and SEA procedure applied on CCS projects. The procedures comprise several phases or steps to be concluded. In this article we will focus on the screening and scoping phase. Following the goal and demarcation of the study the following main research question is formulated:

What are the possible concerns for project initiators and administrative bodies regarding the institutional arrangements and procedural elements in the screening and scoping phase of both the EIA and SEA procedure when applied on CCS activities?

Specific questions to be answered are:

- o Under what circumstances is in the Netherlands an EIA required for the realization of CCS activities?

<sup>1</sup> The Netherlands is administratively divided into 12 provinces. The provincial government is responsible for the formulation of policy on a regional level.

<sup>2</sup> Generic Environmental Impact Study CO<sub>2</sub> storage (in Dutch).

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