



Member State report on Implementation of Directive 2009/31/EC on the geological storage of carbon dioxide ("CCS Directive")

OUTLINE

Changes, reviews and updates of national implementation legislation

- 1. Are there any changes to national legislation, permitting system or competent authorities that have taken place since the last report on implementation of the CCS Directive in your country?**

The Atmospheric Air Protection Act, which entered into force 1st of January 2017 includes the legislation regarding CCS in Estonia (i.e capture, transportation of carbon dioxide). There are no changes in the Earth Crust Act where is provision that prohibits the geological storing of carbon dioxide in accordance with the Atmosphere Air Protection Act in the territory of Estonia and under the continental shelf of Estonia. The prohibition specified in subsection 1 of this section does not apply if the total volume of geologically stored carbon dioxide is less than 100,000 tons and the storage is undertaken for research, development or testing of new products and processes.

- 2. Are there processes in place for storage permit applicants to engage pro-actively with the competent permitting authorities regarding relevant applications? If yes, please provide details.**

As geological storage of carbon dioxide in the territory of the Republic of Estonia and under the continental shelf of Estonia is prohibited, we do not have today applications for storage of carbon dioxide and no processes to engage pro-actively with the competent permitting authorities.

- 3. Please provide the name, email address and telephone of the contact point at the competent authority responsible for fulfilling the duties established under the Directive.**

The contact point at the Ministry of the Environment of Estonia in relation to implementation of the Directive is Merilyn Möls Merilyn.mols@envir.ee +372 605 0096

- 4. Are there any issues that the competent authority would like to discuss with other**

competent authorities in relation to the practical implementation of the Directive and in particular the national permitting procedures in the Information Exchange Group under the auspices of Article 27(2)?

No there aren't any issues.

Selection of areas for storage sites (Article 4)

- 5. Which areas are determined from which storage sites may be selected pursuant to Article 4(1) until April 2023?**

Whilst the geological storing of carbon dioxide is prohibited in the territory of Estonia by law, there aren't any areas determined.

- 6. Will additional areas be determined from which storage sites may be selected in the period until the next report at the end of 2027, if so, which geological type of areas are considered (e.g. saline aquifers, depleted or not depleted gas & oil fields, mafic rocks) from a geological point of view and what are the next steps? Member States are not obliged to justify any such decision, but an indication which territories are concerned, including their location, and why this has been done, would be appreciated.**

There are no relevant plans in Estonia. geological conditions in Estonia are not favorable (ie. not according to the CCS Directive conditions) for CO₂ geological storage. Closed oil-shale mines are too shallow for CO₂ storage (60-65 m). The Cambrian aquifer reaches 707 m depth at the island Ruhnu, at the other area it is mostly 100-500 m. The aquifers are used for drinking water supply; the highest salinity of the deep Cambrian aquifer is 20 g/l. This all means that geological storing in Estonia is not possible.

- 7. Are there information about environmental and/or health risks relating to the geological storage of CO₂ in accordance with the applicable Community legislation available to the public³?**

No

Exploration permits (Article 5)

- 8. Are there areas or specific sites where no exploration permits are required to generate the information necessary for the selection of storage sites, pursuant to Article 5?**

No

- 9. How many exploration permits have been given pursuant to Article 5 since your last reporting?**

No permits have been given.

Storage permits applications (Article 10)

- 10. Member States shall make the permit applications available to the Commission within one month after receipt. Are there any plans of potential operators to apply for storage permits pursuant to Article 7? If yes, please provide an approximate timing.**

There are no such plans.

Third-party fair and open access (Article 21)

- 11. What measures – if any – have been taken to ensure that potential users are able to obtain fair and open access to transport networks and to storage sites for the purposes of geological storage of the produced and captured CO₂ (Article 21)**

There are no measures.

- 12. Are you aware that prospective transport operators and/or storage operators have refused access to their facilities on the grounds of lack of capacity?**

No.

- 13. What measures – if any – have been taken to ensure that the operator refusing access on the grounds of lack of capacity or a lack of connection makes any necessary enhancements as far as it is economic to do so or when a potential customer is willing to pay for them? (Article 21)**

Not applicable.

² Please provide the geospatial information of the relevant territories in line with the INSPIRE Data Specification for the spatial data theme Geology (<https://inspire.ec.europa.eu/id/document/tg/ge>). The information will be used for internal purposes by the Commission services and would only be published with explicit consent.

³ Please provide the relevant URL(s).

Transboundary cooperation (Article 24)

- 14. Is there any experience or plans for transboundary CO₂ transport or CO₂ storage sites or storage complexes? Please provide details on the status of preparations, if any.**

Today there is no experience or plans for transboundary CO₂ transport.

CO₂ capture readiness (Article 33)

- 15. How many combustion plants with a rated electrical output of 300 MW or more have received a permit since the last implementation report? What was the outcome of the assessment under Article 36 of Directive 2010/75/EU? In case of negative assessment, have the combustion plants set aside suitable space irrespectively? Please provide detail for each permit according to Annex 2.**

No combustion plants with a rated electrical output of 300 MW or more have received a permit after the last implementation report. In Estonia there is only one combustion plant with electrical output up to 300 MW. The plant started to operate early autumn in 2018, using indigenous fuel oil shale as main fuel, but has also capability to burn up to 50% by input energy biomass or some other fuels in mix with the main fuel. The plant belongs to Enefit Energiatootmine AS.

Operator of the new unit ordered from Tallinn University of Technology Geology Institute a study about CO₂ geological storage capacities in Estonia and neighboring regions. From this study came out that geological conditions in Estonia are not favorable (ie. not according to the CCS Directive conditions) for CO₂ geological storage. Closed oil-shale mines are too shallow for CO₂ storage (60-65 m). The Cambrian aquifer reaches 707 m depth at the island Ruhnu, at the other area it is mostly 100-500 m. The aquifers are used for drinking water supply; the highest salinity of the deep Cambrian aquifer is 20 g/l. This all means that geological storing in Estonia is not possible. Same information also used for the communication between Estonian State and EU during the CCS Directive implementation.

Until today there is also any commercial CO₂ storing operators available. So therefore operator is monitoring the situation in the storing market for future decisions as starting its own operating activities on the territory of other state is not realistic. Therefore there is no exact information about the transportation options as possible choices that could be direct pipeline option or combination of the pipeline and loading point to maritime vessel. Road transportation is the most expensive option and not suitable due to the big volume to transport.

Plant itself have according to the contract conditions CCS readiness ie the Plant has been designed in such a way that a Carbon Capture System (CCS) can be connected later on without major layout modifications. This means that post capture system can be connected to the Plant later on without bigger modifications. Most probably also oxyfuelling can be implemented, but this needs a bit more modifications in the boiler itself and its flue gas cleaning systems. GE itself promotes the Chilled Ammonia Process because they are of the opinion that it is still the most environmental friendly and economical CCS technology. Still it has to be said that there is basically any commercially available CCS technologies available that are implemented in large scale for commercial use. Therefore all planned projects need to have remarkable financial support by some state or EU funds. All CCS demonstration projects that are not been realized and working in regular bases are about 2 times more expensive than regular energy production projects. Taking into account today's low EUA price as well as low energy prices it is clear that CCS projects are not today and will not be in the near future economically viable without remarkable additional funding. Operator itself sees more possibilities to reduce CO₂ emissions by replacing oil shale as fossil fuel according to the designed parameters. In addition operator is exploring possibilities to use CaO and other active oxides containing oil shale ash for the CO₂

sequestration i.e. mineral binding of CO₂. The needed space for the CCS installation is about 10 000 m² that is basically available nearby the plant.

Further questions

16. What other national programmes are in place or planned to support research, demonstration and deployment of CCS?

No other programmes

17. Are there any ongoing national or European research projects that may have relevance to the Directive?

There is an ongoing research project with Estonia as one of the project partners called *The Building momentum for the long-term CCS deployment in the CEE region*¹. The project is funded by Iceland, Liechtenstein and Norway through the EEA and Norway Grants Fund for Regional Cooperation. The project addresses the “Climate Change Mitigation and Adaptation” programme area by focusing on the challenge of achieving the deep reduction of GHG emissions across all sectors of the European economy by 2050 through deployment of carbon capture and storage (CCS) technologies. The project aims to renew the discussion on the long-term deployment of CCS in the CEE region, leading to new policies and joint projects. It is expected that building evidence-based consensus among key stakeholders will pave the way to implement concrete policies and ventures. This will be achieved through combining analytical work with outreach, communication and capacity-building activities, in the form of series of national and regional publications and events focused on the importance of timely CCS deployment and associated international cooperation. The project covers Poland, Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Romania, the Baltic states and Ukraine with the support of expertise partner from Norway

18. Are there other plans to support further appraisal of CO₂ storage sites, to prepare for CO₂ transport infrastructure or for CO₂ hubs and clusters?

Not at the moment.

¹ [Project - Goals, timeline and motivations behind CCS4CEE](#) (09.06.2023)

Annex 1: CCS related requests as part of the Commission Notice on the Guidance to Member States for the update of the 2021-2030 national energy and climate plans - C(2022) 8263 final

2.5 Integrating long-term geological storage of CO₂

Member States are encouraged to include in their updated NECPs the efforts planned to enable their industries to capture and store their inherent process emissions permanently in geological storage sites, in accordance with Directive 2009/31/EC. Reaching the climate-neutrality objective requires that EU-wide remaining greenhouse gas emissions and removals from hard-to-abate sectors are balanced within the EU at the latest by 2050 and that the EU achieves negative emissions thereafter.

Several activities, including energy intensive industries, such as cement, iron and steel, aluminium, pulp and paper and refineries, as well as agriculture, have inherent process emissions resulting from the production processes themselves. Carbon capture and storage, or carbon capture and use can provide a key contribution to tackling these sectors' emissions.

Furthermore, it can help remove CO₂ from the atmosphere through carbon removals such as bioenergy coupled with carbon capture and storage (BECCS) and through Direct Atmospheric Carbon Capture (DACCS). BECCS deployment should be approached in the updated NECPs in full consideration of the limits and availability of sustainable biomass.

Box 6: Setting objectives, targets and contributions for carbon capture and storage.

Member States are encouraged to provide the following information:

- the annual aggregated projection of inherent process emissions that will have to be abated through CO₂ capture;
- the annual biogenic and direct air CO₂ that will be available for geological storage of CO₂;
- the geological CO₂ storage capacity that can be made operationally available annually;
- annual CO₂ storage capacity that may become available at the end of exploitation of hydrocarbon reservoirs;
- planned CO₂ transport infrastructure;
- public funding support available for investment in CO₂ capture, transport and storage;
- any other measures to support the deployment of long-term geological CO₂ storage opportunities.

Annex 2: Operating licences granted to large combustion installations in accordance with Article 33

Plant operator, name location	Status (planning/construction/operation)	Electrical output	Type of fuel	Date of operating licence, Reference to the licence and assessment	Availability of suitable storage sites	Technical and economic feasibility of transport facilities	Technical and economic feasibility to retrofit for CO ₂ capture	Space set aside	Other measures taken or recommended to prepare for future retrofitting	Comments
Plant operator: Enefit Energiatootmine AS; Name of the plant: Auvere power plant Location of the plant: Auvere küla, Narva-Jõesuu vald, Ida-Virumaa	Operation	Up to 300 MWe	oil shale, and biomass	Currently valid operating licence for the operator is ELT00011 date: 03.12.2003 ² And Integrated environmental permit for the plant KKL/324417 date: 27.06.2014 ³	Geological storing in Estonia is not possible and is prohibited by law	There is no exact information about the transportation options as possible choices that could be direct pipeline option or combination of the pipeline and loading point to maritime vessel.	There is basically not any commercially available CCS technology yet available that is implemented in large scale commercial use.	10 000 m ²	-	

² https://mtr.mkm.ee/taotluse_tulemus/221050#_idandmed

³ https://kotkas.envir.ee/permit_registry/detail_view?search=1&issue_date_start=&permit_status=ISSUED&search_location=&issue_date_end=&party=enefit&valid_start_date_end=&valid_start_date_start=&nr=&represented_id=&type=IEP&permit_id=100341