International Carbon Action Partnership

INCLUSION OF CARBON DIOXIDE REMOVALS IN SELECTED ETS: STATE OF PLAY

Thematic Brief

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Introduction

Recent months have seen ample attention on the potential interaction between emissions trading systems (ETSs) and carbon dioxide removal (CDR), with systems such as the EU ETS and the UK ETS engaging in policy discussions on this issue. Among others, introducing CDR in an ETS can support compliance cost control for regulated entities (if removal units are cost competitive vis à vis abatement in the ETS), create 'space' for hard-to-abate[1] emissions in the ETS, and provide an incentive for CDR development and deployment. However, their inclusion in ETSs also risks undermining environmental integrity (e.g. due to unmitigated reversals and poor quantification of emission outcomes), can reduce control by the regulator over decarbonization pathways, and can also lead to economically inefficient abatement deterrence.[2]

To date, experience with removal units in compliance markets pertains exclusively to nature-based activities. For example, the ETSs in Australia, California, Canada, China, Korea, New Zealand, and Québec allow for the use of nature-based removal units, covering activities such as afforestation, reforestation, and improved forest management. Yet recent developments focus on engineered CDR. The UK government has confirmed that engineered CDR methods (such as bio energy and carbon capture and storage – BECCS and direct air carbon capture and storage – DACCS) will be integrated into the UK ETS from 2029 onwards.[3] The European Commission is currently preparing a proposal for the potential integration of permanent CDR into the EU ETS.

Building on previous ICAP work (on ETS and CDR, on ETS and CCS, and on the role of ETSs in net zero and net negative societies), this note provides a brief survey of provisions for removal unit use in selected ETSs.[4] It contains three tables: ***Table 1*** provides a summary description of how individual ETSs interact with CDR. ***Table 2*** provides more details on **eligibility** (the accepted types and geographic location of CDR activities), on the **relationship with ETS scope** (i.e., whether removal units are generated inside or outside the scope of the ETS), on **legal tender** (i.e., the unit that is initially issued for removal activities)[5], and on **quantitative limits** for the use of CDR in the ETS. ***Table 3*** focuses on the various provisions related to **reversals and permanence**, such as liability provisions, definitions of permanence and monitoring requirements, among others. ***Table 4*** summarizes.

The tables exemplify that most ETS experience with CDR to date pertains to domestic CDR from forestry, outside the scope of the ETS, from domestic crediting programs, and subject to limits. On eligibility, all systems surveyed here except for the UK accept units from forest-related activities (with a decision by the UK government pending on this matter). Other common protocols include soil carbon, blue carbon and mangroves, with protocols for BECCS and DACCS under development. All systems accept units generated domestically, with Korea the only jurisdiction accepting international units. With the exception of New Zealand, all systems surveyed here have CDR activities outside the scope of the ETS, generating carbon credits through domestic crediting programs. Quantitative limits see much more diversity, with most (California, China, Korea, Québec)

[1] There is no consensus definition on what constitutes 'hard-to-abate'. Relevant considerations include, among others emissions that are politically and economically difficult to abate, as well as emissions for which there is insufficient technological progress for abatement (Schenuit et al., 2023), noting that defining emissions as hard-to-abate embeds value judgements of what is feasible and how to weigh different policy priorities (Lund et al., 2023).

[2] For a detailed discussion on the inclusion of CDR in ETSs, see **https://icapcarbonaction.com/en/publications/emissions-trading-systems-and-net-zero-trading-removals** and **Emissions trading systems: Trading removals?: Climate Policy: Vol 25, No 7**

[3] See **https://assets.publishing.service.gov.uk/media/689cda8487bf475940723f5b/uk-ets-ggrs-main-response.pdf** . The full list of documentation (including technical annexes) is available here: **https://www.gov.uk/government/consultations/integrating-greenhouse-gas-removals-in-the-uk-emissions-trading-scheme**

[4] It is important to note that the existence of such provisions does not necessarily reflect the actual use of removal units in practice in the ETS, nor does it indicate the level of market activity. This briefing note therefore offers an overview of the relevant provisions, albeit without an analysis of actual removal unit utilisation or market dynamics.

[5] Note that the unit may be subject to conversion into another unit upon entering ETS registries.

imposing limits of up to 10% of compliance obligations, one (Canada) with a limit of 75%, and two (Australia and New Zealand) allowing unlimited use of CDR in the ETS.[6]

On permanence and reversals, the survey identified ample diversity. Supply-side liability and buffer pools are the most common approaches employed, each used by five out of the eight jurisdictions surveyed here. Three of the surveyed jurisdictions make a distinction between intentional and unintentional reversals. Discount at issuance is employed by two out of the eight. Two jurisdictions include provisions for methods related to tonne-year accounting.[7] One jurisdiction makes use of demand-side liability. Finally, permanence provisions vary widely, with two jurisdictions monitoring permanence for 20-25 years in some instances, three requiring permanence for 100-200 years, and one with no end date.

Overall, and although not exhaustive, the survey helps identify points of convergence and divergence across jurisdictions making use of CDR in their ETSs. Further work in this area could, among others, investigate the evidence base for the effects of different limits in CDR use, as well as on the effectiveness of the various instruments being employed to address reversals.

[6] Noting that in Australia, use of carbon credits exceeding 30% must be accompanied by justification.

[7] From Scheider (2024) **Options for addressing the risk of non-permanence for land-based mitigation in carbon crediting programmes**: "*Under tonne-year accounting, mitigation activities initially receive only a fraction of a carbon credit for each tonne of CO2 of emission reductions or enhanced removals they achieve. For each year that the carbon associated with these reductions or removals remains stored, the fractional amount of issued credits increases, such that a mitigation activity receives one credit for each tonne only at the end of a predefined time period. The underlying premise is that at the end of this predefined period (e.g. 100 years), the mitigation achieved is equivalent to "permanently" reducing or removing CO2. (…) While this approach requires ongoing monitoring for reversals, no compensation is required. Instead, after a reversal occurs, crediting simply ceases, on the assumption that the fraction of previously issued credits still represents a fraction of "permanent" mitigation.*"

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Table 1 - General approach

	General approach on CDR use in the ETS
Australia[8]	ETS and CDR markets are connected, with regulated entities purchasing CDR units directly and without quantitative limits. Transparency requirements are triggered if use of CDR units for compliance exceed a certain threshold. Includes protocols for forestry, soil carbon and blue carbon CDR.
California	ETS and CDR markets are connected, with regulated entities purchasing CDR units directly and subject to quantitative limits. Use of carbon credits by regulated entities allowable up to 4% of compliance obligations. 80% of used credits to date from forestry.
Canada federal OBPS	The federal OBPS and CDR markets are connected, with regulated entities purchasing eligible offset credits (including CDR units) directly and subject to quantitative limits. Use of credits cannot surpass 75% of compliance obligation (as at least 25% of the compliance obligation must be met in the form of a fixed charge per tonne).[9] Includes protocols for forestry CDR.
China ETS	ETS and CDR markets are connected, with regulated entities purchasing CDR units directly and subject to quantitative limits. Use of carbon credits by regulated entities allowable up to 5% of verified emissions. Includes protocols related to forestry and mangrove CDR.
Korea ETS	ETS and CDR markets are connected, with regulated entities purchasing CDR units directly and subject to quantitative limits. Use of carbon credits by regulated entities allowable up to 5% of compliance obligations. Includes protocols for forests and oceans.
New Zealand	CDR is fully integrated in the ETS market. Forestry CDR owners are covered by the ETS and receive perfectly fungible allowances for removals. There is no quantitative limit on CDR use in the system.
Québec	ETS and CDR markets are connected, with regulated entities purchasing CDR units directly and subject to quantitative limits. Use of carbon credits by regulated entities allowable up to 8% of compliance obligations. Includes protocols for forestry CDR.
UK ETS (latest proposal)	ETS and CDR market will be connected as of 2029, with regulated entities purchasing CDR units directly and subject to restrictions. Current proposals would see a limit on CDR supply into the ETS market rather than on a percentage obligation by regulated entity. Initial focus on BECCS and DACCS. Potential use of Woodland Carbon credits under review.

[8] Sources:
- **Carbon Credits (Carbon Farming Initiative) Act 2011 - Federal Register of Legislation**
- **2023 Review of the Carbon Credits Act 2011 - publication.pdf**
- **National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015 - Federal Register of Legislation**

[9] Note that in the Canada federal OBPS, the compliance obligation applies only to the facility's emissions over the limit.

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Table 2 – Eligibility, relationship with ETS scope, legal tender, quantitative limits

	Removal unit eligibility and relationship with ETS scope
Australia[10]	• CDR currently eligible:[11] Forestry, soil carbon, blue carbon • Geography: Domestic • Relationship with ETS scope: Removals occur *outside* the system scope • Legal tender: carbon credits (domestic crediting mechanism) • Quantitative limits: none, but justification must be provided if carbon credit use exceed 30% of compliance obligation
California	• CDR currently eligible:[12] Forestry • Geography: Domestic (US). Units eligible for compliance in Québec are also eligible in California due to the link between the two systems. • Relationship with ETS scope: CDR takes place *outside* the ETS scope. • Legal tender: carbon credits (domestic crediting mechanism) • Quantitative limits: up to 4% of compliance obligations (will be increased to 6%)
Canada federal OBPS	• CDR currently eligible:[12] Forestry (DACCS and soil carbon under development)[13] • Geography: Domestic • Relationship with OBPS scope: CDR takes place *outside* the OBPS scope. • Legal tender: carbon credits (domestic crediting mechanism) • Quantitative limits: up to 75% of compliance obligations
China ETS	• CDR currently eligible:[12] Forestry and mangroves • Geography: Domestic • Relationship with ETS scope: CDR takes place *outside* the ETS scope. • Legal tender: carbon credits (domestic crediting mechanism) • Quantitative limits: up to 5% of compliance obligations
Korea ETS	• CDR currently eligible:[12] Biogenic, including forests and oceans • Geography: Domestic and international • Relationship with ETS scope: CDR takes place *outside* the ETS scope. • Legal tender: carbon credits • Quantitative limits: up to 5% of compliance obligations
New Zealand	• CDR currently eligible:[14] Forestry • Geography: Domestic • Relationship with ETS scope: CDR takes place *inside* the ETS scope. • Legal tender: New Zealand Units (allowances), fully fungible

[10] Sources: **CFI Act 2011**, s.54 and s.106. CFI Act 2011, s. 27(4)(a), CFI Act 2011, s. 4 (Definitions), s. 11 (Issue of ACCUs), s. 168 (Holding ACCUs), Safeguard Mechanism Rule 2015, s. 27A

[11] Based on existing carbon credit methodologies (or 'protocols').

[12] Based on existing carbon credit methodologies (or 'protocols').

[13] The Canada Federal OBPS also recognizes some provincial offset protocols. For CDR this includes, for example, the British Columbia Forest Carbon protocol. See **List of Recognized Offset Programs and Protocols for the Federal OBPS - Canada.ca** .

[14] Based on existing MRV provisions – see **https://www.mpi.govt.nz/forestry/forestry-in-the-emissions-trading-scheme/about-forestry-in-the-emissions-trading-scheme-ets/how-forest-land-is-defined-in-the-ets/** . See also **https://icapcarbonaction.com/en/publications/emissions-trading-and-carbon-capture-and-storage-mapping-possible-interactions** , section 7.4} for more information on the NZ ETS approach.

	• Quantitative limits: none
Québec ETS[15]	• CDR currently eligible:[12] Forestry[16] • Geography: Domestic (Québec). Units eligible for compliance in California are also eligible in Québec due to the link between the two systems. • Relationship with ETS scope: CDR takes place *outside* the ETS scope. • Legal tender: carbon credits (domestic crediting mechanism) • Quantitative limits: up to 8% of compliance obligations
UK ETS (latest proposal)	• CDR currently eligible:[17] BECCS and DACCS; potential use of Woodland Carbon Code credits under review • Geography: Domestic • Relationship with ETS scope: CDR *outside* the ETS scope. • Legal tender: carbon credits (domestic crediting mechanism) • Quantitative limits: transitional supply controls will limit the number of CDR units that can enter the market and will be designed following an upcoming consultation. The use of CDR is also limited by the volume of conventional allowances (as the use of a removal unit will entail the cancellation of a conventional allowance).

[15] **Q-2, r. 35.3.1 - Regulation respecting afforestation and reforestation projects eligible for the issuance of offset credits on privately-owned land**

[16] As of August 2025, no credits have been issued under the forest protocol. See **https://www.environnement.gouv.qc.ca/changements/carbone/credits-compensatoires/registre_creditscompensatoires-en.htm**

[17] Based on the latest government position (**https://assets.publishing.service.gov.uk/media/689cda8487bf475940723f5b/uk-ets-ggrs-main-response.pdf**). Carbon credit methodologies currently under development.

Table 3 – Reversal and permanence provisions

	Reversal and permanence provisions
Australia[18]	• Reversals: Supply-side liability for intentional reversals; discounting at issuance for unintentional reversals (5% reversal buffer discounting for sequestration projects plus 0-25% discount depending on monitoring period choice and methodology-specific provisions) • Permanence: Project sequestration project proponents must choose a permanence period during which monitoring obligations apply: o 25 years (a 20%-25% discount applies at issuance, plus the 5% discount for the reversal buffer) or o 100 years for sequestration projects.
California	• Reversals: Buffer pool for unintentional reversals; supply-side liability for intentional reversals; demand-side liability in case of over-issuance, double crediting, or regulatory non-conformance. • Permanence: 100 years, with monitoring and verification obligations throughout.
Canada federal OBPS	• Reversals: Supply-side liability, backed by a pooled reserve.[19] (Does not apply to projects that may employ tonne-year accounting if an offset protocol enabling tonne-year is developed in the future) • Permanence: two options:[20] (a) monitoring obligations for 100 years after the end of the crediting period; or (b) tonne-year accounting, which aims to generate a permanent credit based on temporary removals (not enabled in any published methodology to date).
China ETS	• Reversals: Discounting at issuance based on risk assessment • Permanence: 20-40 years
Korea ETS	• Reversals, permanence: Buffer pool
New Zealand	• Reversals: Supply-side liability. Reversal provisions depend on the accounting method. o Under *stock change accounting*, forest owners receive allowances as forests grow and must surrender allowances when forests are cleared.[21] o Under *averaging accounting*, forest owners receive allowances up to the average amount of carbon the forest is expected to store in the long term. Allowances must be surrendered if there is a permanent land use change.[22]

[18] **https://cer.gov.au/schemes/australian-carbon-credit-unit-scheme/how-to-participate-accu-scheme/permanence-obligations**; **https://cer.gov.au/document/reducing-risk-fire-and-preserving-sequestered-carbon-accu-vegetation-projects**. Also CFI Act 2011, s. 16 (sequestration offsets projects), s. 81 and 82 (reversals), s. 86A (Relinquishment of ACCUs), s. 87 (Risk of reversal buffer), s. 31A (Discounting); CFI Act 2011, s. 86A, s. 87, s. 31A; **2023 Review** discusses possible reforms to permanence and liability arrangements but these are not yet legally binding (2023 Review, p. 34)

[19] https://gazette.gc.ca/rp-pr/p2/2022/2022-06-08/html/sor-dors111-eng.html, **'Evaluation of reversal'**

[20] https://gazette.gc.ca/rp-pr/p2/2022/2022-06-08/html/sor-dors111-eng.html, **'Monitoring', 22 (1) and (2)**

[21] See **Stock change accounting in the ETS | NZ Government**

[22] See **Averaging accounting | NZ Government**

	• Permanence: The requirement to surrender allowances in case of reversals (as defined above) does not expire.
Québec ETS	• Reversals and permanence: enhanced tonne-year accounting method. A credit is issued when the project generates the radiative forcing equivalent to that needed to cancel out the impact of one tonne of CO_2 in the atmosphere over 100 years. As credit issuance follows from a past climate benefit, under this method reversals do not require compensation.[23]
UK ETS (latest proposal)	• Reversals: Supply-side liability for reversals, with buffer pools where liability is deemed insufficient. Detailed design to be finalised via technical consultation. • Permanence: Minimum 200-year storage requirement.

[23] For more information on Québec's forest offset protocol see : **Carbon Sequestration Through Afforestation or Reforestation on Private Lands**

Table 4 – Summary of reversal and permanence provisions

	Australia	California	Canada	China	Korea	New Zealand	Québec	UK
Supply-side liability	✓	✓	✓	×	×	✓	×	✓
Demand-side liability	×	✓	×	×	×	×	×	×
Buffer pools	✓	✓	✓	×	✓	×	×	✓
Discount at issuance	✓	×	×	✓	×	×	×	×
Distinction between intentional and unintentional reversals	✓	✓	✓	×	×	×	×	tbd
MRV obligation period (years)	25 or 100	100	100 or tonne-year	20-40	Until maturity	No end date	Enhanced tonne-year method	tbd (200)