

EXECUTIVE SUMMARY

The idea behind enhanced rock weathering (ERW) as a carbon removal method has been mooted for more than 20 years: accelerate natural weathering processes of silicate rich rocks by mining, crushing and spreading them on agricultural land, producing an atmospheric CO₂ drawdown effect that locks up carbon away from the atmosphere for multi-century timescales. Some argue it can provide a scalable, cost-effective and durable CO₂ removal pathway, although foundational science has yet to definitively prove the efficacy or effectiveness of the method relative to some other forms of engineered removals. The voluntary carbon market provides a testing ground to accelerate learning and enhance monitoring approaches.

WHAT IS ERW?

Enhanced rock weathering is a means of drawing-down atmospheric CO₂ through ambient chemical reactions that result in it being converted to stable carbonate/bicarbonate ions, which subsequently transfer through the hydrosphere to the oceanic carbon reservoir.

Crushed alkaline rocks such as volcanic silicates provide the feedstock that can be spread onto agricultural land to be chemically weathered, a process leading to atmospheric CO₂ drawdown.

Drawdown relies on the silicates reacting with carbonic acid in rainwater (which is naturally formed in the atmosphere), resulting in the generation of bicarbonate ions, which can travel to the ocean or other natural carbon reservoirs (e.g., underground aquifers). This process mimics existing geologic processes, where basic rock formations are weathered by acids within rain. Storage of bicarbonate can be on millennial timescales, and the application of the crushed rocks can help improve crop yields. However, risks include asbestos exposure and increased soil heavy metal concentrations.

Measuring drawdown rates and fate and behavior of the bicarbonates in the environment is challenging, and the effects of large-scale accelerated weather on exposed ecosystems is not well understood.

Availability of suitable rock can also be a limiting factor.

THE CARBON CREDITING PROCESS

- *Rocks are sourced and commuted to fine dust, transported to sites and spread on fields.*
- *Weathering of the rock dust occurs through ambient reactions with carbonic acid in rainfall, forming bicarbonate and carbonates. Process cannot be directly observed, only inferred.*
- *The formed bicarbonates and carbonates are largely washed from soil in solution and transported through the hydrosphere ultimately to storage in the oceanic bicarbonate reservoir.*
- *Methodologies account for energy use in sourcing, transporting and spreading rock dust, and in some cases potential alternative uses and natural weathering of the materials.*
- *CO₂ drawdown in the near-field zone (NFZ) is estimated by mass-balance methods, stoichiometric soil models or other approaches, calibration against field measurements of dissolved bicarbonate and alkaline ions leaving the NFZ, and comparisons with flows of the same materials from control plots.*
- *Emissions from reverse reactions in the far field zone (FFZ) outside of the area of application are generally excluded.*
- *Total credits are estimated by subtracting the impacts of losses from process emissions, non-carbonic acids, and, in some, reverse reactions (outgassing) during transit.*

KEY ERW CONSIDERATIONS**Long-Term Durability**

Bicarbonate ions can be stored in the ocean on millennial timescales with low reversal risk

Co-Benefits

Use on cropland has been shown to improve yields under a range of circumstances

Land Use

ERW requires no land-use change, reducing productive land competition

Energy Requirements

Often lower energy needs than other engineered CDR methods (depending on rock source)

POLICY & REGULATORY OUTLOOK

Limited policy signals or incentives for ERW today, and limited developments in regulatory contexts.

Forthcoming IPCC Methodology Report on CCUS and CDR is likely to include new methods by which ERW can be counted by countries as mitigation efforts towards the NDCs and the Paris goals. IPCC developments could unlock wider interest.

MARKETS, STANDARDS & METHODOLOGIES**VOLUNTARY CARBON MARKETS**

Carbon Standards International (Rock C-Sink, 2022)

Isometric (Enhanced Weathering in Agriculture, 2026)

Puro.earth (Enhanced Rock Weathering, 2025)

Rainbow (Enhanced Rock Weathering, 2025)

Oncra (Rock Stored Carbon, 2025)

COMPLIANCE / REGULATORY MARKETS**EU Carbon Removals and Carbon Farming (CRCF) Regulation**

The CRCF – a voluntary EU framework for certifying permanent carbon removals, carbon farming, and carbon storage in products – is considering possibilities for an ERW methodology.

Article 6.4

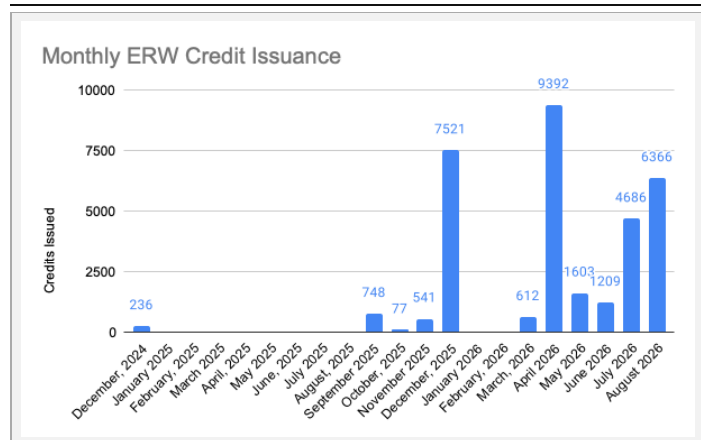
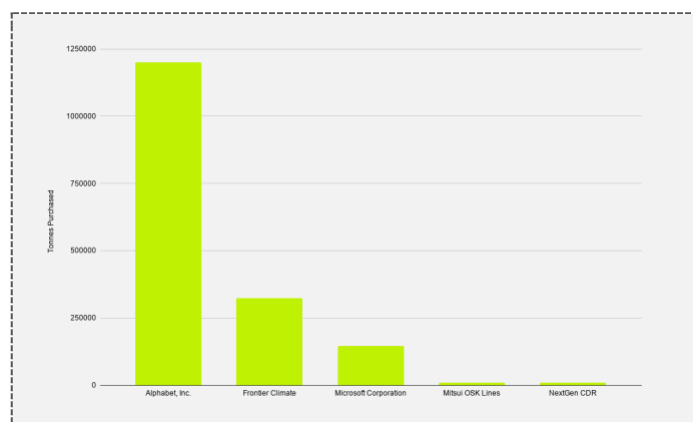
No methodology

Article 6.2 agreements

No existing bilateral agreements include ERW within project types.

Cap-and-invest & ETSs

None includes ERW or accepts ERW credits.

CREDIT ISSUANCE OVER TIME**TOP OFFTAKE BUYERS****REFERENCES**

Sylvera proprietary data
Puro.earth Registry
Isometric Registry
Allied Offsets
All data sources accessed May 11, 2026

AUTHORS

Kit Michaelis, Carbon Analyst, Sylvera
Carmen Alvarez, Jurisdictional Policy Lead, Sylvera
Hugo Lakin, Commodities Lead, Sylvera
Jeremy Rubin, IETA
Kajol Tandon, IETA
Paul Zakkour, IETA/Carbon Counts

MARKET SNAPSHOT – KEY STATS**~33,000 tCO₂e**

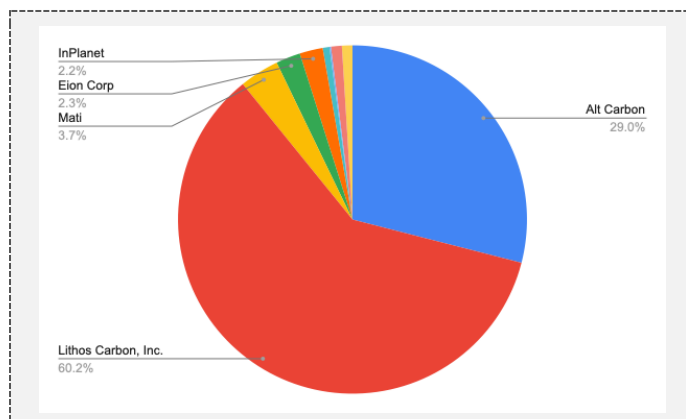
CREDITS ISSUED TO DATE

15

ISSUING PROJECTS GLOBALLY

\$200–\$500¹PRICE RANGE PER TCO₂E**297%²**

YOY VOLUME GROWTH

GEOGRAPHIC DISTRIBUTION OF ISSUANCE**CREDIT ISSUANCE BY SUPPLIER****IETA's CARBON MANAGEMENT BUSINESS BRIEF SERIES****PURPOSE & OVERVIEW**

This IETA Carbon Management Business Brief Series aims to provide market clarity on CCUS and engineered CDR pathways from market participants and stakeholders. IETA's suite of [business briefs](#), covering nearly all compliance carbon markets, is publicly available.

¹ Allied Offsets, Enhanced Rock Weathering (ERW)

² 2025–2026 (to-date); minimal data availability drives significant uncertainty. Data up to date as of 4 September 2026 10:00 (GMT)