HIGH LEVEL CRITERIA FOR CREDITING CARBON GEOSTORAGE ACTIVITIES

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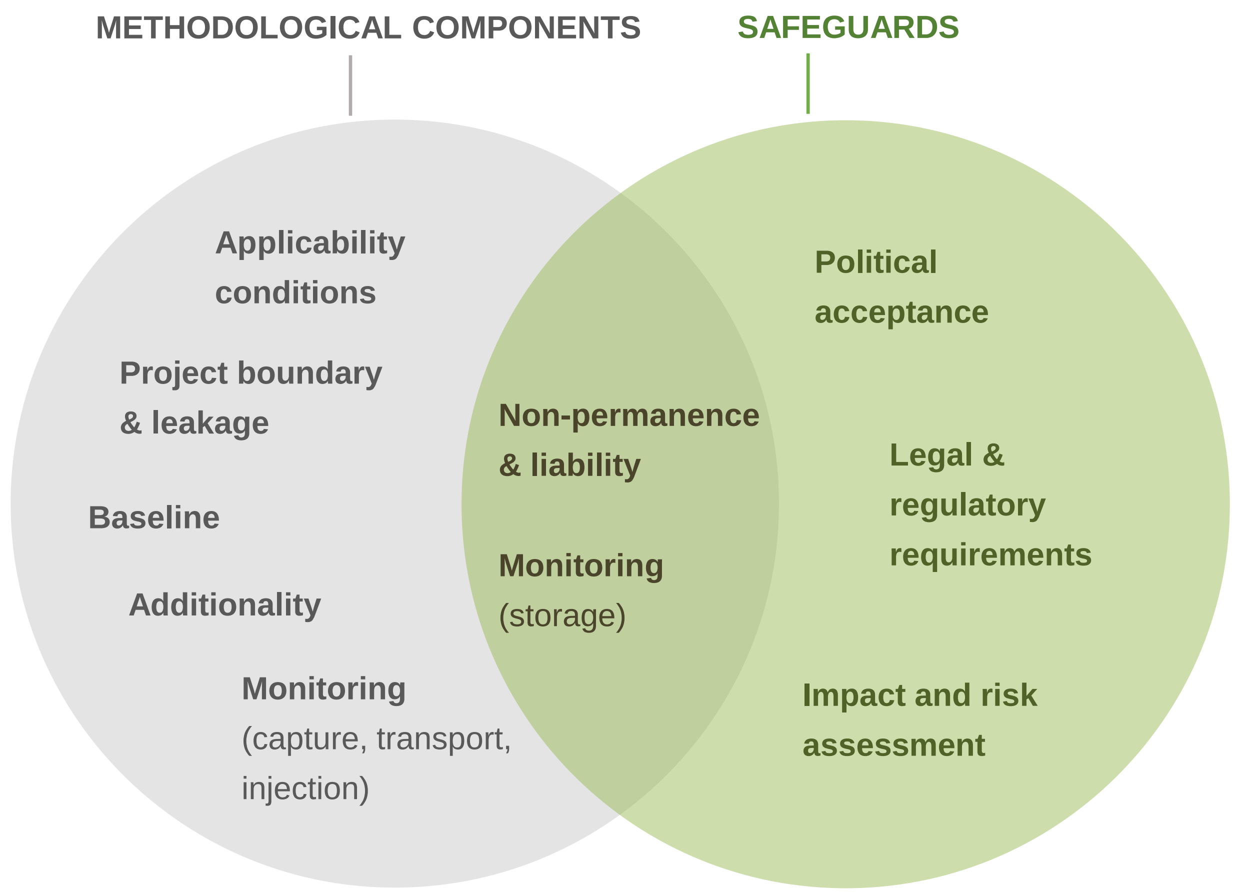
IETA
A IS FOR AMBITION

Based on existing methodologies, expert consultation and global reporting standards*, IETA proposes the following criteria to underpin and guide the crediting of carbon geostorage activities in carbon markets:

- **methodological components** describing the rules and procedures for quantifying emission reductions and removals arising from creditable geostorage activities. Six key core methodological components are provided; and
- **safeguards** that identify and manage the specific impacts and potential risks associated with carbon geostorage (including carbon reversal). Ten high-level criteria and supporting 'checkpoints' for safe deployment are provided.

The handling of non-permanence and liability relates to both methodological design and the safeguards for safe carbon geostorage (see right). As such, quantification methodologies must be underpinned by the safeguards described

Cover image: *horizon mapping using seismic data from a Gulf of Mexico CO_2 storage appraisal (from DeAngelo et al, BEG)*



* Including the 2006 IPCC Guidelines for National Greenhouse Gas Inventories and the CCS CDM Modalities and Procedures

METHODOLOGICAL COMPONENT		DESCRIPTION
01.	**APPLICABILITY CONDITIONS**	Defines the specific circumstances, attributes and other conditions that apply to eligible geological CO_2 storage activities. These can include the eligible sources of captured CO_2 (e.g. which types of CO_2 and from which sectors, both of which have implications for baseline selection; see below), the modes of transport, and the allowable storage media. Geographical and technical restrictions can also be applied (e.g. only countries with CCS laws; conditions on geostorage development/operations).
02.	**PROJECT BOUNDARY & LEAKAGE**	Defines the emissions by sources and removals by sinks that must be measured and accounted for across the capture>transport>storage chain (project boundary). Includes emissions occurring *outside* of the immediate control of the project operator (e.g. upstream emissions), but which are measurable and attributable to the project activity (i.e. 'leakage').
03.	**BASELINE**	Describes procedures and options to establish the *baseline scenario* and a methodology for calculating *baseline emissions.* The emissions from the project activity must be compared to the baseline to quantify the net emission reductions or carbon removals. Options include projection-based approaches (e.g. historical emissions, or estimated future emissions, without CO_2 capture) or standards-based approaches (e.g. using benchmark emissions of a comparable activity without CO_2 capture).
04.	**ADDITIONALITY**	Demonstration that the activity delivers emissions reductions/removals that would not have occurred absent of the incentive created by carbon credit revenues. Different approaches and tests exist for demonstrating additionality (e.g. first-of-a-kind (FOAK); regulatory surplus; financial additionality). The primary purpose of CO_2 capture is climate mitigation, which generally means that most projects will be additional. Novelty also means that FOAK or technology penetration rates can be used to rapidly demonstrate project additionality. Financial additionality testing may also be used to discern the value of crediting where other incentives (e.g. tax breaks) or benefits also exist (e.g. commercial CO_2 utilization).
05.	**NON-PERMANENCE & LIABILITY**	Methodologies should ensure that geological storage sites are appropriately characterized, selected, developed, managed and closed level to mitigate against the risk of carbon reversals (*quality assurance*). Liability to remedy the impacts of any carbon reversals must also be allocated *(liability allocation*). These safeguards can be implemented *either* by applying geographical applicability conditions (i.e. relying on local laws and regulations) and/or through other effective safeguards **(see safeguard criteria 05, 06, 07)**.
06.	**MONITORING**	Robust monitoring is needed to measure flows and emissions related to aboveground features of the activity and to check for CO_2 leaks in around the storage site. Results of monitoring are used to (i) quantify creditable reductions or removals and (ii) protect natural ecosystems and human health. The latter safeguard can be implemented *either* by applying geographical applicability conditions (i.e. relying on safety monitoring under local laws and regulations) and/or through other effective safeguards **(see safeguard criteria 08, 09)**.

SAFEGUARD AREA		HIGH LEVEL CRITERIA
POLITICAL ACCEPTABILITY	**01.**	**SIGNIFICANT AND COST-EFFECTIVE FOR NATIONAL CLIMATE MITIGATION**
	02.	**ALIGNED WITH NATIONAL DEVELOPMENT PRIORITIES AND POLICY AIMS**
	03.	**PUBLIC ACCEPTANCE**
LEGAL AND REGULATORY FRAMEWORK FOR SAFE STORAGE	**04.**	**LEGAL BASIS FOR INJECTION AND STORAGE**
	05.	**EFFECTIVE SITE SELECTION AND DEVELOPMENT**
	06.	**ROBUST OVERSIGHT OF SITE OPERATION AND CLOSURE**
	07.	**LIABILITY FOR CARBON REVERSAL**
ENVIRONMENTAL AND SOCIAL SAFEGUARDS	**08.**	**RISK AND SAFETY ASSESSMENT**
	09.	**ENVIRONMENTAL AND SOCIAL IMPACTS**
	10.	**SUSTAINABILITY**

SAFEGUARD AREA	HIGH LEVEL CRITERIA	DESCRIPTION	EXAMPLES OF EVIDENCE / CHECKPOINTS
POLITICAL ACCEPTABILITY	**01. SIGNIFICANT AND COST-EFFECTIVE FOR NATIONAL CLIMATE MITIGATION**	Technologies involving geostorage should be part of a host country's cost-optimized and Paris-aligned national mitigation pathway. The host country mitigation scenarios must have been developed cognizant of the UN Sustainable Development Goals (SDGs).	• Nationally Determined Contributions (i.e. inclusion of geostorage within mitigation scenarios and plans) • Long-term Low Emissions Development Strategies (i.e. inclusion of geostorage) • Techno-economic mitigation studies etc
	02. ALIGNED WITH NATIONAL DEVELOPMENT PRIORITIES AND POLICY AIMS	Technologies involving geostorage should be well aligned with the host country's national development plans, policies and sectoral programmes (e.g. economic development plans, energy sector development, industrial development strategy).	• Nationally Determined Contributions (i.e. demonstration of alignment with broader aims) • National development plans and strategies (e.g. economic development plans, energy sector development, industrial development strategy)
	03. PUBLIC ACCEPTANCE	Activities should only be credited where the host country government and political stakeholders accept the need for geostorage (e.g. undertaking of robust stakeholder consultation as part of national climate policy development).	• Nationally Determined Contributions (i.e. developed with broad public input) • Normal host country public consultation processes and procedures • *OECD Best Practice Principles on Stakeholder Engagement in Regulatory Policy*

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LEGAL AND REGULATORY FRAMEWORK FOR SAFE STORAGE	**04. LEGAL BASIS FOR INJECTION AND STORAGE**	Activities credited under international standards should be compliant with host country laws and regulations. The responsibility for governing the geological pore space into which CO_2 is injected and stored is typically vested into government (but sometimes the surface property owner). In some situations, protection of sub-surface resources may also trigger government permitting and oversight (e.g. groundwater protection). Appropriate permission must therefore be obtained to access and use geologic pore space for the purpose of storing CO_2.	• National laws (e.g. constitution; mineral laws etc that indicate ownership of geological pore space and procedure(s) by which access is conferred to economic operators/private entities). • *CDM CCS Modalities and Procedures* (requirements outlined in Appendix B)
	05. EFFECTIVE SITE SELECTION AND DEVELOPMENT	In permitting the use of geological pore space for CO_2 storage, the pore space owner should ensure protection of natural resources and public health and safety. The safety and security of storage in a proposed geological storage site must be appropriately demonstrated prior to the granting of access and use permission (through e.g. robust site characterisation and selection reports and development, operation and closure plans).	• National laws and regulations (e.g. mineral or petroleum development laws; environmental protection laws; dedicated geological storage law) • *2006 IPCC Guidelines Volume 2, Chapter 5: Carbon Dioxide Transport, Injection and Geological Storage* (Requirements in Section 5.10 include reporting of site characterisation and selection, modelling, monitoring plan design, monitoring etc.) • *CDM CCS Modalities and Procedures* (Appendix B) • *ISO Standard 27914:2017 - Geological Storage*
	06. ROBUST OVERSIGHT OF SITE OPERATION AND CLOSURE	Geological storage activities must be operated respecting the conditions specified in storage site permits with appropriate oversight of a competent body (i.e. modes of development, operation and closure).	• National laws and regulations (clarifying the competent authority and their regulatory powers)
	07. LIABILITY FOR CARBON REVERSAL	Responsibility for CO_2 stored in geological formations must be appropriately allocated to ensure that remedial measures are implemented in the event of a leak/carbon reversal from a geological storage site.	• Liability arrangements (e.g. national laws on environmental liability; mineral/petroleum laws; geological CO_2 storage law) • Liability transfer arrangements (e.g. aligned with the cessation of monitoring described in the *2006 IPCC Guidelines Volume 2, Chapter 5*) • Non-permanence risk tool (NPRT) applied by registry operator

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ENVIRONMENTAL AND SOCIAL SAFEGUARDS	**08.**	**RISK AND SAFETY ASSESSMENT**	Geological domains are inherently heterogenous, each having unique characteristics that influence the safety, durability and non-permanence risk of storage. Risks from CO_2 leaks therefore need to be suitably assessed and managed on the basis of site-specific characteristics within a proposed geological storage site, its surrounding domains and the proposed modes of development and operation. Inherent uncertainty in geological analysis means that this must be based on scenarios of specific features and potential events and processes that could occur at the specific site in order to understand the scale and magnitude of potential impacts (i.e. risks).	• National laws and regulations • *ISO Standard 27914:2017 - Geological Storage* (Section 6: Risk Assessment) • *CDM CCS Modalities and Procedures* (Appendix B)
	09.	**ENVIRONMENTAL AND SOCIAL IMPACTS**	The nature of the impacts of leaking CO_2 of an individual project needs to be understood in the context of the scenarios identified in the risk and safety assessment (e.g. communities, natural ecosystems). Measures must be taken to mitigate and mange such risks and impacts.	• National laws and regulations • *ISO Standard 27914:2017 - Geological Storage* (Section 6: Risk Assessment) • *IFC Performance Standards on Environmental and Social Sustainability (Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts*)
	10.	**SUSTAINABILITY**	Sustainability impacts and benefits of an individual project must be appropriately demonstrated (e.g. tangible co-benefits and/or contributing towards multiple United Nations SDGs). Corporate social responsibility should be part of project deployment (as appropriate to the project setting). For example, implementation could be accompanied by community support programmes and knowledge sharing, education and engagement actions relating to climate change and its mitigation through geologic CO_2 storage.	• *CDM Sustainable Development co-Benefits Tool* • *ISO Standard 37101:2016 - Sustainable development in communities* • Project-level standard requirements for sustainability (e.g. The Gold Standard requirement to deliver on at least 3 SDGs, including climate action (SDG 13))