CLIMATE FINANCE 101

CARBON CREDITS

EMMI

CLIMATE RISK, BUILT FOR INVESTORS

Executive Summary

The rapid acceleration of global decarbonisation policies is reshaping investment fundamentals.

For institutional investors, carbon risk, the financial exposure created by rising carbon prices and tightening emissions rules, has become a measurable driver of portfolio value. Governments in Europe, the United Kingdom, Australia and across the world are expanding emissions-trading systems, while new border-adjustment mechanisms and disclosure standards embed carbon costs directly into corporate performance.

In this environment, understanding and managing transition risk is no longer optional. Portfolios with high emissions intensity face structural devaluation as the cost of carbon increases. Yet many investors cannot divest immediately or rely solely on companies' near-term abatement. This is where carbon credits can play a complementary role, not as a substitute for decarbonisation, but as a strategic instrument for managing exposure, improving temperature alignment, and demonstrating fiduciary diligence.

Drawing on analytics from Carbon Diagnostics and a live case study with Apostle Funds Management, this paper explores how compliance-market carbon credits can hedge portfolio transition risk. It explains the structure of global carbon markets, outlines the distinction between avoidance and removal credits, and demonstrates how investors can integrate credit positions into risk frameworks that align with net-zero commitments.

> **The message is clear:** portfolios prepared for a carbon-constrained world will be more resilient, more compliant, and better positioned to capture the opportunities of the transitioned economy.

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1.0

The Rising Importance of Carbon Risk

For over a decade, climate discussions focused primarily on physical risks (storms, droughts, and floods) that directly damage assets and disrupt supply chains. However, as regulation tightens and the understanding of climate-related financial risk matures, transition risk has become a central concern for diversified investors. Transition risk captures the economic costs of adjusting to a low-carbon economy, driven by policy, technology, market, and reputational forces that re-price carbon-intensive assets and reshape portfolio valuations.

Institutional investors are particularly exposed. Across both public and private markets, from listed equities and corporate bonds to private infrastructure and real assets, valuations increasingly reflect assumptions about future carbon prices and regulatory trajectories. As carbon pricing spreads globally, covering nearly 28% of greenhouse-gas emissions and generating over US$100 billion in annual revenues according to the World Bank State and Trends of Carbon Pricing 2025, the implicit cost of carbon within portfolios is becoming explicit.

1.1 Why this matters for investors

Portfolio transition risk can manifest in multiple ways:

- Valuation compression as future carbon liabilities are priced in,
- Earnings risk for companies without credible decarbonisation pathways,
- Cost-of-capital differentials as lenders and insurers price transition exposure, and
- Reputational and legal pressure to demonstrate credible net-zero alignment.

Traditional mitigation strategies, divestment [How to shrink climate risk not returns] or company engagement, remain essential but can be slow, incomplete, or constrained by investment mandates. Many investors face the dilemma of needing to hold carbon-intensive assets while wanting to reduce portfolio exposure. Carbon credits (referring to compliance-market permits or allowances used for hedging, not voluntary offsets), when used prudently, offer a financial instrument to bridge this gap.

Emmi's work with institutional clients demonstrates that by combining scenario analysis, temperature-alignment metrics, and carbon-price sensitivity, investors can quantify potential value erosion under various scenarios, a concept Emmi terms Potential Carbon Liability (PCL). Once quantified, that liability can be partially offset by exposure to assets whose value rises with carbon prices: regulated carbon credits.

This approach reframes carbon credits from a reputational gesture into a risk-management tool.

The difference between carbon permits and carbon credits

A carbon permit (or allowance) is a license granted to a company to emit a specific amount of greenhouse gases, while a carbon credit represents one metric ton of CO_2 that has been reduced, avoided, or removed from the atmosphere. Permits are often part of mandatory "cap-and-trade" systems and are used to track and control a company's own emissions, whereas credits are typically generated from projects like reforestation or renewable energy and can be used to offset emissions. The terms are sometimes used interchangeably, but permits grant the right to emit, while credits represent a reduction in emissions elsewhere.

Feature	Carbon permit	Carbon credit
Definition	A tradable license (or allowance) that allows a company to emit one metric ton of CO_2.	A tradable certificate that represents one metric ton of CO_2 that has been reduced, avoided, or removed from the atmosphere.
Origin	Issued by a regulatory body within a mandatory "cap-and-trade" system.	Generated by projects that reduce or remove emissions, such as reforestation or renewable energy projects.
Purpose	To comply with a cap on a company's own emissions.	To offset a company's own emissions or to be sold to other companies that need them for compliance.
Market	Typically found in compliance markets.	Can be used in both voluntary and compliance markets.
Example Analogy	Lie a ticket required to attend a football game (you must have one to emit).	Like a financial instrument representing a cost-saving measure that can be sold.

2.0
Carbon Markets and the Price of Transition

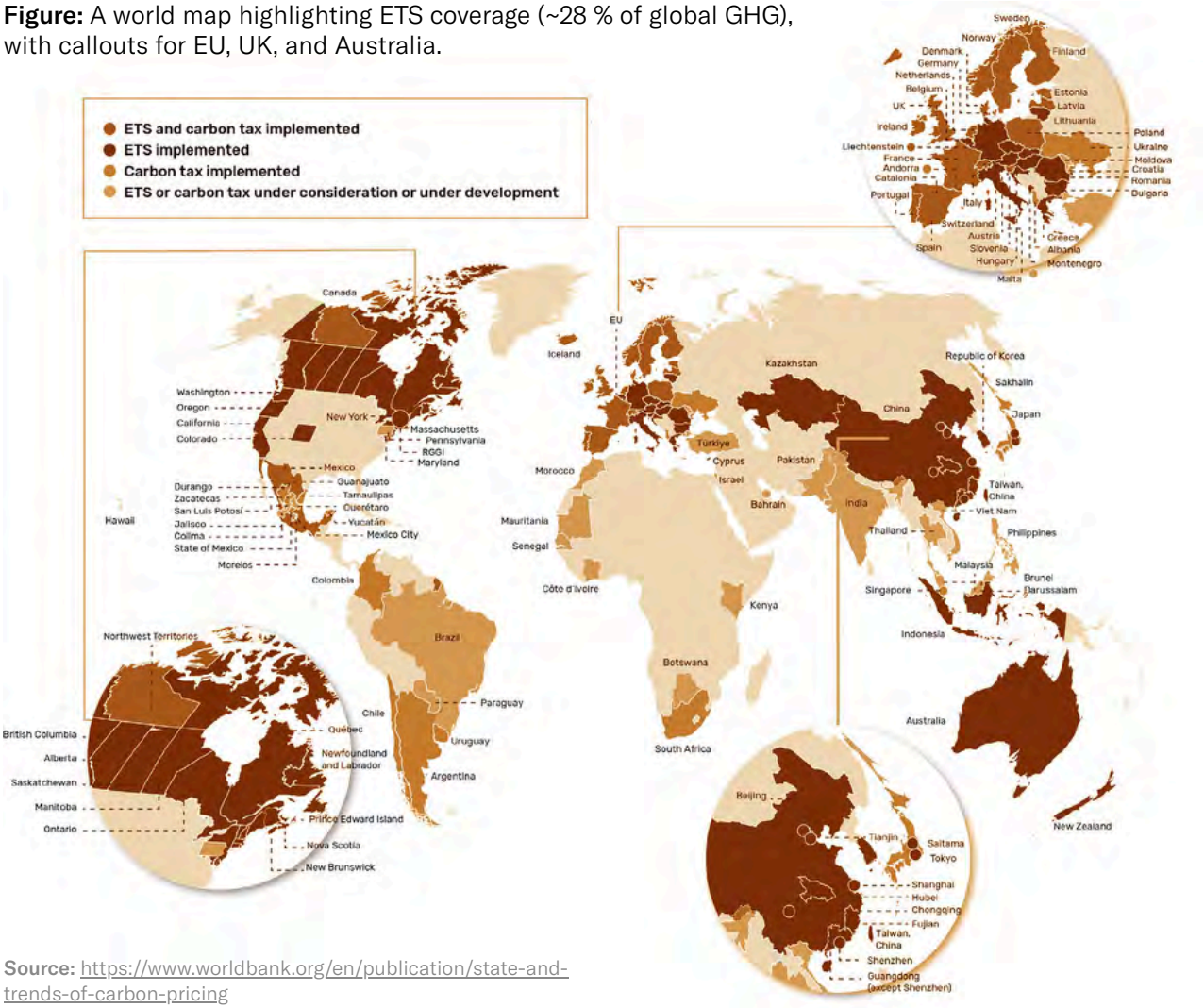
Carbon markets are now among the fastest-growing financial ecosystems in the world. In 2024, more than 80 carbon-pricing instruments operated globally, with Europe, the United Kingdom, China, and Australia at the forefront of policy innovation. Prices in the EU Emissions Trading System (EU ETS) have fluctuated between €70–100 per tonne, the UK ETS between £40–70, China's National ETS around CNY 60–80 (USD 8–11), and Australian Carbon Credit Units (ACCUs) around A$30–40, levels that materially affect company cash flows and investor valuations.

2.1 The policy leaders

- Europe remains a key anchor of global carbon policy. The EU ETS currently covers power, industry, and maritime transport, with ETS 2 set to extend to buildings and road transport by 2027. The Carbon Border Adjustment Mechanism (CBAM) will further embed carbon pricing into trade flows.
- United Kingdom reforms its ETS to tighten the cap by 30% by 2030 and plans a domestic CBAM by 2027, reinforcing convergence with EU pricing.
- China operates the world's second-largest carbon market through its National ETS, currently covering more than 2,000 power sector entities representing roughly 4.5 billion tonnes of CO_2 emissions. The system is expanding to include steel, cement, and aluminium, integrating carbon pricing across key industrial sectors. Although prices remain relatively modest (around CNY 60–80 per tonne, or USD 8–11), the scale and rapid institutional development make China a central pillar of the global carbon-pricing landscape.
- Australia relaunched its Safeguard Mechanism - DCCEEW, setting declining emissions baselines for major facilities and allowing compliance through ACCUs, revitalising a once-nascent market.
    - Although ACCU prices have remained relatively flat in recent years, rising compliance activity is expected to drive stronger demand for carbon permits. According to Commonwealth Bank research, modelling by the Australian Treasury likely overestimates the adoption of low-carbon technologies (CBA, 2025,). As a result, carbon credits are expected to play an important role in offsetting excess emissions from safeguard facilities aiming to achieve the annual emissions intensity reduction target of 4.9% through to 2030.
    - Core Markets projects that demand for ACCUs will reach its peak in 2034, with prices expected to rise steadily each year until then (Core Markets, 2025). By that stage, the stronger price signal is anticipated to shift incentives toward physical decarbonisation rather than reliance on offsets.

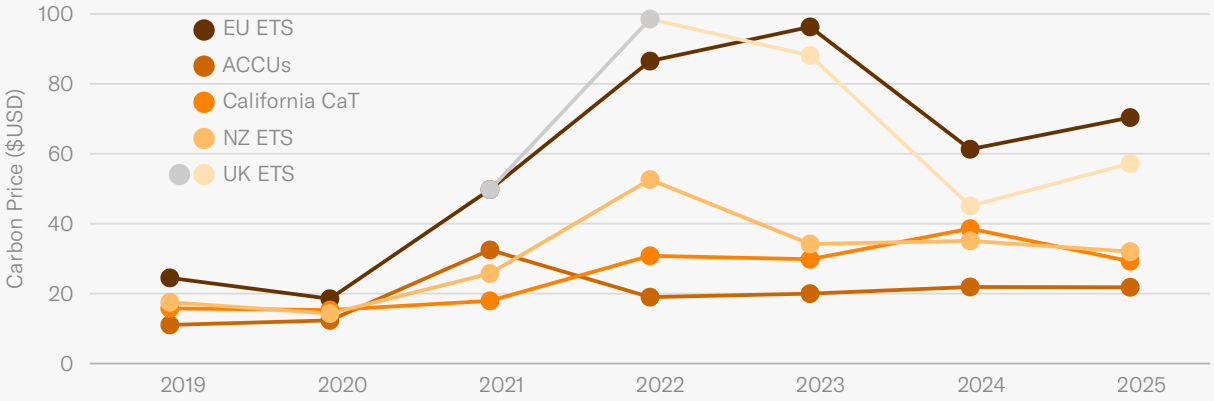
> Together, these regimes form a connected price corridor that increasingly defines global competitiveness. For investors, carbon cost is no longer a regional anomaly; it has become a pervasive cross-asset risk factor embedded in valuations and trade.

Figure: A world map highlighting ETS coverage (~28 % of global GHG), with callouts for EU, UK, and Australia.



Source: https://www.worldbank.org/en/publication/state-and-trends-of-carbon-pricing

Graph: Carbon pricing schemes



Source: World Bank, Clean Energy Regulator

Key carbon policy mechanisms explained

Emissions Trading Systems (ETS)

An ETS is a government-regulated cap-and-trade program that limits total emissions from covered sectors.

Companies receive or buy allowances (each equal to one tonne of CO_2) and can trade them.

If they emit more than their allowances, they must buy additional permits (allowances), creating a market price for carbon.

Examples: EU ETS, UK ETS, NZ ETS.

The ETS defines the benchmark compliance carbon price that drives corporate cost structures and forms the basis for carbon-credit hedging.

Safeguard Mechanism (Australia)

Australia's Safeguard Mechanism sets emission baselines for large industrial facilities.

Facilities exceeding their baseline must buy or surrender Australian Carbon Credit Units (ACCUs) to remain compliant.

Reforms in 2023 introduced declining baselines aligned with national net-zero goals, creating a predictable carbon-price signal for heavy industry.

This mechanism anchors the ACCU market, making it a credible regional compliance instrument suitable for portfolio hedging.

Carbon Border Adjustment Mechanism (CBAM)

The CBAM is a system that places a carbon price on imported goods, such as steel, cement, and aluminium, equivalent to the cost borne by domestic producers under emissions-trading systems. Initially implemented by the European Union, similar carbon border measures are now being developed or considered by other major jurisdictions, including the United Kingdom, Canada, Japan, and the United States. These mechanisms are designed to prevent carbon leakage, which occurs when emissions-intensive production relocates to regions with weaker climate policies.

As more economies adopt CBAM-style frameworks, carbon costs are becoming embedded not only in international trade but also across domestic and global holdings, making border adjustments a systemic source of transition risk for diversified investors.

CBAM extends carbon exposure into global trade flows, making it a systemic transition risk even for portfolios with limited European holdings.

2.2 Market structure and maturity

2.2.1 Market structure and maturity

Compliance markets differ markedly from voluntary systems. They are legally binding, exchange-traded, and backed by government monitoring and enforcement, which gives them the liquidity, transparency, and price integrity necessary for institutional use.

Voluntary markets, by contrast, remain fragmented, though governance and quality standards are improving under the Integrity Council for the Voluntary Carbon Market (ICVCM) and the Voluntary Carbon Markets Integrity Initiative (VCMI).

Within compliance systems, correlations between instruments are strengthening as policies align, a key enabler for cross-market hedging strategies. For example, historical correlations between European Union Allowances (EUA) and United Kingdom Allowances (UKA) exceed 0.8, providing meaningful hedge effectiveness across European exposures.

Compliance permits

Compliance permits function as regulated financial instruments suited to managing transition risk.

Voluntary credits

Voluntary credits, while valuable for demonstrating climate ambition, are best viewed as complementary tools rather than core hedging assets.

2.2.1 Voluntary vs Compliance Markets

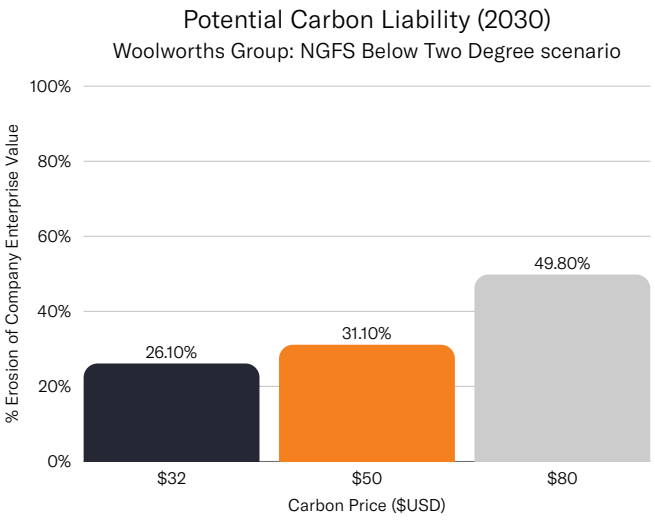
Aspect	Compliance Markets (EU ETS, UK ETS, ACCU, China ETS)	Voluntary Markets (VCM)
Governance	Government-regulated and legally enforceable; backed by monitoring and enforcement mechanisms	Self-regulated frameworks with varying standards and oversight
Pricing	Exchange-traded, transparent, policy-linked	Over-the-counter, heterogeneous, low liquidity
Use	Mandatory compliance for covered emitters; used for regulated emissions management	Corporate or institutional voluntary offsetting; discretionary use
Quality Assurance	High – governed by formal MRV (Measurement, Reporting, and Verification) systems	Improving under ICVCM/VCMI initiatives but remains uneven
Hedge Suitability	High – commodity-like price behaviour closely tied to policy; suitable for financial hedging	Limited – higher basis risk and integrity variance; more suitable for reputational or engagement objectives

2.3 Why carbon pricing matters for investors

Rising carbon prices translate into real, quantifiable financial risk. They influence:

- Operating margins of emissions-intensive sectors;
- Asset valuations through discounted-cash-flow adjustments;
- Cost-of-capital differentials as financiers re-price risk; and
- Equity and bond performance as market expectations shift.

Emmi's analytics link these price pathways directly to portfolio exposure, enabling investors to estimate how a €50 increase in carbon price could translate to a specific reduction in portfolio value, and how strategic credit holdings can offset part of that erosion.



Carbon Permits vs Voluntary Credits

Carbon permits (allowances)

Issued under legally binding emissions-trading systems such as the EU ETS, UK ETS, ACCU scheme, and China ETS.

Each permit represents the right to emit one tonne of CO_2 and is backed by government regulation, monitoring, and enforcement.

Because they are exchange-traded and policy-driven, compliance permits exhibit commodity-like price behaviour and provide a robust hedge against rising carbon prices. They form the foundation of institutional-grade carbon-risk management.

Voluntary credits (offsets)

Generated by projects that reduce or remove emissions outside compliance markets, for example, renewable-energy, forestry, or technology-based initiatives.

While voluntary credits can support corporate engagement and reputational goals, their standards and pricing vary widely across programs. As such, they are less reliable for portfolio-level hedging or valuation purposes.

3.0

The Case for Hedging Transition Risk with Carbon Credits

Institutional investors now increasingly recognise that transition risk is not a distant externality; it is a pricing variable being embedded in capital markets. Carbon-intensive assets face valuation pressure as global policy converges around decarbonisation targets. Yet divestment alone cannot entirely eliminate exposure. The challenge is to manage these risks dynamically, in the same way investors manage currency or interest-rate risk.

Carbon credits, when treated as a regulated commodity rather than a philanthropic offset, offer a financial instrument to hedge exposure to rising carbon prices. They can help neutralise part of the loss that a carbon-intensive portfolio would experience as the cost of carbon increases.

However, this only works when the hedge is built on a clear analytical foundation, understanding how much carbon exposure exists in the portfolio, how sensitive it is to price changes, and which credits most closely track those prices.

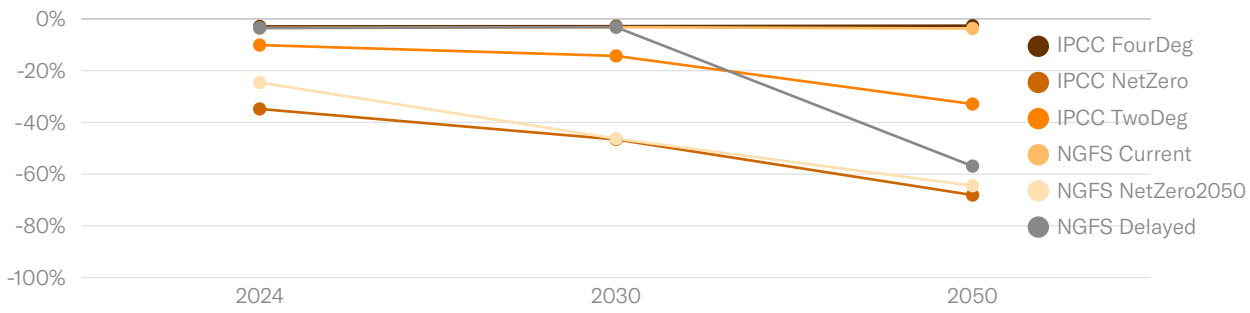
3.1 Quantifying exposure: From emissions to financial risk

The first step is quantification.

Carbon Diagnostic's analytics convert a portfolio's underlying emissions exposure into a financial metric known as Potential Carbon Liability (PCL), the estimated value erosion a portfolio would experience under a given climate scenario and its associated carbon-price pathway. This bridges the language of sustainability and finance, allowing portfolio managers to treat carbon as a measurable risk factor.

PCL is scenario-based, flexible, and compatible with standard return models. It can be calculated across asset classes and geographies, enabling comparison between all assets, and credit portfolios.

Graph: PCL across climate scenarios (FTSE100)



Once quantified, the question becomes: how can that liability be managed?

3.2 Two functional uses of carbon credits

Emmi's research distinguishes between two distinct applications of carbon credits in portfolios:

Financial-hedging use:
Holding credits as tradeable assets provides a position that rises in value as carbon prices increase, directly offsetting potential valuation losses in carbon-exposed holdings.

Temperature-alignment use:
Retiring carbon credits (offsets) to offset financed emissions improves reported temperature alignment, signalling progress toward net-zero objectives.

A single credit cannot do both at once; it must either be held (for hedging) or retired (for alignment). Understanding this distinction ensures that investors avoid double-counting and apply credits strategically within portfolio risk frameworks.

Temperature alignment vs value hedging
Temperature alignment focuses on reported climate metrics; value hedging focuses on protecting portfolio returns. Both are valid, but serve different purposes.

3.3 Basis risk and market selection

As with any hedge, basis risk, the mismatch between the hedge instrument and the underlying exposure, is critical.

Voluntary-market credits can diverge in price and integrity; compliance-market instruments, such as EUAs, UKAs, CAs, and ACCUs, more closely track the policy-driven carbon price embedded in corporate valuations.

In practice, aligning compliance credit exposure with the jurisdictions of portfolio holdings reduces basis risk and ensures that carbon-price signals correspond to the relevant policy environments.

3.4 Integration into portfolio construction

Once exposure is quantified and hedge instruments selected, the implementation mirrors any other risk-management process:

1. Determine Hedge Ratio
Number of tonnes (permits or allowances) required to offset portfolio carbon exposure under a chosen scenario.

2. Select Market Instruments
E.g., EUAs, UKAs, ACCUs, or blended baskets.

3. Monitor and Rebalance
Adjust positions as portfolio composition or carbon prices evolve.

4. Integrate Reporting
Link hedging activity to climate disclosures (TCFD, ISSB, SFDR) without conflating financial and emissions claims.

Treating carbon credits as a recognised asset class within portfolio-risk systems enhances transparency and supports investment-committee governance.

4.0

How a Carbon-Credit Hedge Works in Practice

Emmi has worked with institutional clients to demonstrate two complementary approaches to hedging portfolio transition risk using carbon credits.

The objective in each case is the same: to quantify potential value erosion under rising carbon-price trajectories and design a hedge that mitigates exposure while maintaining investment discipline.

Step 1:
Baseline transition-risk analysis

Carbon Diagnostics establishes the baseline: financed emissions, temperature alignment, and the portfolio's carbon-budget overspend under a defined scenario.

This analysis translates directly into Potential Carbon Liability (PCL), the percentage of portfolio value at risk if policy tightening drives carbon prices along that path.

This baseline provides the quantitative foundation for constructing either a financial hedging position or a temperature alignment strategy.

Step 2:
Modelled carbon-price pathways

Using Carbon Diagnostics data and regional carbon-pricing forecasts, investors can model the impacts on portfolio valuation under a range of policy and technology scenarios through 2030 and 2050.

This identifies both the scale of potential downside risk and the sensitivity of portfolio value to changes in carbon-price trajectories.

Key success factors for institutional carbon-hedging

Quality of instruments

Preference for compliance permits or high-integrity removal credits.

Quantitative foundation

Use of PCL and temperature-alignment analytics to size exposures accurately.

Governance clarity

Document intent, held for sale vs retired, to avoid double-counting.

Monitoring

Integrate both hedges into ongoing performance and climate-risk reporting.

Step 3:
Applying the carbon-permit (allowance) hedge

Carbon-credit hedging can be implemented through two distinct but complementary pathways:

Held-for-sale hedge –
Financial exposure management

Credits or allowances are held as tradable assets whose value rises with carbon prices.

When treated as available-for-sale instruments, these positions function much like commodity exposures, directly offsetting the potential loss that a carbon-intensive portfolio may experience as compliance costs increase.

Because compliance-market instruments (such as EUAs, UKAs, ACCUs and NZUs) are exchange-traded and policy-linked, they closely track the regulatory price signal that drives transition risk, making them suitable for portfolio-level hedging.

Typical sensitivity tests show that an appropriately sized held-for-sale position can materially reduce Potential Carbon Liability without compromising portfolio returns.

Retired-credit hedge –
Temperature alignment and permanent abatement

An alternative pathway is to retire credits once purchased, permanently removing them from circulation. Retirement ensures that the emissions reduction or removal associated with each credit is claimed only once, strengthening the connection between capital allocation and real-world decarbonisation.

For investors, retiring credits rather than trading them reduces available supply, supports portfolio temperature alignment, and provides a clear demonstration of progress toward net-zero goals. Many institutions formalise this approach through an annual retirement budget calibrated to financed-emissions targets.

Using compliance-grade or high-integrity removal credits for retirement offers a measurable and verifiable method to reduce financed emissions while maintaining transparent governance and reporting.

> **These two applications serve different purposes:** the held-for-sale hedge manages value exposure to policy-driven price risk. In contrast, the retirement hedge strengthens climate-alignment metrics and long-term transition credibility.

Step 4:
Ongoing monitoring

Transition risk evolves as regulation, market prices, and portfolio composition change.

Emmi's analytics enable investors to regularly recalculate portfolio alignment and PCL, ensuring that both financial and retirement hedges remain appropriately calibrated.

Firms can integrate these updates into governance cycles, investment-committee materials, and stakeholder reporting, maintaining transparency on the dual dimensions of financial and climate performance.

Regular recalibration using current data helps investors maintain proportionate, credible, and aligned hedging strategies as transition dynamics shift.

Illustrative outcomes

Institutional portfolios that incorporate carbon-hedging typically achieve three core outcomes:

Reduced value erosion, achieved through holding compliance-market permits as tradable financial hedges against rising policy-driven carbon prices.

Improved temperature alignment, delivered when high-integrity credits are retired annually to match financed-emissions targets.

Enhanced transparency and governance, supported by scenario-based reporting that links hedging activity to fiduciary objectives.

APOSTLE

Case Study

Apostle Funds Management: Using carbon credits to hedge portfolio transition risk

Apostle Funds Management is an Australian institutional investment manager with A$7 billion in assets under management and advice. As part of its net-zero investment strategy, Apostle sought to quantify and actively manage carbon-price exposure in diversified portfolios across both public and private markets.

Challenge

Like many institutional managers, Apostle's transition risk analysis was limited by inconsistent emissions data across asset classes. Without full coverage, it was difficult to assess how portfolio holdings aligned with the IPCC 1.5 °C pathway or to size an effective hedge using carbon credits. The firm required a unified methodology to measure financed emissions, temperature alignment, and exposure to rising carbon prices.

Solution

Apostle adopted Carbon Diagnostics as its primary source of emissions and transition-risk data. This platform provided portfolio-wide coverage, including private assets, using a consistent framework to quantify:

- Financed emissions and temperature alignment;
- Carbon-budget overspend relative to a 1.5°C scenario; and
- Potential Carbon Liability (PCL).

This analysis formed the quantitative foundation for structuring a hedge through the Apostle Carbon Credit Fund, which invests in regulated compliance markets such as the EUA, UKA, CCA, ACCU and NZU.

> "Emmi has become our primary source for emissions data across all asset classes. The combination of comprehensive coverage, consistent methodology, and customisable outputs has transformed how we manage towards our net-zero goals."
>
> – Joe Unwin, Apostle Funds Management

Implementation

Baseline Risk Assessment

Carbon Diagnostics showed that Apostle's portfolio exceeded its 1.5 °C carbon budget by 16,836 tonnes of CO_2e, translating into a Potential Carbon Liability of 30.6 % of portfolio value by 2050 if carbon-price trajectories followed IPCC forecasts.

Designing the Hedge

Apostle held 13,398 compliance carbon credits across the five major regional markets (EUA 466, UKA 1,987, CCA 3,808, ACCU 4,117, NZU 3,020).

When these were modelled as "available-for-sale" instruments (rather than as retired), they served as a financial hedge whose value would rise with increases in the carbon price.

Results

The carbon-credit overlay reduced the portfolio's Potential Carbon Liability from 30.6 % to 17.8 %, materially improving transition-risk resilience while maintaining return objectives.

Alternatively, if Apostle were to retire the same volume of credits annually, the portfolio's emissions overspend would fall to roughly 3,438 tonnes CO_2e, nearly achieving 1.5 °C alignment.

Outcome and insights

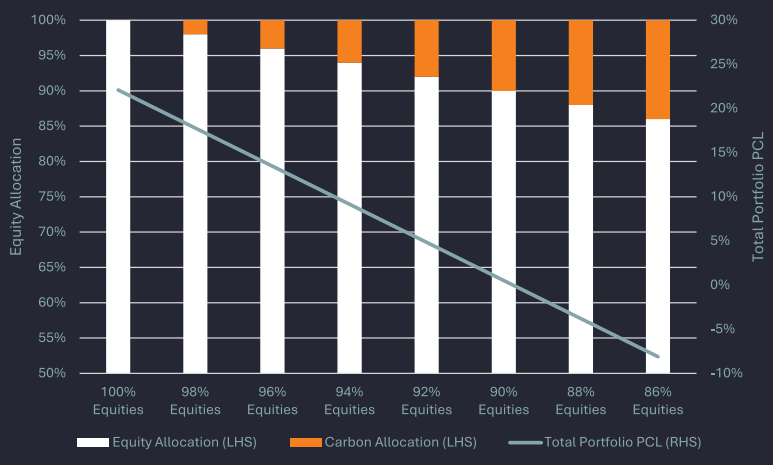
This exercise demonstrated that compliance-market carbon credits can operate as a credible financial hedge, not merely as an offsetting instrument. By integrating emissions, carbon-price, and valuation data into a single framework, Apostle translated climate exposure into a quantifiable financial metric, and used it to manage transition risk dynamically.

For institutional investors, Apostle's experience underscores three key points:

- Carbon exposure can be measured in financial terms (via PCL).
- Regulated carbon credits offer a scalable, policy-linked hedge against rising carbon prices.
- A small allocation to compliance carbon markets can meaningfully reduce portfolio-level transition risk while maintaining performance objectives.

This figure illustrates how increasing allocations to carbon markets progressively lower Potential Carbon Liability, complementing the Apostle case described above.

Figure 3: PCL Exposure
MSCI ACWI Ex-Aus Total Portfolio PCL (RHS)



Data as at 30/06/2025. Source: EMMI Data, Apostle Funds Management

Figure 3 from Apostle Funds Management, "Building a Climate-Resilient Portfolio without Compromising Returns," page 5.

5.0 Integrating Carbon Credits into Portfolio Strategy

Carbon instruments, including permits and credits, are often viewed as the final step in a sustainability strategy. In practice, they should be considered an integral part of portfolio construction and risk management. When treated as a legitimate financial asset, credits can enhance diversification, improve downside protection against transition shocks, and signal a disciplined approach to climate governance.

Beyond this, as the integrity of global carbon markets strengthens and baselines tighten, the potential for capital appreciation in carbon credits merits inclusion within a diversified portfolio.

5.1 Strategic portfolio applications

Carbon credits can support three complementary strategic goals:

1. Risk mitigation
Hedging expected carbon-price increases reduces potential value erosion, particularly for portfolios with heavy industrial, materials, or energy exposure.

2. Transition positioning
Allocating to carbon-credit funds or indexes gives exposure to an emerging asset class likely to appreciate as global policy tightens.

3. Stakeholder alignment
Using credits to improve temperature alignment or demonstrate measurable progress toward net-zero targets reinforces fiduciary credibility and regulatory compliance.

> Investors who model both the 'temperature-alignment' and 'financial-hedging' cases can transparently show boards and regulators how each use supports distinct objectives.

5.2 Governance and disclosure alignment

Regulatory frameworks such as TCFD, ISSB S2, ESRS E2 and SFDR now require investors to disclose transition-risk management. Demonstrating a quantitative methodology for assessing and mitigating carbon exposure positions investors ahead of compliance requirements.

> Integrating carbon-price sensitivity and hedging analytics into strategic-asset-allocation reviews reframes climate action from an ESG gesture into a fiduciary necessity.

6.0 Market Outlook and Investor Implications

The next five years will define the shape and scale of global carbon markets. With carbon-pricing instruments now covering roughly 28 % of global emissions, generating over USD 100 billion in annual revenue and set to expand. Policies are converging, new sectors are entering compliance systems, and voluntary markets are undergoing an integrity reset. For institutional investors, this evolution presents both transition risk and alpha opportunity.

6.1 Emerging market and technology trends

Removals premium
High-integrity removal credits (biochar, direct air capture, mineralisation) already trade at multiples of avoidance projects, reflecting demand for permanence.

Digital measurement and verification
Satellite data, IoT, and blockchain registries are increasing transparency and liquidity.

Financial product innovation
New indices, futures, and tokenised credits are turning carbon into a standardised investment exposure.

Corporate demand
Mandatory transition-plans legislation (EU CSRD, UK Transition Plan Taskforce) will drive sustained credit demand from heavy industry and finance.

6.2 Investor implications

1. Transition risk is now quantifiable
Metrics such as PCL enable measurement and comparison of carbon exposure in the same language as credit or duration risk.

2. Hedging is cost-effective insurance
Allocating a small share of portfolio value to compliance-market carbon credits can meaningfully reduce downside exposure under tightening policy scenarios.

3. Carbon markets offer diversification and return potential
The secular trend toward higher carbon prices creates long-term appreciation prospects in regulated credit instruments and funds.

4. Data and integrity will differentiate managers
Investors equipped with transparent, scenario-based analytics, such as Carbon Diagnostics, will be able to demonstrate alignment and defend strategy decisions to boards and regulators.

6.3 Long-term outlook

The next phase of carbon markets will see integration across systems, expansion into new sectors, and convergence of compliance and voluntary standards. As this occurs, carbon will solidify as a core macro-risk factor influencing asset allocation alongside inflation, interest rates, and currency.

> Early adoption of quantitative carbon-risk tools allows investors to manage exposure proactively rather than reactively, turning compliance cost into competitive advantage.

7.0

The Fiduciary Imperative for Transition-Ready Portfolios

Institutional investors are facing a structural redefinition of fiduciary duty.

What was once interpreted narrowly as maximising financial returns now necessarily includes managing exposure to systemic climate risk.

As carbon pricing, disclosure standards, and policy frameworks accelerate, climate transition risk is no longer a peripheral ESG issue, it is a core financial consideration.

7.1 Transition readiness as financial prudence

Transition risk is now directly visible in earnings, credit spreads, and asset valuations. For institutional investors, managing this exposure is not a matter of sustainability preference, but a fiduciary obligation.

Portfolios equipped with quantified carbon-risk metrics and credible hedging strategies, such as those demonstrated in the Apostle case, are better positioned to protect value as policy frameworks tighten and carbon costs rise.

Integrating carbon analytics into investment governance ensures that transition management is treated with the same rigour as credit, duration, or currency risk.

7.2 Transition risk as a recognised financial factor

Carbon exposure has become a measurable component of financial performance and asset allocation. As carbon pricing expands across jurisdictions, policy-driven price trajectories are influencing earnings, capital flows, and valuations much like other macro-risk variables such as interest rates or inflation. Integrating carbon-risk metrics, including Potential Carbon Liability (PCL) and temperature-alignment measures, enables investors to assess and manage this exposure consistently across portfolios, positioning transition readiness as a standard element of financial risk management.

7.3 The role of carbon credits in the toolkit

Carbon instruments (permits and credits) are not substitutes for decarbonisation; they are instruments that help investors manage the pace and impact of the transition. When applied systematically, compliance-market credits can serve dual purposes:

Financial hedging:
Offsetting value erosion from rising policy-driven carbon prices.

Temperature alignment:
Supporting verifiable progress toward net-zero commitments through the retirement of high-integrity credits.

Used together within a transparent, data-driven framework, these instruments provide flexibility for portfolios that cannot immediately divest, enabling investors to manage transition exposure while maintaining fiduciary discipline.

Conclusion:

From Awareness to Action

The decarbonisation of the global economy is not a matter of ideology; it is a financial inevitability.

For investors, the question is not whether transition risk exists, but how effectively it is measured, managed, and mitigated.

Carbon credits, particularly those from compliance markets, have evolved into credible financial instruments that can play a meaningful role in that process.

When integrated through robust analytics such as Carbon Diagnostics, credits can help institutional investors:

- Quantify their exposure to carbon-price risk,
- Hedge potential value erosion,
- Improve portfolio alignment with global temperature goals, and
- Demonstrate proactive fiduciary governance.

There is no single path to net zero. But there is a clear path to resilience: measure, model, and manage carbon risk as a core portfolio factor.

Investors who adopt that discipline today will be better prepared for the economic realities of tomorrow's carbon-constrained world.

Key takeaways

Theme	Implication for investors
Transition risk is financial risk	Policy, technology, and market forces are re-pricing carbon exposure globally.
Carbon credits are dual-purpose instruments	They can either improve temperature alignment or hedge portfolio value, not both simultaneously.
Compliance credits offer institutional-grade reliability	For example, EUAs, UKAs, and ACCUs provide transparent pricing and enforceable integrity.
Quantification enables governance	Carbon Diagnostics' analytics translate emissions into financial metrics (PCL) to support decision-making.
Fiduciary duty now includes transition management	Demonstrating active carbon (climate)-risk mitigation is fast becoming a regulatory expectation.

About Emmi

Climate risk, built for investors

Emmi creates climate risk solutions for investors. We provide emissions, transition, and physical risk data for every company and investment - supporting 100% portfolio coverage across both private and public markets for all asset classes.

With our comprehensive climate risk data set,
we deliver the transparency and customisation needed to power investment decisions, meet
climate reporting obligations, and align with
investor mandates.

Emmi is backed by a team of climate and
finance experts.

Emmi believes that a low-carbon economy is possible, and that properly incentivising and mobilising capital is the fastest and most cost-effective way to reach Net Zero and beyond.

Quantifying climate risk exposure allows the financial sector to efficiently allocate capital towards this goal.

To achieve this, meet regulatory reporting requirements and investor mandates, there is a need for a broad spectrum of comprehensive climate risk data. We have built Carbon Diagnostics to solve that problem.

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