



CCS Implementation Plan

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1 Executive Summary (restricted)

The progress of CCS is slowing down. The CATO research community has therefore established an implementation plan for CCS in the Netherlands. This plan is prepared in close collaboration with the CCS community and is based on the research performed in the CATO project. An important part of the plan is the CCS roadmap. In this roadmap CATO defines actions to speed up the development and deployment of CCS in the Netherlands.

Implementation Plan rationale

The development of carbon capture and storage is currently stagnating, especially in Europe and the Netherlands. CCS development requires demonstration projects and (long-term) vision. To support the commercial deployment of the technology the right conditions should be in place. Large scale implementation asks for clear and sustained regulatory, organisational and financing structures for CCS. Also the timing of decisions and corresponding actions will be crucial to get CCS successfully deployed. There is need for a clear, agreed and fully supported CCS development path. The question we pose is: "How can implementation of CCS in the Netherlands be realised?" To answer this question requires identification and clear communication of the challenges to overcome and the actions that need to be taken, and by whom.

The CATO research programme developed an 'Implementation Plan' for CCS in the Netherlands to support the Dutch government and other stakeholders. The Implementation Plan clarifies what decisions and actions are needed on the short, mid and long term to provide the right and sustained conditions for CCS deployment in the Netherlands. In addition, it defines the roles and responsibilities of stakeholders beyond the demonstration phase of CCS. The Implementation Plan will help to build a common understanding between the different stakeholders on who should act, how to act and when to act. It will also give clarity on the expectations of the various stakeholders towards other stakeholders. The Implementation Plan is based on the views and visions of relevant CCS stakeholders and draws upon the results obtained in the CATO programme.

The road to the Implementation Plan

In building the Implementation Plan we performed the following steps. First, the stakeholders shared how they see the role of CCS on the longer run. This resulted in the so-called "2050 CCS vision". Subsequently, we created a path to this 2050 CCS vision by defining realistic intermediate steps. Based on this sketched path we follow a systematic approach to identify what actions need to be taken at what time, and what are the responsible parties. This resulted in a 'roadmap' with defined milestones and actions created commonly by the main CCS stakeholders.

2050 CCS vision

The vision is built around four main elements: geographical scope of CCS; whether the Netherlands is a leader or follower in CCS technology development; the market share of CCS; and its timing towards 2050 and what industry applies CCS. To guide the mind, the vision is considered from different perspectives, i.e. economic, legal, technical, spatial and public dimension. The interaction between these dimensions is regarded as the 'organisation' dimension.

Based on input from stakeholders five main 'issues' are identified that need to be addressed to successfully implement CCS and to reach the 2050 CCS vision. First of all, the role of the CCS in a portfolio of mitigation measures needs to be well-understood and accepted by all stakeholders, including the public. Next to that, the technology needs to be improved, reducing energy consumption and costs, and increasing safety and confidence in CCS. The economic conditions need to be established along with improved confidence on stable (economic) conditions in the longer run. The

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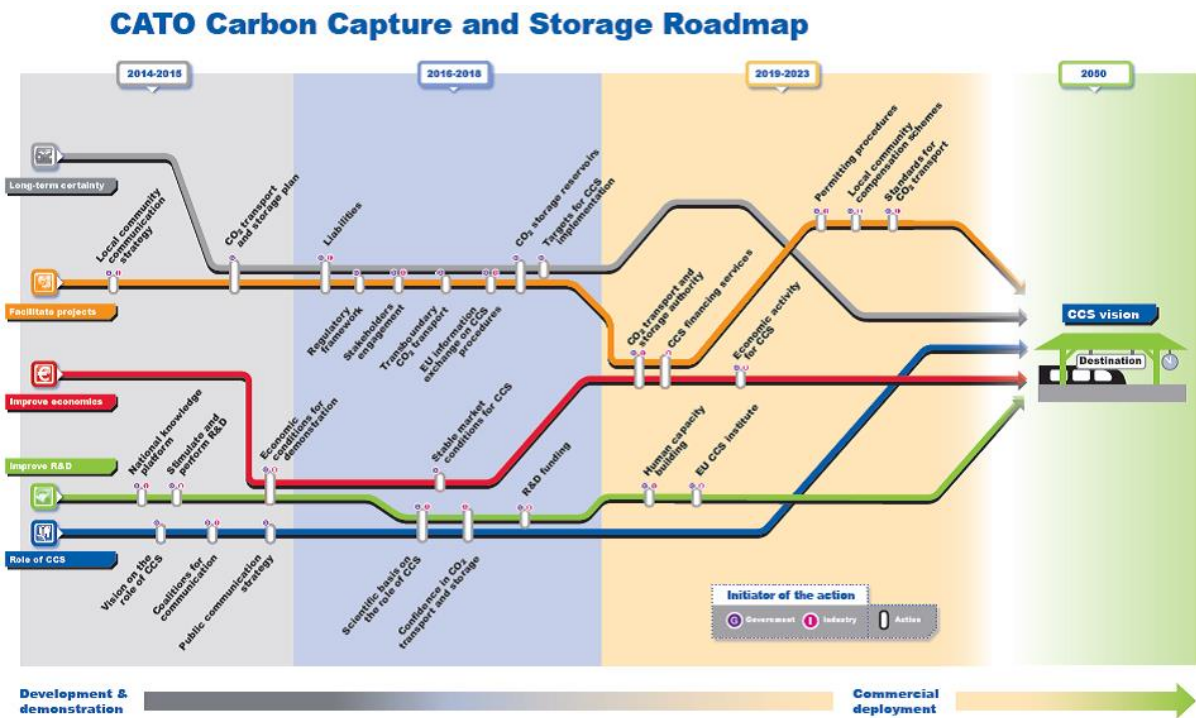
procedures for projects need to be in place to reduce project lead time as much as possible. Finally, the political environment around CCS needs to be stable allowing long-term investments made at acceptable financial risks.

The roadmap and its actions

To follow the road to the 2050 CCS vision, a roadmap has been constructed including actions to reach the vision. Realising an action contributes to 'eliminating' the hurdles in one or more of the abovementioned 'issues'. The actions are formulated in close collaboration with CCS stakeholders. In the picture below you can find the main actions. The full list of actions is described in the CCS roadmap and in the list of actions.

The roadmap is accessible online

To improve access to the implementation plan and the roadmap, instead of a report, it has been published on a dedicated website. The website is: <http://ccs-roadmap.ecofys.com>.



Distribution List

(this section shows the initial distribution list)

External	copies	Internal	Copies

Document Change Record

(this section shows the historical versions, with a short description of the updates)

Version	Nr of pages	Short description of change	Pages
See header	1 - xx	First version	

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2 Applicable/Reference documents and Abbreviations

2.1 Applicable Documents

(Applicable Documents, including their version, are the “legal” basis to the work performed)

	Title	Doc nr	Version
AD-01d	Toezegging CATO-2b	FES10036GXDU	2010.08.05
AD-01f	Besluit wijziging project CATO2b	FES1003AQ1FU	2010.09.21
AD-02a	Consortium Agreement	CATO-2-CA	2009.09.07
AD-02b	CATO-2 Consortium Agreement	CATO-2-CA	2010.09.09
AD-03h	Program Plan 2014	CATO2-WP0.A-D03	2013.12.29

2.2 Reference Documents

(Reference Documents are referred to in the document)

	Title	Doc nr	Version
RD-01			

2.3 Abbreviations

(this refers to abbreviations used in this document)

3 CCS roadmap website

The implementation plan/roadmap website is accessible through <http://ccs-roadmap.ecofys.com>. Main content on the website includes:

- 2050 CCS vision
- CATO CCS roadmap
- 5 issues providing classes of barriers for the development of CCS
- 26 actions to progress implementation of CCS
- History of CCS in the Netherlands
- International and national scenario's for CCS
- CCS business cases for Rotterdam area
- Descriptions of six main CCS topics

Below is the sitemap of the website displayed (as of 16 June 2014)

Sitemap

- Home
- CCS Roadmap
 - Issues
 - Facilitate projects
 - Improve R&D
 - Improve economics
 - Long-term certainty
 - Role of CCS
 - Actions
 - Certify CO₂ storage reservoirs
 - Create coalitions for communication
 - Create economic activity for CCS
 - Create national knowledge platform
 - Create stable market conditions for CCS
 - Create vision on the role of CCS
 - Define targets for CCS implementation
 - Design CO₂ transport and storage plan
 - Develop CCS financing services
 - Develop local community communication strategy
 - Enhance human capacity building
 - Establish CO₂ transport and storage authority
 - Establish EU CCS Institute
 - Establish EU information exchange on CCS procedures
 - Establish local community compensation scheme
 - Establish public communication strategy
 - Improve CCS regulatory framework
 - Improve R&D funding
 - Improve economic conditions demonstration
 - Improve permitting procedures
 - Initiate stakeholder engagement for projects
 - Regulate liabilities
 - Regulate transboundary CO₂ transport
 - Specify standards for CO₂ transport

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- Strengthen confidence in CO₂ transport and storage safety
- Strengthen scientific basis on the role of CCS
- Vision 2050
- About the roadmap
- CCS Story
 - The role of Carbon Capture and Storage
 - Carbon Capture and Storage in development
 - Carbon Capture and Storage in the Netherlands
 - Policies to support Carbon Capture and Storage
 - Topics Descriptions
 - Commercialisation
 - Governance
 - Regulatory issues
 - Communication to the public
 - Field strategy
 - Interfaces
 - Carbon Capture and Storage: relevant subjects
 - CCS in international scenarios
 - History of CCS in the Netherlands
 - CCS role in economic sectors
 - Carbon Capture and Utilisation
 - Biomass and CCS
 - Economic value CCS
 - CCS implementation: timely action is required
 - CCS and long-term policy environment
 - Financial instruments
 - Overview financial support mechanisms
 - Regulatory instruments
 - Mix of policy instruments
 - Research & Development
 - Rational for CCS demonstration
 - CCS demonstration projects
- CCS Scenarios
 - Scenarios towards 2050
 - CCS Scenarios
 - Rotterdam Business cases
- CATO Results
 - CO₂ transport standards
 - Investment models for CO₂ transportation infrastructure
 - Long-term liability
- Help
- About us
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