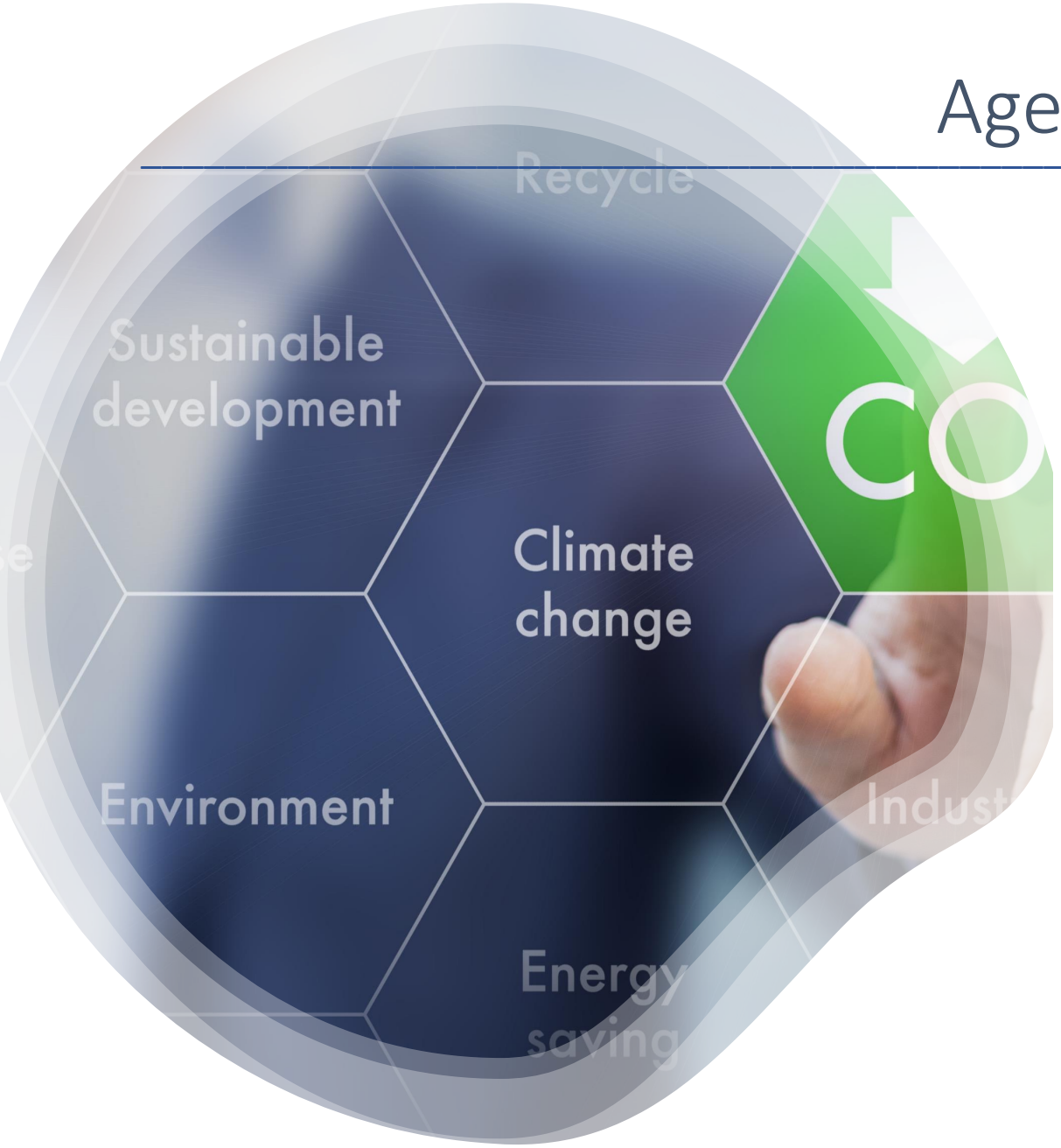



Offshore CCS Permitting in Europe

Joint GoMCarb and SECARB Offshore meeting 5-7 April 2023

Ingvild Ombudstvedt, IOM Law

Agenda



EU permitting framework for CO_2 storage

Offshore permits for CCS

Net Zero Industry Act

IOM Law at a glance

- Founded January 2017
- Specialized in CO_2 capture, transport, use and storage, including negative emissions, with extensive experience from oil and gas, international law and climate change policy
- Seven team members, based in Son (Norway), Tasmania (Australia) and Copenhagen (Denmark)
- Formal education from Norway, England, Denmark, Belgium, Turkey, Hong Kong, Japan, Australia and the United States







Partners


DEPARTMENT OF ENERGY
UNITED STATES OF AMERICA


NATIONAL
ENERGY
TECHNOLOGY
LABORATORY


Advanced Resources
International, Inc.


AkerSolutions


BATTELLE


GEOLOGICAL SURVEY OF ALABAMA
Founded 1848

GERALD R. HILL, PH.D.


IOM
LAW


LSU


Pale Blue Dot.


OSU


Schlumberger


UNIVERSITY OF
South Carolina


VT
VIRGINIA TECH

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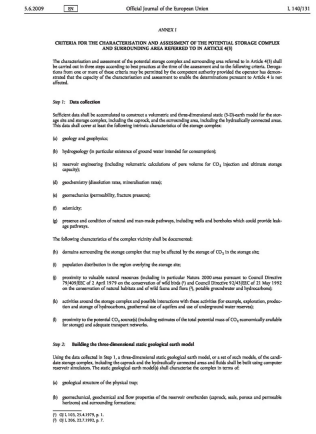
EU Permitting Framework for CCS

EU CCS Directive – Permitting CO_2 Storage

- Selection of storage sites (Article 4)
  - The Member States have the right to determine where and whether to allow for storage
  - Domestic assessment of storage capacity mandatory if opening for storage
  - Characterization and assessment of potential storage complexes and surrounding areas mandatory
  - Only if there is *"no significant risk of leakage, and [no] significant environmental and health risks"*



ANNEX I

CRITERIA FOR THE CHARACTERISATION AND ASSESSMENT OF THE POTENTIAL STORAGE COMPLEX AND SURROUNDING AREA REFERRED TO IN ARTICLE 4(3)

The characterisation and assessment of the potential storage complex and surrounding area referred to in Article 4(3) shall be carried out in three steps according to best practices at the time of the assessment and to the following criteria. Derogations from one or more of these criteria may be permitted by the competent authority provided the operator has demonstrated that the capacity of the characterisation and assessment to enable the determinations pursuant to Article 4 is not affected.

Step 1: Data collection

Sufficient data shall be accumulated to construct a volumetric and three-dimensional static (3-D)-earth model for the storage site and storage complex, including the caprock, and the surrounding area, including the hydraulically connected areas. This data shall cover at least the following intrinsic characteristics of the storage complex:

a) geology and geophysics;

b) hydrogeology (in particular existence of ground water intended for consumption);

c) reservoir engineering (including volumetric calculations of pore volume for CO_2 injection and ultimate storage capacity);

d) geochemistry (dissolution areas, mineralisation areas);

e) geomechanics (permeability, fracture pressure);

f) seismicity;

g) presence and condition of natural and man-made pathways, including wells and boreholes which could provide leakage pathways.

The following characteristics of the complex vicinity shall be documented:

h) domains surrounding the storage complex that may be affected by the storage of CO_2, in the storage site;

i) population distribution in the region overlying the storage site;

j) proximity to valuable natural resources (including in particular Natura 2000 areas pursuant to Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (1) and Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (2), potable groundwater and hydrocarbons);

k) activities around the storage complex and possible interactions with those activities (for example, exploration, production and storage of hydrocarbons, geothermal use of aquifers and use of underground water reservoirs);

l) proximity to the potential CO_2 sources(s) (including estimates of the total potential mass of CO_2 economically available for storage) and adequate transport networks.

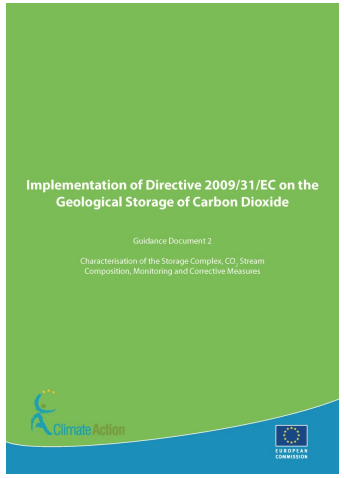
Step 2: Building the three-dimensional static geological earth model

Using the data collected in Step 1, a three-dimensional static geological earth model, or a set of such models, of the candidate storage complex, including the caprock and the hydraulically connected areas and fluids shall be built using computer reservoir simulators. The static geological earth model(s) shall characterise the complex in terms of:

a) geological structure of the physical trap;

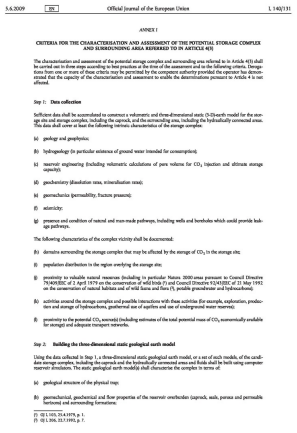
b) geomechanical, geochemical and flow properties of the reservoir overburden (caprock, seals, porous and permeable horizons) and surrounding formations;

(1) OJ L 103, 25.4.1979, p. 1.
(2) OJ L 206, 22.7.1992, p. 7.



EU CCS Directive – Exploration Permits

- Exploration permits (Article 5)
  - Mandatory when exploration is required to generate information necessary to select storage sites
  - Monitoring and injection tests may be included
  - Member States to ensure objective, published and non-discriminatory criteria
  - Permit period not to exceed period necessary to carry out exploration
  - Limited volume area
  - Exploration permit is exclusive, and Member States shall ensure no conflicting uses



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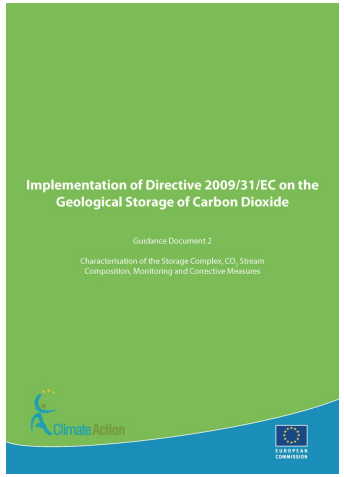


EU CCS Directive – Storage Permits

- Storage permits (Article 6)
  - Mandatory to operate a storage site
  - Only one operator
  - No conflicting uses
  - Member States to ensure objective, published and non-discriminatory criteria
  - Priority given to the holder of the Exploration Permit if exploration is completed, and Exploration Permit criteria complied with
- Rules for
  - Applications (Article 7)
  - Conditions (Article 8)
  - Contents (Article 9)
  - Commission review (Article 10)

Offshore permits for CCS

Commission Review of Storage permits

- Three Commission reviews so far, all offshore
  - 2012: CO_2 storage offshore on the Dutch continental shelf
  - 2016: CO_2 storage in the depleted Goldeneye gas condensate field on the UK continental shelf
  - 2022: CO_2 storage offshore on the Dutch continental shelf
    - Block P18-2 (New)
    - Block P18-4 (Amendment)

TAQA Offshore B.V and Energie Beheer Nederland CCS B.V for "Porthos"

Denmark

Greensand; a speedboat against Norway's Longship

- Demonstration project not subject to Commission review
- Selection of storage site in the North Sea
- Permit to store: December 2022
- Cross-border transport of CO_2 from Belgium to Denmark
- First injection: **8 March 2023**
- FID for full-scale planned for first half of 2024
  - Up to 1,5 million tons of CO2 in 2025/2026
  - Up to 8 million tons of CO2 per year in 2030

Illustration: Norwegian Ministry of Petroleum and Energy

Exploration permits

- Three exclusive permits granted in the North Sea, February 2023
  - INEOS E&P and Wintershall Dea International
  - TotalEnergies Denmark A/S (two licenses)

Norway – Five Exploration Permits

10 June (5 April) 2022

- Equinor ASA in the North Sea (Smeaheia – Northern Lights)
- Equinor ASA, Horisont Energi AS and Vår Energi AS in the Barents Sea (Polaris)

11 November (5 October) 2022

- Wintershall Dea Norway AS and CapeOmega AS in the North Sea

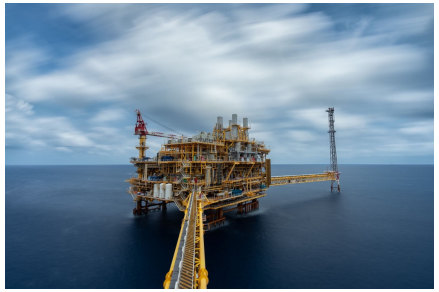
(31 March) 2023

- Aker BP ASA and OMV (Norge) AS in the eastern part of the southern North Sea
- Wintershall Dea Norge AS and Altera Infrastructure Group through its subsidiary Stella Maris CCS AS in the north-western part of the southern North Sea

The United Kingdom

- No longer part of the European Union
  - Framework still based on the CCS Directive
  - No need for Commission review of the storage licences

- Announced their first licensing round after Brexit 14 June 2023
  - 13 areas on offer, which are off the coasts of Aberdeen, Teesside, Liverpool and Lincolnshire
  - The North Sea Transition Authority are evaluating the bids and were aiming at announcing awards “early 2023”
  - Aiming at injection in 2027



The Proposed Net Zero Industry Act – A Promise of Acceleration of CCS in Europe?

- NZIA:
  - establishes a Net-Zero Europe Platform;
  - sets a target for storage in the EU of 50 million tons of CO_2 in annual injection capacity by 2030;
  - recognizes that a cross-border, single-market approach is needed;
  - requires Member States to publish "areas where CO_2 storage sites can be permitted on their territory";
  - calls on Member States to "establish an obligation for licensees of oil and gas production sites located on their territory to make publicly available all geological data relating to production sites that have been decommissioned or whose decommissioning has been notified to the competent authority.

- Within 6 months of the NZIA being implemented, Member States will have to provide an update to the Commission on the status of CO_2 capture and storage project developments, as well as measures taken to support their development.

- CO_2 storage projects will be able to obtain their storage permit through an accelerated and streamlined permitting procedure within 18 months of application provided they are located in the EU and aim to be operational by 2030.

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Thank you for your attention!