Environmental Defense Fund | BUSINESS

Carbon Credits 101 For Investors

October 2023

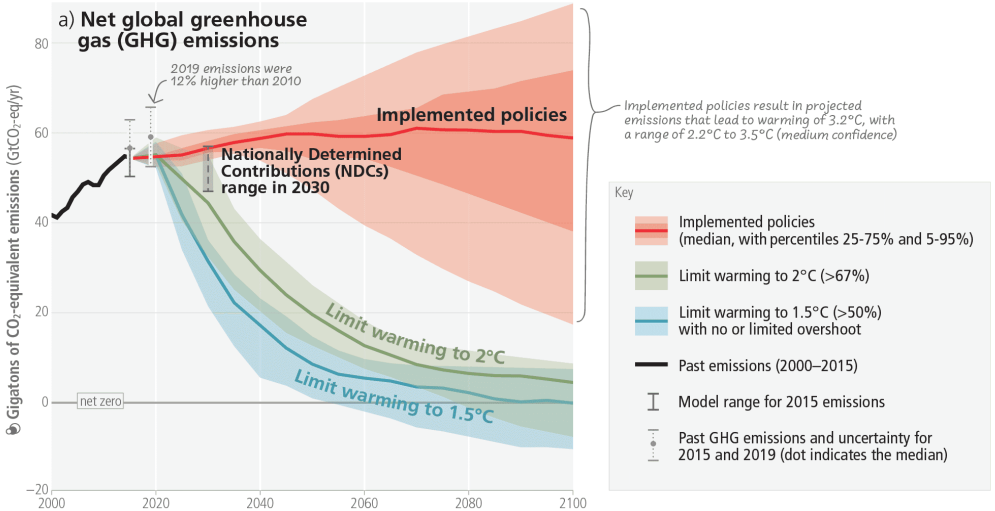
Contents

Environmental Defense Fund

Climate commitments are lacking, and mitigation and adaptation are severely underfinanced…

Limiting warming to 1.5°C and 2°C involves rapid, deep and in most cases immediate greenhouse gas emission reductions

Net zero CO_2 and net zero GHG emissions can be achieved through strong reductions across all sectors



Source: Intergovernmental Panel on Climate Change – AR6 Synthesis Report, Figure SPM.5 (2023).

The State of the Climate Finance Gap

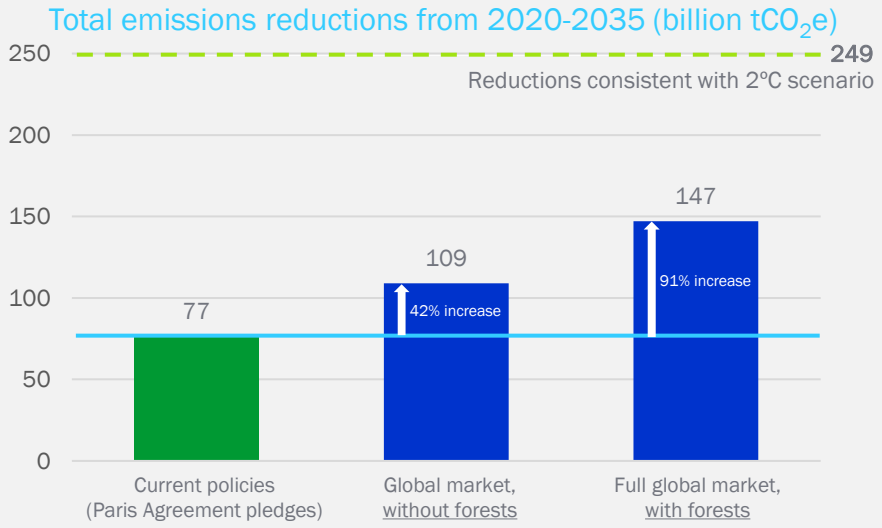
	Annual Need (2020-2025)	Annual Flow (2020)*	Investment Shortfall (%)
Mitigation	$3360 billion	$1310 billion	~66
Adaptation & Resilience	$410 – 560 billion	$51 billion	~88 – 91
Total	$3800 – 3900 billion	$1360 billion	~66

Source: Rockefeller Foundation and Boston Consulting Group (2022).

**Includes financing that does not meet the indicators for climate finance but has mitigation/adaptation impacts.*

...but carbon markets can serve as useful tools for enhancing climate action

Carbon markets provide a mechanism for targeting least-cost abatement options first: a global emissions trading system could reduce total mitigation costs by ~79%; reinvesting these savings could nearly double emissions reductions by 2035.



The IPCC has emphasized the importance of deep, rapid, and sustained mitigation in reaching net-zero GHG emissions. Carbon crediting can financially incentivize emission reduction and removal activities that may be difficult to mandate through regulation for various reasons, while also addressing two key mismatches:

- **Resources**: Carbon credits can provide a flow of finance to critical ecosystems and historically marginalized communities in economically disadvantaged regions.
- **Timing**: Upfront investments in conservation and innovation are needed now for the world to reach and maintain net-zero by 2050.

Source: EDF (2019, 2022), Intergovernmental Panel on Climate Change (2023).

Carbon credits represent both an opportunity and a risk for companies and their investors

High-integrity carbon credits can be used to:

- **Protect standing carbon stocks** such as tropical and temperate and boreal forests.
- **Channel finance to Indigenous Peoples (IPs) and local communities (LCs)** through equitable partnerships and benefit-sharing arrangements.
- **Support key co-benefits** such as biodiversity and economic development.
- **Scale up viable, high-integrity carbon dioxide removal technologies** in the long run.
- **Neutralize hard-to-abate emissions** after companies achieve net-zero-aligned decarbonization targets.

Source: Ceres (2022), Science-Based Targets Initiative (2022).

Systemic climate risk

Systemic climate risks will be exacerbated if:

- The climate finance gap is not closed, or
- Companies rely on offsetting over decarbonization.

Reputational risk

Companies may experience public backlash if:

- Their sustainability efforts are insufficient, or
- They buy low-integrity credits or use credits improperly.

Litigation risk

Lawsuits have been filed based on:

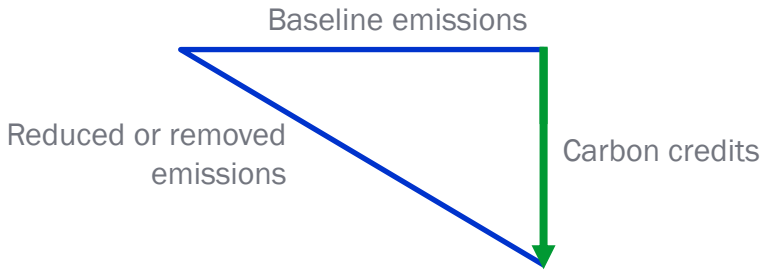
- Companies' contributions to climate change, but also
- "Carbon neutral" claims based solely on offsetting.

High-integrity carbon credits can play an important role in accelerating the transition to net zero, but investors must understand the potential and limitations of this tool to support increased integrity in the voluntary carbon market.

Understanding Carbon Credits

What is a carbon credit?

- An emission unit issued by a carbon crediting program that represents a reduction or removal of greenhouse gases, relative to a baseline scenario.
- Uniquely serialized, issued, tracked, retired, and cancelled through an electronic registry.
- 1 carbon credit = 1 metric ton of carbon dioxide equivalent (tCO_2-e).



Carbon Credits Typology*

	Technological solutions	Natural climate solutions
Reductions	Methane capture and destruction Renewable energy production	Tropical forest protection Natural grassland avoided loss
Removals	Direct air carbon capture Enhanced mineralization	Reforestation and revegetation Mangrove restoration

Withdrawal of greenhouse gases from the atmosphere as a result of anthropogenic activities.

Reductions of greenhouse gas emissions, represented by the difference between baseline and actual emissions.

*The project types listed here are illustrative and not necessarily endorsed by EDF.

Source: EDF (2022), Tropical Forest Credit Integrity Guide (2023). See Appendix 1 for NCS sub-classifications.

What does the carbon crediting ecosystem look like?*

SUPPLY

STANDARDS
Develop & approve methodologies & "house" the credits.

DEVELOPERS
Calculate baselines, create & manage projects end-to-end.

ASSET OWNERS
E.g., jurisdictions, landowners, renewable energy producers, clean cookstove companies etc.

3RD PARTY VERFIERS
Monitor, report, & verify emissions reductions over time.

TRANSACTION

DIRECT PURCHASES
Through an RFP, consultant, or direct from a provider.

BROKERS
Advise & execute procurement of carbon portfolio.

BUYERS' COALITION
Pool demand for specific interventions / outcomes.

MARKET PLACES
Software to compare projects & enable purchases.

DEMAND

PLEDGE NET ZERO
Companies make a voluntary commitment *OR* adhere to compliance markets (e.g., EU ETS).

ACCOUNT FOR EMISSIONS
Establish & monitor company emissions.

MITIGATE SCOPE 1, 2, 3
Reduce GHG emissions DIRECTLY through supply chain efficiency gains & mitigation.

OFFSET
Reduce emissions INDIRECTLY by purchasing credits in the voluntary carbon market.

ECOSYSTEM ENABLERS

Supply-side Integrity Initiatives shape standards & regulation.

QUALITY INITIATIVE

Create pathways for orgs to reduce GHG & provide claims guidance.

Supply Financiers provide access to debt, equity, & liquidity.

FINANCING & INSURANCE

Insurance de-risks investments for buyers & supply-side investors.

Ratings Providers assess quality of issued carbon credits.

RATING & DATA

Data Platforms provide market info & transparency.

MEDIA / COMM

*Representative and Non-Exhaustive. See Appendix 2 for relevant civil society organizations.

What makes a high-integrity carbon credit?

Emissions Impact
Governance
Sustainable Development

1. Additionality

Removed or reduced emissions would not have occurred without the added incentive created by carbon crediting.

2. Permanence

Emissions impact is durable over time, and there are measures to address and compensate for reversals — emissions of carbon for which credits have been issued.

3. Robust quantification

Emissions impact must be quantified using conservative approaches, completeness, and scientific methods.

4. No double counting

Removed or reduced emissions must not be counted more than once toward achieving climate mitigation.

5. Effective governance
6. Tracking
7. Transparency
8. Robust independent third-party verification
9. Sustainable development benefits and safeguards
10. Contribution to net-zero transition

Source: Tropical Forest Credit Integrity Guide (2023), Integrity Council for the Voluntary Carbon Market (2023).

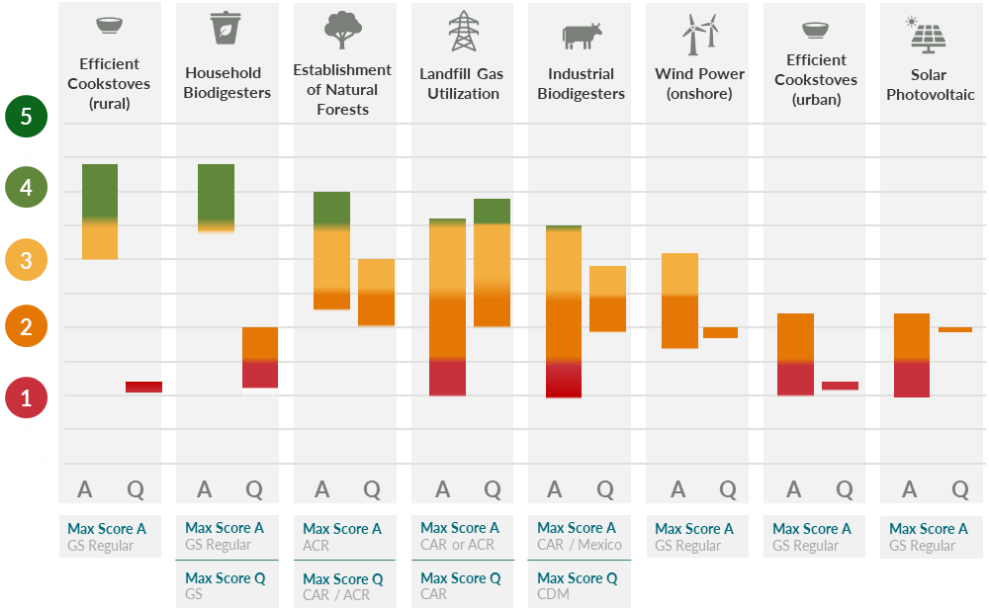
High-integrity carbon credits should be developed with Indigenous Peoples and local communities as active partners, not passive beneficiaries

In addition to complying with all Cancun Safeguards, crediting projects and programs should:

- Respect the rights of IPs, LCs, women, and other underserved communities, including land use and property rights.
- Respect local systems, knowledge, and traditions.
- Ensure full and effective participation as partners and rightsholders or stakeholders, where relevant, with Free, Prior, and Informed Consent (FPIC).
- Provide capacity building, technical support, and logistical resources.
- Develop fair, transparent, and equitable benefit-sharing arrangements in consultation with relevant rightsholders and stakeholders.

Source: Tropical Forest Credit Integrity Guide (2023), UNFCCC (2010).

Credit quality depends on the standard, activity type, and associated co-benefits



CCQI's assessment of various project types on a scale of 1 (low) to 5 (high). A = Additionality, Q = Quantification.

- Co-benefits are environmental, economic, and social benefits beyond climate mitigation.
  - E.g., enhancing biodiversity and adaption to climate change, improving local livelihoods, alleviating poverty, protecting human rights, etc.
- Complementary co-benefit standards boost programs' environmental and social performance, as rated by the Carbon Credit Quality Initiative, and command premiums in the market.

Source: Boston Consulting Group and EDF (2023), Carbon Credit Quality Initiative (2023), Tropical Forest Credit Integrity Guide (2023).

Many initiatives are attempting to improve market integrity, but their effectiveness will depend on their uptake

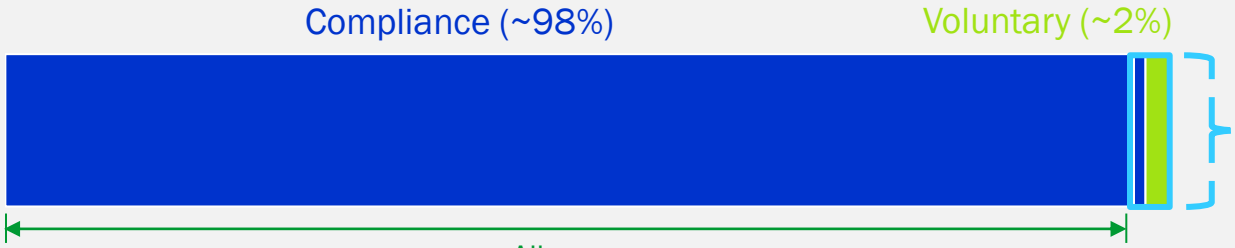
	Project Name	Description	Deliverables and Timing	Participating Organizations
Supply-Side Initiatives	Carbon Credit Quality Initiative (CCQI)	Quality assessment tool that scores project types from 1 to 5 based on seven "quality objectives."	CCQI Scoring Tool available online, Assessment Methodology v3.0 published May 2022; aiming to assess new project types to cover >80% of the VCM by EOY 2023.	EDF, Oeko-Institut, and WWF-US.
	Integrity Council for the Voluntary Carbon Market (IC-VCM)	Independent governance body setting and enforcing global threshold standards for the VCM.	Core Carbon Principles and Assessment Framework published July 2023; in initial assessment phase, with the aim of having CCP-Eligible credits by the end of 2023.	Participants and funders include various public, private, and nonprofit actors.
	Lowering Emissions by Accelerating Forest finance (LEAF) Coalition	Public-private coalition aiming to mobilize ≥$1 B to support tropical and subtropical forest jurisdictions in halting deforestation through jurisdictional crediting.	Jurisdictions sign Letters of Intent, followed by Emissions Reduction Purchase Agreements through LEAF; to date, 24 forest governments have submitted eligible proposals.	Various public, private, and non-profit entities; coordinated by Emergent.
Demand-Side Initiatives	Science-Based Targets Initiative	Leading initiative for science-based emissions reductions and net-zero target setting in the private sector.	Corporate Net-Zero Standard v1.1 published April 2023. BVCM guidance currently under development, with an initial public consultation document published June 2023.	CDP, United Nations Global Compact, WRI, and WWF.
	Tropical Forest Credit Integrity (TFCI) Guide	Guide to assist companies in differentiating among tropical forest carbon credits by impact, quality, and scale	TFCI v2 published February 2023, containing consensus recommendations and implementation guidance.	COICA, CI, EDF, IPAM, TNC, WCS, WRI, and WWF.
	Voluntary Carbon Markets Integrity Initiative (VCMI)	Multi-stakeholder platform developing claims categorization for corporate communication on carbon credit use.	Claims Code of Practice launched in June 2023. Updated Code of Practice and Monitoring, Reporting & Assurance Framework to follow in November 2023.	Housed in Rockefeller Philanthropy Advisors, co-funded by various foundations.

Understanding Carbon Markets

Carbon markets include compliance and voluntary markets

- Compliance markets are created through national, regional, or international carbon reduction regulations that establish cap-and-trade, baseline-and-credit, carbon tax, and/or sectoral schemes. They may employ allowances (tradeable emissions permits) as well as carbon credits.
- The voluntary carbon market (VCM) encompasses all carbon credit transactions that are conducted outside of compliance markets.
- In both cases, carbon credits are retired — taken permanently off the market — when an entity uses and claims the emissions impact a credit represents.

Allowance and Carbon Credit Transactions in Compliance vs. Voluntary Carbon Markets



Primarily traded in voluntary markets but can also be traded in compliance markets, where credits are used against ETS or carbon tax obligations up to a set limit.

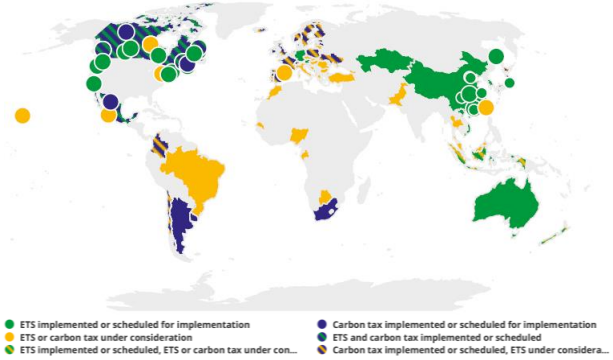
Source: Shell and Boston Consulting Group (2023), Trove Research (2023), World Bank (2023).

Compliance markets are expanding in coverage and value…

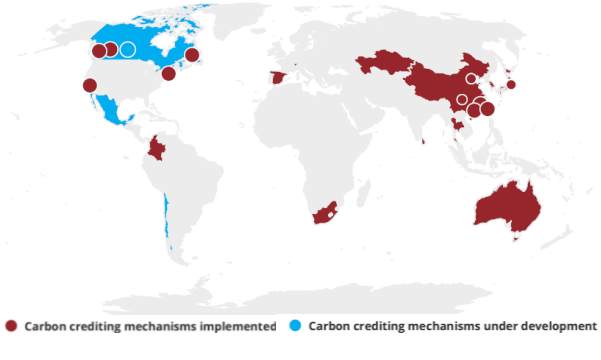
As of 2023, the compliance market is worth ~$850 billion and covers ~23% of global GHG emissions.

- 73 ETS & carbon tax mechanisms, covering 39 national jurisdictions.
- 29 carbon crediting mechanisms, with 7 under development.
- ETS sectoral coverage: Industry (24), Power (17), Buildings (15), Transport (13), Domestic Aviation (8), Waste (2), Forestry (1)

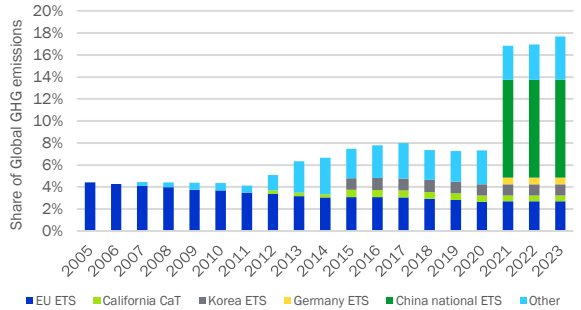
ETS & Carbon Tax Mechanisms

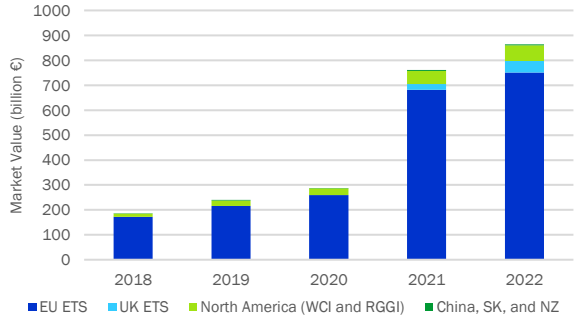


Carbon Crediting Mechanisms



ETS Market Overview

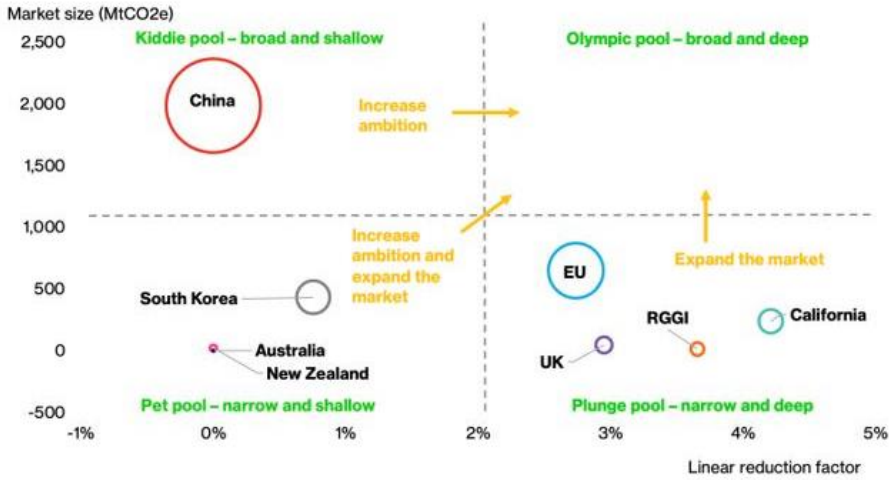




Source: International Carbon Action Partnership (2023), Refinitiv (2023), World Bank (2023).

...but still need to scale up significantly in scope, ambition, and price to be impactful

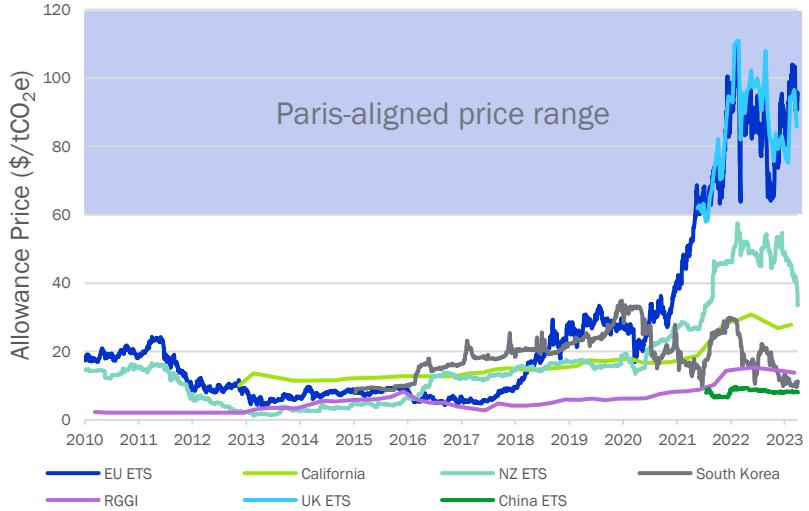
Compliance markets need to expand to be both large in scope and ambitious in their emission reduction goals.



Note: Size of the circle represents emissions cap for 2021. 'Linear reduction factor' refers to annual emissions cap reduction rate compared to 2021 cap. Scope compares the emissions in the carbon market and the overall emissions in the region. 'RGGI' refers to the US Regional Greenhouse Gas Initiative.

Source: BloombergNEF (2022).

According to the World Bank, carbon prices must reach \$50-100/tCO_2e by 2030 (~\$60-120 in 2023 USD) to achieve Paris Agreement targets.



Source: International Carbon Action Partnership (2023), World Bank (2023).

Approaches to compliance markets can vary, such as for the various ETSs currently operating in the United States

ETS Name	Pricing Mechanisms	Average 2022 Price	Scope and Coverage	Emissions Caps and Targets	Status
California Cap-and-Trade Program	Free allocation (benchmarking, consignment) and auctioning.	$28.08/$tCO_2e$	Sectors covered: Transportation, Buildings, Industry, Power % Emissions covered: ~75% in 2020.	2023 cap: 294.1 $MtCO_2e$ Reduction from 1990 GHG levels: 40% by 2030, 85% by 2045.	Began operation in 2012, with compliance obligations starting in 2013. Compliance period is 1 year. Overseen by the California Air Resources Board.
Massachusetts Limits on Emissions from Electricity Generators	Auctioning only.	$8.17/$tCO_2e$	Sectors covered: Power % Emissions covered: ~8% in 2019.	2023 cap: 7.8 $MtCO_2$ Reduction from 1990 GHG levels: 50% by 2030, 75% by 2040, 85% by 2050.	Began operation in 2018. Compliance period is 1 year. Overseen by the Massachusetts Department of Environmental Protection.
Oregon Climate Protection Program	Free allocation (grandparenting) only.	N/A	Sectors covered: Transportation, Buildings, Industry, Power % Emissions covered: ~45% in 2022.	2023 cap: 28 $MtCO_2e$ Reduction from 1990 GHG levels: 75% by 2050.	Began operation in 2022. Compliance period is 3 years. Currently undergoing a rulemaking process. Overseen by the Oregon Department of Environmental Quality.
Regional Greenhouse Gas Initiative	Auctioning only.	$13.46/$tCO_2e$	Sectors covered: Power % Emissions covered: ~14% of total participant emissions in 2020.	2023 cap: 84.7 $MtCO_2$ Reduction from 2020 GHG levels: 30% by 2030.	Began operation in 2009. Compliance period is 3 years, with two-year interim periods. Currently undergoing its Third Program Review.
Washington cap-and-invest program	Free allocation (benchmarking, consignment, grandparenting) and auctioning.	N/A	Sectors covered: Transportation, Buildings, Industry, Power % Emissions covered: ~70% in 2023.	2023 cap: 63 $MtCO_2e$ Reduction from 1990 GHG levels: 45% by 2030, 70% by 2040, 95% by 2050.	Began operation in January 2023. Compliance period is 4 years, with smaller annual deadlines. Overseen by the Washington Department of Ecology.

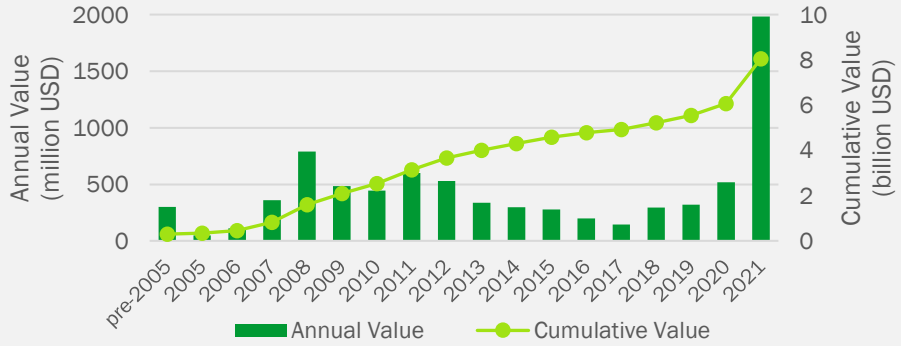
Source: International Carbon Action Partnership (2023).

The VCM has grown rapidly, though it remains small in comparison to compliance markets

In 2021, the VCM had a primary market value of ~$900 M and an overall value of ~$2 billion, a fourfold increase from the year before. Issuances dipped in 2022, though retirements remained steady.

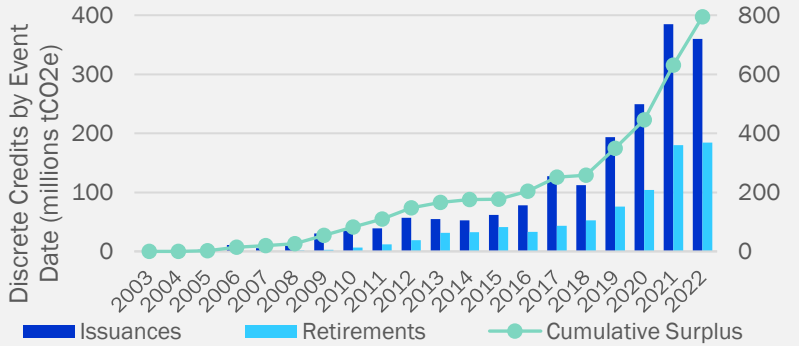
In the long-term, Trove Research estimates that annual demand will exceed annual supply between 2025 and 2034, and cumulative demand will exceed cumulative supply between 2027 and 2039. However, the voluntary carbon market is sensitive to changes in the economy, public opinion, and regulation.

Annual and Cumulative Market Value (2005-2021)



Source: Ecosystem Marketplace (2022).

Issuances, Retirements, and Surplus (2003-2022)



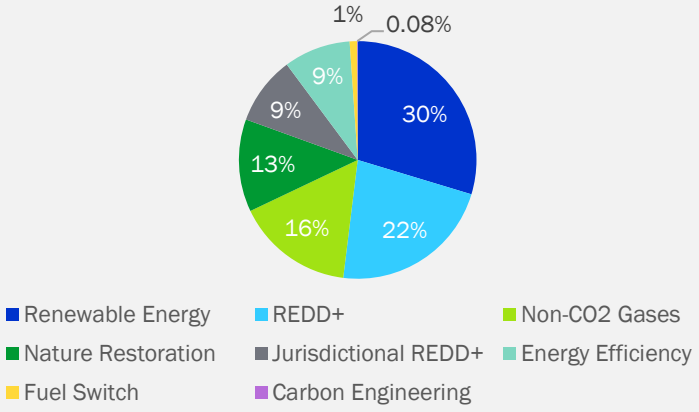
Source: Trove Research (2023).

Market composition and prices in the VCM are highly diverse

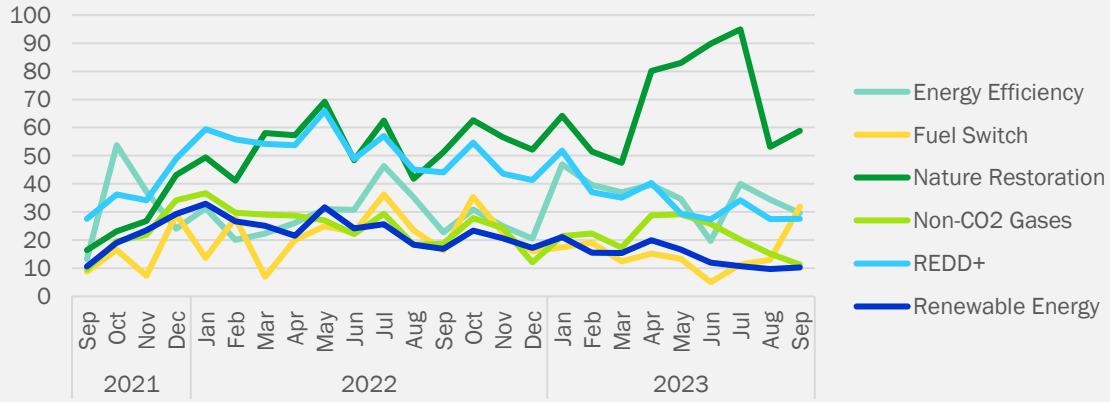
Issuances are currently dominated by renewable energy and REDD+ credits, but that may change as renewable energy credits decrease — cost parity with fossil fuels making them non-additional — and jurisdictional REDD+ credits increase in the supply (see Appendix 3 for definitions of REDD+ and jurisdictional REDD+).

Credit prices are not uniform: they vary significantly based on factors such as project type, co-benefits, and location.

Issuances by Project Type (2022)



Monthly Average VER Prices (Sept. 2021 – Sept. 2023)



Source: Trove Research (2023). See Appendix 4 for a yearly breakdown of issuances and retirements by project type.

The dynamics of these carbon markets will depend on developments in Article 6 of the Paris Agreement

Article 6 allows countries to “pursue voluntary cooperation in the implementation of their nationally determined contributions.” The details are still undecided, but the agreement establishes 2 credit-based approaches:

Article 6.2

Allows countries to transfer internationally traded mitigation outcomes (ITMOs). These emissions reduction can only be used towards targets if the host country “un-counts” them from its NDC — this is known as a corresponding adjustment.

Article 6.4

Establishes an emissions reduction trading mechanism overseen by a decision-making body (established by the UNFCCC). “Authorized” credits under this mechanism require corresponding adjustments; “unauthorized” credits do not.

Article 6 does not directly impact the voluntary market but the potential introduction of Article 6 “authorized” credits into the VCM may cause spillover effects. In particular, questions remain about whether corresponding adjustments should be applied in the VCM, and how they would affect credit supply, demand, and price.

Source: The Nature Conservancy (2023), UNFCCC (2015, 2022), World Bank (2022).

Recommendations for Investors

Investors should support increased integrity with regards to carbon crediting and carbon markets

Push portfolio companies that purchase carbon credits to align with best practices

- High-integrity, high-impact, and net-zero-aligned carbon credit procurement.
- Carbon credit usage that complements, rather than undermines, net-zero decarbonization targets.
- Specific, substantiated, and consistent claims.
- Transparent, comprehensive, and easily accessible public disclosures.

Advocate for complementary actions and policies to enhance climate ambition

- Science-aligned net-zero commitments, target setting, and decarbonization.
- Increased awareness of the role that high-integrity carbon credit usage can play in companies' net-zero strategies.
- Corporate uptake of VCM integrity initiatives
- Better standardization and regulation of carbon markets and carbon credits.

For more EDF resources on how companies should approach their net-zero transition and carbon credit purchasing, please refer to the Carbon Credit Quality Initiative, the Net Zero Action Accelerator, and the Tropical Forest Credit Integrity Guide.

Procurement should be high-integrity, high-impact, and net-zero-aligned

Conduct due diligence to ensure environmental and social integrity

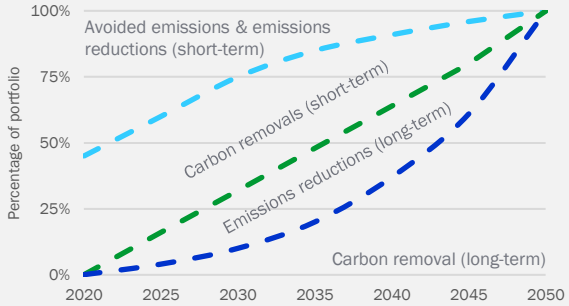
- Purchase high-integrity credits issued by high-quality, accredited standards.
- Conduct independent research, consider site visits to prospective projects, and employ third-party expertise where necessary.
- Ensure that environmental and social safeguards are aligned with existing best-practices:
  - Free, prior, and informed consent.
  - The Cancun Safeguards for REDD+.
  - Tropical Forest Credit Integrity Guide.
  - EDF's Natural Climate Solutions Handbook.

See Appendix 5 for sample due diligence questions.

Align purchasing behavior with evolving needs and guidance to maximize impact and minimize risk

- Prioritize high-impact activities in the near-term, i.e., protecting standing carbon stocks such as tropical and temperate forests.
- Signal demand for high-integrity credits through early-stage financing such as forward finance agreements.
- Invest in R&D for nascent carbon removal solutions to scale up viable, high-integrity technologies.

Example net-zero aligned portfolio:



Adapted from University of Oxford (2022).

- Stay attuned to developments in existing standards and any emergence of new standards.

Usage should complement, rather than replace, net-zero decarbonization targets

Companies can use carbon credits to contribute to global climate action through Beyond Value Chain Mitigation, augmenting their science-aligned decarbonization targets.

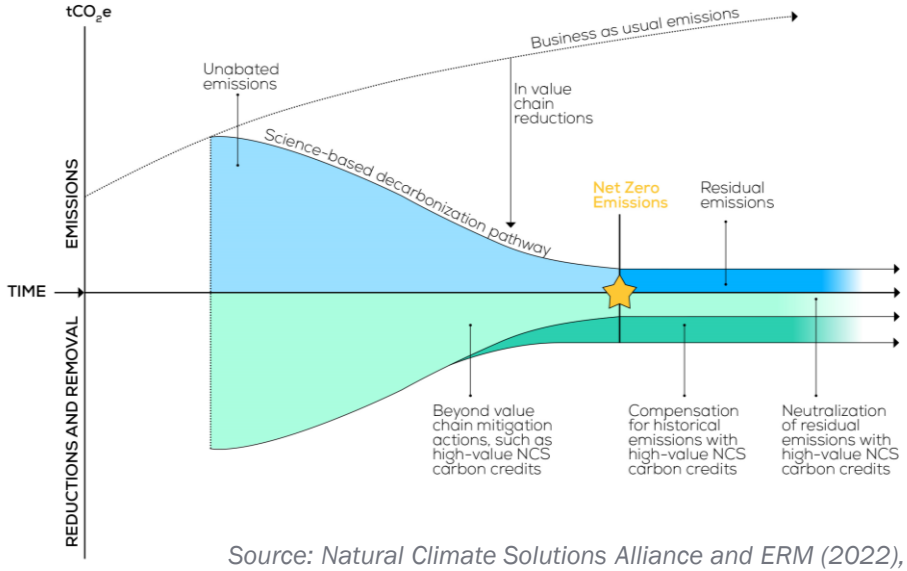
Beyond Value Chain Mitigation

Measures companies take to prevent, reduce, or remove emissions outside their value chain, such as providing direct finance to climate mitigation.

Decarbonization

Measures companies take to prevent the release of greenhouse gas emissions within their own value chain.

Example Decarbonization Pathway with BVCM



Source: Natural Climate Solutions Alliance and ERM (2022), Science Based Targets Initiative (2023).

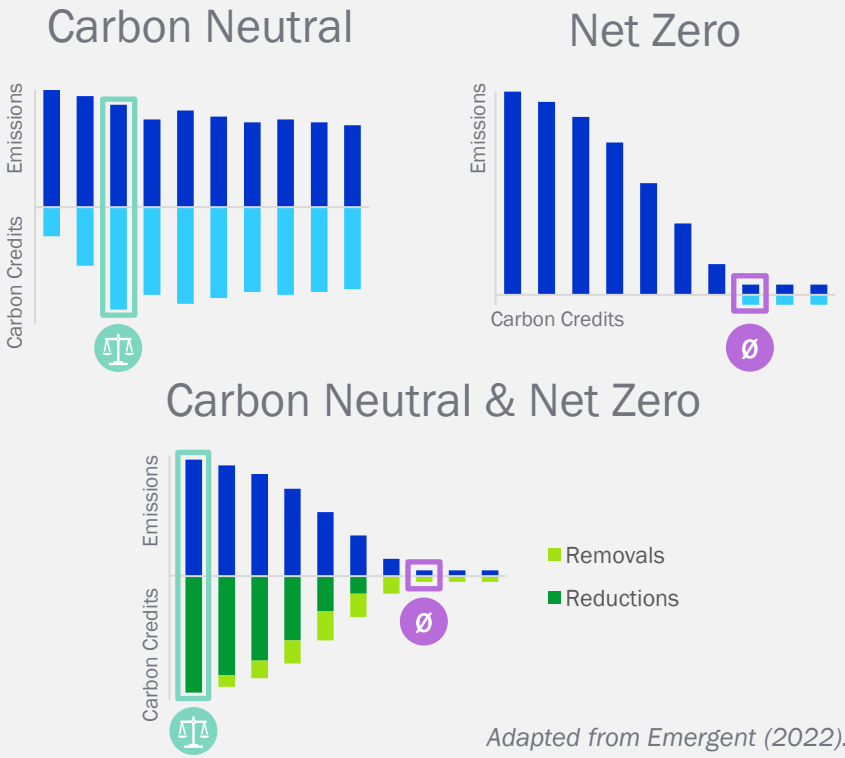
Claims should be specific, substantiated, and consistent

Carbon Neutral	Net Zero
Carbon neutral claims have not been consistently defined but are most often used by a company to assert that they have bought enough carbon credits to fully offset their carbon footprint, typically on an annual basis.	Net zero claims can be made when a company has reduced all feasible emissions and neutralized residual hard-to-abate emissions with high-integrity GHG removals; currently companies are still in the stage of setting net-zero targets.

Compensation	Contribution
Compensation claims describe a company's carbon credit purchases as counterbalancing their unabated emissions. This is also known as an "offset" claim.	Contribution claims represent carbon credit purchases as a contribution to climate change mitigation; retired credits are not counted towards residual emissions.

Achievement	Commitment
Achievement claims are used by a company to express that they have reached a specific target: e.g., "carbon neutral since 2007."	Commitment claims are used by a company to communicate corporate climate targets: e.g., "net-zero by 2050."

Source: Science-Based Targets Initiative (2023), Tropical Forest Credit Integrity Guide (2023), Trouwloon et al. (2023), University of Oxford (2020), Voluntary Carbon Markets Integrity Initiative (2023).



Adapted from Emergent (2022).

Disclosures should be transparent, comprehensive, and easily accessible

Companies should provide transparent, comprehensive, and easily accessible public disclosures regarding their climate impact and carbon credit usage to substantiate their claims, including but not limited to:

- Existing climate commitments, including a net-zero target, interim science-aligned targets, and a credible transition plan (e.g., through the SBTi Net Zero Standard or UN Race to Zero).
- Current Scope 1, 2, and 3 emissions.
- Anticipated residual emissions and the percent to be neutralized with carbon removals.
- Quantity of carbon credits purchased and retired, annual and lifetime.
- The programs/projects and standard setting bodies from which they sourced their carbon credits, along with the project IDs and serial numbers of the underlying credits.
- Key carbon credit characteristics such as host country, project type, vintage (issuing year), co-benefit certifications, and whether the credit is associated with a corresponding adjustment.
- Whether there is independent third-party verification of the company data and claims listed.

Market participants should track developments in ongoing debates

There are many issues that still need to be resolved, with key topics including:

The appropriate role of carbon credits and the voluntary carbon market in corporate climate initiatives.

Operationalizing Article 6 and resulting impacts on compliance and voluntary carbon markets.

Emerging regulations around carbon credit usage, corporate claims, and securities disclosures.

New approaches to measurement and risk management that increase buyer confidence.

Advancements in jurisdictional-scale and High Forest Low Deforestation crediting methodologies (see Appendix 6).

Updates to existing governance initiatives and registry standards, and the development of new standards and best practices.

Thank you!

https://business.edf.org/esg

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Appendices

Appendix 1: Categorizing natural climate solutions by ecosystem and scale

Ecosystem

Forests

Tropical, subtropical, temperate, and boreal.

Agriculture

Cropland, grassland, shrubland, and agroforests.

Blue carbon

Coastal (mangroves, peatlands, marshes, etc.) and open ocean.

Scale

- Project-level approaches set baselines and generate credits within a limited and standalone project boundary.
- Jurisdictional approaches do so at the scale of a country or large subnational political/ administrative unit (e.g., states, provinces, Indigenous territories).
- Nested projects are situated within the scope of a jurisdictional program.

For more resources on natural climate solutions, please see EDF's Natural climate solutions crediting handbook and briefing series, as well as the Tropical Forest Credit Integrity Guide.

Appendix 2: VCM Ecosystem (Representative and Non-Exhaustive) — Credit Issuance and Entities

SUPPLY
(how a carbon credit is created)

STANDARDS
Develop & approve methodologies & "house" the credits.

VERRA · ART · Gold Standard

DEVELOPERS
Calculate baselines, create & manage projects end-to-end.

south pole · WILDLIFE WORKS

ASSET OWNERS
E.g., jurisdictions, landowners, renewable energy producers, clean cookstove companies etc.

3RD PARTY VERFIERS
Monitor, report, & verify emissions reductions over time.

A Gaster Global · First Environment

TRANSACTION
(how suppliers and buyers sell / purchase credits)

DIRECT PURCHASES
Through an RFP, consultant, or direct from a provider.

stripe · climeworks · Carbon Direct

BROKERS
Advise & execute procurement of carbon portfolio.

bluesource · terrapass · 3Degrees

BUYERS' COALITION
Pool demand for specific interventions / outcomes.

LEAF Coalition · Business Alliance to Scale Climate Solutions · Frontier

MARKET PLACES
Software to compare projects & enable purchases.

Patch · puro.earth · Sustaim

DEMAND
(how orgs set targets & reduce emissions)

PLEDGE NET ZERO
Companies make a voluntary commitment *OR* adhere to compliance markets (e.g., EU ETS).

ACCOUNT FOR EMISSIONS
Establish & monitor company emissions.

SINAI · Carbon Chain · PERSEFONI

MITIGATE SCOPE 1, 2, 3
Reduce GHG emissions DIRECTLY through supply chain efficiency gains & mitigation.

OFFSET
Reduce emissions INDIRECTLY by purchasing credits in the voluntary carbon market.

ECOSYSTEM ENABLERS

QUALITY INITIATIVE

IC · CCQI · TFCI

Supply-side Integrity Initiatives shape standards & regulation,

Create pathways for orgs to reduce GHG & provide claims guidance.

Science Based Targets · GHG Protocol · Natural Climate Solutions Alliance · Race to Zero

FINANCING & INSURANCE

Climate Impact Partners · base carbon · Livelihoods Funds

Supply Financiers provide access to debt, equity, & liquidity,

Insurance de-risks investments for buyers & supply-side investors.

MIGA

RATING & DATA

Sylvera · BeZero · (carbon)plan

Ratings Providers assess quality of issued carbon credits,

Data Platforms provide market info & transparency.

Berkeley Public Policy · Ecosystem Marketplace · S&P

MEDIA / COMM

Appendix 2 (cont.): VCM Ecosystem (Representative and Non-Exhaustive) — Civil Society Organizations

SUPPLY (how a carbon credit is created) → **TRANSACTION** (how suppliers and buyers sell / purchase credits) ← **DEMAND** (how orgs set targets & reduce emissions)

SUPPLY

STANDARDS
Wildlife Conservation Society · Environmental Defense Fund · Conservation International · The Nature Conservancy · World Resources Institute · WWF

DEVELOPERS
Wildlife Conservation Society · Environmental Defense Fund · Conservation International · WWF · The Nature Conservancy · World Resources Institute · IPAM Amazônia · EMERGENT

ASSET OWNERS
Conservation International · The Nature Conservancy · IPAM Amazônia

3RD PARTY VERFIERS

TRANSACTION

DIRECT PURCHASES

BROKERS

BUYERS' COALITION
Environmental Defense Fund · The Nature Conservancy · UN-REDD Programme · WWF

MARKET PLACES

DEMAND

PLEDGE NET ZERO
Environmental Defense Fund · The Nature Conservancy · UN-REDD Programme · WWF

ACCOUNT FOR EMISSIONS

MITIGATE SCOPE 1, 2, 3
Environmental Defense Fund · The Nature Conservancy · Conservation International · WWF

OFFSET
Environmental Defense Fund · The Nature Conservancy

ECOSYSTEM ENABLERS

QUALITY INITIATIVE	Environmental Defense Fund · The Nature Conservancy · Conservation International · WWF · World Resources Institute · IPAM Amazônia · Wildlife Conservation Society · ICVCM	Environmental Defense Fund · World Resources Institute · WWF · The Nature Conservancy · Conservation International
FINANCING & INSURANCE	Environmental Defense Fund · The Nature Conservancy · Conservation International	MIGA Multilateral Investment Guarantee Agency
RATING & DATA	Environmental Defense Fund · The Nature Conservancy · Conservation International · WWF	THE WORLD BANK
MEDIA / COMM	Environmental Defense Fund · The Nature Conservancy · Conservation International · WWF · Wildlife Conservation Society · UNDP · Forest Trends · EMERGENT	

Appendix 3: Differentiating REDD+, J-REDD+, and REDD.plus

Reducing Emissions from Deforestation and forest Degradation (REDD+)*

A framework created by the UNFCCC to promote sustainable forest management, conservation, and enhance forest carbon stocks, adopted in December 2013 at COP 19. “REDD+” is also used in the VCM as a general term for avoided deforestation projects.

Jurisdictional REDD+ (J-REDD+)

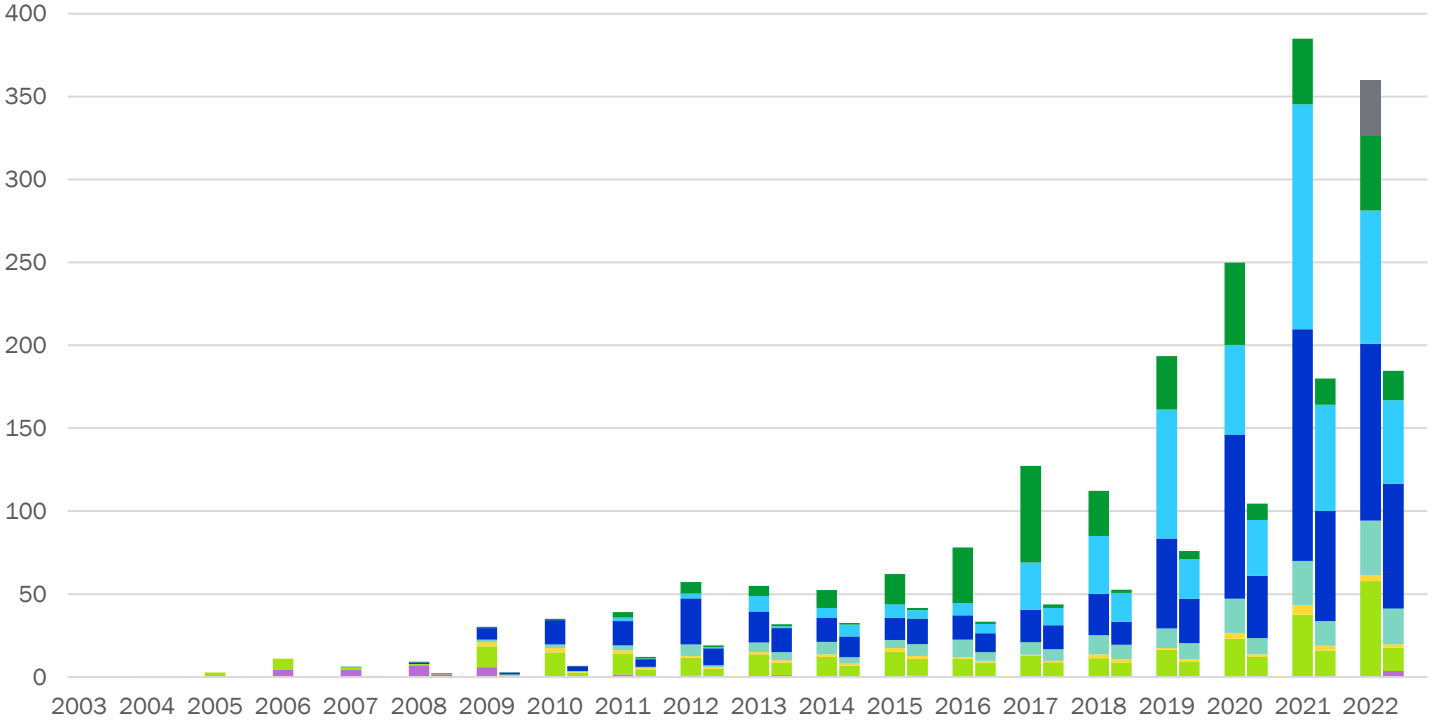
Extends the REDD+ framework to national or large subnational accounting areas to set baselines and generate credits at a jurisdictional scale. Examples include the ART-TREES, Forest Carbon Partnership Facility Carbon Fund, and Verra JNR standards.

REDD.plus

A platform for purchasing credits generated by REDD+ national programs; however, it does not meet fundamental thresholds for standards (e.g., social safeguards; independent third-party verification and validation) and should not be considered high-integrity.

**The “+” stands for additional forest-related activities, such as conservation, sustainable forest management, and the enhancement of forest carbon stocks.*

Appendix 4: Issuances and retirements by project type (2004-2022)



Source: Trove Research (2023).

Appendix 5: Selection of sample due diligence questions from the Tropical Forest Credit Integrity Guide

- In countries where such access is allowed, to what extent does the jurisdictional program/project enable forest rightsholders (especially IP and LC) to directly access carbon markets (e.g., to directly receive credits generated in their territory and trade them directly in carbon markets)?
- To what extent has the jurisdictional program/project been developed and implemented in line with the highest standards of transparency and full and effective participation of IPs and LCs in crediting in their territories?
- Does the program/project allocate credits directly to stakeholders? If not, what benefit-sharing plan has been developed? Was the benefit sharing plan built in a participatory manner?
- How are the financial and resource benefits from sale of credits distributed across stakeholders and rights' holders? Identify the percentage of proceeds that have been allocated to IPs and LCs. How was this distribution determined?
- Is the applied framework for constructing baselines and quantifying credits sufficiently conservative in that it reasonably manages the risk of over crediting and uses the best available data?
- Have the known risks of reversal been comprehensively documented? What systems or measures are in place to address and proactively mitigate the risks of reversal?
- Has the program/project achieved validation and verification to an internationally recognized standard? Are third-party assessors required to be certified validation and verification bodies under their own recognized certification process (such as ISO)?
- Has verification confirmed progress towards conforming with social and environmental safeguards under the relevant standard? Does the project or program standard support the achievement of the Cancun safeguards for REDD+? Does the project or program document any efforts to go beyond the social and environmental safeguards in its relevant crediting standard? For example, has it achieved additional CCB certification?

Please refer to the Tropical Forest Credit Integrity Guide for the full list of sample due diligence questions.

Appendix 6: Benefits of jurisdictional-scale programs and High Forest Low Deforestation (HFLD) crediting

Jurisdictional programs have significant advantages over project-based approaches

- Social safeguards in government programs must follow the standards and verification systems set by the UNFCCC.
- Baselines set across an entire jurisdiction minimize the risk of overestimating emissions reductions impacts.
- Leakage is better managed through jurisdictional-scale accounting and public sector tools for addressing underlying drivers of deforestation.
- Permanence is enhanced: pooling risks across a jurisdiction decreases the possibility of reversals, and the use of long-term systemic measures locks in socioeconomic changes.
- Double-counting is prevented by all accounting occurring on the national or sub-national-scale.

HFLD credits can preserve intact forests, but are still being developed

HFLD jurisdictions — areas with at least 50% forest cover and lower deforestation rates than the global average — are critical areas for forest protection due to their large area, high levels of ecological integrity, and significant co-benefits. However, low rates of historical deforestation make it difficult or impossible to employ standard approaches to crediting for these forests.

Benefits of HFLD crediting include:

- Preventing international leakage and incentivizing active and ongoing interventions for forest conservation.
- Supporting Indigenous Peoples and local communities through financing and equitable benefit-sharing arrangements.
- Large-scale ecosystem and climate co-benefits.

For more information on jurisdictional and HFLD crediting, please refer to the Tropical Forest Credit Integrity Guide.