MONTHLY RESEARCH DIGEST

An Executive Briefing on New & Notable Sustainability Research

In This Issue – **July 2026**

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CORPORATE CLIMATE RISKS & RESILIENCE

Climate Resilience as Strategy: Scaling Corporate Action on Physical Risks from Climate Change

By Center for Climate and Energy Solutions (C2ES), Systemiq

View the full report here

Notable Highlights

- Without adapting to the physical impacts of climate change, **S&P 1200 companies are projected to incur $1.2 trillion in annual losses by 2050.**
- **Of the companies investing in operational resilience, 82% report positive financial or organizational/cultural results** (including improved access to capital and internal buy-in), 68% report **increased investor interest**, and 67% report **improved insurance terms.**
- **While 65% of public companies cite physical climate risk in their annual filings, only 25%** of those that have begun to act publicly **have taken strategic measures to build climate resilience** (e.g., adapting products and services). Additionally, only **42% of companies** in the S&P Global 2025 Corporate Sustainability Assessment **have a public climate adaptation plan.**

  This is due to action being fragmented across departments and reactive to individual disruptions (e.g., at the facility level) rather than integrated into enterprise-level strategy. **An internal champion** (often at the senior level) **is needed** to coordinate and engage stakeholders across the organization.
- The following Report Findings include a **framework to help companies assess their climate resilience maturity** and drive toward enterprise-level resilience, insights on **corporate performance/practice,** and **priorities for scaling climate resilience**.

Objective

- To examine corporate readiness for addressing physical climate risks and provide guidance for improving corporate climate resilience.

Background

- The report data is based on research and interviews with over 40 organizations (including executives from over 24 companies) and an assessment of 30 frameworks, standards, tools, and market analyses (methodology on pg. 4-5, 16, 18, 37).
- The report includes a framework to help companies diagnose their climate resilience maturity, based on WBCSD's Adaptation Planning for Business and CEO Handbook for Executive Engagement, as well as other frameworks (see Report Findings for details).

Report Findings

Climate resilience (or lack thereof) affects corporate profits (pg. 11-13):

- **Over 80% of companies report that extreme weather events have disrupted operations** or increased costs in the past five years, with large- and mid-cap companies incurring **average annual losses of $88 billion from asset damage and $1.1 trillion from business interruptions.**
- Following a weather-related disclosure, **over half of companies miss revenue growth expectations within a year**.
- **"Secondary" perils** (e.g., wildfires and floods) **now account for 92% of global insured catastrophe losses.**
    - Nearly 44% of companies say commercial **insurance coverage is too costly to protect** their exposed assets fully.
    - **1 in 4 companies rely on self-insurance,** thereby putting climate-driven disruptions on their balance sheets.
- Over the past decade, companies in the Dow Jones Industrial Average with **insignificant levels of physical climate-risk exposure have generated returns approximately 1.7x higher** than those of companies with moderate exposure.

Companies are recognizing physical climate risks but lack the organizational readiness to act at scale (pg. 8-9, 13-14):

- **Only 40% of European and 20% of North American companies** in the S&P Global 2025 Corporate Sustainability Assessment **have a public climate adaptation plan.** Of those European companies, 85% don't translate climate-scenario insights into strategic planning, and 70% don't quantify adaptation costs.
- **Translating climate risk into financial terms is critical for business resilience.**

- **Even where corporate climate adaptation plans exist, most lack financial rigor.** This is due to the difficulty of expressing the benefits of resilience investments in monetary terms and a mismatch between corporate budget-planning cycles and the multi-year timescales of physical climate risks.
- **Companies that quantify climate exposure** in terms of operational downtime, revenue loss, and value at risk **are better able to mobilize investment** than those that describe climate risk generally as "high," "medium," or "low."

Guidance for managing climate risks is highly fragmented (pg. 16-17):

- While the **frameworks, standards, and tools** available for managing climate risks have grown significantly in recent years, **no single resource provides end-to-end support,** limiting companies' abilities to translate assessments into action.
- Page 17 lists standards and frameworks that are **highly implementable**.
- Pages 30-36 include a **landscape review of 30 frameworks**, standards, tools, and market analyses, including key differentiators, best use cases, and limitations.

A framework to assess corporate climate resilience maturity (pg. 46-52):

NOTE: The following framework can help companies assess their climate resilience maturity, **identify barriers to progress, and drive toward enterprise-level resilience.** Companies are characterized as having Reactive, Strategic, or Integrated maturity across six areas of capability needed to build resilience ("modules").

	Increasing Maturity		
Modules	**Reactive / Aware** *Early-stage; isolated efforts, limited visibility*	**Integrated** *Embedded in core processes; building strategic capability*	**Strategic** *Resilience as competitive advantage; fully enterprise-integrated*
1. Understand and assess risk	‣ Asset-level hazard mapping using external data ‣ Focus on acute risks only	‣ Dynamic scenario analysis across multiple time horizons and geographies for operations and select supply chain nodes ‣ Internal climate champion identified to understand risk across organization	‣ Dynamic, multi-scenario analysis across full supply and value chains and time horizons ‣ Nature, social, and system dependencies integrated; data continuously stress-tested
2. Integrate into governance and operations	‣ Climate risk managed as a sustainability issue ‣ Limited board visibility ‣ Risk registers updated infrequently	‣ Physical risks integrated into ERM ‣ Cross-functional groups in strategic planning, capital allocation, and performance metrics developed or forming ‣ Worker health and safety part of planning ‣ Internal climate champion coordinating action and information sharing across organization	‣ Resilience embedded in ERM, strategic planning, capital allocation, and performance metrics ‣ Board-level oversight ‣ Cross-functional ownership linked to incentives ‣ Worker health and safety considerations integrated
3. Value and build resilience	‣ Adaptation viewed as cost avoidance or compliance ‣ No valuation of resilience benefits	‣ Business case linking resilience to profitability, with clear levers defined and flagged for prioritization ‣ Framing for resilience ROI and other metrics in financial planning being developed	‣ Clear business case linking resilience to profitability, innovation, and competitiveness ‣ Resilience ROI tracked in financial planning ‣ Full set of possible adaptation levers defined and prioritized
4. Finance resilience	‣ Opportunistic or reactive investment with limited to no dedicated budget ‣ Insurance used post-event	‣ Dedicated resilience budgets emerging ‣ Cost-benefit and payback analysis applied to key projects	‣ Dedicated resilience budgets with cost-benefit and payback analysis ‣ Innovative instruments deployed (resilience bonds, parametric insurance); integrated with sustainability financing
5. Disclose	‣ Qualitative TCFD-style disclosures ‣ No adaptation KPIs or third-party assurance	‣ Physical risk and adaptation are incorporated into reporting (e.g., ISSB S2, TNFD)	‣ Quantitative adaptation and resilience metrics; targets validated (e.g., ISSB S2, TNFD, CSRD) ‣ Integrated with transition and nature reporting; continuous improvement tracked
6. Engage the ecosystem	‣ Ad hoc ecosystem engagement ‣ Supplier outreach limited to compliance requirements	‣ Participation in industry initiatives ‣ Beginning to engage key suppliers on shared risks ‣ Community resilience part of planning	‣ Active co-leadership of joint initiatives with peers, governments, and financiers ‣ Open knowledge sharing; adaptation aligned with ecosystem-level resilience goals ‣ Active engagement with communities

Image taken from pg. 18

Corporate performance/practice on climate resilience maturity (pg. 20-25):

#1: Understand and assess climate risk (pg. 20):

- **Most companies only have a qualitative understanding of their climate risk exposure.** They often rank hazards as high-, medium-, or low-risk, which is useful for identifying priority hazards but insufficient for capital allocation or supply chain redesign.
- 78% of companies identify, evaluate, and monitor the impacts of extreme weather.
- Decisions related to climate risks operate on different time horizons. **A consistent set of organization-specific risk units** (e.g., downtime, expected outage days) **must be applied across time horizons to make effective operational decisions.**
- **Leading companies with a digital infrastructure-heavy business are estimating operational downtime for critical facilities and translating it into financial impact** (i.e., revenue loss plus repair cost). This makes climate risk understandable to asset owners and finance leaders and influences the prioritization of interventions.

#2: Integrate climate risk into governance and operations (pg. 21):

- **Climate resilience responsibility most commonly sits with sustainability leaders (54%) or risk leaders (28%),** though they rarely control the levers that drive action, such as finance.
- **Each function operates within its own analytical framework** (e.g., finance manages risk through financial instruments, while facilities do so through engineering standards), with no shared mechanism to reconcile trade-offs. **As a result, even strong risk signals often fail to translate into coordinated action**.

#3: Value and build resilience (pg. 22):

- **40% of companies are not considering relocating assets or operations** to reduce exposure to extreme weather.
- Resilience is often treated as a set of incremental risk controls rather than a value-creating strategic capability. As a result, **investment decisions often default to what is easiest to justify rather than what is most material.**
- The range of possible resilience interventions is broader than most companies realize. The challenge is not a lack of options but the **absence of a consistent method for comparing and prioritizing interventions** against competing uses of capital.
- **Resilience investments can gain more internal traction when framed as reliability upgrades** amid near-term cost pressures (e.g., rising energy prices).

#4: Finance resilience (pg. 23-24):

- **Only 60% of companies believe they have sufficient funds and resources** to respond to future extreme-weather impacts.
- Because resilience investments compete with other projects, the benefits are often framed as avoided losses, which are **difficult to justify to finance teams.**
- **Resilience funding is often episodic and reactive** to a damaging event or a near miss rather than embedded as durable, multi-year programs.

#5: Disclose risk and resilience in action (pg. 24):

- **89% of companies engage in at least one identifiable resilience activity,** but such activities are rarely captured in standardized reporting frameworks. Unlike emissions data, they are often buried in general descriptions rather than reported as metrics.
- **Corporate climate resilience can stall if companies become "reporting mature" but not "decision mature"—** building the infrastructure for sustainability reporting while lagging in setting operational thresholds, agreeing on who makes resilience-related decisions, and embedding resilience into capital planning and procurement.

#6: Engage the ecosystem (pg. 25):

- **Many of the largest risks and highest-return solutions depend on systems outside corporate control.** Companies can harden facilities and strengthen continuity plans but still face material exposure when public infrastructure fails or disruptions cascade across shared supplier geographies.
- **Pre-competitive cooperation and sustained public-private collaboration are often needed to** align incentives and invest in shared resilience.

Key priorities for scaling corporate climate resilience (pg. 26-28):

1. **Develop a navigable catalog of guidance, frameworks, and tools:** a single source of truth built for companies that maps these resources to concrete decisions (e.g., site selection, supplier resilience requirements). The **C2ES catalog** may serve as a preliminary option.
2. **Develop a corporate climate resilience maturity model** to help companies assess where they are on their climate resilience journey and how to progress and provide a clear entry point for what "good" action looks like.

a. Pairing the model with benchmarking could spur a race to the top, giving companies a sense of whether they are leading or lagging their peers and where to focus investment and capability building.

- C2ES created a **prototype corporate climate resilience self-assessment tool.**

3. **Develop a broadly accepted corporate climate resilience framework:**
   - A common framework for assessing, integrating, valuing, and disclosing decision-useful climate resilience measures would **help align executives, finance, operators, and boards.**
   - This includes **converging on a set of core measures** (e.g., downtime, asset criticality) and a consistent approach to quantifying downtime protection and upside value creation, uncertainty, and non-linear risks.
   - Rather than starting from scratch, **the framework can be built off existing ones** by consolidating the strongest elements, identifying key gaps, and addressing them through a stakeholder process.
4. **Develop sector-specific climate resilience playbooks:** WBCSD released an **adaptation-planning "starter kit"** for companies. Sector playbooks could be created by leveraging this guidance and translating it into industry-specific pathways paired with regionally specific approaches.

SUSTAINABILITY VALUATION

Closing the Sustainability Valuation Gap: Why Quantification Is the Missing Link

By KPMG

View the full report here

Notable Highlights

- **72% of executives globally have a detailed understanding of their company's sustainability strategy, metrics, and performance** or are familiar with key aspects, and **60%** consider sustainability-related risks and opportunities **in financial planning.**
- However, **only 19% of companies use robust quantification approaches to measure the impact of sustainability** on financial outcomes, operational gains, and innovation. As a result, **companies often fail to make the business case for sustainability**; projects fail to secure approval; and **decisions** progress, only for companies to struggle to defend them later.
- **Embedding sustainability valuation into finance requires investment-grade, decision-useful data** and can require systemic change across value chains.
- **Companies should start by (1) identifying core value drivers; (2)** using fit-for-purpose valuation approaches to **quantify the impacts of sustainability-related risks and opportunities,** including the upside of acting and the cost of inaction; and **(3) integrating risks and opportunities** into capital allocation, investment appraisal, and strategic planning.
- **Companies that look at what they can do now will be better prepared** to protect and create value and competitive advantage. **Those that wait** for perfect data, a shift in market practices, or regulations **could miss a critical window** to shape resilience.
- The following Report Findings include a **corporate case study** on quantifying sustainable value creation.

Objective

- To analyze companies' challenges with connecting sustainability to financial performance (the "valuation gap") and offer a case study on how companies can quantify sustainable value creation.

Background

- The report data is based on a survey of 2,024 C-suite and senior business leaders at companies with annual revenues over $100 million across 19 countries and 20 sectors (methodology on pg. 4, 27).

Report Findings

The sustainability valuation gap (pg. 5-8):

- **50%** of executives say **sustainability is an integral part of their strategies,** and **40% integrate sustainability** into innovation/product development.
- However, **few companies have translated sustainability into financial terms that boards and finance teams recognize,** such as impacts on cash flow and CapEx, balance sheet exposure, and credible risk ranges.

Companies using sustainability valuation methodologies (pg. 12-13):

- Across all sectors, **19% of companies are modeling ESG impacts and quantifying the outcomes and gains through robust valuation techniques** like digital twins; **39%** are running a single model for ESG impacts **and estimating outcomes/gains**; **28%** are interested in measuring impacts but **unsure how to do so**; and **6% have no plans** to do so (see page 12 for details).
- **Banking (33%), energy (31%), and automotive (27%) companies are the most likely to use robust valuation techniques** to model ESG impacts and quantify outcomes due to sustainability risks shaping their financials more directly and urgently than they do for companies in other sectors.
- Investing in sophisticated valuation tools may feel less urgent **for companies in sectors where sustainability is less tightly linked** to near-term financial performance. However, they **should consider and quantify the cost of inaction**.

The case for linking sustainability to value creation (pg. 14-16, 26):

- **External pressures are rising:** Macroeconomic headwinds, geopolitical shocks, climate impacts, and stakeholder expectations are putting pressure on revenues, margins, and the cost of capital. Many **companies have already realized sustainability quick wins** and are looking for broader value.

- For many companies, **traditional growth levers**, such as pricing, headcount, CapEx cuts, and incremental efficiency, **are reaching their limits.**
- **If sustainability is treated as a driver of enterprise value** (rather than a compliance or reputational issue), properly quantified, and embedded in strategy and financial planning, **it can become a growth lever** that improves capital efficiency and builds resilience.
- Fully embedding sustainability valuation into corporate finance can require systemic change, which will likely be built from the bottom up as much as mandated from the top down. **Companies must build leadership, foster cross-functional collaboration, and treat sustainability as a financial matter rather than a reporting exercise.**

Corporate case study: quantifying sustainability value creation (pg. 19-24):

*Pages 19-24 include a **detailed case study** on identifying and quantifying sustainability-related opportunities that could uplift the EBITDA of a private equity firm's portfolio company by up to 35%, including value levers, a sample value-driver tree, and an EBITDA bridge to help visualize the business case.*

NATURE

State of Private Investment in Nature 2026

By Forest Trends, The Nature Conservancy, NatureVest

View the full report here

Notable Highlights

- **Annual private investment in nature has grown fivefold over the past decade.** At least **$61.4 billion was committed from 2016 to 2025**, and **deployed capital exceeded $14 billion in 2025** (vs. $2.8 billion in 2016). An additional $183.5 billion is committed for future years
- From 2016 to 2025, **$32.8 billion was deployed for sustainable agriculture (more than half of total deployments), $6 billion** was deployed for **ecosystem restoration** and conservation, **$5.5 billion** for sustainable **forestry**, **$4.9 billion** for **nature-based** climate solutions, **$1.1 billion** for enabling and **commercializing technologies**, and **$433.3 million** for **mixed-landscape** portfolios (working lands with conservation outcomes).
- **Institution-led deals total $22 billion across 233 deals over the last decade,** with the average ticket size more than doubling from $70 million in 2017 to $167 million in 2025 and the **annual deal count roughly tripling** over the same period.
- **Financial returns are the top motivation for nature investment,** followed by conservation impact, nature-related mitigation, portfolio diversification, and deforestation-free supply chains.
- Across all investment categories, the **time to positive cash flow averages 3-5 years,** and the **time to target return averages 7-10 years.**
- The following Notable Findings include a **nature-finance outlook** and **recommendations to scale private nature investment.**

Objective

- To track global private investment in nature, including the global investment landscape, market maturation, investment impact and performance, and the investment outlook.

Background

- This report is an update of the 2016 State of Private Investment in Conservation report.

- It tracks private investment in nature from 2016 to 2025, including investments in sustainable agriculture and forestry, ecosystem restoration and conservation, nature-based climate solutions, and enabling and commercialization technologies.
- The report data is based on an assessment of 1,731 nature-related financial transactions and planned allocation announcements in private equity, venture capital, private debt, blended finance, and concessional development finance; a survey of 70 nature investors representing $207 trillion in total assets under management; and public data (methodology on pg. 3, 11, 17-18, 67-70).

Report Findings

Global nature-investment landscape (pg. 4-7, 19-48):

NOTE: The following subchapters include case studies.

▷ **Subchapters:** global investment trends (pg. 19), agriculture and forestry investments (26), mixed-landscape portfolios (38), restoration and conservation investments (41), nature-based climate solutions (44), enabling and commercialization technologies (48)

Figure 5. Share of Total Capital Deployment by Investment Category (2004–2015 vs 2016–2020 vs 2021–2023 vs 2024–2025)

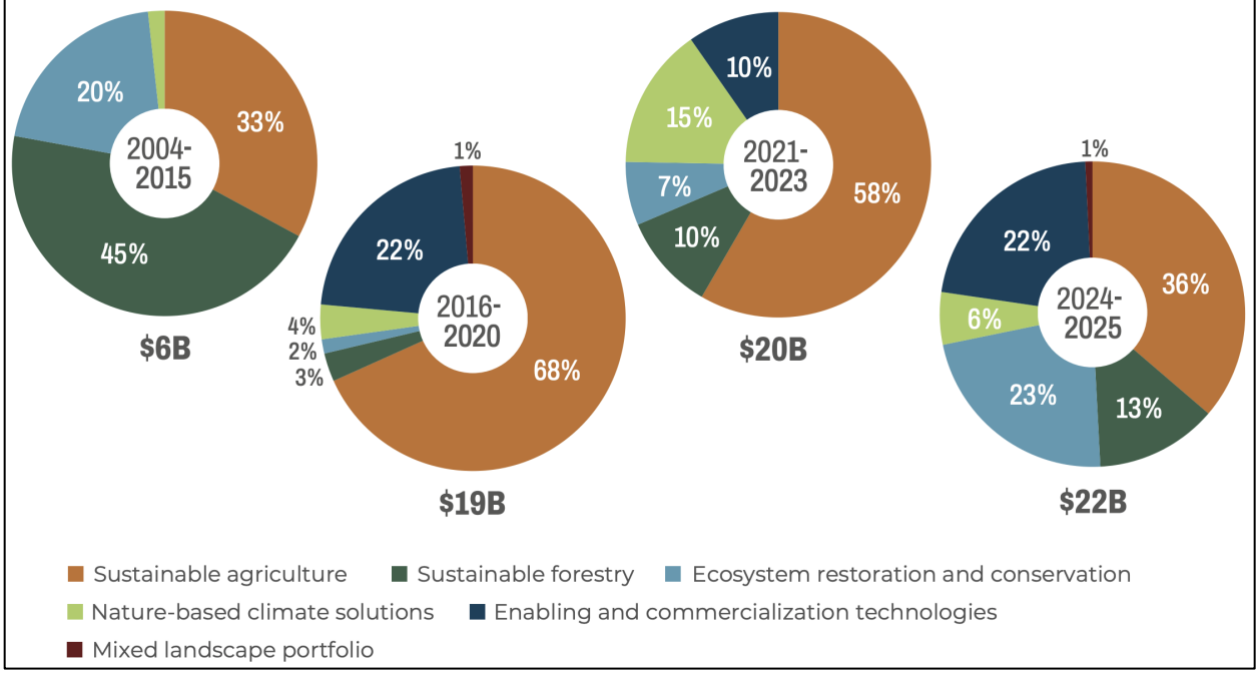

Image taken from pg. 21

- **Sustainable agriculture and forestry account for a disproportionate share** of capital deployments largely **because they are familiar asset classes** for investors **and they offer portfolio hedges** against macroeconomic volatility, such as supply chain mandates, shifts in agricultural production, and nature-related risks in food supply chains (see pg. 33 for details).
- **Investment in nature-based climate solutions is growing.**
    - Deal count increased from 7 deals in 2016 to at least 41 in 2025, driven by growth in voluntary carbon markets and net-zero commitments.
    - **Reforestation accounted for 59% of deals**, with significant growth in large-scale deals, including over $1 billion committed in the U.S. and Brazil from 2022 to 2024.
    - **Investors are heavily concentrating investment in these solutions** because they offer clearer revenue streams and stronger policy support. However, this suggests that **capital is flowing toward sectors that are the easiest to finance** vs. those with the greatest ecological need.
    - Policy uncertainty and carbon credit integrity are key investment risks.
- Asset managers reporting **revenue streams from ecological restoration** (i.e., biodiversity and nature credits) **are almost entirely concentrated in established regulatory markets**, such as the U.S. and the U.K., rather than in voluntary markets.
- **Investment in enabling technologies is tightening despite sustained deal activity.**
    - Venture-backed enabling technology **attracted at least $11.8 billion** between 2016 and 2025.
    - Capital deployment declined from 2023 to 2024 despite a stable deal count, driven by a contraction in early-stage VC.
    - 7 in 10 enabling technology deals support sustainable agriculture.
- **More than half of private capital deals (54%) layer multiple income sources**, combining commodity production with ecosystem-service credits, renewable energy, and other sources. This is due to **investor interest in resilient structures** in which performance comes from multiple cash flows.
- **North America and Latin America receive a disproportionate share of investment:**
    - **North America received $20.8 billion** in capital deployment from 2016 to 2025; **Latin America received $15.3 billion;** Asia and Oceania received $6.3 billion each; Europe received $4.1 billion; and Africa received $2.3 billion.
    - The concentration in Latin America is due to the region's disproportionate share of the world's remaining tropical forests and high-biodiversity agricultural landscapes, as well as the rapid growth of a private timberland market.

Market maturation (pg. 7-9, 49-52):

- **Macroeconomic volatility and geopolitical frictions have shaped investment conditions unevenly.**
    - A decade of framework-building, from the TNFD to the ISSB standards, has given the market shared definitions of nature-related risk, and stronger government disclosure mandates have boosted investor confidence.
    - However, fragmented regulations, evolving standards, and inconsistent rules across jurisdictions limit market scalability.
- As of 2025, **59% of organizations use a hybrid approach to measure and verify nature-related investment impacts,** combining internal criteria with third-party certifications. Previously, they mostly relied on one or the other.

Investment impact and performance (pg. 7-9, 53-56):

- **88% of investors** believe there is a **positive relationship between financial performance and impact delivery.**
- **Across all investment categories, the time to positive cash flow averages 3-5 years, and the time to target return averages 7-10 years.**
    - The longer timelines of nature investments, driven by ecological timescales (e.g., soil regeneration), may be constrained by typical 10-year fund structures.
    - As a result, many funds are already moving toward 12–15-year timelines or open-ended structures.
- **Market development is the primary performance constraint reported by managers, followed by ecological timelines (e.g., soil regeneration) and scale effects.**
    - This is due to demand for nature-related credits and verified outcomes being fairly policy-dependent.
    - Market development risk is most acute in investment categories where revenue models are more dependent on the monetization of ecosystem services.

Catalytic capital (pg. 57-60):

- **Catalytic capital plays an important role in de-risking blended finance** by accepting disproportionate risk or below-market returns to unlock capital for projects with positive environmental and social impact.

- **2 in 3 investors have either used catalytic capital, provided it, or done both,** with the most common mechanisms including first-loss guarantees or credit enhancements, blended finance structures, and offtake agreements.
- **Access to catalytic capital is constrained** due to slow deployment, high complexity, misalignment with capital providers' mandates, and high transaction costs.
- A shift from bespoke deals toward more standardized structures and stronger intermediation (e.g., platforms that can pre-screen deals) is needed.

Nature finance outlook (pg. 9-10, 61-62):

- **An additional $700 billion in annual nature finance** (public and private) is needed to sustain global biodiversity and ecosystem services.
- **Planned allocations for 2026-2028 exceed recent deployment rates across all categories** (see pg. 61), signaling investor confidence despite geopolitical volatility and macroeconomic uncertainty. This is **driven by** European disclosure regulations and frameworks like TNFD that **reframe nature-related risk as financial risk** (vs. a conservation issue), which can help sustain investment amid political ESG backlash.
- **The next growth phase for private nature investment depends more on market formation than on capital;** it will require greater certainty on the value, demand, and performance of nature investments.
- **"Nature as infrastructure" is projected to be a key theme.** Soil degradation and water, flood, and wildfire risks are increasingly being priced into institutional risk frameworks, thereby **reframing nature from an externality to infrastructure that mitigates risks** and clearing a path toward blended infrastructure finance.
- **Significant growth in nature-based carbon solutions** (projects whose value centers on generating carbon credits) **will depend on policy direction and clarity,** particularly on how international carbon markets develop under Article 6. Until then, capital may remain concentrated in offtake-backed deals with contractually secured demand or in clusters with strong enabling conditions.
- **Biodiversity and water investments often remain capital-constrained** or dependent on concessional finance until regulatory frameworks and revenue models mature.
    - A clear line of sight to revenue is often missing because these ecosystem services strongly benefit the public good but are hard to price or measure.
    - **Scaling ecosystem restoration capital will require** standardized outcome measurement, regulatory clarity that creates demand signals, and early demonstration projects that prove financial viability.

- **Large banks are showing a growing appetite** for entry points into nature finance, such as BNP Paribas launching a dedicated fund for responsible forest management.

Recommendations for scaling nature investments (pg. 10-11, 62-63):

- The **most significant lever** for growing investment **is developing clearer policy drivers and long-term corporate procurement commitments** that create predictable, reliable revenue streams.
    - Long-term procurement agreements are typically anchored in carbon-based business models (whose core revenue comes from generating and selling carbon credits).
    - Replicating this for biodiversity outcomes and ecosystem services would materially de-risk managers' revenue projections.
- **Develop consistent standards, metrics, and due diligence processes to reduce uncertainty and transaction costs and help investors connect nature to economic signals.**
    - Standardization should be accelerated where revenue models are unfamiliar, especially by tying nature outcomes to business-relevant metrics like agricultural productivity, water security, or timber production.
    - Consistent outcome benchmarking (particularly for biodiversity and soil health) and taxonomic clarity on what constitutes "nature-positive" or "nature-aligned" are needed.

CARBON REMOVAL

Contracted Durability: A Framework for Performance-Based Carbon Removal

By RMI, Beyond Alliance, the American Forest Foundation, LongRun Climate

View the full report here

Notable Highlights

- **Carbon credit durability has several challenges,** including a **lack of a singular approach** across policies and standards, carbon market projects having **varying durability timelines,** and there often being **no party liable** for ensuring carbon remains stored after the post-crediting monitoring period ends.
- **"Contracted durability" could help address durability gaps** by ensuring that credits represent one ton of carbon removed from the atmosphere for the entirety of the durability threshold. Contracted durability **mechanisms do so by assigning ongoing liability for reversals and providing compensation for them**, so the same credited level of removal is achieved.
- **Contracted durability should be treated as part of a broader policy portfolio**—improving the integrity of credits today while complementary measures scale novel CDR pathways and drive down costs.
- It is not a silver bullet and is not yet a proven solution. **Advancing it requires near-term progress in research and development, piloting, and policy** (see the following Notable Findings for detailed recommendations).

Objective

- To outline durability challenges in the current system for carbon-removal credits and present a performance-based framework for managing reversal risk ("contracted durability").

Background

- This report data is based on reviews from various companies, investors, NGOs, nonprofits, standard-setters, trade associations, and academic institutions (methodology on pg. 2).

- "Durability" refers to the length of time that a ton of CO2, represented by a carbon credit, remains out of the atmosphere. "Contracted durability" refers to the length of time that a ton of CO2 is contractually guaranteed to remain out of the atmosphere.
- The report does not define a durability threshold (a time period over which carbon must remain stored out of the atmosphere, as defined by a policy, standard, or use case).

Report Findings

The current system for carbon-removal credits (pg. 5-6, 10-11):

- **No single CDR pathway is sufficient** to meet the CDR volumes required for net-zero emissions.
- **Effective policy supports the full range of removal pathways while credibly managing the variability and uncertainty in credit durability** (credits have different storage durations, and their duration is often unknown until a storage reversal occurs).
- **Current CDR policy approaches typically fail due to:**
    - **Excluding necessary pathways:** Policies restrict CDR credits to those with 1,000-year durability or geologic storage. This excludes nature-based pathways, which have a higher risk of reversal but are economically feasible today, are crucial to near-term climate goals, and deliver significant social benefits.
    - **Undermining environmental integrity:** Policies that include nature-based credits failed to ensure storage over sufficient timescales because the set durability threshold exceeds the project monitoring and liability commitments, leaving reversals unmonitored and uncompensated.

Challenges with carbon credit durability (pg. 5-6, 14-21):

- **There is currently no singular approach to durability across policies and standards.** (Page 14 summarizes how existing policies and voluntary standards define durability requirements.)
- **Durability varies by project,** not just by the CDR pathway. However, most policies and standards still classify it at the pathway level, **obscuring the differences in risk** between projects and credits.
- In most crediting programs, **no party is liable for ensuring carbon remains in storage** after the post-crediting monitoring period ends. (Page 17 includes a summary of carbon credit registries' post-crediting monitoring requirements.)

- **Nearly all carbon credit registries rely on buffer pools to address credit reversals**, which withhold a portion of a project's credits from sale as compensation. However, there are **limitations to buffer pools:**
    - There is no way to account for reversals exceeding a pool's capacity.
    - Contributions are determined by risk assessment tools using historical data, thereby failing to account for how climate change increases risks over time.
    - They can concentrate credits with correlated risk exposures, so conditions that cause a reversal in one project may affect the buffer credits intended to compensate for that reversal.
    - Page 18 includes a summary of how registries address reversals.
- A growing number of **initiatives are emerging to address durability gaps** (listed on pg. 22).

Contracted durability could help address durability gaps (pg. 6-9, 23-29):

- **"Contracted durability" could help address durability gaps by ensuring that credits represent one ton of carbon removed from the atmosphere for the entirety of the durability threshold.**
    - Rather than classifying credits as "permanent" or "non-permanent" based on the CDR pathway, contracted durability evaluates them by the mechanisms in place to ensure durability over the required timescale.
    - Page 28 includes a graphic demonstrating contracted durability scenarios.
- **Contracted durability can operate through four legal and financial mechanisms, a combination of which is the most effective:**
    1. **Buffer pools,** which provide first-loss protection by withholding a portion of issued credits to compensate for reversals during the crediting/monitoring period.
    2. **Insurance** coverage for specific reversal events, particularly correlated losses that could overwhelm a buffer pool.
    3. **Horizontal stacking**, which replaces a credit with a new one at the end of the monitoring period or following a reversal to carry the storage obligation forward.
    4. **A permanence trust:** an endowed financial institution that assumes liability for ongoing reversal monitoring and compensation, funded through a per-credit fee at issuance.
    - Buffer pools and insurance cannot deliver contracted durability on their own.
- Pages 26-28 include an example of how a reforestation project could achieve contracted durability via a permanence trust.

Limitations of contracted durability (pg. 9):

- **Scope**: Contracted durability does not address the cost parity between nature-based and novel engineered CDR pathways.
- **Cost:** It will likely raise the price of credits with higher reversal risk, somewhat narrowing the cost parity. However, a gap will likely persist and require policy measures, including subsidies, public procurement, and R&D funding for novel CDR.
- **Risk of underinvestment**: If the durability threshold is set too low, markets may settle for cheaper credits with shorter durations, thereby slowing investment in novel CDR.

How contracted durability could be integrated in policies and standards (pg. 7, 30-39):

- Several policy jurisdictions and standard-setting bodies are determining how to regulate, incentivize, and set quality benchmarks for carbon removal.
- Pages 30-39 include **case studies on four bodies (California**, **the EU, the SBTi, and the ICVCM)**, including what policymakers aim to achieve with CDR durability, key durability challenges, and how contracted durability mechanisms can be integrated into existing processes to address those challenges.

Recommendations to advance contracted durability (pg. 40-43):

- **Research and development:** Translating contracted durability into operational tools will require (1) risk-assessment frameworks; (2) models for pricing reversal risk; (3) permanence trusts designed to outlast the organizations that create them; and (4) legal frameworks for binding obligations over decades.
- **Piloting:** Real-world testing is essential to build the evidence base that policymakers and standard-setters require before broader adoption. Several efforts are already underway, including the ICVCM's Innovation Sandbox, the American Forest Foundation's Permanence Trust Feasibility Study, and Verra's Durability Pilot.
- **Policy:** Define what constitutes a negligible risk of reversal to give contracted durability a clear performance target. Adopt performance-based language so that contractual mechanisms attached to credits meet durability requirements.

ELECTRIFICATION

Powering Up: Business Perspectives on Electrification

By We Mean Business Coalition, E3G, Global Renewables Alliance, and Public First

View the full report here

Notable Highlights

- **79% of business leaders say geopolitical instability has made electrification more urgent, 87%** report that **energy costs have increased** as a share of their revenue over the last five years, and **57%** say their use of fossil fuels has made them **more exposed to price shocks.**
- **Businesses believe electrification will strengthen their energy security (91%),** help them **grow and be more competitive (88%),** stabilize energy prices (87%), reduce energy import reliance (85%), and reduce long-term operating costs (84%).
- 8% of businesses have already largely electrified their operations, **73% expect to do so by 2030**, and 90% by 2035.
- **Policy and infrastructure are the main barriers:** Around **70% are electrifying their operations faster than policies** are advancing; **63%** say their country's **power systems are not keeping pace;** and **54%** say there is **insufficient grid capacity**.
- As a result, **half of businesses have delayed or canceled electrification projects.**
- **Most businesses would consider moving their operations abroad** if their country did not transition to a renewables-based electricity system within the next decade (57%) and if their government did not offer sufficient support for electrification (62%).
- **Businesses want practical policy support for grid expansion,** digitalization, and future-proofing (43%); **fiscal incentives** to reduce the cost of replacing fossil-powered equipment (41%); **lower electricity prices** (40%); and **faster grid connection** (39%).

Objective

- To assess companies' attitudes toward and plans for electrification, as well as the gap between business ambition and the pace of policy and grid infrastructure to support it.

Background

- The report data is based on a survey of 1,994 business leaders (CEOs, VPs, directors, and senior managers) across 18 markets (methodology on pg. 7-8).

- "Clean electrification" refers to replacing fossil-powered technologies with electric alternatives powered predominantly by renewable electricity.

Report Findings

Geopolitical instability is accelerating clean electrification (pg. 9-13, 19-21):

- **87% report that energy costs have increased as a share of their revenue** over the last five years, due to instability in oil- and gas-producing regions (36%), rising energy demand (36%), and global energy supply chain disruption (30%).
- **88% expect electrification to improve local air quality**, and 85% expect it to improve public health in their community.

Clean electrification is a business priority (pg. 22-25):

- **82% want an energy system mainly based on renewable-powered electricity.** Even when given the option to choose an equal blend of renewables and fossil fuels, 74% opted for a majority-renewables supply.
- **84% believe that** moving to a renewables-based electricity system within their country **would reduce long-term operating costs**.
- **40% have already invested in on-site renewable generation,** and 47% are actively considering it.
- Businesses **widely support country-level investment** in solar farms (89%), offshore wind farms (81%), and onshore wind farms (81%).

Policy and infrastructure are the main electrification barriers (pg. 14-18, 26-32):

- Around **70% of businesses are electrifying their operations faster than policies are advancing**, and **54%** say there is **insufficient grid capacity**.
    - 2,060 GW of energy and storage capacity are seeking grid connection in the U.S.
    - In Europe, queues for grid access are resulting in billions in unrealized investment in industrial electrification.
- **If their government does not offer sufficient support for electrification,** 50% of businesses would invest in their own renewable generation; 45% would invest in their own electrification technologies; and 25% would pass higher costs on to consumers.

- **Businesses strongly support increased investment in electricity grid upgrades and energy storage (89%),** EV charging networks (86%), electricity transmission (85%), and electric heating (82%).

Country electrification profiles (pg. 34-69):

NOTE: Pages 34-69 break down the state of electrification across the 18 markets assessed, including the policy context and key survey findings.

- **United States (pg. 68-69):**
  - 91% of businesses say that electrifying their operations would increase their competitiveness—the highest percentage of all advanced markets.
  - Rewarding renewable use through **electricity market reforms is the strongest driver** of rapid clean electrification.
  - The Trump administration has rolled back federal subsidies and other financial incentives for renewable energy production. However, the Department of Energy operates a $2.5 billion revolving fund to finance the construction of long-distance, interregional transmission lines, and the proposed SPEED Act would streamline the permitting process for energy infrastructure.
- **United Kingdom (pg. 66-67):**
  - The UK Clean Power 2030 plan establishes a path toward a clean electrified economy, though oil and gas still account for 75% of final energy consumption.
  - **Faster grid connectivity** (44%), **grid expansion**, digitalization, and future-proofing (43%), and **subsidies** to bring down high upfront costs (43%) are the **most effective policy levers** for accelerating electrification.