Avoided Emissions: *Focus on the investment case*

World Business Council *for Sustainable Development*

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Executive *summary*

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Investment in climate solutions is an institutional imperative to accelerate decarbonization and mitigate risk to our communities, businesses and livelihoods. However, investment in needed solutions is challenging due to a lack of consistent methodological approaches across solution types and asset classes.

Avoided emissions (AE) are the reduction in systemic emissions resulting from a product or service compared to a counterfactual or incumbent scenario in which the solution is not in place. Put simply, avoided emissions are emissions reductions that would not occur should the product or service not exist. AE assessment provides an estimated emissions reduction due to the use of a low-carbon solution such as low-carbon animal feed, renewables transmission and storage infrastructure, and efficiency insulation or glazing.

The concept of AE is transforming climate action, offering a crucial lens to assess and compare the systemic impact of low-carbon solutions. A growing number of investors and companies share the ambition to accelerate decarbonization. Concepts like avoided emissions and emission reduction potential come to the fore to help investors and companies identify high-potential decarbonization solutions for investment and strengthen transition finance efforts. Despite the progress in developing methodological principles and standards for analysing avoided emissions (e.g., by PCAF, ICMA, ISO, IEC, and WBCSD), existing frameworks in finance and real economy are not fully aligned, and practitioners are not consistently utilizing the same approaches for AE assessment and disclosure.

This paper aims to strengthen the connection between real economy and financial actors by showing how AE can be used as a decision input in capital allocation and investment assessment. By focusing on options theory, it provides corporate and other non-financial actors with a clearer understanding of financial decision-making and prioritization approaches within financial institutions. For this, we suggest and expand on a practical approach along the following steps:

- → **Frame investments in avoided-emissions solutions as real options**, structuring capital allocation as staged commitments with defined triggers that allow companies to scale, delay, or exit as policy, demand, and technology signals evolve.
- → **Use avoided emissions as an input to financial analysis**, supporting assumptions on demand, growth, and market opportunity under transition scenarios.
- → **Maintain credibility through robust methodologies and governance**, ensuring avoided emissions assessments are transparent, comparable, and decision-useful.
- → **Leverage avoided emissions assessments to identify, track, and communicate transition opportunities**, that align decarbonization with growth potential, scalability, and risk resilience.
- → **Apply avoided emissions insights in portfolio construction and performance assessment**, helping identify scalable transition opportunities while balancing exposure across technologies, geographies, and policy environments.

Introduction

01.

01. Introduction

This paper explores the financial case for avoided emissions (AE), and the growth, innovation and transition investment opportunities they represent. For corporate finance and investment professionals, investments in technologies and solutions that enable avoided emissions can be viewed as real options, providing flexibility to capitalize on future regulatory or market shifts while managing uncertainty. Capital providers are increasingly focused on climate solutions and transition finance, which creates opportunities for real economy companies to improve both the cost of and access to capital. Avoided emissions can reinforce credible transition strategies and support enterprise value, provided they are underpinned by robust standards, frameworks, financial discipline, and governance.

This paper aims to strengthen the connection between real economy and financial actors by showing how avoided emissions can be used as a decision input in capital allocation and investment assessment. By focusing on options theory, it provides corporate and other non-financial actors with a clearer understanding of financial decision-making and prioritization approaches within financial institutions. Simultaneously, financial actors are offered a practical framework for leveraging avoided emissions assessments to capitalize on assets' ability to accelerate decarbonization. To guide readers, the paper is organized into two sections: the first addresses how corporate finance teams can evaluate investments in avoided-emissions technologies as part of their capital allocation and transition strategies, while the second explores the perspective of external capital providers, examining how investors and lenders interpret avoided emissions when assessing transition opportunities and allocating capital.

How avoided emissions are used in this paper

For corporate finance teams, avoided emissions (AE) **do not constitute an investment rationale in their own right**. Instead, AE are treated as a year-on-year or forward-looking input that can inform assumptions on demand, growth potential, and strategic positioning under transition scenarios, while **capital allocation decisions remain driven by cash flow economics, risk, and capital discipline.**

Option theory and *avoided emissions*

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02. Option theory and *avoided emissions*

Avoided emissions in a financial context

Increasingly, investors aim to invest in companies that clearly contribute to decarbonization. At the same time, businesses are seeking ways to highlight and benefit from their climate contributions beyond just reducing emissions from their own operations. **Analysis of avoided emissions can help guide investors in allocating capital, tracking and managing portfolio results, communicating progress to stakeholders, meeting regulatory requirements, raising capital, and creating value after investing**.

Avoided emissions express the reduction in systemic emissions that result from the use of a low-carbon solution compared to a counterfactual or market average scenario. **Put simply, avoided emissions are emissions reductions that would not occur should the product or service in question not exist.** Example solutions are high-efficiency glazing and insulation in the construction sector, waste management solutions, low-carbon animal feed and bio-stimulants in agriculture and food, and storage and transmission solutions in energy systems. Complementary to inventory footprints, avoided emissions analysis adopts an intervention perspective and provides a critical perspective on the plausible realized and forward-looking impact of solutions that enable systemic change across industries.

AE has three distinct use cases in finance. In this paper, we propose three practical ways:

1. **as an explanatory variable on** why demand, adoption, or policy support could be structurally stronger in certain scenarios,
2. **as an option signal**, where staged investment, learning, and flexibility have higher value under uncertainty, and
3. **as an impact and communication metric** – e.g. how transition opportunity and credibility are discussed with capital providers.

These use cases are distinct and – while there may be correlation and links – AE should not be conflated with financial returns or valuation mechanics.

Avoided emissions as an input to financial decision making

Avoided emissions concepts are already used in several financial contexts, including green bonds, portfolio evaluation, transition finance frameworks, and specialized financing vehicles. WBCSD has worked with financial practitioners to structure, guide, and explicate existing financing approaches. More details can be found in our recent publications Avoided Emissions & Climate Investing as well as Avoided Emissions & Sustainable Finance. However, the integration of avoided emissions analysis into structured capital allocation frameworks is still evolving. In this context, financial decision-making frameworks can help translate avoided emissions insights into investment decisions.

Why option theory is relevant for avoided emissions investments

From a finance perspective, **option theory[1] provides a useful framework for evaluating investments in technologies or solutions that create avoided emissions. In simple terms, real options refer to investments that create the right, but not the obligation, to expand, delay, or scale projects as market conditions evolve**. This perspective can be helpful when evaluating investments where the value depends heavily on uncertain future developments.

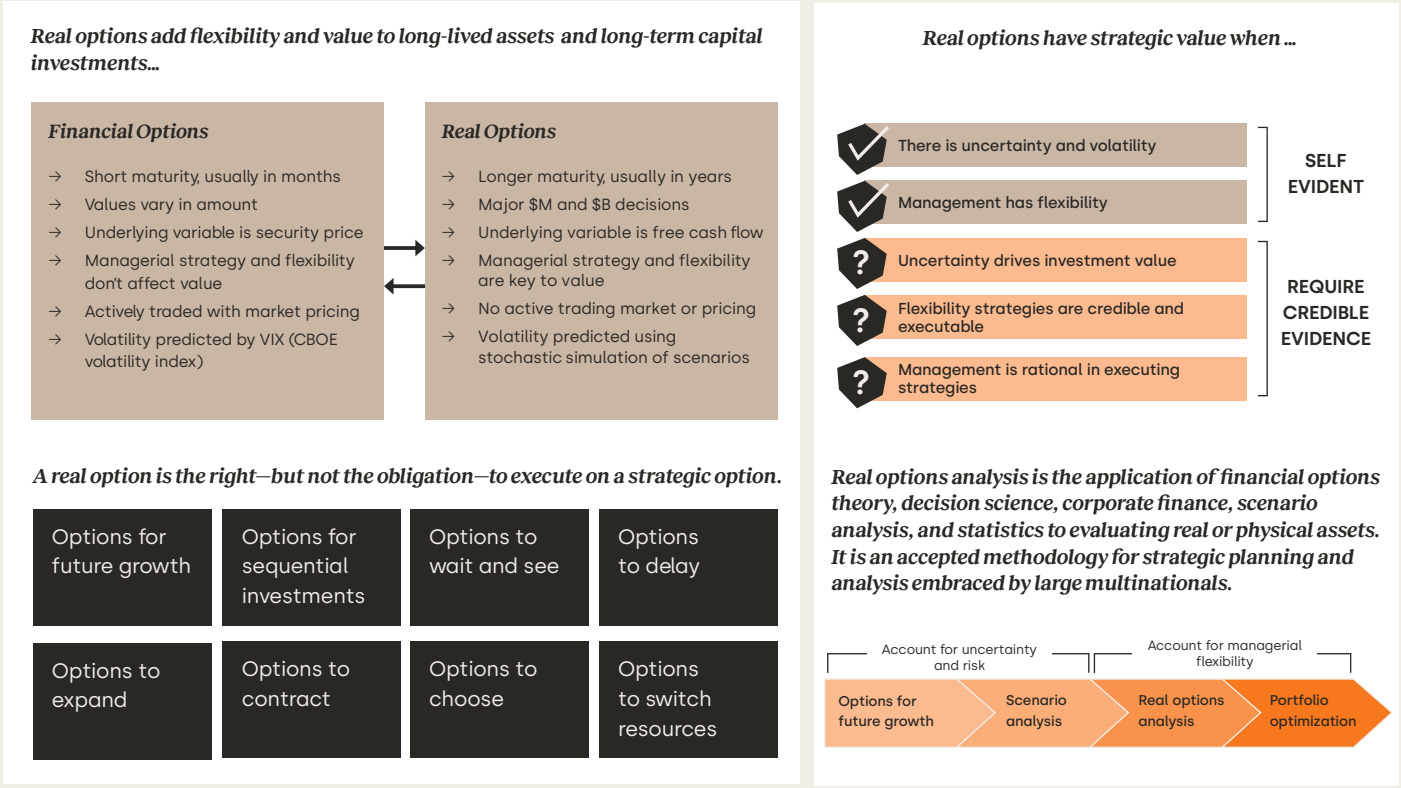
A helpful way to operationalize this distinction in capital allocation is to contrast 'futures-like' commitments with 'options-like' commitments. In financial markets, futures can be valuable for locking-in price certainty but they also create bilateral obligations and can amplify losses through leverage and liquidity demands (e.g., margin requirements), whereas options provide the right to act, with downside typically limited to the premium paid.

In corporate terms, **'futures-like' structures resemble early, hard-to-reverse commitments** (large up-front capex, rigid capacity builds, or inflexible long-term volume commitments) that reduce strategic flexibility if policy, demand, or technology performance evolves unfavorably. **By contrast, 'options-like' structures align with a real-options approach to avoided-emissions-enabling investments on entity or solution level:** staged funding that intentionally purchases learning and flexibility, preserving the ability to scale, delay, switch, or abandon as market signals strengthen or weaken.

For instance, allocating capital to technologies that enable avoided emissions could allow a business to benefit from potential regulatory shifts, evolving customer preferences, or increasing adoption of low-carbon solutions. However, it is important to recognize that these benefits are inherently uncertain, as they depend on assumptions regarding market developments as well as external variables such as the pace of decarbonization and the development of relevant policies.

This framing helps finance teams distinguishing between hedging and de-risking where appropriate, and preserving managerial flexibility through disciplined steps and downside protections, an approach reflected in the staged process below.

Figure 1: Real option overview, use and value



Source: Greg Rogers - Closing the Climate Intelligence Gap

Applying real options *to avoided emissions investments*

03.

03. Applying real options to *avoided emissions investments*

Structuring uncertainty through staged investment decisions

In a conventional capital allocation decision, **finance teams typically assess a defined project scope and approve a largely upfront and irreversible commitment**, based on a small number of scenarios. By contrast, **a real options approach views investments in avoided emissions enabling technologies as deliberately staged commitments**. The objective is not only to decide whether to invest, but to retain the flexibility to scale, pause, switch, or exit as information on policy, demand, and technology performance becomes clearer over time.

A six step approach

To apply option theory efficiently, corporate finance departments can approach investment decisions related to technologies that enable avoided **emissions through a staged and well-organized process**, mirroring the way they might evaluate research and development or other innovation-driven projects. This involves six key steps. Strong AE potential can increase the value of flexibility, but **it should not increase tolerance for weak unit economics or unclear paths to cash generation**. In practice, **AE metrics work best as supplementary indicators alongside core financial KPIs** (e.g., margins, cash conversion, ROIC), and the staged process below should include **explicit downside protections** (gates, stop loss thresholds, and exit rights) that are triggered when key assumptions do not materialize.

1. Identifying the Option

Finance teams must first clarify what type of "option" the investment represents. For avoided emissions activities, this could include the ability to scale up new technologies if regulatory incentives strengthen, or the flexibility to pivot toward products that become more attractive as market demand for low-carbon solutions grows.

2. Valuing the Option

Unlike traditional investments, the value of these projects often lies in their potential to provide upside under certain scenarios rather than in near-term cash flows. Finance teams can therefore use scenario and transition analysis and probabilistic modelling to estimate the value of this flexibility, factoring in the likelihood of regulatory changes, shifts in customer behaviour, demand dynamics, or technological breakthroughs. Option pricing models, such as Black-Scholes[2] or binomial trees[3], can in some cases be adapted to assess the range of possible outcomes and the value of waiting or scaling investment in response to new information. In practice, many organizations may also rely on scenario or sensitivity analysis to evaluate potential outcomes.

3. Phased Deployment

Given the inherent uncertainty, finance departments may advocate staged capital allocation, where initial investments are limited and incremental funding is contingent upon the achievement of predefined milestones or the emergence of favorable market signals. This approach helps contain downside risk and ensures that larger commitments are made only once uncertainty has been reduced.

4. Explicit Downside Management

Option-like investments should be accompanied by clear strategies to limit potential losses. This may include setting stop-loss thresholds, diversifying across multiple transition technologies, or embedding contractual protections that allow the company to exit or scale back projects if key assumptions fail to materialize. To date, most avoided emissions investments deploy incentive or phased deployment financing structures while penalties for non-achievement are rather scarce.

5. Holding Period / Asset Engagement Strategy

Finance teams should track and validate avoided emissions assessments and impacts during the holding period. To manage data quality, organizations should ensure transparency regarding the sources of the data being used and how those interact with the assumptions (e.g., on evolving baselines) taken. Organizations may also develop monitoring processes to compare realized results against forward-looking assessments, allowing assumptions and data inputs to be refined over time so that results remain robust for decision-making and credible for stakeholders.

6. Integration with Strategic Planning

Finance departments should ensure that the rationale for investments enabling avoided emissions is closely aligned with the broader transition strategy of the business. While the strategic narrative around enabling customer decarbonization is important, investment decisions must remain grounded in rigorous financial analysis, with non-financial benefits serving as supplementary rather than primary justifications. Similarly, avoided emissions should be treated as complementary to emissions inventory reporting and reduction efforts of the business.

By systematically applying option theory in this manner, finance departments can make more informed and resilient decisions about investments associated with avoided emissions. **This approach acknowledges the speculative nature of such projects while providing a structured process for capturing upside potential and managing risk**. Ultimately, it helps ensure that capital allocation remains disciplined while maintaining flexibility to adapt to evolving transition pathways.

Illustrative corporate example: applying an option style investment approach

Company: EuroTherm Appliances (ETA) - a residential heating manufacturer

Investment Candidate: HP X high efficiency air to water heat pump and optimization service

Strategic Aim: Enable customer decarbonization while maintaining capital discipline

1. Identify the Option

- → **Scale up option:** Expand capacity from 25k → 150k units/year if policy/demand strengthen.
- → **Timing option:** Pilot via contract manufacturing; defer major capex pending market signals.
- → **Switching option:** Pivot to hybrid heat pumps if grid constraints slow adoption.
- → **Abandonment option:** Exit if milestones aren't met.

2. Value the Option (Scenario based)

- → **Key drivers:** Policy incentives, customer adoption, technology performance (SCOP), grid decarbonization.
- → Illustrative outcomes:
  - **Bull (Upside) (35%):** 150k units/year, €500 margin, ~3.3 tCO_2e avoided/unit.
  - **Base (45%):** 80k units/year, €430 margin, ~3.0 tCO_2e avoided/unit.
  - **Bear (Downside) (20%):** 35k units/year, €360 margin, ~2.6 tCO_2e avoided/unit.
- → **Insight:** Staged "real option" approach yields positive NPV in Base/Bull by **exercising scale only when signals improve**, avoiding Bear downside.

3. Phased Deployment

- → **Stage 1 (0-18m, €7m):** Pilot, train installers, validate SCOP ≥ 3.2; 10k units; average ≥ 2.5 tCO_2e avoided/unit.
- → **Gate A:** Proceed if ≥2 of 3 signals hit thresholds (policy strength, demand traction, installer readiness).
- → **Stage 2 (Years 2-3, €15m):** Capacity expansion; launch €9/month optimisation service.
- → **Stage 3 (Years 3-7):** Cost down, variants, light commercial entry.

4. Downside Management

- → **Stop loss:** Margin < €300 for 2 quarters → freeze scale.
- → **Diversify:** Hybrid product line + multi country rollout.
- → **Contracts:** Flexible machinery and manufacturing terms; dual sourcing critical components.

5. Strategic Integration

- → **Finance governance:** Option style gates, quarterly signal dashboard.
- → **KPIs:** ROIC, cash conversion; **tCO_2e avoided per unit and per € capex** (as supplementary metrics).

Decision Summary: Commit €7m pilot now; **retain the right, not the obligation to scale** to €15m additional capex when market signals warrant, capturing upside while capping downside.

The capital *providers' view*

04.

04. The capital *providers' view*

How investors and lenders interpret avoided emissions information

The following section considers how external capital providers, including investors and lenders, may interpret avoided emissions when evaluating transition-related investment opportunities. In current investment practice, avoided emissions (AE) rarely influence valuation or credit outcomes directly. Instead, capital providers use AE analysis to inform their judgement on transition credibility, growth assumptions, and uncertainty management. AE can help explain why demand or adoption may be structurally supported under transition scenarios, but investors and lenders place greatest weight on how the company structures risk in financial terms, notably through staged commitments, clear milestones, downside protection, and governance that preserves flexibility if assumptions do not materialise.

Investments in technologies or solutions that enable avoided emissions can strengthen a transition plan by demonstrating alignment between a company's products or services and customer decarbonization needs, increased exposure to growth markets linked to the transition, or strategic positioning under plausible transition scenarios. Avoided emissions can therefore help explain why an opportunity exists and provide an input into financial analysis.

Why financial structure and governance matter more than metrics

Capital providers often respond not only to the transition narrative, but also to how the company structures uncertainty and downside risk in financial terms. A useful lens is the distinction between futures and options mentioned above, whereby futures can secure price certainty but embed obligation, while options provide upside participation with the right to act, and typically limit downside to the premium paid.

Translating this to transition and avoided emissions investments, **investors and lenders may place greater confidence in strategies that are 'option-like'** – i.e. staged commitments with explicit milestones, exit rights, and governance that caps the downside while preserving the ability to scale if policy, adoption, or economics develop favorably. Conversely, 'futures-like' corporate commitments, namely large, irreversible capex or inflexible commercial obligations taken before signals are clear, can be interpreted as higher execution and stranded-capital risk, even when the decarbonization rationale is strong.

This helps explain why some capital and data providers are developing frameworks to identify transition opportunities that combine credible decarbonization contribution with commercial discipline and risk-controlled pathways, such as the example below.

Such investments also illustrate a broader shift in sustainable finance toward business-case-led transition investment. Investors and lenders increasingly emphasize whether climate-related activities are commercially viable, scalable, and integrated into core strategy.[4]

Schroders Example - Avoided emissions investments outperforming equity benchmarks

Schroders has developed a proprietary avoided emissions framework that enables capital providers to systematically identify and allocate capital to companies driving real-world decarbonization.

Their approach measures the emissions reductions enabled by a company's products or services compared to a credible baseline scenario and expresses this as tonnes of CO_2 avoided per $1 million of revenue. By grounding the analysis in life cycle assessment (LCA) principles and applying a value chain methodology to minimize the risk of double counting, Schroders ensures consistency and comparability across sectors and technologies.

Notably, Schroders' research demonstrates that a low-risk global equity portfolio tilted toward companies with high avoided emissions intensity would have outperformed global equity benchmarks by 10% over the past five years, with the potential for reduced system-wide emissions despite sometimes having higher operational carbon intensity.

This highlights the value of avoided emissions as a forward-looking metric for uncovering transition opportunities and supporting capital allocation to scalable climate solutions, rather than relying solely on GHG inventory measures.[5]

Avoided emissions *and valuation*

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05. Avoided emissions *and valuation*

When avoided emissions technologies begin to influence valuation

When technologies that enable avoided emissions achieve commercial success, they may be valued by financial markets at multiples above the sector average. However, **it is challenging to directly attribute these higher valuations to avoided emissions alone. Instead, such valuation outcomes are primarily driven by core commercial fundamentals**, such as sustainable growth, strong margins, scalability, capital requirements, and risks adjusted for policy factors. While avoided emissions can help explain why demand and adoption might be more resilient in transition scenarios, **they serve as an explanatory factor rather than a substitute for proven earnings potential.**

This pattern is observed in several transition-enabling sectors such as:

→ energy-efficiency solutions

→ grid digitalization platforms

→ low-carbon materials technologies.[6]

However, **these valuation outcomes are not solely driven by avoided emissions as a metric alone but by similar factors that underpin high valuation multiples in other growth sectors.** These factors include scalability and durable demand, robust margins and pricing power, supportive policy environments, and recurring revenue models. In such cases, avoided emissions function primarily as an explanatory variable, helping investors understand why demand may be structurally supported under transition scenarios.

Illustrative examples

Power utilities investing in grid flexibility software, grid-level storage systems, or demand-response technologies may highlight avoided emissions at system level. Investors typically focus less on the emissions figures and more on the regulated returns, contract duration, the scalability of the technology and relevant policy and regulation.

Energy-efficiency software providers that monetize customer cost savings through subscription or performance-based models, are able to attract higher valuations driven by recurring revenues and low capital intensity, regardless of whether avoided emissions are disclosed explicitly. By contrast, technologies with large theoretical emissions benefits, such as certain carbon-capture or hydrogen applications, have struggled to achieve comparable valuations where the economics are weak, capital intensity is high, or revenues remain heavily policy-dependent.

This demonstrates that capital markets may reward technologies associated with avoided emissions once they succeed as commercially viable businesses.

Why fundamentals remain the primary driver of valuation outcomes

Before reaching this stage of commercial viability, such investments should typically be treated as speculative growth or option-like capital, subject to staged deployment, conservative assumptions and explicit downside protection. The WBCSD guide on Avoided Emissions and Climate Investing[7] addresses these rather early- to mid-stage investments with stronger speculative and prospective elements. Avoided emissions may help explain why an opportunity exists, but they do not yet singularly, in themselves, justify valuation premia or capital allocation.

As the global standards landscape for intervention-based impact assessment and disclosure matures, and the alignment on practical elements such as baselines and system boundaries increases, the use cases of avoided emissions assessment can expand towards a leading indicator for valuation or capital allocation. This reinforces the case for financial discipline in current sustainable investing approaches and the need for continuous efforts to strengthen the methodological and data infrastructure. **It underscores that transition relevance must ultimately be demonstrated through earnings, growth and risk resilience.**

Conclusion

06.

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Incorporating investments in technologies that support avoided emissions presents valuable opportunities for finance departments and capital providers. By adopting a disciplined, phased approach to capital allocation, grounded in option-style thinking, organisations are better equipped to manage uncertainty, engage stakeholders, capture growth potential, and limit risks.

For corporate finance teams, investments that enable avoided emissions are best approached as option-like growth prospects, with staged capital deployment, clear decision points, and ongoing attention to financial performance. For capital providers, avoided emissions add value when they are part of strategies that feature transparent decision-making, disciplined capital allocation, and strong governance to protect against downside risks.

Avoided emissions do not, in themselves, determine investment attractiveness or valuation. Capital allocation and pricing decisions continue to be driven by expected cash flows, risk, and capital efficiency. In this context, avoided emissions serve as an explanatory input—helping decision makers understand why certain growth, demand, or adoption assumptions may be credible under transition scenarios—rather than as a substitute for financial performance.

In summary, success in this area depends on aligning investment choices with rigorous financial analysis while acknowledging the strategic benefits of decarbonisation. Capital markets favour technologies and companies that are commercially viable, scalable, and resilient, demonstrating that strong financial fundamentals are essential for advancing effective transition and climate solutions.

Endnotes

1 Option theory is a branch of financial mathematics and economics that analyzes the value and strategic use of options – i.e. contracts that give the holder the right, but not the obligation, to buy or sell an asset at a predetermined price within a specified time frame. These financial derivatives provide flexibility to act (buy/sell) if conditions are favorable, but do not require action if they are not.

2 The Black–Scholes model is a mathematical framework used to estimate the fair value of options based on factors such as the underlying asset price, strike price, volatility, time to maturity, and the risk-free rate. It assumes efficient markets and continuous hedging, providing a widely used benchmark for option valuation and implied volatility.

3 Binomial tree models value financial options by mapping an asset's possible up- or down-moves over discrete time steps and then working backwards through the tree to discount expected payoffs using risk-neutral probabilities, allowing flexible handling of options that can be exercised before maturity.

4 Pastor, L., Stambaugh, R. F., & Taylor, L. A. (2021, revised June 2022). Dissecting Green Returns, NBER Working Paper No. 28940. The paper explains that the rise in green asset pricing is driven by investor demand for commercially viable climate solutions, especially when climate concerns intensify and these gains don't necessarily translate into future expected returns. **Dissecting Green Returns**.

5 Schroders (August 2025), **Identifying investment opportunities using avoided emissions**. Result is based on back-tested performance of an illustrative, diversified "Tilted Avoided Emissions" global equity portfolio constructed for research purposes and constrained to 1% ex-ante tracking error versus the MSCI All Country World Index (ACWI), with standard risk constraints (including sector, regional and position-size limits) and quarterly rebalancing. "Avoided emissions intensity" is defined as tonnes of CO_2 avoided per US$1 million of revenue, estimated using use-phase avoided emissions versus a reference scenario and grounded in LCA/value-chain principles.

6 Examples of publicly traded energy efficiency and energy management software providers that command elevated valuations: Schneider Electric (EPA: SU / Euronext Paris), Ameresco, Inc. (NASDAQ: AMRC), Nextracker Inc. (NASDAQ: NXT)

7 WBCSD: **Avoided Emissions & Climate Investing: A Guide for Investors and Businesses**

Acknowledgements

Acknowledgements

We thank WBCSD Climate and Corporate Performance & Accountability member companies and other named and unnamed individuals, who, in a personal capacity, provided their insightful comments on this paper. The views and opinions expressed in this paper are solely those of the author and do not necessarily reflect the perspectives of these reviewers or affiliated institutions:

Akio Ohata — Nomura Asset Management

Diane Mak — Allianz Global Investors

Gavin McCormick — Climate TRACE / WattTime

Greg Rogers — Eratosthenes

Katherine Kitson — EQT Group

Laura Bossino — Schroders

Madeleine Evans — Generation Investment Management

Teppei Yamaga — Mizuho Financial Group

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Established in 1995, WBCSD is a non-profit member-led organization that connects business leaders through all sectors and major economies, and creates the tools and frameworks to scale collective impact, drive cross-sector innovation, and shape an ambitious, enabling policy agenda. We operate from seven offices worldwide – in Geneva, New York, Chicago, Amsterdam, London, Singapore and Wuhan – enabling collaboration across value chains and geographies.

Together with our members, we are rewiring economic and financial systems to support the transition to a net-zero, nature-positive, and inclusive future that creates business value.

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