

The Top-level Research Initiative - A major Nordic venture for climate, energy and the environment

The Top-level Research Initiative (TRI) is a joint effort on the part of the Nordic countries to find solutions to global climate challenges - the largest-ever Nordic venture of its kind.

The Nordic countries have created a platform for cooperation with central players from research, innovation, business and industry.

The TRI is one of the Globalisation initiatives declared by the Nordic Prime Ministers in 2008, intended to increase competitiveness and promote the Nordic region as a pioneer in tackling globalisation. With a programme budget of 53 million Euro, the initiative currently funds 31 Nordic projects amounting to a collective value of some 94 million Euro.

Joint governance across sectors

Three Nordic institutions - NordForsk, Nordic Innovation and Nordic Energy Research - act as secretariat for the initiative, contributing with their combined competencies in the fields of research, innovation and technology. The three organisations are all under the auspices of the Nordic Council of Ministers.

TRI is governed by a Management Board consisting of 15 members representing public financing bodies for research and innovation, as well as the private sector.

The various funded activities involve participants from the whole Nordic region and a range of sectors. Expertise within research, education and innovation is brought together and coordinated in collaboration projects with hundreds of participants from all the Nordic and Arctic countries.

The Top-level Research Initiative addresses six primary thematic areas:

- **Climate (ADAPT)** = Effect Studies and Adaptation to Climate Change
- **Cryo** = Interaction between Climate Change and the Cryosphere
- **Nano** = Energy Efficiency with Nanotechnology
- **Wind** = Integration of Large-scale Wind Power
- **Bio** = Sustainable Bio-fuels
- **CCS** = CO₂ - capture and storage

Within the framework of these areas, the initiative also includes:

- Advanced climate modelling
- Social sciences and humanities
- Focus on the Arctic

Overall objectives

- To promote the Nordic region as a pioneer within climate, energy and the environment
- To ensure research and innovation of excellent quality by joining the strongest Nordic environments
- To promote Nordic business
- To promote professional environments across sectors and enhance mobility of competence
- To create platforms for international cooperation and to strengthen the Nordic region within EU programmes

Content and results

The TRI has established six Nordic Centres of Excellence (NCoE), one Nordic competence centre, 11 integrated research and innovation projects and 13 thematic networks within climate and energy issues. The projects contribute to enhancing society's knowledge about climate change and to better prepare us for them, such as through technology development and sustainable energy solutions.

Participation from industry

One-third of all the TRI projects have active business participation. This participation gives an opportunity to realise long-term investments and to build strategic networks.

International perspectives and dialogue with the EU

Through various projects and networks, the TRI links research, innovation and industry together, by acting as a platform for further international collaboration. Examples of such collaboration are a project dealing with the continuation of the International Polar Year (IPY) and Arctic issues and involvement in the Joint Programming Initiative (JPI Climate) Connecting Climate Knowledge for Europe.

Result-oriented

The Top-level Research Initiative aims to obtain results through effective plans, organisation and processes, and evaluations are carried out in order to document its results.

Outreach and communication

Communication and dissemination of results through various channels is a priority. The initiative participates on various arenas in Europe, and organises a large annual conference gathering many categories of professionals and receiving international attention.

See www.toplevelresearch.org for more information about the initiative.

Top-level
Research
Initiative

CO₂-capture and storage



CO₂ – capture and storage

The Top-level Research Initiative (TRI) is the largest joint Nordic research and innovation initiative to date. The initiative aims to involve the very best agencies and institutions in the Nordic region, and promote research and innovation of the highest level, in order to make a Nordic contribution towards solving the global climate crisis. The Top-level Research Initiative consists of six sub-programs and «CO₂ – capture and storage (CCS)» is one of them.

Sub-program «CO₂ – capture and storage (CCS)»
TRI sub-program «CO₂ – capture and storage» facilitates cooperation between industry, researchers and policymakers.

Two studies on ongoing national activities and priorities were prepared in the start phase of the sub-program. VTT Technical Research Centre of Finland has made an overview of the technologies and applications required for CCS in the Nordic countries. Sund Energy's (Norway) study focused on the role of Nordic CCS in a renewable scenario.

In 2010 the sub-program launched a call for a Nordic User-driven Competence Center for CCS.

What is CO₂ – capture and storage (CCS)

CCS technology is an efficient method for reducing CO₂ emissions in the future. In CCS, CO₂ is captured at a power plant or an industrial facility, after which it is purified, pressurised and transported to a long-term storage site by pipeline or ship.

Gas treating technologies have been around for over 80 years. During the last couple of decades, new technologies have surfaced. The development of CCS is currently being strongly pursued worldwide. Many pilot plants have been designed and operated. Large amounts of CO₂ would need to be captured and transported, and the uncertainties and responsibilities related to its long-term storage as well as high costs are the main challenges for CCS.

CCS in the Nordic region

CCS could prove opportunities for the Nordic countries, since both large stationary sources of CO₂ and geology suitable for storage of CO₂ can be found in this region. The Nordic countries are involved in a number of CCS research and pilot projects.

Coordination and dialogue between various national players at the Nordic level is vital for the successful development of Nordic competence. Closer cooperation will strengthen the region's position as CCS expert in the EU and globally. Coordination and cooperation can improve the best Nordic methods and technologies and help the region to achieve the CO₂ reduction goals.

Photo: Peter Andrews/Scampix



CO₂ sources in the Nordic countries where CCS is applicable:

- Cement and lime production
- Iron and steel production
- Non-ferrous metal production
- Offshore oil and gas activities
- Oil and gas refineries
- Power and heat production
- Production of chemicals
- Pulp and paper production

NORDICCS

Nordic CCS Competence Centre

Nordic User-driven Competence Center for realization of Carbon Capture and Storage (NORDICCS)

NORDICCS was established in 2011 and is funded until 2014. It is a virtual CCS networking platform aiming for increased CCS deployment in the five Nordic countries. Total budget of the Center is 47 MNOK.

The 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 with the purpose to:

- Provide Nordic industry-driven leadership within CCS innovation and realization
- Demonstrate how CCS can contribute to the Nordic portfolio of climate change mitigation options
- Enable the Nordic countries to join forces to become pioneers in large-scale implementation of CCS
- Multi-contextual focus to utilize Nordic differences for broad stakeholder and global relevance
- Strengthen the competitive power of the region by combining capacities of the Nordic countries

Some of the concrete results of the Center's activities will include:

- Nordic CO₂ storage atlas – web based geographic information system database (GIS) about possible CO₂ storage locations
- Nordic CCS roadmap – a common vision of strategies for implementation of large-scale CCS
- Provision of CCS knowledge basis for the decision makers
- Communication of CCS to general public and stakeholders

- Coordination of industry case studies
- Investigation of opportunities for economically viable solutions
- CO₂ emission database for Nordic countries
- Recommendations on CO₂ transport solutions for the Nordic countries

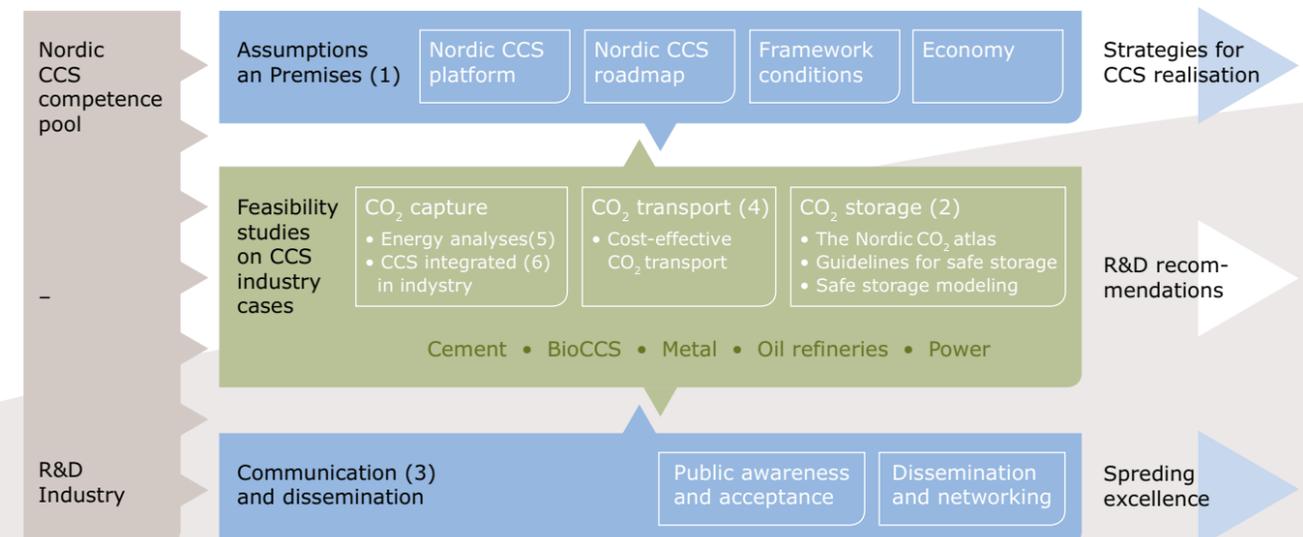
Participating institutions:

- SINTEF Petroleum Research (NO)
- Norwegian University of science and Technology NTNU (NO)
- Tel-Tek (NO)
- University of Oslo (NO)
- SINTEF Energy Research (NO)
- Statoil (NO)
- Gassco (NO)
- Norcem AS (NO)
- VTT Technical Research Centre of Finland (FI)
- Chalmers University of Technology (SE)
- IVL Swedish Environmental Research Institute (SE)
- Geological Survey of Sweden SGU (SE)
- University of Iceland (IS)
- Reykjavik Energy (IS)
- Geological Survey of Denmark and Greenland GEUS (DK)

In addition there is an extended partner group, which includes research institutes, NGOs and industry.

Center leader: Nils A. Røkke, SINTEF Energy, Norway.

The NORDICCS Concept



Source: SINTEF