Aligning Carbon Valuation with Decision-Making

Because Not All Equivalents Are Equivalent

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SUSTAINABLE VALUE CREATION

The report in six insights

1. **Valuation as a tool for value creation**: Carbon valuation is not just a compliance or risk tool, it can drive innovation, capital efficiency, and long-term value creation.
2. **One size does not fit all**: Valuation methods must be tailored to specific decision-making contexts, functions, and time horizons.
3. **Corporate short-termism**: Overreliance on current market prices and carbon taxes risks obscuring long-term transition risks and strategic opportunities.
4. **Price convergence is underway**: Market prices and carbon taxes are gradually aligning with the social cost of carbon, narrowing the gap between private and societal costs.
5. **Early action pays off**: Delaying mitigation is more expensive. Externalities are increasingly being priced in, making proactive investment more cost-effective.
6. **Bridging today and tomorrow**: The core challenge is translating future climate consequences into today's financial decisions.

Executive Summary: Aligning Carbon Valuation with Decision-Making

As climate risks increasingly shape market dynamics, companies are under mounting pressure to integrate sustainability into core business decisions. Carbon valuation—the practice of assigning a monetary value to CO_2e emissions—has emerged as a critical tool in this transition. It helps translate climate impacts into financial terms and supports alignment with long-term strategy, capital allocation, and risk management. Yet despite growing attention, most firms still undervalue emissions in their internal systems, rely narrowly on compliance-oriented prices, and fall short in using valuation as a strategic asset for long-term planning.

To address these challenges, this report introduces a three-dimensional framework: the decision-making cube. It maps carbon valuation tools across management phases (from governance to communication), business contexts (such as accounting or strategy), and organizational levels (from operations to executive leadership). This framework helps clarify which valuation method fits which decision type. While a multi-method strategy is recommended, in practice, a survey of 15 leading companies reveals that most still rely heavily on short-term metrics like market prices, with strategic tools such as abatement cost or SCC rarely influencing high-impact decisions. As a result, firms have the chance to change this and take advantage of opportunities to identify resilient investments or plan for future regulation and market shifts—creating both long-term business and societal value creation.

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Aligning Carbon Valuation with Decision-Making
Because Not All Equivalents Are Equivalent

As companies navigate the rapidly evolving sustainability landscape, they increasingly need to integrate climate considerations into core business decisions[1]. One of the most established approaches supporting this shift is valuation, which translates CO_2e emissions into monetary terms to frame decisions in business-relevant language[2]. However, despite growing adoption, valuation methods often fall short in fully capturing the broader implications for long-term value creation[3].

CO_2e valuation offers a way to understand the external costs of greenhouse gas (GHG) emissions by assigning a **monetary value to each ton of CO_2e** emitted. Two main perspectives are used when determining this value. The first is Value to Business (V2B), which refers to the direct impact of GHG emissions on a company's short- and long-term financial performance (an outside-in view)[4]. The second is Value to Society (V2S), which reflects the broader societal costs of a company's emissions (an inside-out view)[5]. This is often based on the Social Cost of Carbon, a metric that played a key role in William Nordhaus being awarded the Nobel Prize in Economics in 2018[6].

How can companies align their strategies with the societal cost of emissions in a way that supports both long-term **profitability and broader environmental and social resilience**?

In most companies, GHG emissions are undervalued in internal systems, influenced primarily by current market prices. At the same time, natural assets and ecosystem services remain largely absent from financial and operational decision-making[7]. A significant gap persists between the estimated societal cost of carbon emissions —and the risks they pose to long-term business models— and the GHG-related costs companies currently reflect in their financial planning (see Figure 1). As a result, this undervaluation leads to unintended consequences and distortions in decision-making such as mispricing transition risks, underinvesting in mitigation and nature-based solutions, and misaligning capital allocation.

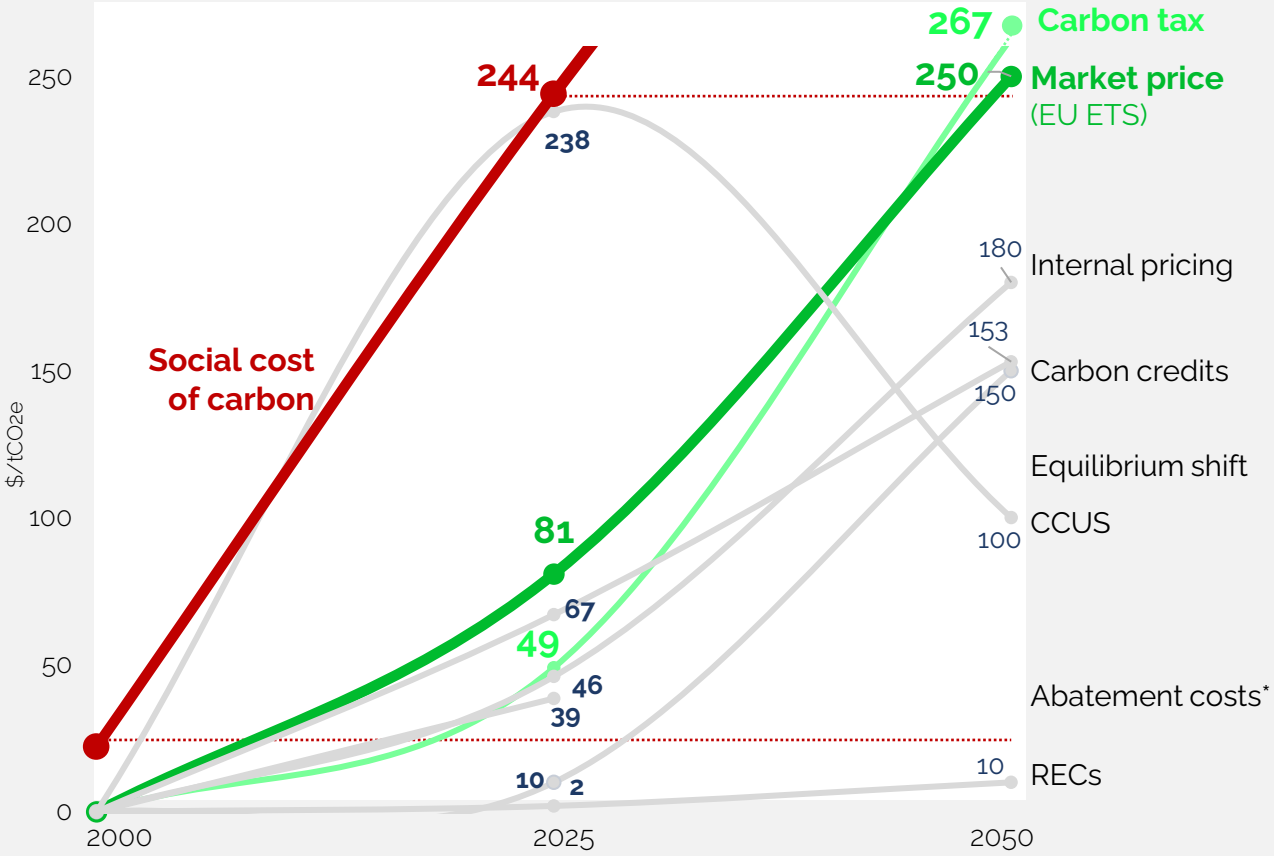
To address this challenge, companies need to recognize that **different valuation methods serve different purposes**, such as strategic decision-making or financial planning[8]. This calls for an integrated, impact-oriented approach to valuation. The goal is not to find a one-size-fits-all solution, but to identify which method —or combination of methods— is **most appropriate** for the specific decision context, and to apply it with a clear rationale aligned to the intended objectives.

Note: *Emissions themselves may not directly impact a company's financials. However, the consequences they trigger—such as policy or market-related transition shocks, or physical impacts driven by global warming—can have significant financial implications. Additionally, Value to Business (V2B) assessments may extend beyond direct corporate performance to include broader climate-related financial effects, such as adaptation risks and impacts on critical dependencies (e.g., supply chains, ecosystems, or infrastructure).*

Twenty years ago, carbon was priced at USD 0/tCO2e. Today, the EU ETS is above USD 80/tCO2e, having peaked above USD 120/tCO2e. **Carbon prices and taxes are converging towards its social cost.**

Some key takeaways emerge: First, market prices and taxes are steadily converging toward the social cost of carbon. Second, parts of that cost are already being internalized through carbon pricing and regulation[9]. Third, costs are likely to rise as externalities are more fully priced in, so taking action today is more cost-effective than waiting.

Figure 1: Projection of average carbon prices under different valuation techniques and their convergence to the SCC



Legend and references

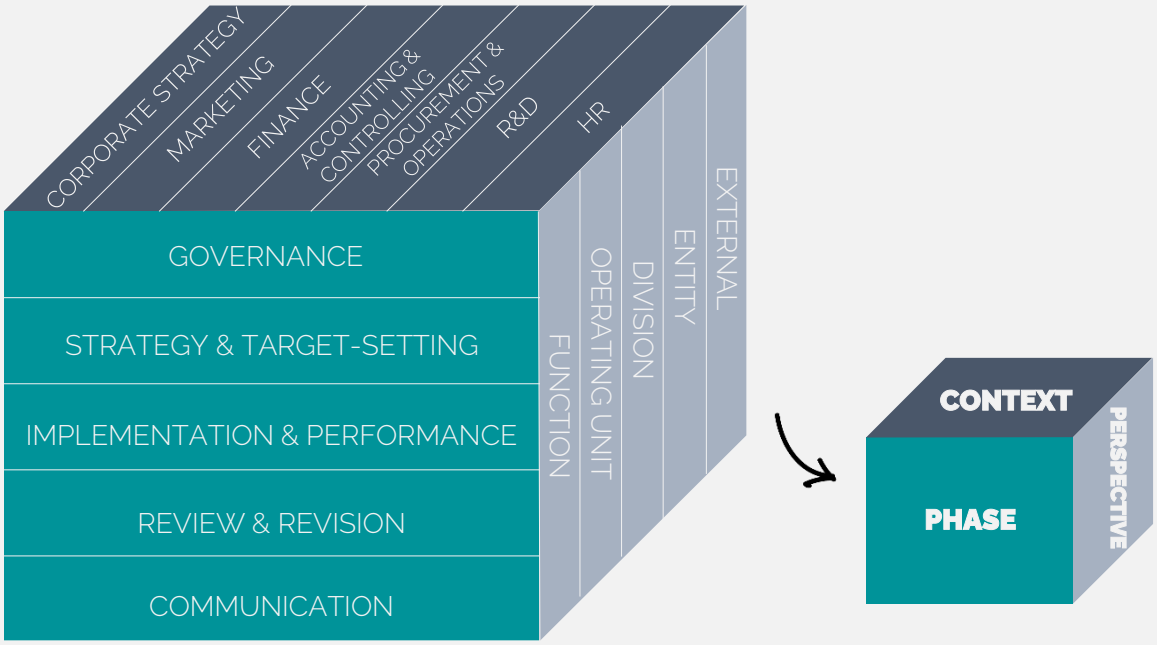
- **Social Cost of Carbon:** 2025 and 2050 values based on the IFVI-VBA GHG Emissions Topic methodology (2024). Year 2000 figures from Nordhaus (2014).
- **Market Price:** Based on EU ETS value as of July 1st, 2025. Projection derived from IEA (2024) and Enerdata (2025) scenarios.
- **Carbon Tax:** Based on France and Germany carbon tax retrieved from World Bank (2025). Projection derived from IMF (2024).
- **Voluntary Carbon Credits**: Based on MSCI (2024) nature restoration credit values (2024). Projection informed by BCG and EY's future willingness-to-pay (WTP) estimates (2023).
- **Mitigation and Abatement Costs***: Based on IEA's wide range of marginal abatement costs (USD −177 to 254/tCO_2e, 2020). These values are highly context-dependent; no projections provided.
- **Internal Carbon Pricing**: Based on CDP (2021) averages of national median prices (ranging from USD 17 in India to USD 76 in Japan). Projection based on McKinsey's lower-bound estimates for achieving Paris Agreement targets (2023).
- **Equilibrium Shift Pricing**: Calculated as the average of World Bank's recommended carbon shadow prices (USD 45–89 for 2025; USD 78–156 for 2050) to limit global temperature rise (2024).
- **Carbon Capture, Utilization, and Storage (CCUS)**: Average derived from IEA Direct Air Capture estimates (USD 134–342/tCO_2e, 2021). Projection based on Wood Mackenzie outlook (2021).
- **Renewable Energy Certificates (RECs)**: Current values from MSCI's renewable energy credit index (2024). Projection based on various market sources (2023).

The Sustainable Value Creation Decision-Making Cube
How Phases, Contexts, and Perspectives Shape Decisions

Corporate decision-making is complex and multidimensional, requiring alignment across distinct objectives by considering the business management phase, the departments and functions involved, and the hierarchical levels within the organizational structure. These three dimensions form the decision-making cube (see Figure 2).

For aligning carbon valuation with decision-making, the COSO Enterprise Risk Management framework[10] is adapted beyond risks to include opportunities and impacts, serving as an integral IRO management tool. Five key components, or **phases**, are on the front face of the cube: governance; strategy and target setting; performance; review and revision; and communication. These represent core activities: (1) establishing structures and mechanisms, (2) analyzing contexts, defining strategies and setting goals, (3) implementing actions, (4) tracking progress and evaluating performance, and (5) disclosing results to stakeholders. The top face shows organizational departments, or **contexts**[11], while the side face represents hierarchical levels, or **perspectives**. For example, a decision could be characterized by a perspective such as a manager of an operational unit, a context such as accounting and controlling, and a phase such as strategy and target setting. This three-dimensional view illustrates how **decision-makers are driven by different purposes** across management phases, business contexts, and hierarchical perspectives within a firm.

Figure 2: Cube of corporate sustainable value creation decision-making



Applying these elements to carbon valuation, it becomes clear that the relevance of any method depends on the specific decision-making scenario. Any scenario will be shaped by the management phase in which the decision is made, as well as the business context and organizational perspective. While companies increasingly use different valuation methods, they often struggle to align these with the relevant decision-making scenario. To help close this gap, Figure 3 maps various valuation methods based on their usefulness for the different management phases described in the decision-making cube.

Usefulness is assessed by factors such as the potential to internalize external impacts and how well the valuation method fits the type of decisions made at each phase. For example, **market prices and taxes** are especially relevant during the performance phase, where current costs and regulatory exposure affect short-term financial results. **Internal carbon prices** and **abatement costs** are key for strategy and operational decisions, helping to prioritize projects and manage budgets with a longer time-frame. In the same way, the **social cost of carbon** fits well with long-term strategic alignment, decisions that affect multiple social and environmental impacts, and helps in the communication with internal and external stakeholders. However, it is rarely used in business-as-usual settings due to its perceived distance from short-term financial concerns[3].

Overall, most methods have broad applicability, but their highest value is found in specific contexts. This highlights the **importance** of choosing **valuation methods tailored to each use case**.

Figure 3: Usefulness of valuation methods by management phase

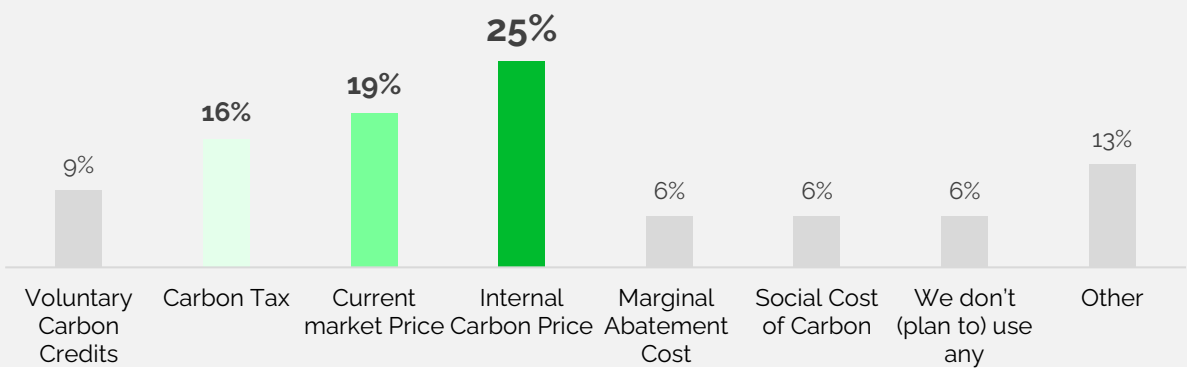
Pricing Method	Management Phase				
	Governance	Strategy & Target Setting	Performance	Review & Revision	Communication
Market Price		High	High	High	
Carbon Tax		High	High		
Carbon Credits (Voluntary)					High
Mitigation/Abatement Cost		High	High	High	
Carbon Capture & Storage					
Renewable Energy Certificates					
Market Premiums					
Internal Carbon Price	High	High		High	
Equilibrium Shift Pricing					
Social Cost of Carbon		High			High

Usefulness Not useful Low Medium High

A practical way to apply this approach is through a multi-method strategy along the decision chain. For example, a company developing a new production facility might use the internal cost of carbon to establish structures that encourage oversight and define responsibilities in carbon management. When designing internal carbon prices, it is essential to tailor them to the relevant emissions scopes (e.g., Scope 1 & 2, Scope 3.1, 3.11) and adapt them to the geographical context, as different regions and scopes require distinct measures, pricing strategies, and implementation approaches. During strategy and investment, it could use abatement costs to prioritize resilient technologies, model market premiums to predict demand or investor behaviour, and apply the social cost of carbon to ensure long-term alignment with planetary boundaries and assess future risks if societal costs were internalized. In performance and operations, the company may rely on market prices, taxes and internal carbon pricing to assess financial risk, guide cost-effective emissions reductions, track savings, and encourage climate action. In review and revision, both financial and societal value created or destroyed, along with potential long-term risks and opportunities, can be evaluated using market prices and the social cost of carbon. Finally, in communication, valuation metrics can be shared with stakeholders, including market premiums gained and voluntary carbon credits purchased, while clearly explaining their limitations, as well as societal value created.

Despite this theoretical framework, a gap in practice remains. **Many companies treat carbon valuation as a uniform figure rather than a flexible tool**. According to responses from 15 multinational companies leading in the sustainability sphere (Figure 4), internal carbon pricing stands out as a useful management tool, but beyond that, market prices and carbon taxes dominate, reflecting a continued focus on compliance and short-term planning. Abatement costs and the social cost of carbon rarely factor into decision-making. This reveals a misalignment: the most relevant valuation methods for long-term are the least embedded in high-impact decisions in practice, even among sustainability champions. Two challenges contribute to this: valuation is often siloed across departments[12], and long-term methods like the social cost of carbon are overlooked due to perceived lack of relevance for short-term financials[3]. As a result, major decisions such as capital planning are likely to fail to fully account for societal impacts and risks, causing companies to miss opportunities for real long-term value creation through transition planning and innovation. For example, low-carbon investments may seem unattractive under traditional metrics, but when future carbon costs or regulatory shifts are considered, they often reveal greater long-term value—both for business and society[1,13,14,15].

Figure 4: What carbon valuation methods are (most likely to be) considered in decision-making by your organization?

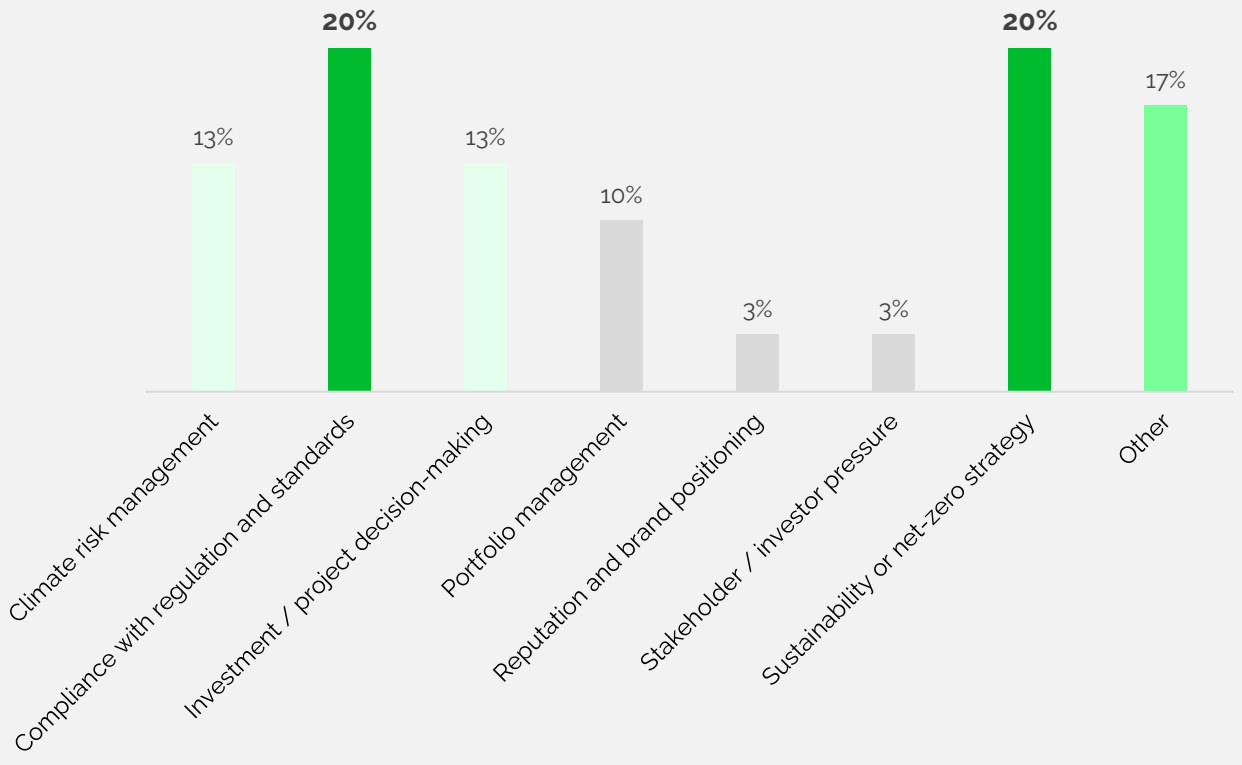


The underlying motivations for applying carbon valuation further highlight this strategic gap. As the survey shows, most organizations currently use carbon valuation primarily to meet regulatory or reporting requirements and support sustainability strategies (Figure 5). While some respondents mention investment planning or climate risk management as drivers, few apply carbon valuation to operational decisions or business aspects such as portfolio management.

This reinforces the observation that **even when long-term or societal valuation methods are in place, they are rarely embedded in financially material decisions**[16]. As long as compliance remains as the main motivation, companies are likely to underuse the valuation methods with the greatest long-term strategic value, such as abatement costs or the social cost of carbon, despite their relevance for sustainable value creation.

The challenge is **making future consequences matter** in today's financial choices.

Figure 5: What are (could be) the most relevant reasons for your organization to apply a carbon price?



The emphasized discrepancies reveal structural misconceptions and cultural barriers in how organizations understand, prioritize, and apply GHG valuation.

First, carbon valuation remains **fragmented**. Finance teams focus on measurable, short-term metrics, while sustainability and strategy departments consider broader, long-term externalities. This siloed approach undermines consistency, shared understanding, and alignment in decision-making. Second, many firms assume a **single carbon value** can serve all purposes. However, as the World Bank emphasizes[17], valuation tools must be context-specific—what works for compliance rarely suits strategic planning or capital allocation. Third, few companies have the internal capabilities to embed carbon valuation in core financial processes. Unlike standardized accounting, carbon valuation **lacks formal integration into management control**. Ongoing geopolitical disruptions only deepen short-termism and delay the development of long-term valuation tools. Fourth, disclosure frameworks like CSRD and ISSB are still mostly **retrospective**. While they improve transparency, they do not require companies to link emissions data to forward-looking decisions. Finally, inertia remains a barrier. Aligning valuation with societal value often raises near-term costs and risks. Without stronger regulatory or market incentives, many firms are likely to **postpone meaningful change** until external pressure forces action[3].

To overcome these challenges, companies must balance pragmatism with ambition: embedding carbon valuation into decision-making, while investors and standard-setters push for forward-looking, impact-driven data. Those who act early will not only manage risk more effectively—they will help shape the future of sustainable markets.

Toward Sustainable Value Creation
Embedding impact valuation in decision-making

The insights presented in this article point to a clear imperative: organizations must move beyond symbolic carbon valuation and adopt context-specific, decision-useful approaches. The usefulness mapping (Figure 3) offers a starting point, but remains a simplified, two-dimensional view. In practice, decision-making unfolds across intersecting layers —management phases, business contexts, and organizational levels— as captured in the decision-making cube. Future frameworks must reflect this multidimensionality to effectively guide impact-aware decisions. This approach to valuation must also extend beyond greenhouse gases. Holistic sustainability management requires the valuation of broader environmental and social impacts to ensure that decision-making supports truly sustainable value creation across the full spectrum of business activities.

Building on these insights, the Value Balancing Alliance's Sustainable Value Creation (SVC) Task Force will continue developing actionable tools to support this shift.

For business and finance professionals, the path forward is both clear and urgent: treat valuation as a strategic asset. When done right, carbon valuation is not only a risk mitigation tool, but a **catalyst** for innovation, capital efficiency, and long-term value creation. This article is both a starting point and a call to shape the next chapter of this journey.

Appendix
Inventory of valuation techniques

The **Value to Business (V2B)** concept aims to identify, quantify, and assess the financial impact of risks and opportunities arising from an entity's current and future environmental, social, and economic impacts and dependencies[4]

The **Value to Society (V2S)** concept refers to the broader costs and benefits of an entity's activities to society—also known as external, public, or stakeholder value. While often used interchangeably with externalities, the two concepts have conceptual distinctions.[5]

Pricing method	Definition	V2B	V2S	2025, USD/tCO2	Source	2050, USD/tCO2	Source
Market Price (e.g., ETS)	The market-determined price per ton of CO_2 under a cap-and-trade or emissions trading system.	x		61 [0.46, 167]	EU ETS from World Bank (2024)[18]	250 [160, 500]	IEA (2024)[27] World Energy Outlook & Enerdata (2023)[28]
Carbon Tax	A government-imposed price per ton of CO2 emitted, paid by emitters.	x		49 [0.46, 167]	France & Germany carbon tax, from World Bank (2024)[19]	250 [160, 500]	IMF (2015)[29]
Carbon Credits (Voluntary Market)	Tradable certificates represented avoided or removed emissions, bought to offset corporate emissions.	x		10 [0.7, 160]	MSCI (2024) supported by BCG[20]	150	EY (2023)[30]
Abatement Cost	The internal cost to reduce 1 ton of CO2 through business actions (e.g. tech upgrades, process changes).	x		38,5 [-177, 254]	IEA (2020)[21]	-	Not identified
Carbon Capture & Storage (CCS) Price	The cost per ton of CO2 captured and stored through technological means.	x		238 [134, 342]	IEA (2021)[22]	100	Wood Mackenzie (2021)[31]
Renewable Energy Certificates (RECs)	Tradable certificates proving that electricity was generated from renewable energy sources.	x		2	MSCI (2024)[23]	10	Based on FutureEnergy (2023)[32] *Price of the certificate itself. Additional prices for energy generation are not considered
Market Premiums	Additional payments (or foregone value) in voluntary green markets for low-carbon products of services	x		-	Not identified	-	Not identified
Internal Carbon Price	A self-imposed shadow price on CO2 used for evaluating investments or steering business behavior.	x	x	46 [4,115]	CDP (2023)[24]	180 [160, 200]	CDP (2025)[33] Reuters (2024)[34] McKinsey (2023)[35]
Equilibrium Shift Pricing	A method of estimating the indirect USD/ton CO_2 cost based on how carbon policy (e.g., market caps) affect the availability and cost of key inputs (e.g., lithium), causing price shifts through broader market dynamics such as supply constraints or demand changes.	x		67 [45, 89]	World Bank (2024)[25]	117 [78, 156]	World Bank (2024)
Social Cost of Carbon (SCC)	An estimate of total societal damage per ton of CO2 emitted, used for policy or impact valuation.		x	244 [80, 308]	IFVI & VBA (2024)[26]	435 [310, 480]	German Environment Agency (2024)[36] EPA (2023)[37] Nature (2022)[38]

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