

Pillar 1 - Regulatory architecture and institutional competence

This pillar focuses on the legal and regulatory framework applicable to the geological storage of CO₂. The comparative analysis addresses the regulatory and institutional issues associated with the selection, authorization, operation, closure and long-term stewardship of geological storage sites. While capture and transport are essential components of CCS projects, they are addressed only to the extent necessary to explain the regulatory context or the interface with geological storage; a detailed analysis of the frameworks governing capture facilities and transport infrastructure falls outside the scope of this study.

The analysis is structured around the principal legal and institutional issues that arise throughout the development of a CCS project, with particular emphasis on the regulatory matters expected to be addressed by the ANP under the forthcoming CCS regulatory framework.

The study will combine an assessment of the current Brazilian legal framework with an international benchmark of selected jurisdictions that have either implemented CCS regulation or have recently adopted comprehensive legal frameworks for commercial-scale geological storage.

1.1 Regulatory model for CCS activities

This section will establish the overall regulatory architecture governing CCS activities. It will examine the legal scope of CCS regulation, the stages of the CCS project lifecycle subject to regulatory oversight, the authorization model adopted in each jurisdiction, and the interaction between different regulatory instruments applicable throughout project development. For Brazil, the analysis will assess the current legal framework and identify the principal regulatory issues to be addressed by ANP.

Expected subtopics

- Scope of CCS regulation.
- CCS project lifecycle.
- Regulatory instruments applicable to each project phase.
- Authorization model for CCS activities.
- Main regulatory gaps and pending issues in Brazil.

1.2 Institutional governance

This section will examine the institutional arrangements adopted to regulate CCS. It will identify the competent authorities responsible for each stage of the CCS value chain and analyze coordination mechanisms between agencies.

Expected subtopics

- Allocation of regulatory responsibilities among competent authorities.
- Role of sectoral regulators and environmental authorities.
- Institutional coordination mechanisms.
- Institutional gaps and coordination risks.

1.3 Storage area identification and allocation

This section will analyse the mechanisms through which geological storage areas are identified, evaluated and made available for CCS projects. It will compare different models for granting storage rights, allocation procedures, the treatment of competing applications and priority rules where multiple parties seek access to the same storage formation.

Expected subtopics

- Identification and assessment of prospective storage areas.
- Mechanisms for granting storage rights.
- Procedures for granting storage rights.
- Allocation procedures and priority among competing applicants.

1.4 Environmental licensing framework

This section will examine the environmental regulatory requirements applicable to CCS projects. It will compare environmental licensing models, general environmental impact assessment requirements, monitoring and verification obligations from an environmental perspective, long-term stewardship arrangements and regulatory approaches to leakage management and remediation.

Expected subtopics

- Environmental licensing frameworks applicable to CCS projects.
- Environmental impact assessment requirements.
- Environmental monitoring and verification obligations.
- Long-term stewardship and transfer of responsibility.
- Leakage management and remediation obligations.

The analysis will focus on the regulatory and institutional framework rather than on technical environmental-assessment methodologies. As commercial-scale CCS deployment remains relatively recent in most jurisdictions, practical regulatory experience relating to the closure and post-closure phases is still limited. Consequently, some aspects of long-term stewardship and transfer of responsibility will necessarily be discussed at a higher level of generality, drawing primarily on the applicable regulatory frameworks rather than on established regulatory practice.

1.5 Financial guarantees, liability and long-term responsibility

This section will examine the regulatory arrangements used to secure the operator's obligations throughout the operational, closure and post-closure phases. It will compare financial guarantee models required under regulation, the obligations covered by those and their relationship with the transfer of long-term responsibility or liability.

The analysis will also consider how jurisdictions allocate responsibilities between operators and the State following site closure.

Expected subtopics

- Financial guarantee models applicable to CCS activities.

- Obligations and risks covered by financial guarantees.
- Timing, adjustment, enforcement and release of guarantees.

1.6 Comparative assessment and regulatory design options

Building upon the preceding sections, this chapter will synthesise the principal regulatory approaches adopted across Brazil and the selected international jurisdictions, highlighting convergences, divergences and emerging international practices. Rather than advocating a single regulatory model, the analysis will present alternative regulatory design options, discussing their respective advantages, disadvantages and implementation considerations, with specific observations regarding their applicability to the Brazilian context.

Expected subtopics

- Comparative matrix of Brazil and selected jurisdictions.
- Identification of convergences and divergences.
- Regulatory gaps and unresolved issues in Brazil.
- Advantages, disadvantages and implementation considerations.