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ARTICLE 23 | BRIEF

Designing penalties to ensure compliance with the EU CO₂ storage obligation

Prepared By:
The Article 23 Project



Objective

Enable timely delivery of the Net-Zero Industry Act, Article 23 obligations towards the EU target of 50 Mt/year CO₂ injection capacity by 2030, by ensuring the cost of non-compliance is greater than the cost of compliance, while keeping penalties proportionate and ensuring compliant entities are not placed at an economic disadvantage.

Legal Requirements

By 30 June 2026, Member States must establish penalties that are effective, proportionate and dissuasive, using administrative measures, court proceedings, or both.

Compliance with the obligation

Article 23 defines company contributions to the target as consisting of “CO₂ injection capacity in a storage site permitted in accordance with Directive 2009/31/EC and available to the market by 2030”. In communications with the obligated entities, the Commission has further clarified the criteria for compliance as:

- Obligated entities are required to submit a report to the Commission by 30th June 2026, and every year thereafter, detailing their progress towards meeting their contribution under Article 23(6). The required contents of this report are outlined in Article 5 of Commission Delegated Regulation 2025/1477.
- By 2030, obligated entities (or their partners) will have been awarded a CO₂ storage permit from the Member States. The CO₂ storage permit should cover sufficient injection capacity equal to or more than their individual contribution. The Commission monitors the achievement of storage permits and the draft permits as notified by the Member States in accordance with Article 10 of Directive 2009/31/EC.
- Obligated entities should have contractual storage agreements in place with emitters which cover relevant injection capacities. Such agreements should be notified by obligated entities in their Annual Progress Report in accordance with Article 5(1)g of Delegated Regulation 2025/1477 (at the latest on 30 June 2031).

Design principles

- **Effective and dissuasive:** cost of non-compliance must exceed cost of compliance; companies that comply should not be placed at an economic disadvantage.

- **Proportionate:** penalties should increase with the size of the shortfall (i.e., missing annual CO₂ injection capacity, tCO₂/year), without imposing an excessive burden that could affect the ability to remedy the shortfall.
- **Administratively workable:** penalties should be transparent, simple to administer, and broadly consistent across Member States.

Penalty payment should not be considered a substitute for meeting the obligation, which remains until the obligated capacity is achieved.

State of Play

- **Germany.** The Amendment to the CO₂ Storage Act (Nov 2025)¹ introduces a per-tonne payment for annual injection-capacity shortfall, capped at the EU ETS non-compliance penalty level (€100/t indexed from 2012; ~€135/t in 2025)². The Federal Ministry for Economic Affairs and Energy may specify implementation details and set which authorities monitor compliance and enforce penalties.
- **Denmark:** A consultation concluded (Dec 2025) that amendments should be made to the Danish Subsoil Act enabling court-based fines for non-compliance, triggered by a ministry compliance report. Fines would be set case-by-case using compliance-cost proxies (development, expansion, or purchase of storage capacity) and adjusted for mitigating and aggravating circumstances.³

Design options for determining penalty levels

Emerging national practice reflects two principal approaches:

- **Carbon-price reference:** Linking the shortfall to carbon price indicators (EU ETS price, ETS non-compliance penalty, an investment “shadow” carbon value, or social cost of carbon).
- **Cost-of-compliance reference:** Linking the shortfall to storage development costs.

Under both approaches, the fine can be expressed per tonne of annual injection capacity shortfall (tCO₂/year) attributable to the entity’s Article 23 obligation. Compliance cost is challenging to define, as CO₂ storage costs differ widely depending on location and geology (onshore vs offshore, reservoir type), reuse of infrastructure, and whether figures include transport/terminal costs. Published project costs often include ‘oversized’ transport infrastructure and are difficult to benchmark consistently (see Annex 1). Global storage cost benchmarking by the Global CCS Institute provides a range of \$2/t (€1.7/t, for onshore storage and optimum geology) to \$147/t (€127/t, for offshore sites with poor

¹Federal Ministry for Economic Affairs and Energy (2025) Law amending the carbon dioxide storage act. Available at: <https://www.recht.bund.de/bgb/1/2025/282/VO.html?>

² Assuming 2% inflation, the maximum penalty would reach €147/tonne in 2030.

³ Consultation on a proposal for an act amending the Act on the use of Denmark’s subsoil. Available at: <https://hoeringsportalen.dk/Hearing/Details/70699>

geology).⁴ As entities can meet obligations through agreements with any EU storage developer, a cost-of-compliance benchmark should arguably reflect the marginal cost of adding storage capacity in the EU.

Projections of the ETS price in 2030 range from €70–150/t,⁵ while the inflation-adjusted ETS penalty will likely approach the higher end of these projections by 2030. In assessing its investments, the European Investment Bank applies a shadow cost of carbon which increases to €250/t in 2030.⁶ The German Environmental Agency has proposed a social cost of carbon which reaches €215/t in 2030.⁷

Given the wide variation in compliance costs, a carbon price benchmark provides a more justifiable and clearly defined penalty level, which directly reflects the cost to EU industry associated with a delay in CCS deployment. However, it is worth noting that the likely range of storage development costs in Europe also falls broadly within the projected range for future ETS prices (see Annex 1). Following the German approach, a benchmark penalty at the level of the penalty for ETS non-compliance would be sufficiently dissuasive and put non-compliant entities at an economic disadvantage relative to those developing storage. An annual average of the ETS price would be a comparable alternative but would provide a less predictable signal to obligated entities.

Enforcement model

Administrative penalties provide a simple, fast and predictable deterrent; court proceedings may be appropriate for repeated non-compliance or noncooperation. Court proceedings can be time-consuming, which can delay the imposition of penalties. Where the shortfall continues, penalties should be repeatable on an annual basis. For jurisdictions where repeated penalties for the same violation are not possible, the penalty can accumulate until 2035, or whenever the required capacity is delivered.

Derogations

Formally, only Article 23(11) of the Act provides for derogation requests to the Commission from the Member States to exempt obligated entities. Derogation requests will only be considered in the case of a substantial imbalance between the demand for injection capacity in a Member State, the main infrastructure needed for the transport of CO₂ in progress or planned to be operational by 2030, and the sum of the individual contributions of the obligated entities. Beyond this derogation, there are no further possibilities for Member States to allow for structured adjustments to the level or amount of penalties based on actions of the obligated entity and relevant circumstances beyond the entity's control.

⁴ GCCSI (2025) Cost of CO₂ storage.

⁵ Daud P et al. (2025) Part 1: Carbon costs are coming, ready or not. Available at: <https://www.simon-kucher.com/en/insights/part-1-carbon-costs-are-coming-ready-or-not>.

⁶ European Commission (2021) Technical guidance on the climate proofing of infrastructure in the period 2021–2027, C(2021) 5430 final.

⁷ Umwelt Bundesamt (2020) *Methodenkonvention 3.1 zur Ermittlung von Umweltkosten*.

However, informally, the Commission has mentioned that obligated entities who clearly demonstrate a willingness to comply and make demonstrable progress, as communicated through the Member States, would be provided with flexibility and potentially a time-limited relief from penalties. Mitigating factors could include active progression of storage permits/licenses or contracts with other storage developers, or project delays outside the entity's control, such as delayed implementation of supporting legislation at the national level. Member States could therefore approach the Commission for clarification and written guidance on handling such cases.

Proportionality across company sizes

To reduce the risk of disproportionate impacts while maintaining deterrence, a turnover-based cap could be considered. The EU Methane Regulation, for example, provides for an upper limit expressed as a share of company turnover (20%).⁸

Use of penalty revenues

Revenues should support attainment of the injection-capacity target (e.g., geological characterisation, CO₂ transport networks, capture funding mechanisms, capacity-building for competent authorities).

Key Recommendations:

- Member States should prefer administrative fines as the default enforcement tool. Court/legal proceedings could be reserved for serious or repeated non-compliance.
- Member States should set fines using a clear per-tonne metric: a defined reference value per tonne of annual injection-capacity shortfall (tCO₂/year).
- Member States should apply a benchmark penalty level based on the penalty for ETS non-compliance (€100/t indexed from 2012) or an annual average of the ETS price, with the former providing a more predictable deterrent.
- Member States should approach the Commission for guidance on handling cases of mitigating factors when considering the enforcement of penalties.
- The European Commission should publish guidelines to enable the application of common design principles across Member States, including a minimum penalty amount per tonne of annual injection-capacity shortfall.
- Member States should designate a competent authority to monitor compliance, administer penalties, investigate non-compliance, and enforce proceedings.

In addition, the European Commission should provide a written, public clarification on how compliance with the obligation is defined. This will have a significant impact on how penalties are designed.

⁸ Regulation (EU) 2024/177 of the European Parliament and of the Council of 13 June 2024 on the reduction of methane emissions in the energy sector.

Annex 1

Table 1⁹ shows available cost data from planned European storage projects; however, published costs cover various project scopes and often include extensive CO₂ transport infrastructure in addition to the storage site. Arguably, the cost of compliance will include some transport infrastructure or CO₂ receiving terminals, which will be integral to a storage site becoming commercially operational.

Cost analysis by the Global CCS Institute shows that storage costs can vary widely from US\$2/t to US\$147/t depending on geology and location (**Figure 1**). However, a base case indicates US\$15 (12 EUR/t) for onshore storage and US\$31 (26 EUR/t) for offshore.

Table 1. Publicly available costs for CO₂ transport and storage projects.⁹

Project	Public capital cost	Project capacity, Mtpa	Capital cost per tonne CO ₂ (€/t)	Published tariff
Northern Lights Phase 1	NOK 4.1 billion (storage): €350 million NOK 2.8 billion (terminal): €241 million	1.5	230 (storage) 510 (transport and storage)	Not available
Aramis	Not available	Not available	Not available	€90.6/t (benchmark for SDE++, based on 7.5 Mtpa and including transport)
Danube Removals	€30 million (storage) €80 million (storage, pipeline and compression)	0.5	60 (storage) 160 (transport and storage)	Not available

⁹ Gassnova (2025) Potential for cost reductions in the CCS value chain; Xodus (2024) 2024 SDE++ Aramis carbon capture and storage fee review. Danube Energy Ventures (2025) Danube Removals Project Overview. Available at: <https://danubeenergy.com/danube-removals/>.

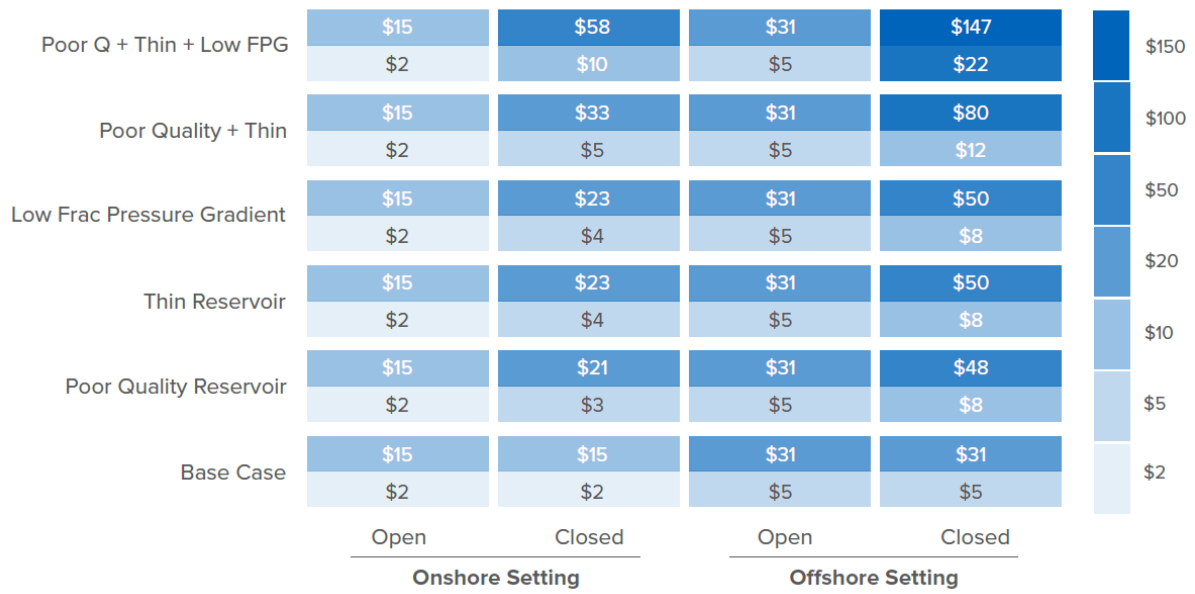


Figure 1. Modelled CO₂ storage costs across a range of geological scenarios and locations (US\$/t).¹⁰

¹⁰ GCCSI (2025) Cost of CO₂ storage. Available at: <https://www.globalccsinstitute.com/wp-content/uploads/2025/12/Cost-of-CO2-Storage-1225.pdf>