

NORDICCS



The Nordic CO₂ storage atlas

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GEUS – Geological Survey of Denmark and Greenland

NORDICCS – the Nordic CCS Competence Centre

The screenshot shows the website for Nordiccscs, the Nordic CCS Competence Centre. The header includes language options (English, Suomi, Íslenska, Scandinavian), Site Map, Accessibility, and Contact. The main navigation menu includes Home, About TRI, Programmes, Calls for applications, Projects, News, FAQ, Contacts, and Links. The 'Programmes' menu item is highlighted.

On the left sidebar, there is a list of topics: Effect studies and adaptation to climate change, Interaction between climate change and the cryosphere, Energy efficiency with nanotechnology, Integration of large-scale wind power, Sustainable bio-fuels, and CO2 – capture and storage. The 'CO2 – capture and storage' item is highlighted and has a link to a 'Closed call: Nordic user driven competence centre for realisation of carbon capture and storage'.

The main content area features a large image of an industrial facility at night. Below the image, the text reads: 'Closed call: Nordic user driven competence centre for realisation of carbon capture and storage'. The text continues: 'The Nordic Top-level Research Initiative announces a call for proposals to support the establishment of a Nordic User Driven Competence Centre for realisation of Carbon Capture and Storage.' Below this, it states: 'The objective of the Centre is to boost innovation, joint actions and processes in the Nordic countries and to increase industry-driven innovation in CCS. This call aims for a model of cooperation based on the need for more innovation for CCS realisation within'.

On the right side, there is a 'CONTACT PERSON' section with the following information: 'Programme Secretary Natalia Grebennik, Nordic Innovation Centre. E-mail: [redacted] Phone: +47 410 45 211'. Below this is a 'SEARCH' section with a search box and a 'Search' button. There is also a 'NEWS' section with two items: 'Will your house stand in the next storm?' dated Jan 03, 2012, and 'Promoting green growth' dated Dec 09, 2011. At the bottom right, there is a 'NEWSLETTER' section with a 'Subscribe to our newsletter!' button and an 'E-mail address' field.

Our history:

Call ultimo 2010

Application March 2011

Granted June 15th 2011

35 million NOK ~ 4.6 million €

4 year period

Kick-off October 1st 2011

Objectives for NORDICCS

The main objective of NORDICCS is to boost the deployment of CCS in the Nordic countries by creating a durable network of excellence integrating R&D capacities and relevant industry.

- The Center carries out both research and development activities, however, NORDICCS has a strong objective in facilitating **networking** in the Nordic area.
- One main issue is to stimulate CCS innovation and deployment through **interaction** between relevant actors throughout the CCS value chain.
- NORDICCS aims at providing **recommendations** for future research and development activities, and at spreading unbiased information to the general public.

Who are we?

R & D partners:

SINTEF Energy AS

SINTEF Petroleum Research

NTNU Trondheim - Norwegian University of Science and technology

University of Oslo

Tel-Tek

VTT

Chalmers

IVL – Swedish Environmental Research Institute

SGU – Geological Survey of Sweden

University of Iceland

GEUS – Geological Survey of Denmark and Greenland

Industry partners:

NORCEM – Heidelberg Cement Group

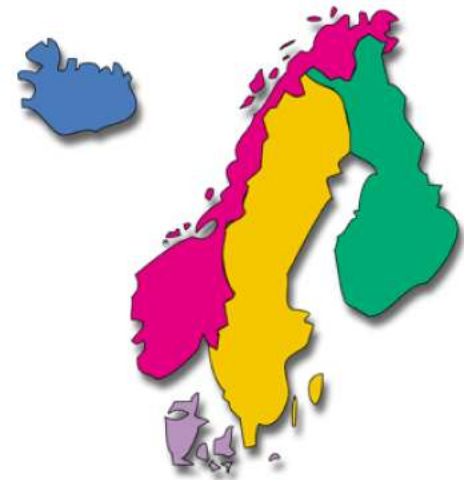
TCM - Technology Centre Mongstad

Reykjavik Energy

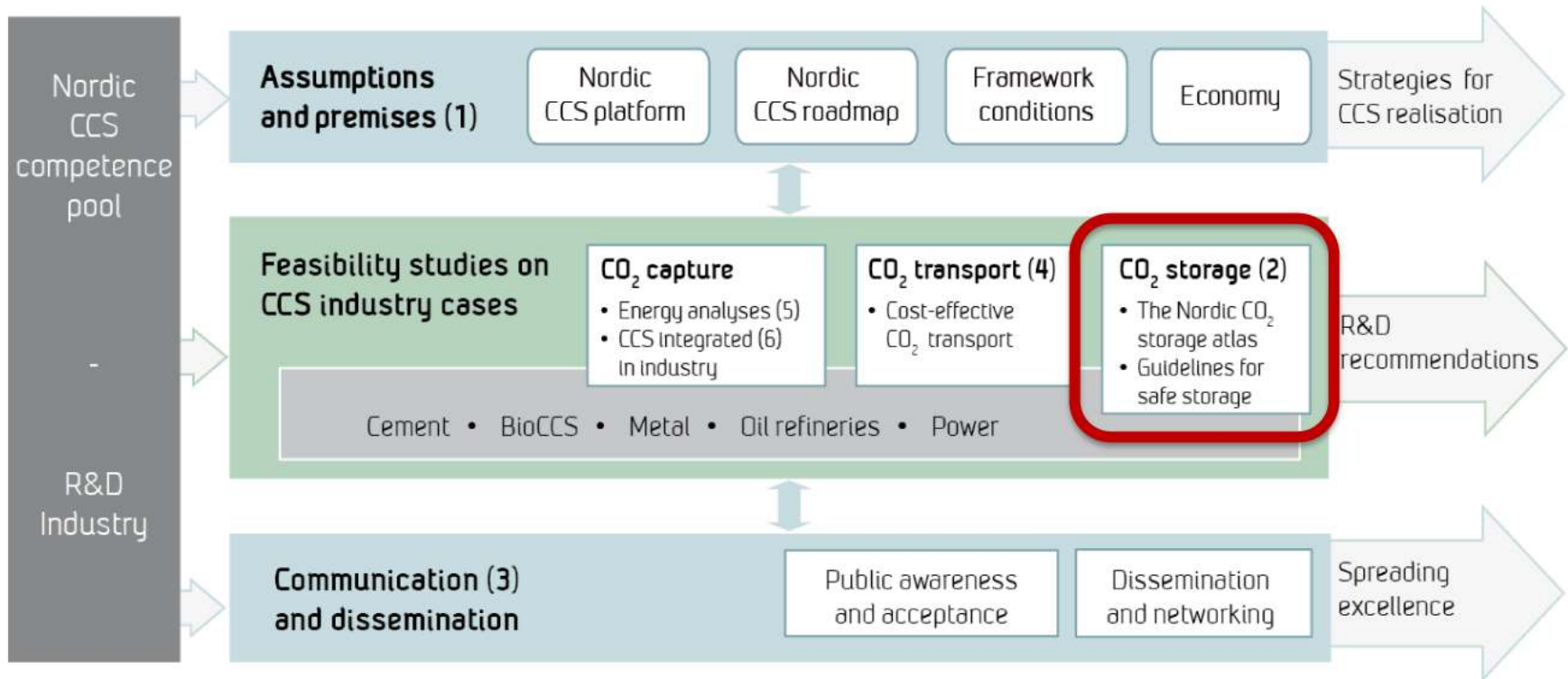
GASSCO

Statoil

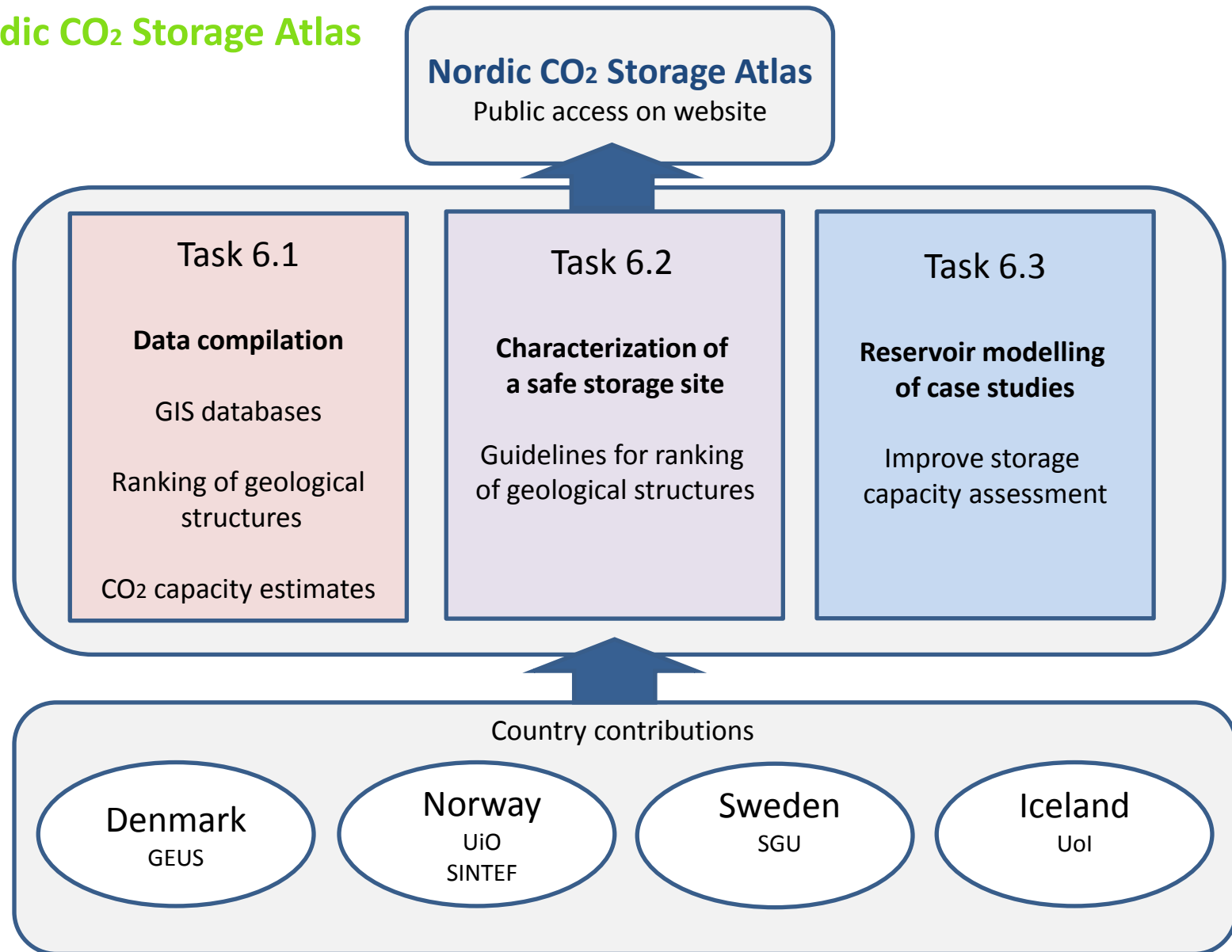
Vattenfall



NORDICCS concept



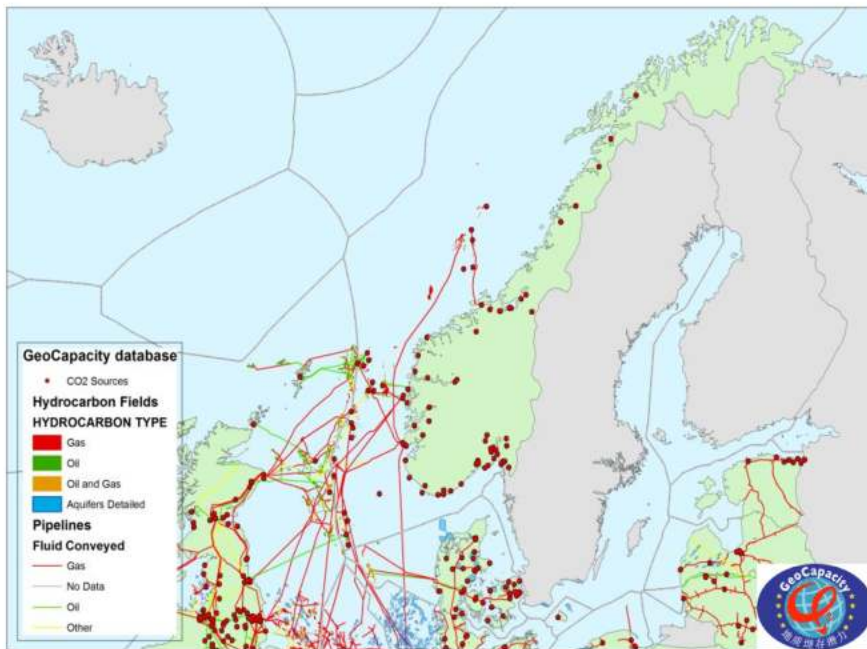
Nordic CO₂ Storage Atlas



Nordic CO₂ Storage Atlas

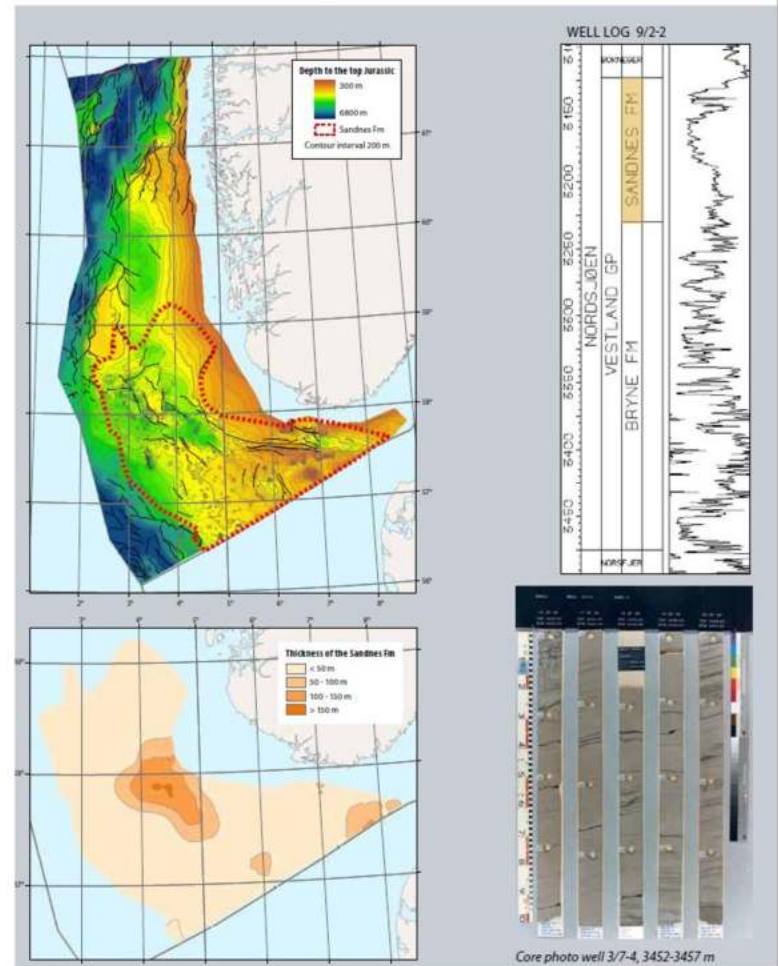
Previous mapping of CO₂ storage sites:

- GESTCO, 2004
- EU GeoCapacity, 2009
- Norwegian CO₂ storage atlas, 2011 & 2012
- CO2StoP GIS-project, 2012 (2013)



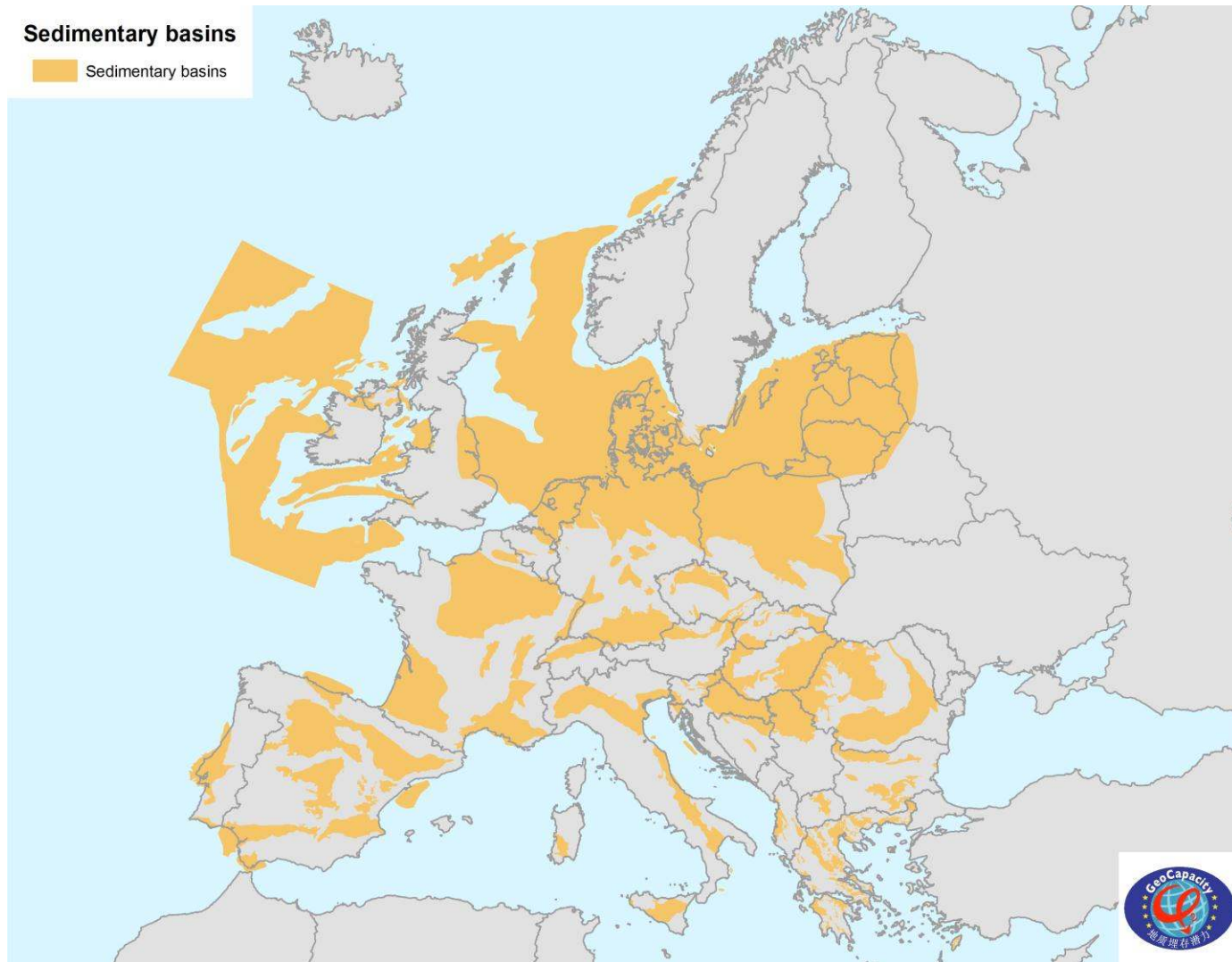
EU GeoCapacity, 2009 and GESTCO, 2004

The Sandnes Formation



Norwegian CO₂ Storage Atlas – Norwegian North sea
Norwegian Petroleum Directorate, 2011

Nordic CO₂ Storage Atlas



Sedimentary basins mapped in GeoCapacity

Nordic CO₂ Storage Atlas



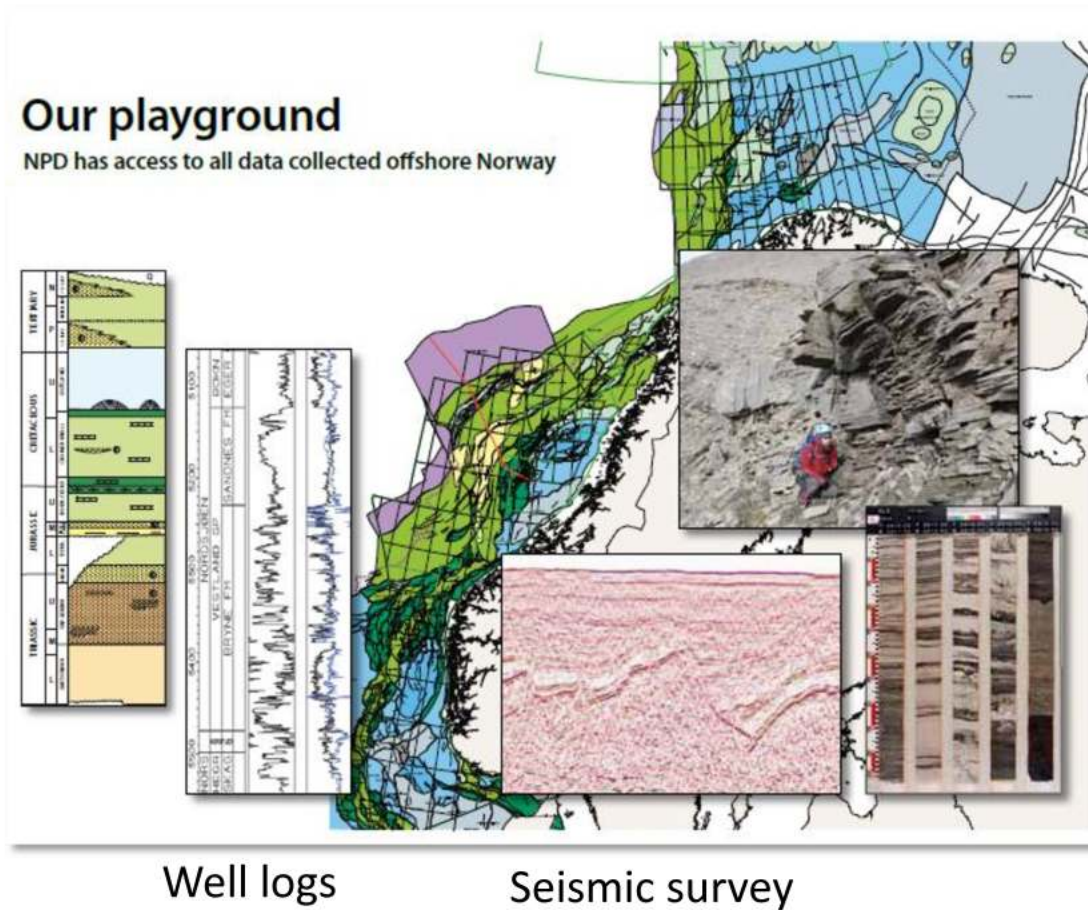
Off-shore basins mapped in GeoCapacity

Nordic CO₂ Storage Atlas

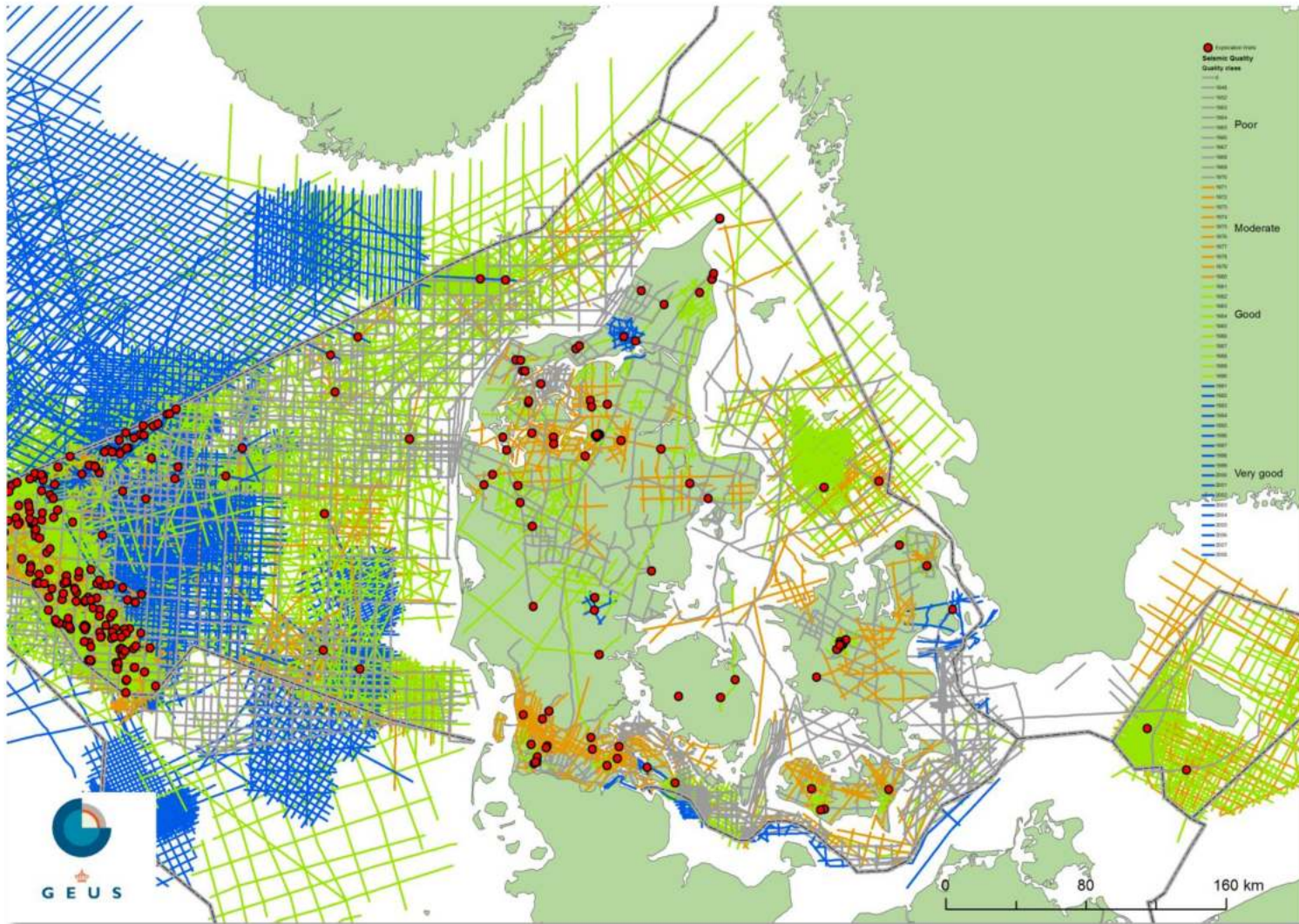
The objective is to review and update existing databases and generate “The Nordic CO₂ Storage Atlas”

- European R&D on CO₂ storage capacity only includes data from Denmark and part of Norway. The input data will be extended to cover the rest of the Nordic area.
- A clear distinction between geological formations forming regional aquifers with potential for CO₂ storage and individual geological structures and traps are not well established in the European projects.
- Geological formations with sealing properties are not previously mapped.

Nordic CO₂ Storage Atlas – how do we map storage?



Nordic CO₂ Storage Atlas – data quality



Quality and density of seismic survey in Denmark

Nordic CO₂ Storage Atlas

Eu GeoCapacity mapped:

- Aquifers regional
- Aquifers detailed

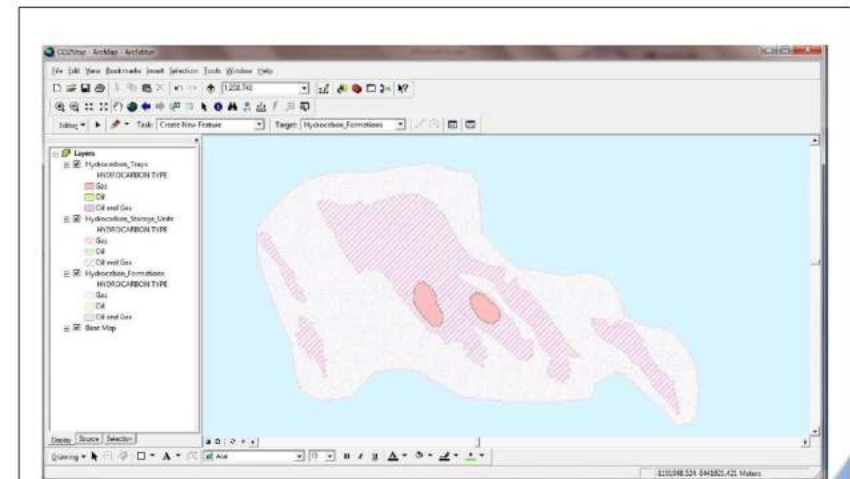
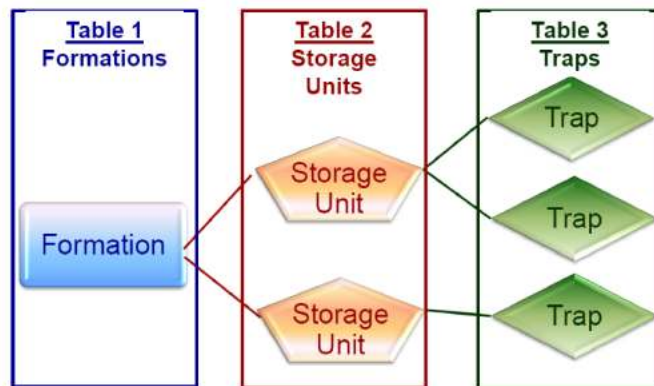
NPD mapped:

- Potential storage formations
- Sealing formations

NORDICCS will follow the CO2StoP project terminology and map:

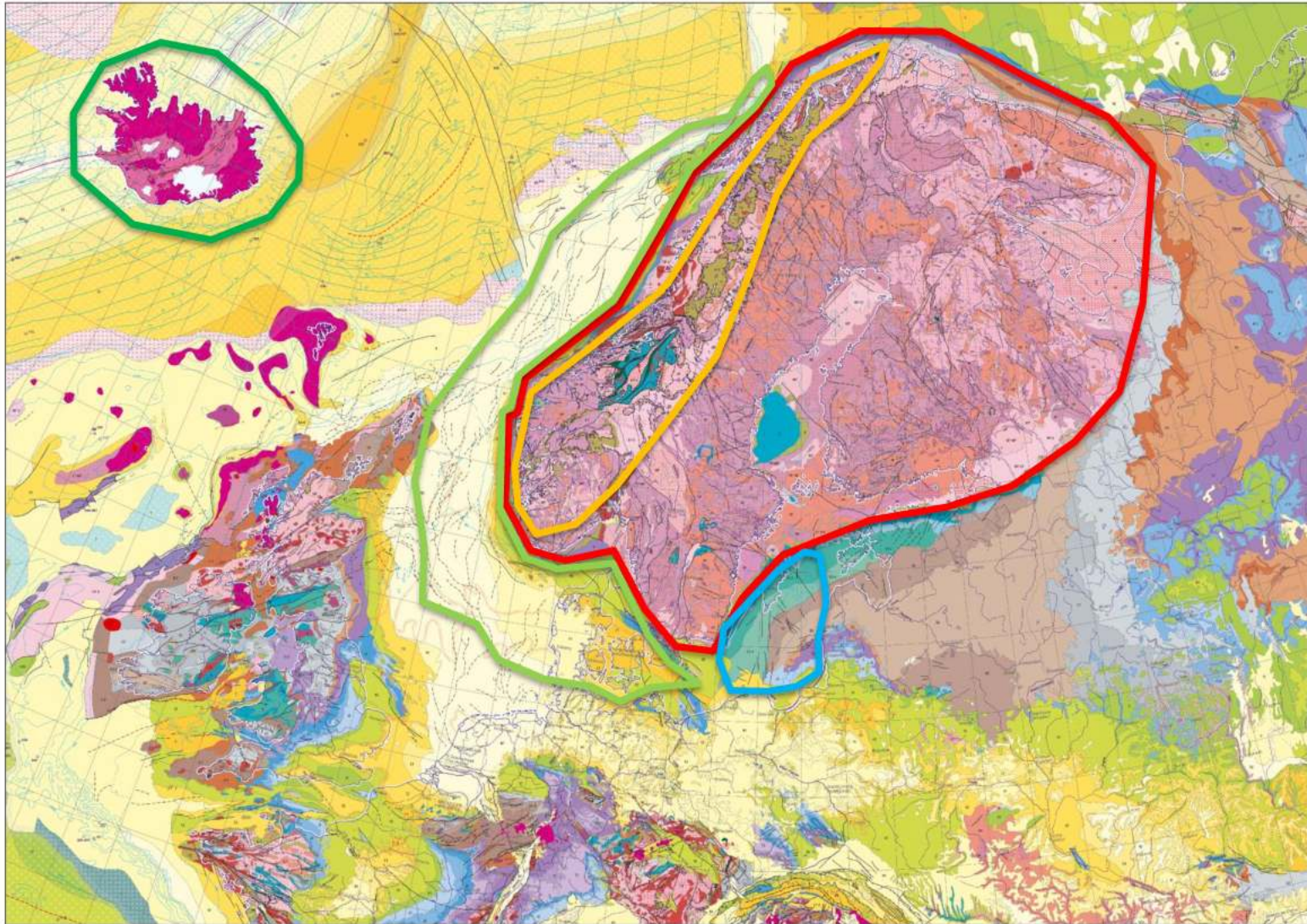
- Formations
- Storage units
- Traps

Database Structure



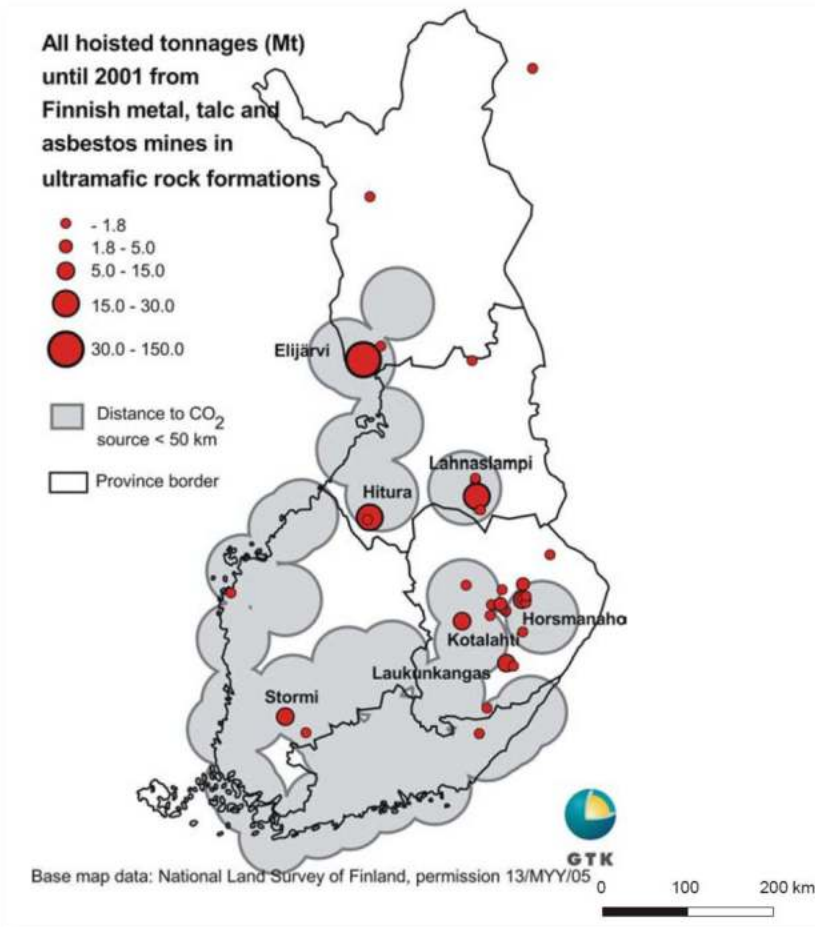
Relational data from the database linked to polygons in the GIS

Source CO2StoP project – the project will be finalised December 2012



IGME 5000

Nordic CO₂ Storage Atlas - Finland



The pre study on the potential for applying CCS in the Nordic countries “Potential for carbon, capture and storage (CCS) in the Nordic region” (Teir et al., 2010) concluded that Finland has no storage capacity in sedimentary formations (saline aquifers).

Finland has a minor potential for mineral carbonation in ultramafic rocks at about 2-3 Gt (Aatos et al., 2006).

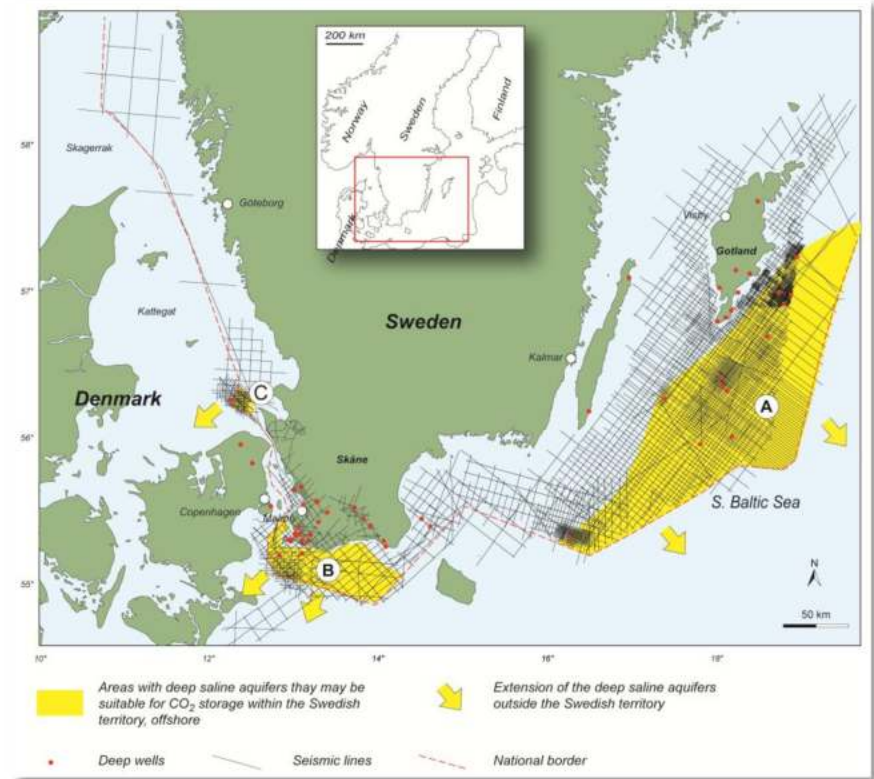
Nordic CO₂ Storage Atlas - Sweden

All the data and material are public at the Geological Survey of Sweden.

Storage areas are mapped.

Data not available as GIS.

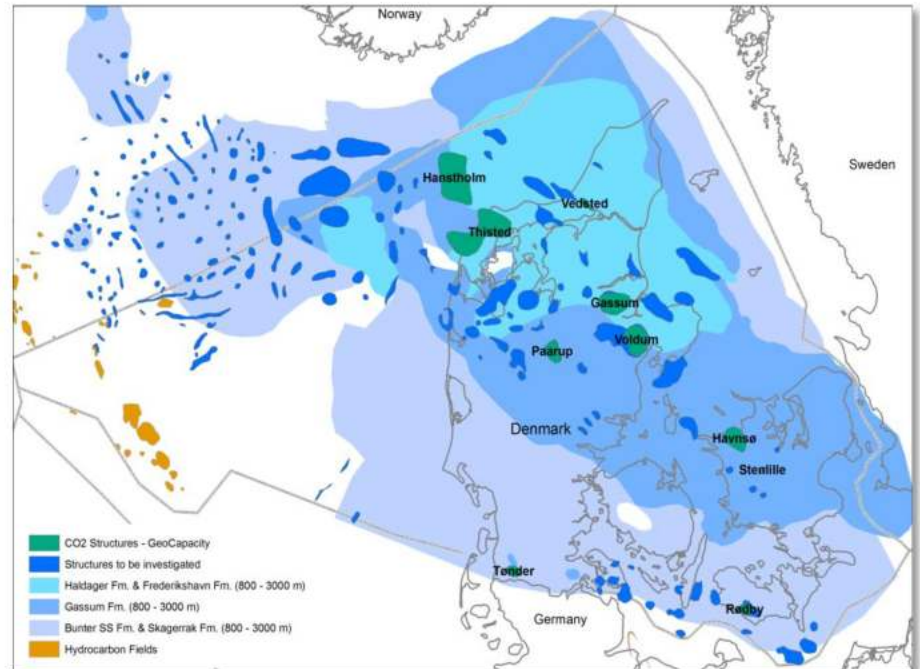
No mapping of structures.



Nordic CO₂ Storage Atlas - Denmark

In the GESTCO and the GeoCapacity projects, **10 geological structures** were selected as the most prospective CO₂ storage sites.

Denmark has more than 100 onshore and offshore geological structures and only further research can determine whether these structures are potential candidates for CO₂ storage.



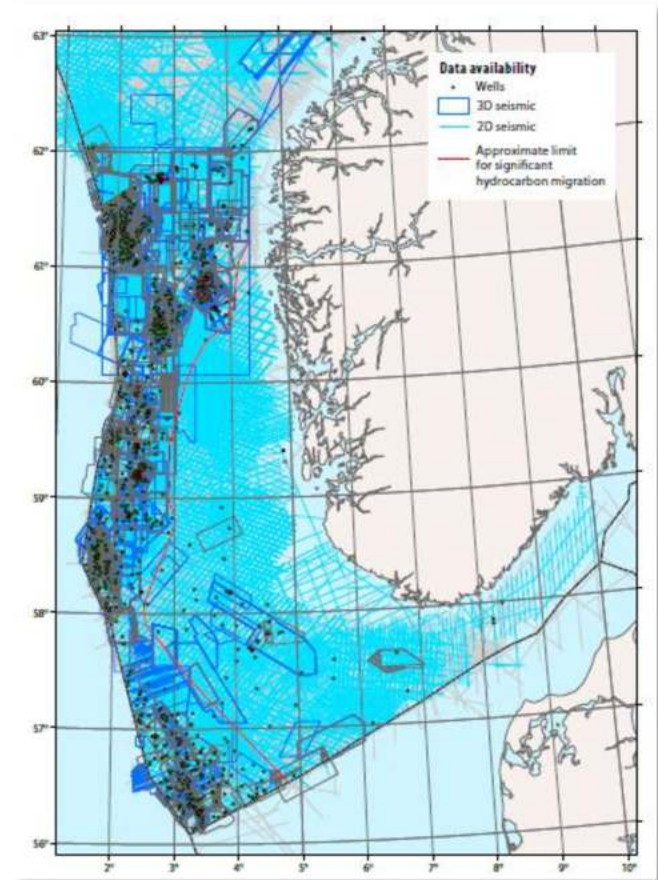
Nordic CO₂ Storage Atlas - Norway

Many data available and public from NPD.

Data are already in a GIS-format.

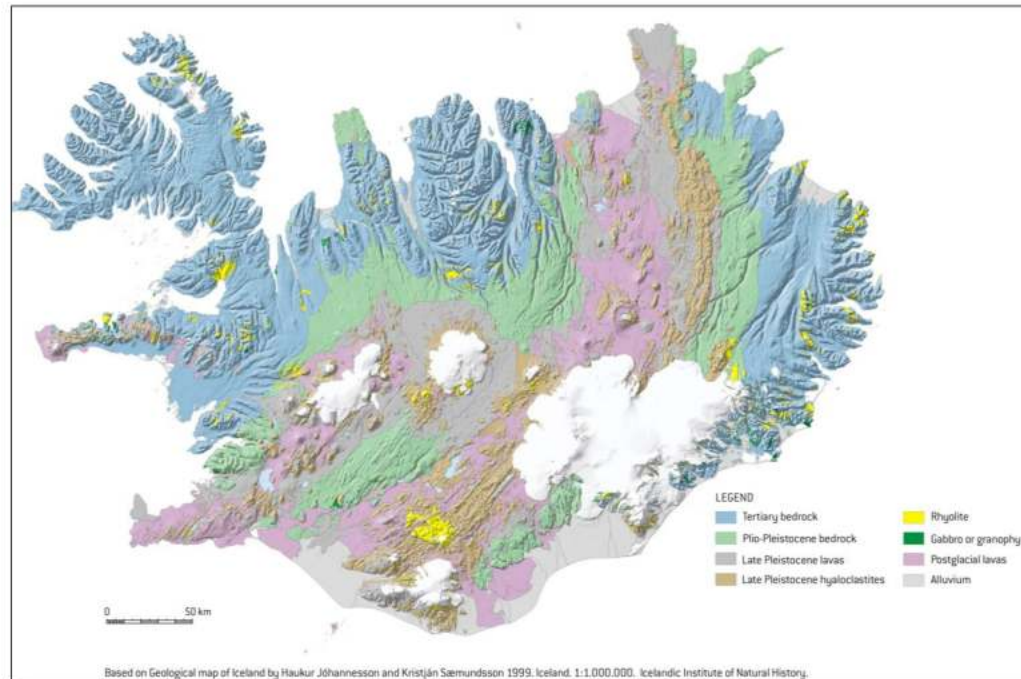
No mapping of most prospective structures or storage units.

Huge potential storage areas makes it difficult to cover all.



Norwegian CO₂ Storage Atlas – Norwegian North sea
Norwegian Petroleum Directorate, 2011

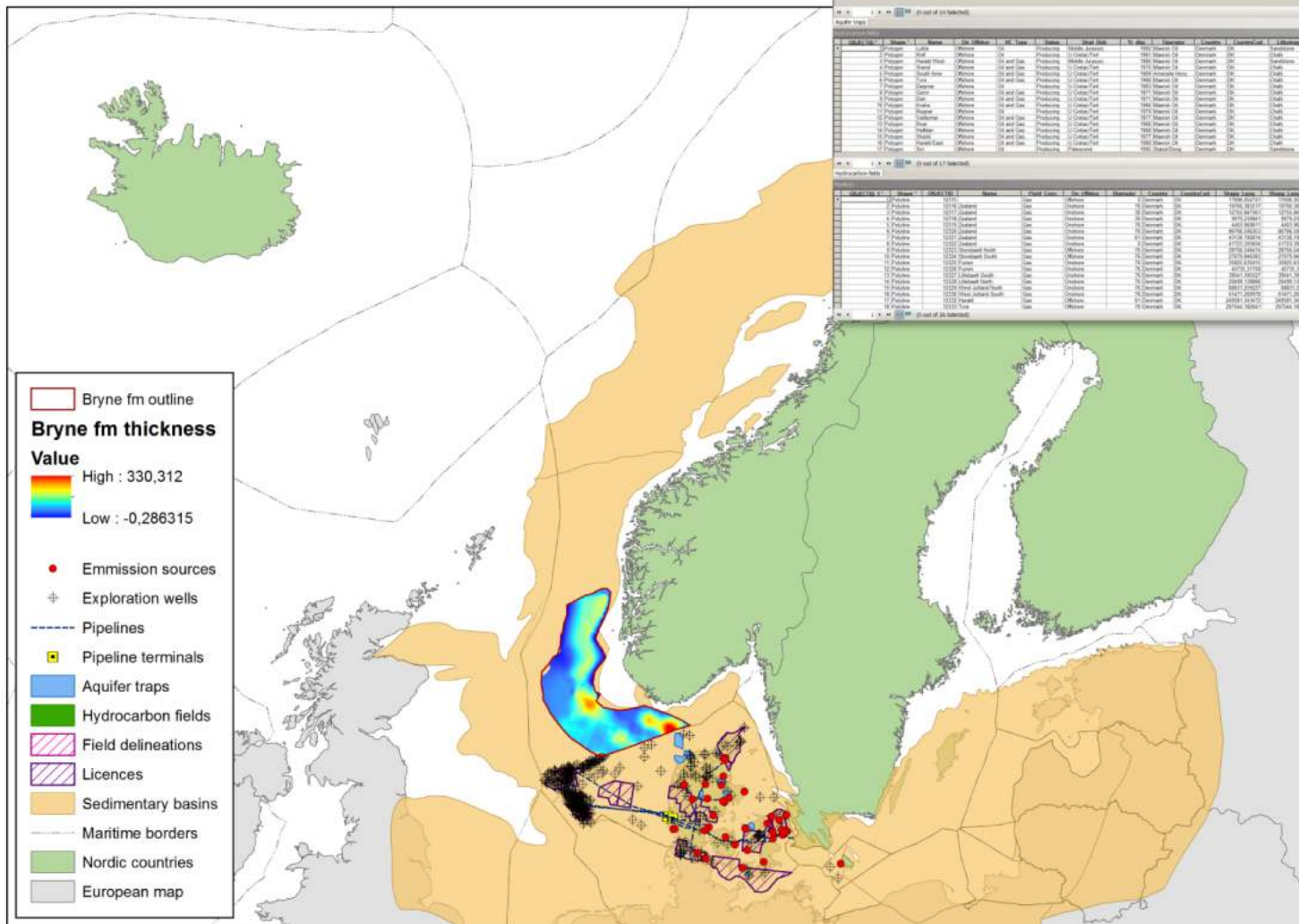
Nordic CO₂ Storage Atlas - Iceland



Over 80% of Iceland is basalt, and most of it is extrusive. Iceland has no sedimentary formations, sedimentary geological structures or hydrocarbon fields suitable for CO₂ storage.

The CarbFix pilot study is researching **the possibilities for storage in basalts.**

Nordic CO₂ Storage Atlas



NORDICCS GIS database 2012



CHALMERS



NTNU – Trondheim
Norwegian University of
Science and Technology



GEUS



VATTENFALL



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