



EUROPEAN
COMMISSION

Brussels, 23.9.2025
C(2025) 6381 final

COMMISSION OPINION

of 23.9.2025

**on the draft permit to permanently store carbon dioxide in block section L04-A of the
Dutch continental shelf**

(Only the Dutch text is authentic)

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1. LEGAL CONTEXT

Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 ('Directive 2009/31/EC')¹ establishes a legal framework for the environmentally safe geological storage of CO₂ to contribute to the fight against climate change.

Directive 2009/31/EC covers CO₂ storage in geological formations in the Union during the entire lifetime of storage sites and harmonises the requirements for selecting and operating CO₂ storage sites. Chapter 3 of Directive 2009/31/EC requires the Member States to ensure that no storage site is operated without a storage permit and establishes the requirements for the national permitting process and the content of storage permits.

Article 10 of Directive 2009/31/EC establishes an additional safeguard to ensure that storage permits are in line with Directive 2009/31/EC through the dialogue between the Member State concerned and the European Commission ('the Commission'). In this respect, Article 10 of Directive 2009/31/EC requires the Member States to inform the Commission of all draft storage permits and to provide all material taken into consideration for the adoption of the draft decision to award the storage permit.

Article 10 of Directive 2009/31/EC provides for the Commission to issue a non-binding opinion within four months after receipt of a draft storage permit. Where the Commission issues a non-binding opinion, the competent authority is expected to take the utmost account of it when adopting the final storage permit. Where the competent authority decides to depart from the Commission's opinion, Article 10(2) of Directive 2009/31/EC requires the competent authority to state the reasons.

Directive 2009/31/EC was incorporated into Dutch law. The competent authority for issuing the storage permit in the Netherlands is the Minister of Climate Policy and Green Growth. The Dutch State Supervision of Mines ('SSM') is responsible for inspections.

¹ OJ L 140, 5.6.2009, p. 114.

2. PROJECT AND NATIONAL PERMITTING PROCESS

2.1. APPLICATION FOR A STORAGE PERMIT

On 7 December 2022, TotalEnergies EP Nederland B.V. ('TEPNL'², 'TotalEnergies', 'the Applicant') submitted an application ('the Application') to the Minister for a permit for the permanent storage of CO₂ in the L04-A depleted gas field (CO₂ storage site) pursuant to Article 25(1) of the Dutch Mining Act ('Mining Act'). Following the request of the competent authority, the Applicant updated the Application on 31 May 2023.

The Applicant indicates that the L04-A storage complex is part of a large-scale CO₂ transport and storage project in the Netherlands called Aramis. The Aramis project currently involves the following partners: TotalEnergies, Shell, Energie Beheer Nederland (EBN), and Nederlandse Gasunie. In April 2025, the consortium announced that *"from April 2025, Gasunie and EBN will take more control over the further development of the Aramis pipeline. TotalEnergies and Shell will remain involved as partners until the final investment decision, contributing essential technical knowledge and expertise to help realise the project. The initiators aim for Gasunie and EBN to make an investment decision as soon as possible in 2026. After this, Shell and TotalEnergies will primarily focus on developing CO₂ storage facilities. In the supplementary climate package, the government has decided to allocate funds for EBN and Gasunie as prospective investors in the Aramis transport infrastructure"*³.

This consortium aims to create *"a decarbonisation solution for the industrial sectors by enabling the transport of CO₂ to depleted offshore gas fields under the North Sea"*⁴.

2.2. PROJECT DESCRIPTION

The L04-A CO₂ storage site, part of the Aramis CCS project, consists of:

- CO₂ storage reservoirs formed by Permian Lower Slochteren sandstones. These sandstones were mainly deposited as mixed aeolian and fluvial deposits. The top of the reservoir is located approximately 3,800 metres below the seabed;
- the geological capping layers above the L04-A CO₂ storage site comprise the Silverpit formation, a 250-metre-thick Permian clay caprock. This is overlain by impermeable salt layers from the Zechstein, ranging in thickness from about 20 metres to 2,200 metres. That these rocks could hold the original gas column proves the sealing property of these overlying layers with respect to CO₂;

² TotalEnergies EP Nederland B.V (TEPNL) is a private limited liability company, having its registered office in The Hague, with address Pr. Catharina-Amaliastraat 5, 2496 XD The Hague and trade register number 27075440. The objective of TEPNL, as reflected in the applicable Articles of Association, is the exploration and extraction of natural gas. The sole shareholder of TEPNL is TotalEnergies Holdings Nederland B.V. TotalEnergies Holdings Nederland B.V. is a private limited liability company and is a wholly-owned subsidiary of TotalEnergies Holdings Europe SAS, with TotalEnergies S.E. as ultimate top holding company (a listed entity registered in Paris, France). TEPNL has years of experience as an Operator and Contractor within the meaning of Article 22(5) of the Mining Act. TEPNL extracts and produces offshore gas from several small fields in the Netherlands. TEPNL is currently the permit holder for extraction of natural gas from block section L04-A and has been designated to carry out the operational activities associated with CO₂ storage at the L04-A CO₂ storage site within the meaning of Article 22(5) of the Dutch Mining Act.

³ Website of the [Aramis CCS](#) project – 'Aramis takes next step towards investment decision' – 25 April 2025.

⁴ Website of the [Aramis CCS](#) project – Main page.

- the formations under the storage reservoir, comprising of Carboniferous shales;
- the fault zones surrounding the L04-A CO₂ storage site;
- the CO₂ injection wells in reservoir L04-A; and,
- the injection facilities and associated above-ground facilities on platform L04-A, up to and including the wellheads.

The geographical area to which the storage permit application applies is clearly specified and displayed in the Application and the geographical coordinates of the storage permit area are presented in Article 2 of the draft permit.

The L04-A CO₂ storage site is the only storage site in the hydraulic unit, according to the draft permit. Therefore, pressure interaction requirements under Article 8(1)(c) of Directive 2009/31/EC do not apply.

Three existing wells are planned to be used for the injection of CO₂. In the base case, two of the three possible injection wells on L04-A will be used for injection, initially L04-A1 and L04-A4. The third injection well, L04-A3, serves as an alternative should the other wells not be available for injection.

The injectate stream will be delivered to the L04-A storage site by a trunkline off the Aramis pipeline and will have a CO₂ content greater than 95%. The injectate stream composition is set by the overall composition of the Aramis project injectate stream, which shall have a CO₂ content greater than 95%. The CO₂ specifications for the Aramis transport infrastructure are available on the project website⁵.

The L04-A storage site expects to store in total up to 39.55 million tonnes of CO₂ over a 25-year period, starting no later than 1 January 2034. This equates to approximately 1.6 million tonnes of CO₂ stored per year.

The CO₂ will be injected at a maximum injection rate of 30 meters per second per well. The maximum injection pressure has been specified not to exceed the hydrostatic pressure (358 bar) of the complex, based on a hydrostatic pressure gradient of 0.108 bar/m, while final reservoir pressure over time (330 bar) will be lower than this to ensure long-term secure containment of the CO₂.

3. REVIEW BY THE COMMISSION

On 30 May 2023, the Dutch Government submitted to the Commission the Application for the permanent storage of CO₂ in block section L04-A located in blocks L4 and L7 of the Dutch continental shelf. The Dutch Government submitted to the Commission a modified Application on 12 February 2025.

On 12 March 2025, the Dutch Government submitted to the Commission the Minister's draft decision on a CO₂ storage permit for L04-A. Several additional documents were taken into consideration for the preparation of the storage permit (*see section 4 of this Non-Binding Opinion*).

On 11 April 2025, the Commission services sent clarification questions on the draft permit to the Dutch Government. On 28 April 2025, the Commission services met with the Dutch

⁵ Website of the [Aramis CCS](#) project – CO₂ Specifications for Aramis transport infrastructure.

authorities and discussed the content of the draft permit. The Dutch authorities sent further clarifications and documents to the Commission services on 29 April 2025. Following discussions with the Commission, the Dutch Government sent a revised draft permit on 23 May 2025.

Article 10 of Directive 2009/31/EC provides for the Commission to issue a non-binding opinion within four months after receipt of a draft storage permit. In this context, the draft permit, application and supporting documents provided by the Dutch Government constitute the basis for the Commission's review of the L04-A draft permit in light of the requirements set out in Directive 2009/31/EC and for this Non-Binding Opinion ('Opinion').

In particular, the Dutch authorities clarified that, in line with the provisions on permitting of Dutch administrative law, any permit contains only special requirements for the permit holder of a project (CO₂ storage site in the present case), while other more general legally binding requirements are established under Dutch law and are not included in CO₂ storage permits. As far as the L04-A draft permit is concerned, the Dutch authorities reassured the Commission that the general requirements stemming from Directive 2009/31/EC, as incorporated into Dutch law, and not included in the draft permit, must at all times be fulfilled by the permit holder. Those requirements for the permit holder include, but are not limited to:

- Preparing and operating approved monitoring and corrective measures plans (Articles 9(5), 9(6), 11 and 16 of Directive 2009/31/EC);
- Keeping a register of the quantities and characteristics of the CO₂ streams, including their composition delivered, stored, and, where applicable, leaked (Article 12(3)(b) of Directive 2009/31/EC);
- Ensuring regular reporting to the competent authority of the results of the monitoring and the quantities and properties of the CO₂ streams delivered and injected (Articles 14(1) and (2) of Directive 2009/31/EC); and
- Immediately reporting leakages and significant irregularities to the competent authority (Article 16 of Directive 2009/31/EC).

In addition, the Dutch authorities clarified that other requirements, such as conditions for the transfer of responsibility under Article 18 of Directive 2009/31/EC, are equally covered by the applicable Dutch legislation and are therefore not included in the permit.

The Commission took note of the explanations provided by the Dutch authorities and therefore abstains from recommendations on the draft permit in this regard, based on the understanding that the consequences for the permit holder as regards non-respect of such obligations will be similar to those put in place for the non-respect of the obligations explicitly spelled out in the draft permit. The Commission recommends, for reasons of legal certainty, that the Dutch authority lists the relevant national legal provisions setting out requirements applicable to the permit at hand in an annex to the draft permit.

4. OPINION

Based on the review of the application, draft permit and other supporting documents, the Commission analysed the technical, environmental, and financial aspects of the draft permit as outlined in the following points.

As explained above, the Commission understands that several requirements are covered by the applicable Dutch legislation and do not need to be included in the permit.

4.1. Technical requirements

Directive 2009/31/EC requires that applications for storage permits include, among others, a characterisation of the storage site and storage complex, an assessment of the expected security of the storage site, the total quantity of CO₂ to be injected and stored, the prospective sources and transport methods, the composition of CO₂ streams, the injection rates and pressures, and the location of injection facilities. Applications must also include a proposed monitoring plan, corrective measures plan, and provisional post-closure plan.

Directive 2009/31/EC requires that storage permits include, among others, the precise location and delimitation of the storage site and storage complex, the requirements for storage operation, the total quantity of CO₂ authorised to be geologically stored, the reservoir pressure limits, the maximum injection rates and pressures, the requirements for the composition of the CO₂ stream, the approved monitoring plan, the approved corrective measures plan, and the approved provisional post-closure plan.

The Commission notes that the suitability of the storage site is demonstrated by the detailed characterisation and assessment of the storage site and storage complex contained in the application and confirmed by the technical reports⁶. The technical assessment provided in the application contains static, dynamic, geomechanical, geochemical, and well performance modelling proving that the L04-A storage site is hydraulically isolated and suitable for the long-term storage of CO₂.

In addition, the maximum permissible volumes to be injected (total quantity of CO₂ authorised to be geologically stored) has been set in the draft permit⁷ at a maximum of 39.55 million tonnes of CO₂, equivalent to approximately 1.6 million tonnes per annum.

The maximum 25-year period of injection⁸, the proposed maximum injection rates and pressures⁹ in the wells and in the reservoir, both during and after cessation of injection established in the draft permit, are reasonable. The maximum permissible pressure and rates are linked to the maximum hydrostatic pressure gradient of 0.108 bar/metre. These limits have been based on detailed static, dynamic and well performance modelling using a significant database of information and standard industry techniques and technologies.

The requirement of the draft permit for the CO₂ stream to consist of a minimum content of 95% CO₂¹⁰ is also in line with Article 12 of Directive 2009/31/EC. This composition is measured at several points, including at the compressor station¹¹. The draft permit only allows a clearly specified and limited range of naturally occurring process impurities and these should not affect the integrity of the storage system or process. No waste products or other additives are allowable or specified.

The Commission notes that the monitoring and corrective measures plans presented by the Applicant, as well as the requirements related to their updating and approval prior to the start

⁶ TNO Appendix Bijlage B – Technical report – Evaluation storage license application L04-A.

⁷ Article 6(3) of the draft Decision: “The maximum quantity of CO₂ expected to be stored in storage conditions L04-A at the pressure limit set out in the second paragraph shall be approximately 39.55 Mt”.

⁸ Article 4(4) of the draft Decision: “The period of injection of CO₂ shall not exceed 25 years”.

⁹ Article 6 of the draft Decision: Maximum permissible pressures and injection rate.

¹⁰ Article 7 of the draft Decision: Composition of CO₂ flow (and accompanying table).

¹¹ TotalEnergies Storage Licence Application - Part IV: Monitoring Plan: Section 3.2.1: Metering and Fluid Analyses.

of the injection period contained in the draft permit¹², are compliant with Directive 2009/31/EC.

Regarding potential leakage, the Commission acknowledges the independent scientific opinions of the research organisation TNO and the SSM that risks of leakage during operation and after closure of the storage complex are very limited. The site has stored natural gas for millions of years, the well technologies and injection practices are considered to be industry standard and fit for purpose, and appropriate risk assessment, monitoring and corrective measures are planned.

The Commission acknowledges the conclusion of TNO and the SSM that the construction, operation and closure of the storage site and necessary facilities will not pose a significant danger to the environment and human health¹³.

The Commission welcomes the requirement for a six-month regulatory period at the start of the injection period during which time the facilities and monitoring equipment will be tested *“to refine/improve the identification and correction for risk management of injection and storage of CO₂”*¹⁴.

The Commission is of the view that the draft permit provisions on the closure of the storage site satisfy the requirements of Directive 2009/31/EC. The closure conditions contained in the draft permit specify that closure shall take place when approximately 39.5 million tonnes of CO₂ are injected and, in any case, no later than on 31 December 2059¹⁵.

In addition, upon cessation of injection, the draft closure plan¹⁶ contained in the application includes a one-year period during which monitoring, corrective measures, and reporting to the competent authority on the site conditions will be maintained until the competent authority is satisfied that there are no irregularities, and at which time the injection wells and facilities can be decommissioned. The period can be extended for as long as required by the competent authority until the competent authority is satisfied that the site is safe, and that CO₂ is completely and permanently contained.

The Commission however notes that the closure plan contained in the Application also includes a period of 20 years of post-closure monitoring prior to handover to the competent authority pursuant to the requirements of Directive 2009/31/EC. The draft permit requires the submission of a draft closure plan to be submitted for approval three months prior to the start of operations and to be updated before the closure of the storage site¹⁷.

A provisional post-closure plan is included in the application. The Commission invites the competent authority to approve the provisional post-closure plan in the draft permit as required under Article 9(7) of Directive 2009/31/EC.

The Commission considers that, from a technical point of view, the L04-A storage site is suitable for permanent geological storage of CO₂ and the draft permit includes the necessary requirements for the safe operation of the storage site in line with Directive 2009/31/EC.

¹² Articles 11 and 12 of the draft Decision: Monitoring Plan and Corrective Measures Plan.

¹³ Section 4.2.3.1.c of the draft Decision: Significant environmental or health risks.

¹⁴ Article 8(2) of the draft Decision.

¹⁵ The injection period must start by 1 January 2034 and lasts for a maximum of 25 years based on Article 4 of the draft Decision.

¹⁶ TotalEnergies Storage Licence Application - Part VI: Closure Plan: Section 3: Steps to Closure and Transfer.

¹⁷ Draft Decision: Section 4.2.3.1.a: Storage site and development concept by the applicant.

4.2. Environmental requirements

CO₂ storage sites require an environmental impact assessment under Article 5 of Directive 2011/92/EU¹⁸, except if they are exempted by Member States under Article 2(4) of Directive 2011/92/EU. Applications for storage permits must include relevant environmental impact assessment information under Article 7(9) of Directive 2009/31/EC.

As stated under point 4.1 of this Opinion, the Commission takes note of the views of independent scientific bodies that the construction, operation and closure of the storage site and necessary facilities will not pose a significant danger to the environment and human health. The Commission also notes the Minister's view, included in the draft permit, that there is no significant risk of leakage and no significant environmental or health risks linked to storage under the proposed operating conditions¹⁹.

However, the environmental impact assessment prepared ahead of the storage site's operational start²⁰, as required under Article 7(9) of Directive 2009/31/EC and Article 4(1) of Directive 2011/92/EU, suggests that more information regarding the effects of the project on the biosphere, such as benthic and marine fauna, seabirds, and atmosphere, is needed. In addition, in line with Directive 2008/56/EC²¹, Member States shall take the necessary measures to achieve or maintain good environmental status in the marine environment (such as those related to seabed integrity, biodiversity, chemical contamination or underwater noise in the Dutch marine waters). Where relevant, elements missing from the environmental impact assessment should also be reflected in the corrective measures plan.

Furthermore, the Commission highlights that under Article 6(3) of Council Directive 92/43/EEC²², any plan or project likely to have a significant effect on a Natura 2000 site, either individually or in combination with other plans or projects, must be subject to an appropriate assessment of its implications for the site in view of the site's conservation objectives. The competent national authorities can agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned. The Commission asks the competent authority to ensure that Natura 2000 sites and protected species under Council Directive 92/43/EEC and Directive 2009/147/EC²³ are not adversely affected by the project before authorising it.

The Commission asks the competent authority to refer to the environmental impact assessment and its outcomes in the draft permit, while also clearly indicating the corrective measures to be taken.

In addition, the Commission recommends to the competent authority that this project is included in any revision of the currently adopted Dutch Maritime Spatial Plan²⁴, under Directive 2014/89/EU, notably in the associated strategic environmental assessment under Directive 2001/42/EC.

¹⁸ OJ L 26, 28.1.2012, p. 1.

¹⁹ Draft Decision: Section 4.2.3.2: Significant risk of leakage or significant environmental or health risks.

²⁰ Website of the Netherlands Enterprise Agency - [Aramis – Phase I](#) - Environmental Impact Assessment.

²¹ OJ L 125, 18.5.2017, p. 27

²² OJ L 206, 22.7.1992, p. 7.

²³ OJ L 20, 26.1.2010, p. 7.

²⁴ Website of the Ministry of Infrastructure and Water Management - [Programma Noordzee 2022-2027](#).

4.3. Financial requirements

Directive 2009/31/EC requires that applications for storage permits include, among others, proof of the technical competence of the potential operator and proof that the financial security will be valid and effective before commencement of injection. Directive 2009/31/EC requires that storage permits include, among others, the requirement to establish and maintain the financial security.

While it appears that professional and technical development and training of all staff is not explicitly planned, the Commission considers that if the site operator is accepted to be technically competent and reliable to operate and control the site, then they must have professional development and training embedded in their core business – otherwise they would not be technically competent. The Commission considers that the draft permit and related documents provide sufficient assurance that the operator is technically competent and reliable to operate and control the site.

The Commission notes the Minister's view in the draft permit that there is sufficient confidence that the operator will have the financial resources to carry out the activities under the CO₂ storage permit and to fulfil the associated obligations²⁵. However, the Commission does not consider that the draft permit and related documents provide sufficient assurance that the operator is financially sound. In particular, the draft permit does not appear to provide criteria for determining financial soundness. The Commission understands that the competent authority intends to address the issue of financial soundness by developing criteria, which would provide necessary benchmarks for this Directive's requirement in the Member State.

The draft permit provides a general framework for the financial security scheme and makes the start of injection subject to the lodging of the financial security for the duration of the permit²⁶.

The Commission understands that, in these circumstances, the draft permit cannot be expected to provide the same level of detail as the final financial security scheme that will be later approved by the competent authority before injection. The Commission however recommends the competent authority to include in the final permit, at least the minimum requirements for the financial security scheme to be valid, adequate and effective, in line with provisions of Directive 2009/31/EC and to inform the operator accordingly. In the Commission's view, the final permit should at least require that:

- the amounts are sufficient and adequate at all times, the underlying assumptions and calculations are justified, verified and confirmed,
- all obligations stemming from Directive 2009/31/EC are covered by the financial security scheme,
- the insurance and the parent company guarantee are valid, effective and adequate, and submitted with sufficient time for the competent authority to review and approve them; and,
- annual reporting demonstrates that the financial security continues to be maintained as valid and effective.

In the Commission's view, the final permit should also include transparent minimum requirements for the proposed insurance and parent company guarantee's amount of coverage.

²⁵ Draft Decision: Section 4.2.2.3: Financial capacity of the Applicant.

²⁶ Article 14 of the draft Decision.

These requirements should cover cost estimates, contingency factors and calculation methods provided by the Applicant and their approval by the competent authority.

The competent authority has noted provisions in applicable Dutch law requiring regular updates to the cost estimates forming the basis for the amounts of financial security. Such regular reviews should capture the need for adjustments to account for changes in cost estimates and apply based on the final permit.

The Commission also considers that the final permit should require that the parent company guarantee obliges the guarantor to accept cost estimate updates and adjustments from their subsidiaries and for the parent guarantors to adjust the amounts of their guarantees accordingly. The Commission notes that the draft permit agrees with the Applicant's proposed use of an insurance scheme, with financial security for any residual risks provided through a parent company guarantee.

Subject to the completeness of the coverage of the financial security scheme, the Commission views the use of insurance combined with a parent company guarantee as a prudent and pragmatic decision by the competent authority, given the novelty of covering CO₂ storage obligations under Directive 2009/31/EC using offshore oil and gas insurance policies not originally designed for that purpose.

The aforementioned changes will significantly improve the transparency and effectiveness of the entire financial security scheme both for the operator and to the benefit of the competent authority.

Finally, the inclusion of the aforementioned requirements into the draft permit would provide assurance that the final financial security scheme, as approved by the Dutch authorities, will fully comply with Directive 2009/31/EC.

This Opinion is addressed to the Kingdom of the Netherlands.

Done at Brussels, 23.9.2025

For the Commission
Wopke HOEKSTRA
Member of the Commission