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Market Risk for ERCs, laptop and tablet on wooden desk. working from home. cozy workplace

Market Risk for ERCs

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On this page: *ERC market risk remains high and still needs to be mitigated directly to facilitate scaling up ERC financing while the market matures. Read more below, or visit Strategic Guidance for Country System Assessments, Guidance for Countries in Assessing ERC Projects, or Mobilizing ERC Finance.*

Demand for and trade of ERCs are steadily increasing, see ERC Market Status, but ERC market risk remains high and still needs to be mitigated directly to facilitate scaling up ERC financing while the market matures. The market for ERCs is still nascent and highly fragmented. Such markets can attract financing from specific niche entities, which in the case of ERC activities includes end users, impact-focused entities, or specialist financial intermediaries. However, a large, liquid market is more likely to attract mainstream financiers to lend or invest in exchange for ERCs or ERC-linked returns. ERC market risk is largely driven by (1) uncertain overall demand, including due to longer-term uncertainty about the extent to which ERCs are eligible for compliance use or what claims can be made for voluntary use, and (2) demand and price variation of end users for specific ERC attributes, which is influenced by not only the end users' direct preferences, but also policy, reputation, and other external factors influencing eligible uses and desirable qualities of ERCs. The former can be alleviated broadly by governments and standard setters clarifying policies and standards around ERC use. From a supply-side perspective, ERC activity proponents can take steps to help ensure they can sell ERCs at a reasonable price.

1. Credit integrity

ERC activities will increasingly need to demonstrate verification against leading standards and adhere to key integrity indicators to meet market demand for high-quality ERCs and therefore attract financing. A high degree of confidence that ERCs are supporting their purported environmental and social benefits is critical for integrity of any specific ERCs and the market overall. ERC proponents can consider designing and implementing activities in line with three key integrity measures:

- Verification standards comprise requirements to register the underlying project, comply with the relevant credit methodologies; conduct robust monitoring, reporting, and verification (MRV); and obtain independent third-party validation and verification to achieve final ERC issuance. Standard and methodology selection is important due to different activity requirements, which informs market views on perceived integrity of ERC activities and credits issued in line with those standards. For example, certain standards or methodologies may have more conservative requirements for baseline setting and/or stronger technical, environmental, or social safeguards than others. In deciding which standards and methodologies will be eligible in a given jurisdiction, governments should select those that are widely accepted by the market, considered to be high-integrity, and support national policy goals. At the project level, decisions regarding which standard and methodology to adopt will depend on jurisdictional suitability and other technical, environmental, and social priorities.

- Voluntary market integrity frameworks are emerging which seek to evaluate the integrity of ERC activities. These may be relevant to end users and may eventually result in market segmentation between ERCs that adhere to such frameworks and those that do not. For instance, the Integrity Council for the Voluntary Carbon Market's (ICVCM) Core Carbon Principles (CCPs) are intended to provide a global benchmark for integrity across verification standards.[1] These are accompanied by an Assessment Framework and Assessment Procedure against which crediting programs that manage the verification standards and categories of ERCs issued through those programs will be evaluated by ICVCM in order for ERCs issued through approved programs to receive the CCP label. The CCPs have the potential to provide a degree of alignment across international standards and drive up quality, standardization, and financing, but they could also potentially impede ERC transactions if it is a long, difficult process to obtain the CCP label for standards, methodologies, and projects. Project developers would be wise to start considering whether to align with standards bodies, methodologies, and individual projects that are (or are likely to be) CCP eligible and labelled.
- ERC ratings are emerging as assessments of the probability that ERCs issued from a particular activity or using a particular methodology deliver their purported mitigation outcomes. The intention is to improve transparency and facilitate greater capital flows into high-integrity ERC activities. While ERC ratings agencies are currently in their infancy, they could potentially evolve to support development of better pricing indices and benchmarks that the market currently lacks. Nevertheless, ERC ratings agencies also have the potential to create further confusion in the market—e.g., in instances where these private companies do not make publicly available their evaluation criteria or in the event that an ERC ratings agency assigned an integrity score that conflicted with other emerging market guidance, such as the ICVCM's CCPs. As of March 2023, the three largest third-party agencies—BeZero Carbon, Calyx Global, and Sylvera—had provided ratings for over 300 projects representing more than half of all ERCs on the market.[2]

Given the increasing scrutiny of ERC integrity on a global scale, it may be beneficial for large-scale ERC activities (or ERC aggregators) to appoint a panel of ERC market experts and advisors to provide initial and ongoing review of ERC activities. This would help ensure that the activities align with the latest standards, methodologies, and guidelines for generating high-integrity ERCs.

2. Registries

Establishing or working with robust registries to track ERCs domestically and internationally is essential to help ensure integrity if the global ERC market is ever going to grow to meet the anticipated scale of demand. Registries are a centralized system that tracks assets with value, not dissimilar from central securities depositories in securities markets. Secure and well-governed registries are a critical piece of market infrastructure to track where and for what purposes ERCs are issued, transferred, and cancelled. Accessible and robust data on these events is essential to enhance market transparency, credibility, oversight, compliance, and liquidity—all of which help ensure the financial and environmental integrity of ERCs, promote interoperability across borders, and contribute to enabling ERC transactions at scale.[3] Notably governments are required to have, or have access to, a registry for compliance with Article 6.

Governments seeking to develop national ERC markets and participate in Article 6 activities could further integrate into the global ERC market and promote ERC financing in-country by linking their national registry with the Climate Action Data Trust platform. In December 2022, the International Emissions Trading Association, the World Bank, and the Government of Singapore announced the launch of the Climate Action Data Trust (CAD Trust), which hosts a global public meta-data information technology platform built on the blockchain.[4] This new, decentralized global carbon market infrastructure seeks to enhance transparency and environmental integrity of ERC transactions and the market more broadly.[5] Major registries, including national registries, are expected to be able to connect to the CAD Trust platform in 2023,[6] with associated data to subsequently be made publicly available.[7] The CAD Trust anticipates it will integrate other registries (both compliance and voluntary) as time goes on to improve transparency and accountability in ERC

markets. It is expected that this will support implementation of country-level NDCs under the Paris Agreement, as well as the needs of corporate buyers. Advantages of linking could include a common taxonomy to support reconciliation of transactions across jurisdictions, visibility into corresponding adjustment procedures to mitigate risk of double counting, greater transparency, and accountability, as well as support in operationalizing Article 6 processes, such as registry development and compliance reporting.[8]

3. Securing demand

Contracts for future delivery of ERCs provide greater certainty about future ERC revenues, making it easier for ERC activities to attract investment, and in some cases, such agreements can be a source of finance prior to ERC generation. This approach is used across sectors such as extractives, power, and agriculture and are particularly helpful to manage market risk in smaller, nascent, or potentially volatile markets, such as ERC markets. Offtake agreements can be particularly helpful where there are challenges related to production or market access, such as generating ERCs in EMDEs. There are two primary tools that can be used to secure future purchase of ERCs:

- Forward contracts are bilateral agreements between a buyer (e.g., corporate) and a seller (e.g., ERC project developer) to transact ERCs at a specified price at a specified date in the future. Both parties take on some risk of price fluctuations and forfeit being able to buy or sell at a lower or higher price, but prefer the volume and price security because (1) many end user buyers are corporate sustainability functions that need to procure credits over a long time horizon to offset emissions and must adhere to a predetermined budget, so prefer the price certainty, and (2) sellers are protected against downside risk of low demand and low prices in future. Some forward contracts set a floating ERC price linked to a market index. While less common than fixed-price structures, floating-price structures are becoming more common especially amongst investors and offtakers with a greater risk tolerance. They provide less certainty for the buyer in exchange for greater potential upside on the secondary market. Floating price structures that involve upfront financing can include a risk-sharing mechanism that enables the buyer and the seller to share in the upside and downside risk, based on an agreed-upon benchmark price and price range.
- Advance market commitments (AMCs) are typically larger in scale and more speculative in nature, aggregating demand from governments and other large entities (e.g., corporates and financial institutions) to signal guaranteed demand and support for development of new technologies that could generate ERCs in future. Once commitments are in place, the AMC organizing entity can select activities to receive funding and facilitate upfront ERC transactions on behalf of specific interested buyers. Over time, activities receive further payment as ERCs are delivered and transacted. Like forward contracts, AMCs provide a greater level of financial certainty for project developers and financiers. As AMCs often have a longer time horizon than forward contracts, they can provide the additional benefit of greater flexibility in terms of quantity of ERCs to be delivered (Box 4).

Box 4

Case of Frontier[9]

Frontier is an AMC launched by Stripe, Alphabet, Shopify, Meta, and McKinsey to purchase $1 billion in permanent carbon removal ERCs between 2022 and 2030. Frontier seeks to accelerate the development and scale of carbon removal technologies by creating a strong demand signal for the market and providing funding to a diverse range of activities, including enhanced weathering, direct air capture, biomass carbon removal and storage, ocean carbon removal, and synthetic biology.

In practice, Frontier aggregates total buyer demand to set an annual maximum spend (based on how much each individual buyer wants to spend) on carbon removal between 2022 and 2030. Activities and carbon removal technology developers then apply for funding through a tender process, and Frontier selects activities based on the following criteria: durability, physical footprint, cost, capacity, net negativity, additionality, verifiability, and safety and legality. For early-stage or small-scale activities piloting new technologies, Frontier will sign a small prepurchase agreement to provide upfront financing. For larger activities that are ready to scale their technology, Frontier will sign an offtake agreement to purchase future tons of carbon removal at a specified price when delivered.

As of September 2023, Frontier has contracted US$65.9 million to 30 projects, primarily in the United States and Europe.

4. Price Support

Price support mechanisms benefit ERC activities by guaranteeing a minimum unit price and therefore support revenue flows and reduce market risk, which can help mobilize ERC financing. Forward contracts and AMCs are designed to secure sale of ERCs, but in doing so can lock in a price and therefore cap the potential profit to the seller. Price support mechanisms do not include the obligation to sell ERCs and are used to protect against a low market price. There are two primary mechanisms relevant for ERC markets:

- Put options give ERC suppliers the right, but not the obligation, to sell an ERC at a specified ‘strike price’ within a specified period, providing protection for the ERC supplier if the market price drops below the strike price. This can be a useful instrument for activities to hedge against price volatility, provide downside protection, secure financing, and increase certainty regarding future cash flows and profit margins.
- Price floors also provide a guaranteed minimum ERC price but are not contracted by the ERC supplier and another party and are instead offered by stakeholders interested in stimulating the ERC market, such as through ERC buyer’s clubs (Box 5). While a floor may be attractive to sellers, there could be a risk that buyers respond by treating it as though it is a fixed price rather than just the minimum. In ideal circumstances, competitive market forces will still operate to drive the price higher than the floor rather than compress the market.

Box 5

Case of LEAF Coalition.

In 2021, the Lowering Emissions by Accelerating Forest finance (LEAF) Coalition announced a $1 billion commitment to purchase ERCs to protect tropical forests and enhance global climate action. Participants include the governments of Norway, the United Kingdom, the United States, and large companies including Amazon, Airbnb, Bayer, Burberry, Delta, GSK, Nestlé, Salesforce, and Unilever.[10] Membership conditions include public commitment to the Sciencebased Targets initiative (SBTi), public net-zero targets across all three scopes, reporting of GHG emissions in line with the Greenhouse Gas Protocol, and reporting of ERC use.[11] ERCs transacted through the platform must originate from activities eligible for crediting under the Architecture for REDD+ Transactions’ The REDD+ Environmental Excellence Standard (ART-TREES) and conducted at a jurisdictional level through national or sub-national programs.

ERCs will be purchased by buyers at a minimum price of $10 per tCO_2e.[12] This price floor model seeks to help ensure that projects funded through the LEAF Coalition are financially viable and able to attract

commercial capital required to scale their activities. LEAF transactions have suffered from buyers treating $10 per tCO_2e as a fixed price, rather than a floor, thereby compressing the market and disadvantaging sellers that may have been able to get a higher price outside of LEAF.

Footnote 1: Integrity Council for the Voluntary Carbon Market (ICVCM), *"The Core Carbon Principles"*, 2023.

Footnote 2: World Bank Group, *"State and Trends of Carbon Pricing 2023"*, *2023*.

Footnote 3: See, e.g., IOSCO, *"FR09/23 Compliance Carbon Markets"*, 2023 and IOSCO, *"CR06/2022 Voluntary Carbon Markets"*, 2022.

*Footnote 4:*IETA, "*IETA and Founding Partners Announce the Launch of Climate Action Data Trust*", 2022.

Footnote 5: Climate Action Data (CAD) Trust, *"About"*, n.d.

Footnote 6: IETA, "*IETA and Founding Partners Announce the Launch of Climate Action Data Trust*", 2022.

Footnote 7: CAD Trust, *"Connecting carbon markets through open data"*, n.d.

Footnote 8: Climate Action Data (CAD) Trust, *"About"*, n.d.

Footnote 9: Frontier, 2023.

Footnote 10: Lowering Emissions by Accelerating Forest finance (LEAF) Coalition, *"LEAF Coalition"*, 2021.

Footnote 11: LEAF Coalition, *"LEAF Coalition buyer's qualification policy"*, n.d.

Footnote 12: LEAF Coalition, *"LEAF Coalition"*, 2021.

Additional Resources

- UNCITRAL Legislative Guide on Public-Private Partnerships
- World Bank Guidance on PPP Legal Frameworks
- Climate-Smart PPP Legal and Regulatory Framework

This section is intended to be a living document and will be reviewed at regular intervals. The Guidelines have not been prepared with any specific transaction in mind and are meant to serve only as general guidance. It is therefore critical that the Guidelines be reviewed and adapted for specific transactions. Unless expressly stated otherwise, the findings, interpretations, and conclusions expressed in the Materials in this Site are those of the various authors of the Materials and are not necessarily those of The World Bank Group, its member institutions, or their respective Boards of Executive Directors or member countries. For feedback on the content of this section of the website or suggestions for links or materials that could be included, please contact the Public-Private Partnership Resource Center at ppp@worldbank.org.