



The Catalysts: Unlocking Markets for a Sustainable Economy

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Preface



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As unprecedented wildfires raged across Europe this summer, communities, corporates and policy-makers once again felt the heat on climate change. Progress has been both steady and insufficient since the Paris Agreement was signed in 2015. Back then, the world was on track for around 3.6°C of warming by 2100. Today, thanks to countries implementing national climate policies and action, powered by a swift roll-out of clean energy, that trajectory leads to around 2.6°C.¹ However, as temperature records tumble, even this warming could prove life-threatening for large swathes of the planet's population. As things stand, we will burn through our carbon budget for 1.5°C within four years.²

Meanwhile, the protection of terrestrial, freshwater and marine biodiversity, although improving, lags well behind the 30% target of the widely adopted Global Biodiversity Framework. More than half of global GDP is moderately or highly dependent on nature.³ So, as ecosystems deteriorate, threatening 1 million species with extinction, we are eroding the foundations of our economic prosperity.

Leaders have launched a host of initiatives to mobilize finance to achieve these goals. They include expanding the capacity of development banks to issue loans, grants, guarantees and technical assistance. Pioneering debt-for-nature swaps enable countries to exchange loan repayments for investment in conservation. Innovative mechanisms such as the Tropical Forest Forever Facility are finding ways to pay countries to keep their trees standing.

Even so, a small fraction of the finance needed to limit warming to 1.5°C and halt nature loss is materializing, leaving a wide gap between commitment and reality. The challenges are systemic and deeply

interconnected. Geopolitical fragmentation is putting decades of multilateral cooperation at risk. Debt distress is constraining the fiscal space for countries most exposed to climate risk. Markets do not reward sustainable solutions at the scale and speed needed to finance them adequately.

Overcoming these challenges and ensuring finance flows towards climate- and nature-positive solutions – rather than towards harmful practices that drive emissions and ecosystem degradation – will depend largely on public policy support and private sector investment.

However, this report sheds light on a band of actors whose potential remains largely untapped: foundations, philanthropies, family offices, impact investors and select institutional investors. Together, this “catalytic community” possesses both the financial and non-financial resources to help unlock progress in times of volatility. The opportunity lies in mobilizing these resources more strategically, by expanding the definition of what intelligent capital deployment means without sacrificing financial discipline.

Doing so requires a paradigm shift: from transactional grant-making to active stewardship. Catalytic actors cannot simply subsidize short-term responses to climate and nature crises. Their role is more consequential: co-creating the conditions for positive tipping points when long-term solutions become self-sustaining. This is the transformation that GAEA – the World Economic Forum's Global Accelerator for Earth Action platform – is committed to support: building a catalytic community that acts not as a funder of last resort, but as a committed enabler of the systems, markets and policy frameworks needed for a more sustainable economy.

Executive summary

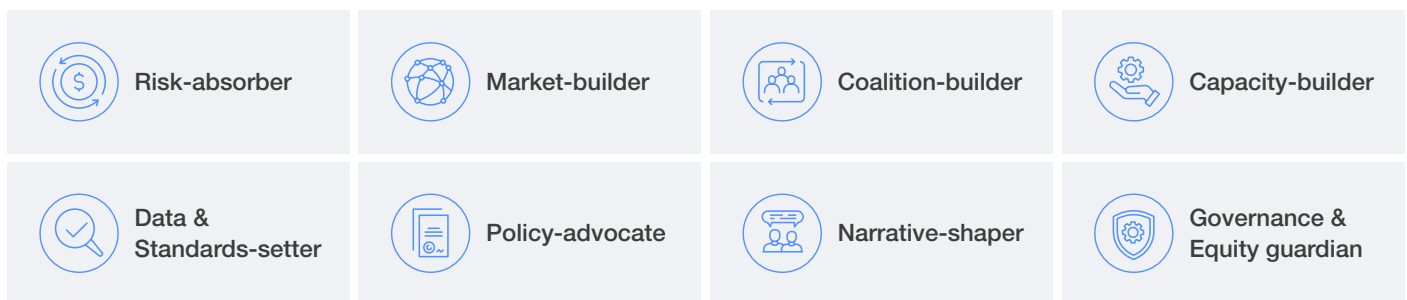
Foundations, family offices and impact investors have an opportunity to generate disproportionate and durable progress towards climate and nature outcomes.

The world needs roughly \$10 trillion in annual investment to meet its climate and nature targets; \$7 trillion for a 1.5°C pathway and an additional \$2.7 trillion for a nature-positive economy. Current climate finance stands at around \$2 trillion per year.

The problem is not the quantum of capital available, but how it is deployed. The challenge is systemic, as the financial, political and institutional systems that could uphold and promote climate- and nature-positive solutions are poorly aligned with the pace and magnitude of change required for the world to transition to a sustainable economy.

This report focuses on a particular group of catalytic actors who have the capacity to help address this misalignment: foundations, philanthropies, family offices, impact fund managers and select institutional investors. What sets these actors apart is their ability to deploy both financial and non-financial resources – such as credibility, networks, influence, governance capacity and patience – in ways that commercial investors find out of reach.

Eight roles catalysts can play to drive transformation



Catalysts can drive transformation in at least eight distinct ways. Each role targets a specific systemic constraint or bottleneck. Deployed strategically, at moments of maximum leverage, these roles can trigger self-reinforcing dynamics – positive tipping points, when sustainable solutions no longer depend on subsidies because the market has restructured to reward them.

This report provides evidence from three systems to illustrate these dynamics in practice:

Ocean:

- Ecuador's external debt restructuring to release \$450 million of funding for conservation of the Galápagos Islands.
- Ørsted's blue bond that raised €100 million of commercial debt for offshore development that commits to protecting marine ecosystems.

- Equatic's evolution from a foundation-backed university pilot to a commercially financed ocean carbon dioxide removal (CDR) plant.

Forests:

- Tropical Forest Forever Facility's plan to mobilize \$125 billion in philanthropic, public and private capital to pay countries to preserve their standing forests.
- Canopy's journey from philanthropic pilot to \$2 billion investment programme to shift paper, packaging and textile supply chains from virgin tree pulp to "next-gen fibre".
- FireSat's launch of high-tech satellites capable of detecting wildfires in near-real time – a replicable, public-private-philanthropic model gaining international adoption.

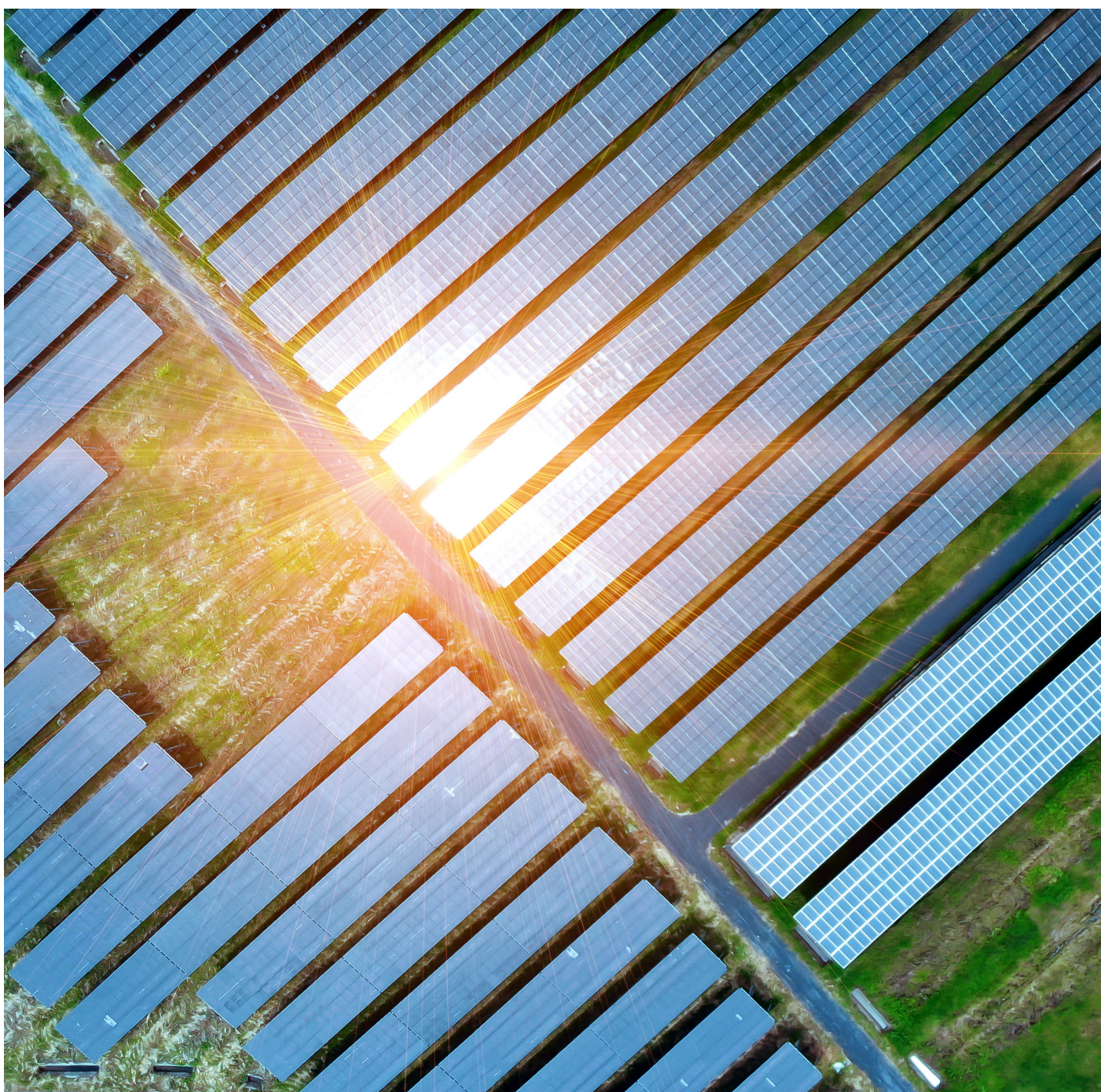
Energy:

- Global Energy Alliance for People and Planet (GEAPP)'s mobilization of over \$1 billion in clean energy financing, generating livelihoods for 600,000 across 40 countries.
- Self-Employed Women's Association (SEWA)'s promotion of bundled loans to “unbankable” women in India to finance solar pumps and energy access.
- Acumen's early-stage investment that brought pay-as-you-go solar and mini-grids to 1.25 million people, attracting \$128 million in follow-on capital.
- ACEN's engagement of catalytic actors to help close a coal power plant early in the Philippines.

Governments, businesses and communities remain the primary agents of the nature-positive, low-carbon transition. However, the catalytic actors highlighted in this report are well-positioned to help support this transition by financing innovative opportunities that markets have not yet priced and accelerating them towards commercially viable solutions.

The aim of the report is to encourage these actors to reimagine their roles: moving up the value chain from simply filling project finance gaps to identifying and activating the leverage points in a system where catalytic interventions can generate disproportionate and durable change.

GAEA, the World Economic Forum's [Global Accelerator for Earth Action](#) initiative, is committed to convening these catalytic actors to accelerate systemic climate and nature solutions.



A defining moment for the “Catalysts” to step forward

As the urgency to mitigate climate change, restore nature and boost resilience ramps up, the role of catalytic actors has never been more vital.

1.1 The wrong trajectory for climate, nature and finance

“Over 3 billion people live in nations spending more on interest payments than health, education or climate resilience.”

Four years out from 2030 – a crucial milestone for driving progress on both climate nature action – current national policies put the planet on track for 2.6°C warming above pre-industrial levels by the end of the century.⁴ The target of protecting 30% of Earth’s land and water by 2030, agreed by 196 countries in 2022’s Global Biodiversity Framework, also appears a tough ask – when just 17.5% of land and 8.5% of seas are covered by protected areas.⁵ Meanwhile, seven of the nine planetary boundaries defined by the Potsdam Institute for Climate Impact Research have been breached – including climate change, biosphere integrity, land system change, freshwater use and, most recently, ocean acidification.⁶

Global finance follows a similar, flawed trajectory. Meeting Paris’s 1.5°C climate target requires ~\$7 trillion in annual investment,⁷ which touches nearly \$10 trillion when the ~\$2.7 trillion to unlock a nature-positive economy is added.⁸ Although climate

finance has increased significantly in recent years, reaching ~\$2 trillion in 2024,⁹ the gap in annual funding is roughly equivalent to the GDP of Germany. Biodiversity financing faces an annual shortfall of nearly \$1 trillion.¹⁰ These gaps only tell part of the story. The problem is not a shortage of funds, but where they flow. In 2023, \$7.3 trillion funded activities that harm nature – especially fossil fuel subsidies, but also investments in energy and utilities.¹¹

At the same time, more than a quarter of the world’s countries are either in – or at risk of falling into – debt distress. This means over 3 billion people live in nations spending more on interest payments than health, education or climate resilience.¹² When a country can barely afford its current financial obligations, investing in decarbonization, marine protection or mangrove and forest restoration may seem unaffordable luxuries, even if those investments are critical for long-term resilience and development.

1.2 Investment in climate and nature pays rich dividends

Yet investment in climate and nature action is far from a luxury. Given that more than half of global GDP depends on nature, it is a necessity – but also one which can deliver 10-fold returns over the long term. According to research by Boston Consulting Group (BCG) – if the planet warmed by 3°C, global cumulative economic output could plunge by 11-27% up to 2100. By limiting warming to below 2°C, however, these losses could be avoided at a cost of just 1-2% of economic output over the same period. To deliver these results, it is critical these investments are front-loaded – rising 9-fold for climate mitigation and 13-fold for climate adaptation by 2050.¹³

Nature-positive innovations and success in the green economy are already visible – both in purely commercial contexts and in public-private initiatives. For example:

- **Green revenues have grown twice as fast as conventional revenues:** Between 2020 and 2024, over 6,500 publicly listed global companies¹⁴ analysed by London Stock Exchange Group (LSEG) grew aggregate green revenues by 12% a year – twice as fast as conventional business lines. Growth was strongest among companies where green products made up a material part of their

business. The green economy is now worth over \$5 trillion per year – the most dynamic growth sector after technology, according to the World Economic Forum's [CEO Guide to Growth in the Green Economy](#).¹⁵

- **The nature-positive transition represents ~\$10 trillion in annual opportunities by 2030:** From precision agriculture to battery recycling to bio-based materials, new ways of doing business are delivering both long-term resilience and short-term gains. A recent Forum report, [50 Investible Opportunities for a New Nature Economy](#), highlights how nature-positive approaches can generate both cost-savings and new revenues for businesses across the real economy.¹⁶
- **Debt-for-nature swaps could free up \$100 billion for nature and climate:** These allow countries burdened by external debt to reduce repayments in return for redirecting funds into nature conservation and climate

resilience. [Analysis reported by the Forum](#) shows such swaps could free up \$100 billion to restore damaged ecosystems and protect vulnerable communities from floods, drought and wildfires.¹⁷ The restructuring of Ecuador's \$1.63 billion of public debt to finance the conservation of the Galápagos Islands features as a case study in this report.

- **Payments for ecosystem services are rewarding farmers and landowners** for protecting wetlands and watersheds, conserving forests and protecting species – demonstrating that protecting habitats can make financial sense.¹⁸ Traditionally, these initiatives have been government-funded, with data – now a decade old – suggesting over 550 active programmes valued at \$36-42 billion.¹⁹ Recent innovations, such as the Tropical Forests Forever Facility – featured as a case study in this report – are looking to scale up similar programmes through a combination of philanthropic, public and private capital.



1.3 Step forward the “Catalysts”

“Catalysts” comprise philanthropies, foundations, family offices, impact investors and select fund managers and institutional investors.

Many of these business models and innovative approaches have the potential to deliver strong environmental outcomes and attractive financial returns – but to realize this potential requires leadership and vision. The current moment offers an opportunity for a powerful coalition of actors – catalytic capital providers – to demonstrate this leadership.

This report highlights the roles of what can be called the “Catalysts”: comprising philanthropies, foundations, family offices, impact investors and select fund managers and institutional investors, these Catalysts can deploy their unique

interventions, often in a sequenced manner, to transform seedlings of opportunity into fully grown paradigms of the emerging green economy.

There are signs these Catalysts are heeding the call. Impact investing has grown to nearly \$1.6 trillion in assets under management.²⁰ Blended finance deal flows were higher in 2024 than the market average for the previous four years, with 123 deals totalling \$18 billion reaching close.²¹ Meanwhile, it remains to be seen if the next generation of philanthropists will steer more of their resources towards climate and nature than the older generation (see Box 1).

BOX 1 Next-gen philanthropists – will they prioritize nature, climate and greater inclusion?

Although the funding for climate mitigation from foundations and ultra-high net worth individuals (UHNWIs) increased to a record \$11.7-18.4 billion in 2024, this still represented just 2.1% of total philanthropic giving worldwide.²²

However, the transfer of ~\$83 trillion to a new generation of wealth holders over the next two decades²³ offers the possibility that more capital could flow towards climate and nature solutions, depending on the priorities and actions of these inheritors.

There may be positive signs, according to a detailed analysis of the preferences of next-gen UHNWIs in the United States, published in 2022.²⁴

The report found the following:

- 56% of next-gens invest sustainably, with 53% of these targeting climate action and affordable, clean energy.
- 53% agree they are more engaged in sustainable investing than their parents.
- 43% of next-gens support environmental causes (e.g. “climate change, green issues, wildlife”) in their philanthropy, compared to 35% of their family.
- 49% of next-gens support economic and social development (e.g. “financial inclusion, entrepreneurship”) in their philanthropy, compared to 37% of their family.

This report highlights the interlinked roles that these catalytic actors are already playing to scale up pilots and innovations into sustainable, commercial solutions. Eleven case studies across Ocean, Forest and Energy systems illustrate how these varied roles can be orchestrated to maximize their catalytic effect.

What emerges from this analysis is both the scale of the challenge and the unprecedented opportunity for these Catalysts to drive systems-level solutions that can make a tangible difference in tackling climate change, reversing nature loss and boosting resilience.

Catalytic actors – a market-making force

Catalytic capital and capabilities offer a new paradigm, replacing grant funding with systemic investment and stewardship to generate returns that are positive for people and planet.

2.1 How catalytic action triggers disproportionate change

The generational challenge to steer sufficient capital towards restoring balance in climate and nature systems demands a rethink of how catalytic tools and resources are understood, structured and deployed in pursuit of sustainable growth.

Since catalytic capital is closely associated with concessional finance, the term has historically been linked to philanthropic and foundation investments, deployed mainly in service of charitable objectives.

As a result, catalytic action has long been understood as operating outside the realm of financial returns and commercial opportunities.

However, catalytic capital and capabilities are increasingly playing a critical role in both seeding and scaling-up enterprises from fledgling operations to commercially viable businesses operating at scale across geographies (see Box 2).

BOX 2 Catalytic capital – definition and roles

Definition

Catalytic capital accepts disproportionate risk and/or concessionary return to generate positive impact and enable third-party investment that otherwise would not be possible.

Role	Application	Financing type
Seeding	– Early-stage capital for fledgling enterprises – Supports pre-breakeven operations with uneven cashflows	– Grants – Patient equity – Convertible debt
Scaling	– Capital structured specifically to help enterprises scale up or replicate – Enables economies of scale, reaching new geographies and populations – De-risks and leverages broader investment	– Concessionary debt – Equity – Hybrid instruments
Sustaining	– Ongoing subsidies for non-commercial business models	– Concessionary debt – Long-term guarantees

Source: Tideline (2019).²⁵

Impact investing is on the rise, driven by structural forces

The subset of catalytic capital known as impact investment seeks a return from investing in

measurable social and environmental impacts (see Box 3). According to the Global Impact Investing Network (GIIN), the market for global impact investing reached \$1.57 trillion in assets under management (AUM) in 2024, representing a CAGR of 21% since 2019.²⁶

BOX 3

Impact investments – seeking a return on social and environment impact

The GIIN defines impact investments as investments made with the intention to generate positive, measurable social and environmental impact alongside a financial return. There are four key elements:

- **Intentionality:** Impact investments intentionally contribute to social and environmental solutions. This differentiates them from other strategies such as ESG investing, responsible investing, and screening strategies.

- **Financial returns:** Impact investments seek a financial return on capital that can range from below market rate to risk-adjusted market rate. This distinguishes them from philanthropy.
- **Range of asset classes:** Impact investments can be made across asset classes.
- **Impact measurement:** A hallmark of impact investing is the commitment of the investor to measure and report the social and environmental performance of underlying investments.”

Source: Global Impact Investing Network (GIIN).²⁷

“ The market for global impact investing reached \$1.57 trillion in assets under management in 2024, representing a CAGR of 21% since 2019.

“ Impact investing is increasingly becoming a tool for active risk management, not just ethical positioning.

Within the investment universe, impact investment amounts to around 10% of the \$16.7 trillion invested into wider “responsible and sustainable fund approaches”, but just 1.25% of the \$128 trillion of global assets under management.²⁸

However, the aggregate figure only tells part of the story. This surge in impact investing has been driven primarily by larger institutional investors, asset owners and pension funds, as well as insurance companies and sovereign wealth funds, reflecting a rising demand for impact-orientated investment opportunities. These traditional financial players are increasingly incorporating impact investments as part of their core portfolio strategies.

While frameworks such as the EU Taxonomy have accelerated impact investment, the rise in demand for these products is being shaped by deeper structural forces:

- **Portfolio diversification:** In an environment increasingly characterized by heightened macroeconomic volatility, impact investments offer exposure to asset classes and geographies structurally underrepresented in traditional portfolios, providing diversification benefits that conventional asset allocation cannot replicate.
- **Competitive risk-adjusted returns:** The assumption that impact comes at the cost of financial performance has been progressively disproven by empirical evidence. Areas such as climate-resilient infrastructure, clean energy and sustainable agriculture have demonstrated a capacity to deliver market-rate returns, making the financial case increasingly difficult to dismiss.

- **Beneficiary demand:** Institutional investors face mounting pressure to align portfolio strategies with the long-term values and interests of those on whose behalf they invest.
- **Long-term risk management:** Climate change, biodiversity loss and social instability represent material, systemic risks with direct implications for returns. Impact investing is increasingly becoming a tool for active risk management, not just ethical positioning.^{29,30}
- **Market maturity and product availability:** The proliferation of institutional-grade instruments (e.g. sustainability-linked loans, blended finance structures, impact-focused private equity, infrastructure funds) has substantially lowered barriers to entry.³¹

How catalytic investors go beyond traditional philanthropy

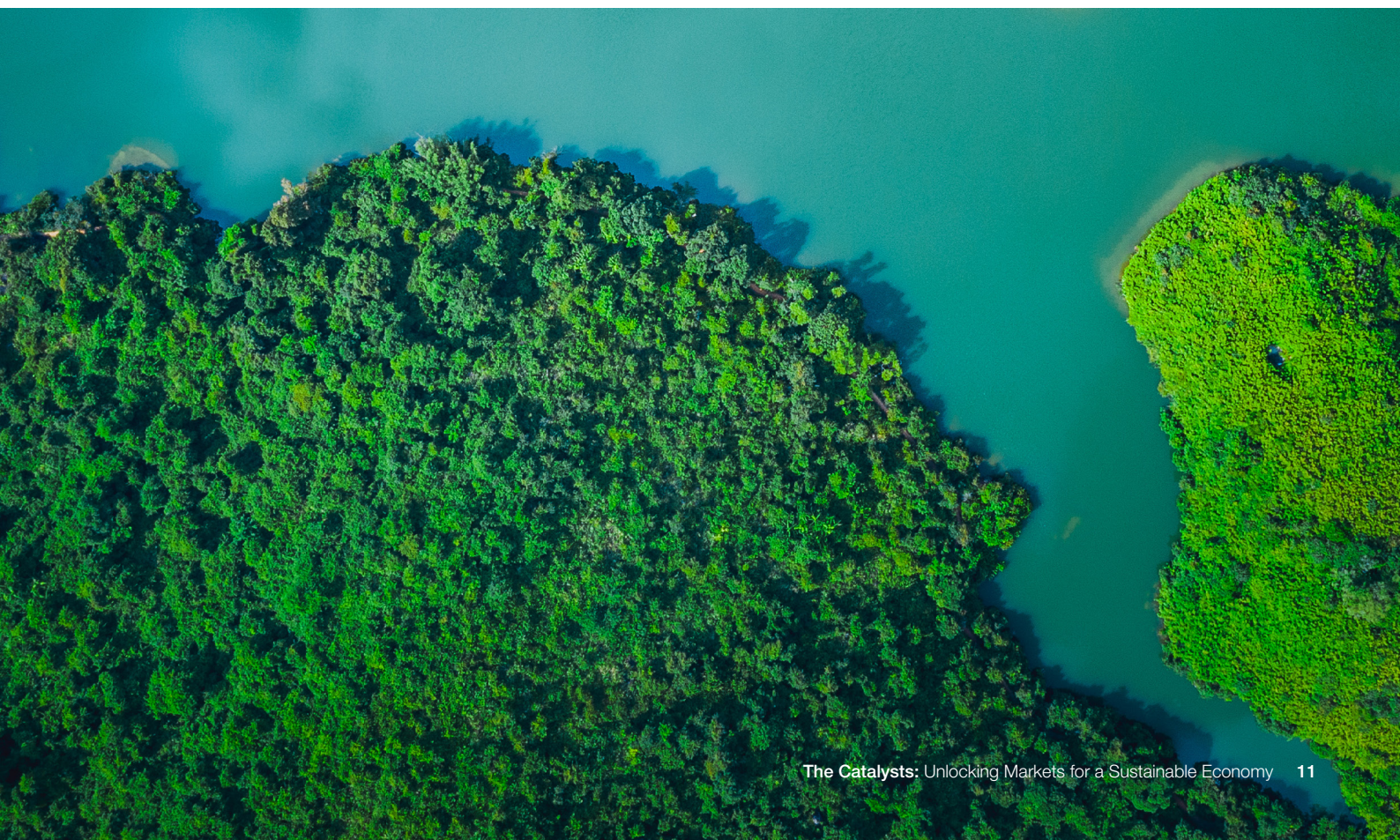
Catalytic capital can no longer be understood as synonymous with conventional philanthropy or grant-making. What was once the exclusive domain of foundations and multilateral institutions is increasingly part of the toolkit of mainstream investors seeking both competitive returns and resilience against systemic macro risks. As a result, the boundaries between philanthropy, impact investing and commercial finance are, in certain markets, dissolving, and the actors most effective in operating seamlessly across all three areas are catalytic capital providers.

The opportunity now is to integrate catalytic actors into the wider investment value chain – not simply as peripheral de-riskers brought in to make deals viable, but as strategic partners whose engagement can accelerate commercial and economic success.

The actors best positioned to play this strategic, catalytic role are: foundations and philanthropies, impact-first fund managers and intermediaries, ultra-high net worth individuals and family offices, and large institutional investors (see Table 1).

TABLE 1 **Leading types of catalytic investors**

Categories		Strengths & roles
	Foundations	– <i>Strengths:</i> Patient capital, convening power and institutional credibility – Going beyond grant-making towards active market stewardship – Forging intentional partnerships with commercial investors and governments to build the conditions for sustainable solutions to take root and grow
	Philanthropies	
	Ultra-high net worth individuals	– <i>Strengths:</i> Multigenerational outlook, governance flexibility and freedom from short-term reporting constraints – Uniquely suited to absorb early-stage risk, back unconventional solutions and act as anchor investors in markets that institutional capital cannot yet reach
	Family offices	
	Impact-first fund managers	– <i>Strengths:</i> Ability to operate at the frontier of market creation – Providing the patient equity, risk-tolerant debt and blended structures that validate emerging sectors – Attracting institutional follow-on capital – Demonstrating that impact and financial performance are mutually reinforcing
	Venture capitalists (VCs)	
	Multilateral development banks (MDBs)	
	Development finance institutions (DFIs)	
	Large institutional investors	– <i>Strengths:</i> Scale, breadth of clients and long investment horizons – Leveraging their capacity and mandate to prioritize the systemic resilience of the economies and ecosystems on which their beneficiaries ultimately depend – e.g. pension funds, sovereign wealth funds, insurance companies, asset owners



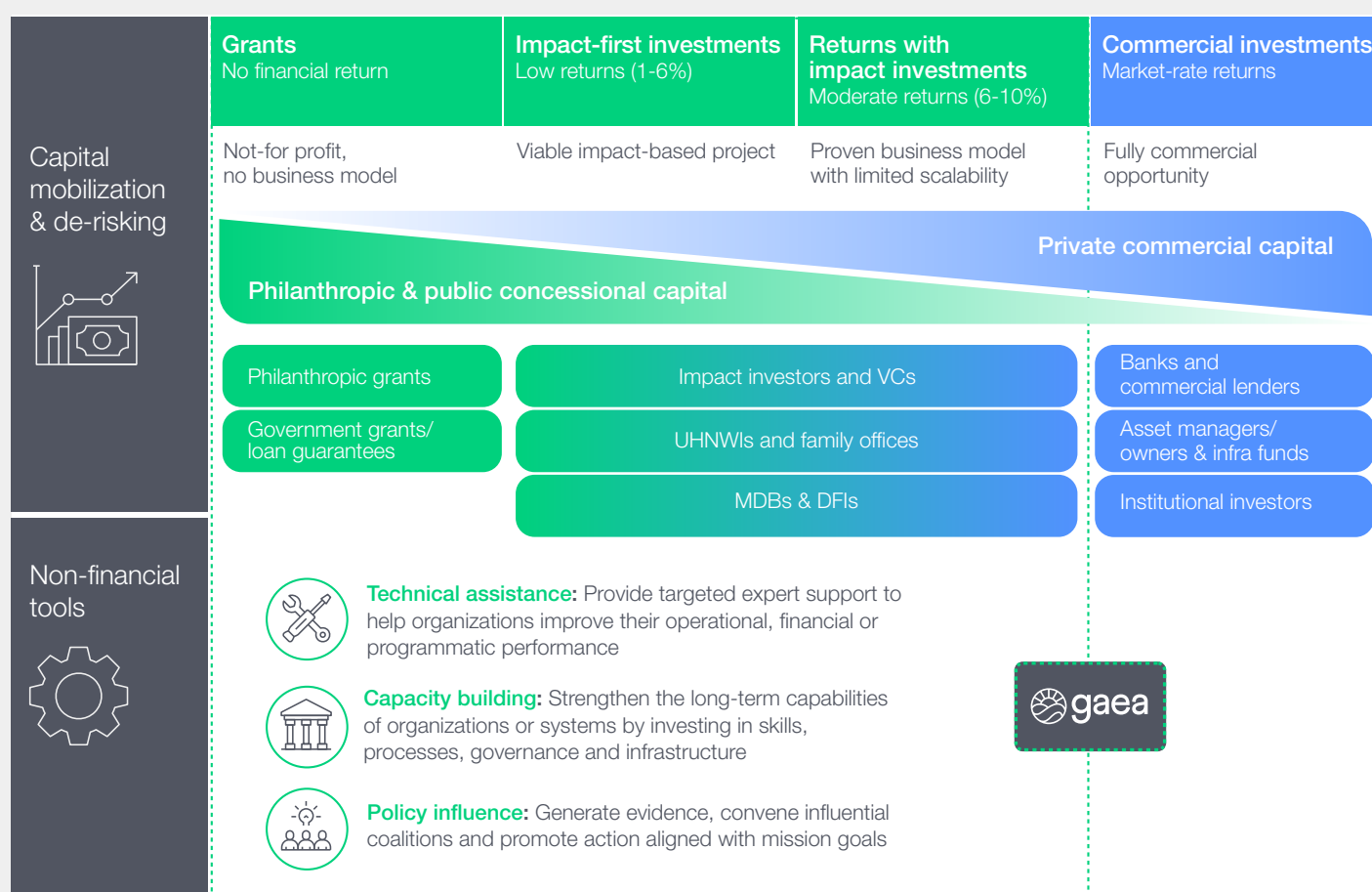
Critical role of both financial and non-financial resources

Financial resources alone are insufficient to create new markets for future solutions. Finance can fund opportunities, but it cannot by itself create the conditions in which those solutions can scale up. Systemic change requires more than a project-by-project approach; it requires the strategic

deployment of the kinds of resources that these catalytic investors and capital providers possess – such as the convening power, capacity building, policy influence, market credibility and patient stewardship that prioritize the long-term integrity of systems over the short-term optimization of returns.

Figure 1 presents both the financial and non-financial resources that catalytic investors can deploy to move markets towards more sustainable solutions.

FIGURE 1 Financial and non-financial resources that catalytic investors can deploy



Source: World Economic Forum.

BOX 4 GAEA connects Catalysts to drive systemic change

GAEA, the World Economic Forum's [Global Accelerator for Earth Action](#) initiative, connects Catalysts – including philanthropic leaders, foundations, family offices, impact investors and select institutional investors – at moments when coordinated support can accelerate systemic climate and nature solutions. Rather than deploying capital itself, GAEA engages

the Forum's trusted convening platform and its dedicated community of Catalysts to bring together complementary forms of capital, expertise and influence. By building trusted relationships and aligning participants around shared opportunities through its "Big Bets", GAEA helps enable cooperation where collective action can make the greatest difference.

The growth of impact investing, combined with the capacity of catalytic actors to take the long view, offers a rare moment of opportunity. Seizing it demands a shift in ambition: not simply subsidizing climate and nature solutions through grants, but deliberately deploying market-making capital to trigger positive tipping points for the greatest impact. This requires directing resources – financial and non-financial – towards validating what works and anchoring institutional legitimacy where it can

do the most to accelerate change. Acting with this intention, catalytic investors move beyond funding to become strategic partners with companies and policy-makers to enable a climate- and nature-friendly transition.

The essence of this new paradigm is to identify – in partnership with businesses and governments – which opportunities offer the clearest path to growth within planetary boundaries.

BOX 5 Old and new philanthropic paradigms

“Catalytic actors hold onto both financial and planetary logic at the same time: deploying capital with the precision of a skilled investor, while practicing the patience of a long-term steward.”

Old paradigm	New paradigm
Grant-based transactions	Active, systemic stewardship
Transactional philanthropists ask: Which gaps can my grants fill?	Catalytic investors ask: Which solutions, backed with capital, credibility and legitimacy, have the potential to reshape markets, reorientate economies and generate returns that are positive for people and planet – not just portfolios?
Conventional investors ask: What returns can my investments generate?	

The catalytic actors who will matter most in the decades ahead are those capable of holding onto both financial and planetary logic at the same time: deploying capital with the precision

of a skilled investor, while practicing the patience of a long-term steward who responds to the urgency of the present crisis by creating a more sustainable future.

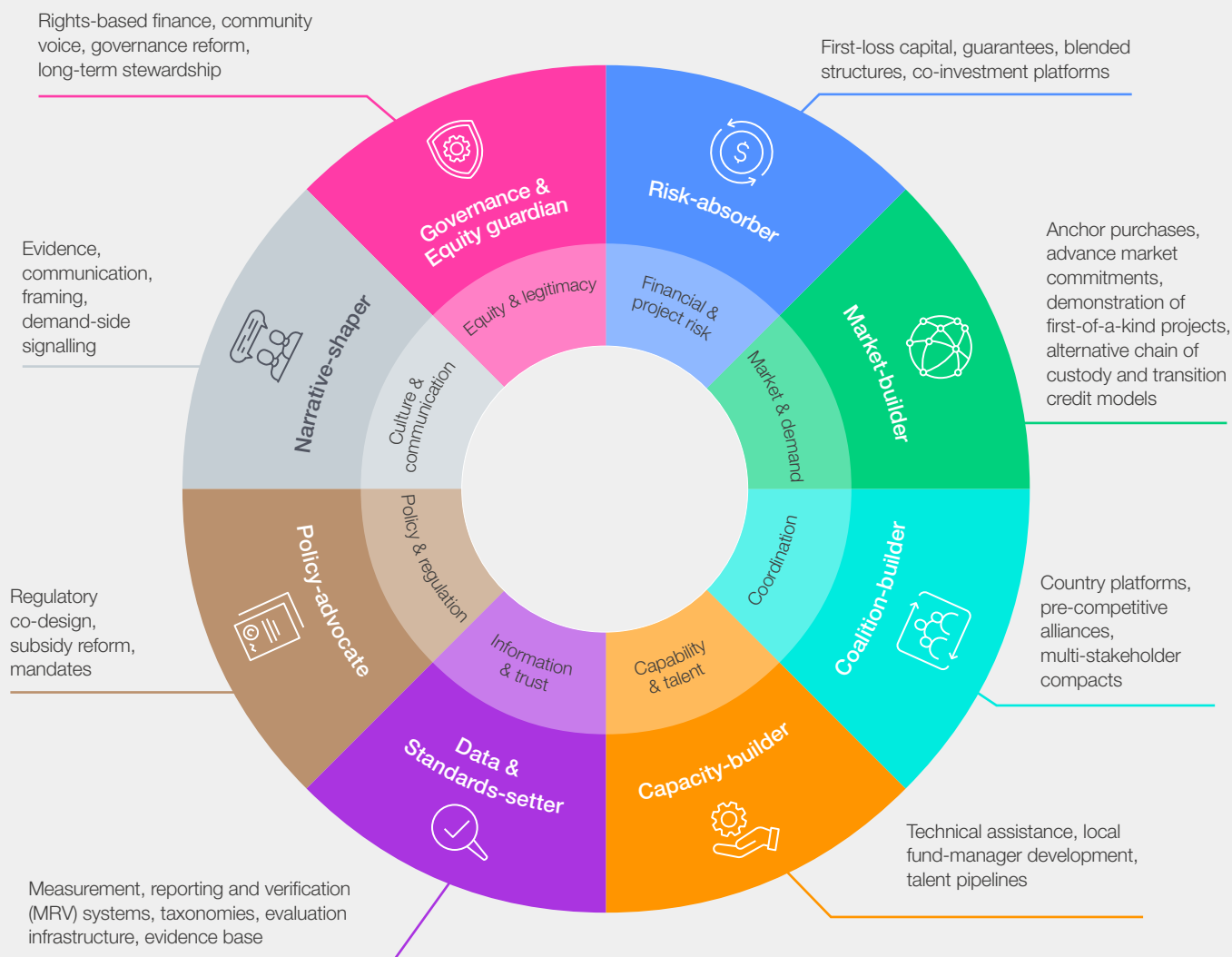


Eight transformative roles catalysts can play

Across the literature,³² eight distinct catalytic roles emerge, each addressing specific systemic challenges and bottlenecks (see Figure 2):

FIGURE 2

Eight roles catalysts can play to ease systemic bottlenecks and drive transformation



Inner circle: Systemic bottlenecks **Outer circle:** Catalytic roles **Annotations:** Illustrative actions

Note: This framework is non-exclusive; it is intended to clarify functions, not to assign actors to single boxes. Most major initiatives play several roles simultaneously.

Source: World Economic Forum.

Eleven case studies across three systems

Catalytic actors – especially philanthropies and foundations – can unlock nature- and climate-positive solutions across ocean, forest and energy systems.

⚙️ A critical role for catalytic actors is to identify bottlenecks, deploy the right combination of roles and sequence interventions at key moments to maximize their leverage to unlock system change.

This chapter profiles recent case studies drawn from the GAEA network, ranging across three distinct systems: Ocean, Forests and Energy. These systems demonstrate similar sets of challenges, while highlighting multiple roles for catalytic actors. For example, while traditional infrastructure assets are typically financed by commercial banks and institutional investors, the transition towards more sustainable and regenerative practices often depends on catalytic capital to reach a positive tipping point.

The challenges are numerous and complex. They include misaligned incentives, destructive supply chains, stranded assets, risk perceptions, valuation gaps, complex execution requirements, long development timelines, extended payback periods, and the need for close coordination with governments and local communities. These challenges in turn create interlinked bottlenecks, leading to fragmented project pipelines, insufficient financial and impact performance data, and limited track records of success.

A critical diagnostic and operational role for catalytic actors is to identify these bottlenecks, deploy the right combination of roles to address specific constraints, and sequence these interventions strategically at key moments to maximize their leverage to unlock broader system change.

Each of the case studies follows a similar structure, presenting the challenge, solution and outcome, while analysing the catalysts and their roles as summarised in Figure 2. Some actors – particularly philanthropies and foundations – play multiple, catalytic roles. Equally, the collective effort of all stakeholders acting together can itself generate wider catalytic outcomes.

Cross-sector

[Case Study 1](#): SDG Loan Fund – providing blended capital to support sustainable development

Ocean

[Case Study 2](#): Galápagos – converting debt into conservation funding

[Case Study 3](#): Ørsted's blue bond – raising institutional capital for the blue economy

[Case Study 4](#): Equatic – catalytic philanthropy accelerates ocean carbon removal

Forests

[Case Study 5](#): Tropical Forest Forever Facility – rewarding countries for standing forest

[Case Study 6](#): Canopy – forest-friendly alternatives for paper, packaging and apparel

[Case Study 7](#): FireSat – near-real time satellite-based detection of wildfires

Energy

[Case Study 8](#): Global Energy Alliance for People and Planet (GEAPP) – scaling-up clean energy access

[Case Study 9](#): SEWA – bringing hope, training and higher incomes to “unbankable” women

[Case Study 10](#): Acumen's Pioneer Energy Investment Initiative – de-risking off-grid energy

[Case Study 11](#): ACEN's early closure of a coal power plant, supported by catalytic actors

SDG Loan Fund – \$1.1 billion of blended capital providing loans for emerging-market SDGs



Challenge:

While the SDGs continue to face trillions in investment shortfalls, the gaps are particularly acute in emerging and frontier markets, where institutional investors are unable to invest due to credit risk and ratings constraints.

Solution:

In November 2023, AllianzGI announced that it had succeeded in structuring an SDG Loan Fund that mobilized \$1.1 billion of investor capital to advance the SDGs in emerging and frontier markets. The Loan Fund has been designed to issue more than 100 loans over a 25-year investment period across agribusiness, financial institutions and renewable energy, in more than 80 frontier and emerging markets across Africa, Asia, Eastern Europe and Latin America.

Catalysts and their roles:

Allianz Global Investors (AllianzGI), FMO Investment Management (FMO IM) and its parent, the Dutch development bank FMO, the John D. and Catherine T. MacArthur Foundation, and senior institutional investors Allianz SE and Skandia created a model to overcome those barriers.

Initially conceived by AllianzGI, the Fund's manager, and FMO IM, the portfolio manager, the vehicle layered catalytic capital in two structured tranches:

Risk-absorber (FMO): FMO provided a \$111 million first-loss Class B tranche, drawing on FMO's long history and extensive network in underwriting global development projects to originate and vet the underlying loan pipeline.

Risk-absorber (MacArthur): To satisfy FMO's own risk considerations, MacArthur Foundation, with its Triple-A rating, agreed to put up an unfunded guarantee commitment of \$25 million to protect FMO against downstream investment

losses. This acted as a second, smaller layer of credit enhancement wrapped around FMO's own first-loss position.

Market-builder (Allianz & Skandia): Class A preference shares of \$1 billion were subscribed by institutional investors, including an anchor investment from Allianz SE, with Skandia also participating. The senior capital that would not otherwise have been deployable into this risk category, is now investable because of the credit enhancement stacked beneath it.

Coalition-builder (AllianzGI): as fund manager, AllianzGI designed and coordinated the overall structure, bringing a DFI, a philanthropic guarantor and mainstream institutional investors into a single vehicle.

Outcome:

The result of the SDG Loan Fund was one of the more efficient blended finance structures on record. FMO's catalytic capital achieved a mobilization ratio of 1:9: every dollar of first-loss capital mobilized \$9 of private sector capital.³³

The ratio between the dollars committed to MacArthur's guarantee and the dollars ultimately unlocked from private investors reached 40:1.³⁴

Both these figures sit well above the sector norm: across a sample of 340 blended finance transactions, every dollar of concessional capital has mobilized on average \$4.1 in commercially priced capital, of which just under half (\$1.8) has been sourced from private sector investors.

Notably, this was the final transaction in MacArthur's \$150 million allocation to demonstrate the effectiveness and varied uses of catalytic capital, meaning the SDG Loan Fund was explicitly designed as a proof point as much as a financing vehicle: evidence that a modest guarantee, correctly layered, can unlock institutional capital at a scale most blended finance structures do not reach.





“ Ocean ecosystems enable 80% of global trade and support food security for over 3 billion people. Yet, SDG 14 (Life below water) remains the least-funded goal, receiving under 1% of development finance.

Aligning finance with ocean-positive solutions

Ocean ecosystems enable 80% of global trade and support food security for over 3 billion people. Ocean sectors are expected to contribute over \$3 trillion annually to global GDP by 2030.³⁵ Yet, SDG 14 (Life below water) remains the least-funded goal, receiving under 1% of development finance, against an estimated \$175 billion of annual investment needed to support the conservation and restoration of the world's ocean ecosystems.^{36,37}

Three core challenges include:

- **Limited alignment of ocean priorities** within national policy and financial frameworks.
- **Harmful subsidies** that distort incentives (e.g. \$22 billion/year to unsustainable fishing).^{38,39}
- **Shortage of bankable, replicable projects** to build a scalable investment pipeline of ocean-regenerating activities.

The three case studies below demonstrate how catalytic actors can address these challenges by operating across multiple roles simultaneously. In Case Study 2, a debt-for-nature swap has unlocked significant new resources for Ecuador to invest in conservation of the Galápagos marine ecosystem. Case Study 3 illustrates how a corporate actor, Ørsted, was able to raise institutional capital to finance a blue economy that safeguards marine ecosystems. Case Study 4 demonstrates how an early, strategic and well-placed catalytic intervention moved a university ocean CDR project from prototype to a publicly co-funded plant with institutional investors and pre-sold offtake.

**Challenge:**

The Galápagos Islands are a globally significant marine ecosystem under mounting ecological pressure, threatened by global warming and biodiversity loss. In early 2023, Ecuador accounted for 42% of the total catch by netted and pole-and-line vessels across the entire Eastern Pacific, fished in part by an artisanal fleet of roughly 55,000 vessels.⁴⁰ The government's ability to protect this natural ecosystem was severely limited by high levels of commercial sovereign debt. This left very little fiscal room to invest in conservation efforts, which therefore remained permanently underfunded.

Solution:

In May 2023, the world's largest debt-for-nature swap made history by restructuring \$1.63 billion of Ecuador's public debt for a new \$656 million blue bond loan, unlocking over \$450 million to protect the Galápagos marine ecosystem. Since the new loan is backed by insurance and guarantees, it carries a lower interest rate and will ultimately generate more than \$1.1 billion in lifetime savings through reduced debt costs for the government.⁴¹

Catalysts and their roles:

The structure was considered bankable only thanks to the very tight collaboration between multiple catalytic actors and commercial capital providers, including the following:

Deal origination & structuring: Oceans Finance Company (part of Climate Fund Managers, a for-profit impact investor) developed the concept from scratch, invested early-stage development capital and convened Ecuador, the U.S. International Development Finance Corporation (DFC), the Inter-American Development Bank (IDB), Credit Suisse and Pew Charitable Trusts into a single coordinated structure. It therefore played a combined **Risk-absorber** (first capital in) and **Coalition-builder** role.

Impact loan: The \$656 million loan was financed via the Galápagos Marine Bond, arranged and structured by Credit Suisse, which also acted as offeror in the bond exchange with existing holders – demonstrating a debt-for-nature bond of this scale could be priced and placed with private investors (**Market-builder**).

Risk-mitigation layer: The DFC provided political risk insurance covering the full \$656 million loan, the IDB added an \$85 million guarantee, and a consortium of 11 private insurers supplied more than 50% reinsurance. This layered guarantee stack made the loan priceable by capital providers (**Risk-absorber**).

Technical assistance & advisory: The Pew Bertarelli Ocean Legacy Project, a partnership between

philanthropist Dona Bertarelli and the Pew Charitable Trusts, spent four years on the underlying technical work, including the foundational assessment of the Galápagos Marine Reserve, while Baker McKenzie provided the legal structuring, including setting up the Galápagos Life Fund and drafting the sustainability commitment documentation (**Capacity-builder**).

Conservation commitments & monitoring: Ecuador's government agreed to time-bound, independently tracked sustainable-fishing and climate-resilience commitments, with additional payments triggered if targets are missed, building the measurement backbone that gives investors the confidence that their funds are achieving real outcomes (**Data & Standards-setter**).

Policy commitment: The government's parallel commitment to a sustainable blue economy, crystallized in the creation of the new 60,000 km² Hermandad Marine Reserve, embedded the deal's conservation goals directly into national policy (**Policy-advocate**).

Conservation funding: For the first 18.5 years, Ecuador has committed to channelling roughly \$323 million into marine conservation (composed of ~\$12 million a year in direct funding plus ~\$5.4 million a year seeding an endowment). These funds cover the management of both the Galápagos Marine Reserve and the new Hermandad Marine Reserve.

Narrative effect: Public positioning of the deal by Pew, Bertarelli and DFC as the “world's largest debt conversion for marine conservation” has helped establish debt-for-nature swaps as a credible, replicable asset class for other sovereigns (**Narrative-shaper**).

Endowment: The Galápagos Life Fund (GLF), a newly created Ecuadorian-led nonprofit, was established to govern these proceeds in perpetuity. By 2041, the endowment is projected to reach more than \$227 million, generating roughly \$12 million annually in conservation funding indefinitely — well beyond the loan's term (**Governance & Equity guardian**).

Outcome:

This tightly orchestrated deployment of catalytic roles turned Ecuador's sovereign debt burden into a self-sustaining conservation asset. It was only by combining risk-absorption, market-building, capacity-building and stewardship into one single structure that the full catalytic power of this collaboration led to the protection of the Galápagos Islands. The deal sits within a growing wave of debt-for-nature swaps, alongside Belize, Barbados and Gabon, that together are establishing this kind of catalytic structuring as a credible, replicable model for countries looking to restructure high debt burdens while investing in nature conservation.

**Challenge:**

Ocean-positive solutions face a chronic financing gap, partly due to the lack of standards and definitions around what can be considered “blue”. For example, offshore wind expansion is a powerful source of clean energy, but construction and operation can cause harm to marine life.

Solution:

In 2023 Ørsted, a Danish energy company and the world's largest offshore wind developer, issued the first “blue bond” by an energy company, managing to raise capital for offshore development while committing to protecting marine ecosystems.⁴² The bond proceeds are allocated to two areas:

1. **Biodiversity conservation and restoration:** e.g. piloting artificial habitat restoration, supporting Ørsted's commitment that all new renewable energy projects commissioned from 2030 onward will have a net-positive biodiversity impact;
2. **Sustainable shipping:** funding the development of sustainable marine fuels to decarbonize ocean vessels.

Catalysts and their roles:

Definitions & verification: The bond was structured in alignment with the *Guidelines for Blue Finance* published by the International Finance Corporation (IFC).⁴³ The guidelines map eight “blue” project categories, including offshore renewable energy and marine ecosystem restoration, against the existing Green Bond Principles and Green Loan Principles, and align them with UN Sustainable Development Goals 6 (Clean water and sanitation) and 14 (Life below water). In its catalytic role as **Data & Standards-setter**, IFC gave the issuer and investors a shared taxonomy for what counts as “blue,” required transparent management and reporting of proceeds, and called for independent second-party verification. This closed the information and trust gap, reducing uncertainty for investors and giving them a credible framework against which to underwrite the bond.

Using monitoring to build capacity: Meanwhile, Ørsted built an internal Biodiversity Measurement Framework, translating IFC's high-level eligibility standards into a single practical tool for selecting and monitoring its own projects, driving capacity-building across multiple divisions of its business (**Capacity-builder**).

Building capacity and policy narratives: Ørsted brought additional market credibility to this endeavour through its ongoing partnership with WWF, which plays a catalytic role as **Capacity-builder** and **Policy-advocate**. Since 2022, WWF's restoration project in the North Sea, with academic partner DTU Aqua, has tested methods to repopulate depleted reef-building species (e.g. native flat oysters, horse mussels) at scale, as proof-of-concept for what “net-positive biodiversity” offshore wind could look like in practice, while jointly pushing for governments to embed nature-positive requirements into future offshore wind tenders.⁴⁴

Commercial returns: Ørsted as the issuer and NatWest as the arranger both acted as catalytic **Market-builders**. By structuring a straightforward five-year €100 million private placement (3.625% fixed rate) modelled against the IFC framework, they enabled APG, Europe's largest pension investor, to commit €50 million on behalf of Dutch pension fund ABP as the anchor institutional investor. ABP in turn was able to declare explicitly that its investment was attractive for its risk/return profile, not merely for its ecological impact.⁴⁵

Outcome:

The absence of guarantees or first-loss protection attached to this transaction demonstrates that IFC's catalytic role combined with Ørsted's own credibility and track record were sufficient to give institutional investors the confidence to participate without a de-risking layer. Blue bonds had traditionally been reserved for DFIs and governments, but this case proves that a corporate energy company can not only issue a blue bond, but also place it successfully with major institutional investors. Since this transaction, APG has backed further blue bonds, including a €75 million investment in a 2025 Italian water-infrastructure blue bond issued by A2A, citing its experience with Ørsted as a reference point.⁴⁶

**Challenge:**

Ocean carbon dioxide removal (CDR) is increasingly recognized as a potential complement to emissions reductions, but the technology faces a significant financing gap between laboratory research and commercial deployment.⁴⁷ However, despite its abatement potential, CDR technologies remain technically unproven at scale, capital-intensive to demonstrate and too risky for most commercial investors.⁴⁸ This creates a “valley of death” where promising innovations struggle to secure the funding needed to validate their technologies and reach commercial readiness.

The core problem is that the bottlenecks are interconnected: a first-of-a-kind marine CDR plant cannot attract investment without performance data; it cannot generate that data without a host site offering seawater intake, discharge consents and regulatory cover; and it cannot sell the resulting removals without a verification standard that, until recently, did not exist for electrolytic ocean CDR. Grant capital alone cannot overcome these multiple barriers.

Solution:

Equatic, formerly Project SeaChange, was created at UCLA's Institute for Carbon Management (ICM) and spun out in 2023. Its patented seawater electrolysis process removes carbon dioxide from the ocean and stores it permanently as carbonates, while producing green hydrogen as a saleable co-product. By enhancing the ocean's natural capacity to absorb atmospheric carbon dioxide while generating a clean fuel, the technology has the potential to create a commercially viable ocean-based carbon removal industry.⁴⁹ It moved from prototypes at UCLA in 2021 to two pilots running by March 2023, at the Port of Los Angeles and PUB's research facility in Tuas, Singapore. In February 2024, PUB (Singapore's National Water Agency), the National Research Foundation (NRF) and UCLA ICM committed S\$27 million to Equatic-1, a demonstration plant 100 times the pilot's size, with PUB and Singapore's National Parks Board (NParks) acting as governance stewards over discharge treatment and environmental review.

Catalysts and their roles:

Temasek Foundation, PUB, NRF, NParks, UCLA ICM and Temasek Trust's Catalytic Capital for Climate and Health (C3H) form the core catalytic ecosystem, with Stripe, Axios and Boeing and the U.S. Department of Energy supplying early demand and the registries Isometric and Puro.earth verification.

Foundation plays multiple early catalytic roles:

1) Risk-absorber: In July 2021, SeaChange won Temasek Foundation's Liveability Challenge from 450 applications across 60 countries and was awarded S\$1 million to develop the project in Singapore.⁵⁰

2) Coalition-builder: The award and its ecosystem connected Equatic to PUB, turning a university spin-out into a philanthropic-public-private partnership. This unlocked access rather than money: PUB's Tuas facility supplied the seawater intake, outfall and regulatory standing that a first-of-a-kind plant cannot buy.

3) Narrative-shaper: The Challenge, Equatic's selection in September 2024 as an Earthshot Prize finalist, as well as being named a Carbon Dioxide Removal Purchase Pilot Prize semi-finalist by the U.S. Department of Energy, supplied the third-party endorsement that early-stage deep tech needs.⁵¹

Anchor buyers and standards build the market:

1) Market-builder: in 2023 buyers committed before the technology could prove itself. Stripe pre-purchased carbon removals in 2021 at \$1,370 per tonne.⁵² By Equatic's launch in May 2023, the pilot's entire output was pre-sold, and Boeing signed a pre-purchase agreement for 62,000 tonnes of removal and 2,100 tonnes of hydrogen from future plants.⁵³

2) Data & Standards-setter: in 2024 Equatic published an ISO 14064-2:2019 methodology for the monitoring, reporting and verification (MRV) of electrolytic ocean-based CDR. Isometric subsequently certified a protocol for Electrolytic Seawater Mineralization, while Puro.earth developed a Direct Air Capture and Ocean Storage methodology.⁵⁴ With Equatic's ISO 14064 MRV standard validated by both registries it became one of the only marine companies able to issue credits under each.

Public sector's critical scale-up roles:

1) Risk-absorber: With the pilots proven and forward demand evidenced, PUB and NRF absorbed the scale-up risk, co-funding with UCLA ICM the S\$27 million Equatic-1 demonstration plant. This was a pre-commercial facility designed to remove 10 tonnes of CO₂ daily (100x the pilot) while producing 300kg of green hydrogen.

2) Governance & Equity guardian: PUB and NParks also acted in a stewardship role, requiring discharge to be properly treated, with independent impact modelling and environmental reviews before any further expansion of the technology.⁵⁵

Philanthropy graduates to commercial funding:

In August 2025, Equatic closed an \$11.6 million Series A, exceeding its target, led by C3H (a catalytic vehicle of Temasek Trust) and co-led by Kibo Invest, with the Aga Khan Foundation and Grantham Neglected Climate Opportunities participating.⁵⁶ The ecosystem that supplied the first concessional grant in 2021 returned as an equity investor, on the strength of a track record it had helped build.

Outcome:

Equatic has demonstrated how philanthropic and catalytic actors can combine many roles – Risk-absorber, Coalition-builder, Narrative-shaper, Market-builder, Data & Standards-setter and Governance & Equity guardian – to release bottlenecks no single instrument could address. A S\$1 million

grant bought a pathway out of the laboratory; an introduction bought an operating site and a regulator; anchor purchases bought demand ahead of proof; and a verification standard bought a market. Thanks to early, strategic and well-placed catalytic interventions, four years later a university spin-out moved from prototype to a publicly co-funded plant with institutional investors and pre-sold offtake.





“ **Gross deforestation – permanent conversion to another land use – averaged 10.9 million hectares per year from 2015-2025.**

Revaluing standing trees, transforming supply chains and mitigating threats

Forests store approximately 861 gigatonnes of carbon,⁵⁷ with large amounts held in forest soils or converted through photosynthesis into glucose with oxygen as a by-product. Forests also provide essential ecosystem services to an estimated 2.4 billion people who are dependent on them for food, shelter, water, energy and economic activity. Not least, forests are home to approximately 80% of the world's terrestrial biodiversity, making them vital in supporting healthy ecosystems.

Gross deforestation – that is, permanent conversion to another land use – averaged 10.9 million hectares per year from 2015-2025, according to FAO, including 4.3 million hectares of primary rainforest.⁵⁸ Economic incentives still favour dead trees (and the cleared land on which they stand) over living ones. Timber extraction and land conversion for agriculture, pasture, mining or settlement generate more immediate and favourable financial returns than carbon storage, biodiversity or watershed protection,

which are difficult to value and therefore to monetize.

Hence, the journey towards forest-positive economies must navigate the following core challenges:

- Failure to incorporate the true economic value of standing forests into national accounts and financial decision-making.
- Destructive supply chains that systematically reward deforestation, including food systems, mining, paper, packaging and textiles.
- Financial flows will continue to favour conversion and extraction over conservation, unless both the valuation problem and demand-side drivers are addressed.

Case Study 5 profiles the Tropical Forest Forever Facility which is creating an innovative financial instrument to reward countries that conserve their standing forests. Case Study 6 profiles the work of Canopy in accelerating forest-friendly alternatives for the feedstocks used in paper, packaging and apparel supply chains.

Not all deforestation is deliberate or human-caused. In 2025, wildfires accounted for 42% of the 25.5 million hectares of worldwide tree cover loss (permanent or temporary disturbance of the canopy).⁵⁹ During the 2024-2025 season, an estimated \$215 billion in assets were exposed to wildfire globally – with economic losses from the Los Angeles fires of January 2025 alone causing economic losses exceeding \$140 billion.⁶⁰ In fire-prone regions, communities are left doubly exposed – as the capacity of governments and forest agencies to respond is overwhelmed, while insurers

are being driven out of markets they can no longer price with confidence.

Case Study 7 profiles the work of FireSat in developing near-real time satellite-based detection of wildfires that can greatly speed up response times.

Each of the case studies below illustrates how catalytic actors can deploy different tools to unlock the different challenges related to deforestation and forest degradation.

CASE STUDY 5

Tropical Forest Forever Facility – rewarding countries for standing forest



Challenge:

The planet is losing more than 4 million hectares of primary tropical forest every year, releasing more than 5 billion tonnes of CO₂e and threatening many species with extinction. Deforestation in turn destabilizes the global economy, by reducing agricultural yields, increasing water insecurity and threatening the livelihoods of millions of people who depend on forests for income, food and stability.⁶¹ The challenge that underpins most deforestation is economic by nature: land-use decisions favour timber and agriculture because conservation lacks scalable, bankable returns and private investors view forest protection as high risk. Put simply: in the current economic paradigm, trees are worth more cut down than kept standing. Changing this paradigm is complex and challenging.

Solution:

The Tropical Forest Forever Facility (TFFF) – launched at COP30 in Belém, Brazil in November 2025 – is an innovative financing mechanism that reframes standing forests as durable, investable public goods by creating predictable revenue streams for conservation. The TFFF aims to mobilize \$125 billion in philanthropic, public and private capital, which is then reinvested. The revenues generated will be used to reward Tropical Forest Countries with a fixed amount per hectare of conserved or restored forest. Meanwhile, the TFFF will maintain its capital base to ensure the facility's long-term sustainability.

Catalysts and their roles:

Sponsor countries and organizations absorb risk and build capacity:

1) Risk-absorber: Sponsor countries, including Norway, Germany, Brazil, Indonesia, France and Luxembourg, plus several philanthropic or non-profit organizations, serve as risk-absorbers. At the time of writing, their pledges totalled ~\$6.8 billion towards the target of \$25 billion of “sponsor capital”, which will serve as the core of TFFF's investments and junior debt in the event of any losses. This capital will then be leveraged to mobilize an additional \$100 billion from private investors.⁶²

2) Capacity-builder: Sponsor countries and organizations will also play a role in building capacity through convening stakeholders and providing technical assistance grants. Tropical Forest Countries will need to build capacities to meet forest monitoring criteria, establish a grievance and redress mechanism, and create a credible financial management mechanism to allocate forest payments.

Tropical Forest Countries ensure equity of outcomes:

1) Governance & Equity guardian: Tropical Forest Countries including Ghana, the Democratic Republic of Congo, Malaysia and Indonesia are participating in TFFF, along with the Global Alliance on Indigenous Peoples. This will ensure equity of outcomes, including through the rule that at least 20% of resources must go to Indigenous Peoples and Local Communities.⁶³

TFFF's coalition will design the framework and build the market:

1) Data & Standards-setter: TFFF's coalition includes the World Bank, the UN's Food and Agriculture Organization (FAO) and Brazil's National Institute for Space Research (INPE), which are helping design the TFFF's eligibility framework and satellite-based forest monitoring system.⁶⁴

2) Market-builder: The Tropical Forest Investment Fund (TFIF), likely to be established in Luxembourg in October 2026, will be the market-building engine – pooling sponsor and investor capital, investing in a diversified fixed-income portfolio and converting investment returns into predictable forest payments.⁶⁵

Outcome:

By taking a different approach, TFFF complements other forest finance programmes, such as REDD+ and forest carbon markets. While they focus on rewarding emissions reductions, TFFF's model aims to pay tropical forest countries a fixed amount for each hectare of standing forest they maintain, while any deforestation or fire-related degradation will reduce payments.⁶⁶ If successful, TFFF offers a potentially replicable model for scaling-up conservation finance, which can be applied to a range of terrestrial and aquatic biomes.



Challenge:

Over 5 billion trees are logged globally each year to manufacture paper, packaging and man-made cellulosic fibres (MMCF) such as viscose and rayon – widely used in the manufacture of apparel. Many of these trees come from “the world’s most carbon-rich and biodiverse forests”, according to Canopy, a non-profit group dedicated to promoting alternative packaging solutions.⁶⁷

The underlying challenge is one inherent to scaling-up nascent markets for all sustainable solutions: technologies are capital-intensive and risky at first-of-a-kind scale, supply chains are fragmented, traceability is weak and buyers face procurement, cost and reputational uncertainty. Without coordinated intervention, promising alternatives struggle to move from pilot projects to bankable industrial capacity.

Solution:

Canopy works to accelerate a shift away from virgin tree pulp by scaling-up commercial conditions for alternative industrial feedstocks (“Next Gen fibre”) across paper, packaging and textile supply chains. These include cellulosic materials derived from textile and paper waste, as well as agricultural and plantation residues. The NGO counts over 1,000 partners committed to phasing out fibre from ancient and endangered forests in preference of Next Gen fibre – they include brands, innovators and producers with \$2 trillion in annual combined revenues.

Catalysts and their roles:

Addressing these barriers requires catalytic capital, technical support and anchored demand. Canopy’s ecosystem brings together a wide range of actors to deliver the sequence of catalytic roles presented in this report:

Philanthropies and foundations:

These Catalysts act as **Risk-absorbers** by funding pilots and technical assistance through seed grants, proof-of-concept finance; and as **Capacity-builders** by supporting multi-stakeholder convening. For example, in 2023 Canopy secured funding from The Audacious Project (TED’s philanthropic vehicle),⁶⁸ while the NO.17 Foundation (the philanthropic arm of the Tsao Pao Chee Group) co-hosted the Davos announcement.

Development finance and blended funds:

These function as **Risk-absorbers** and **Market-builders** through providing concessional capital and guarantee structures that lower first-of-a-kind financing costs, layering

capital tranches to blend different risk tolerances. Canopy is planning to engage with DFIs and MDBs, as well as governments, to develop its blended finance model.

Private investors and family offices:

These Catalysts can play a **Market-builder’s** role by providing growth capital for scaling-up facilities. Canopy’s \$2 billion investment programme is designed first to establish market confidence, then crowd-in private capital alongside catalytic investors and public finance to accelerate the transition to Next Gen fibre.

Major brands and retailers:

These companies can play a similar **Market-builder’s** role by serving as anchor offtakers and aggregating demand. At COP27 in 2022, Canopy spearheaded a collective commitment from brands including H&M, Inditex, Ben & Jerry’s, Stella McCartney, HH Global and Kering to purchase over half a million tons of regenerated cellulosic and other alternative fibres for fashion textiles and paper packaging.⁶⁹

Technical partners, NGOs and standards bodies:

These organizations play an important role as **Data & Standards-setters** by establishing certification and traceability protocols (e.g. for feedstocks), product standards and performance evidence through MRV. Canopy partners with FSC, ZDHC* and Preferred by Nature.

Canopy itself plays several catalytic roles:

Through its work with these partners, Canopy acts as a **Coalition-builder** through forming pre-competitive alliances to create predictable demand and **Market-builder** through aggregating advance purchase agreements. Underpinning all of this is its function of **Narrative-shaper**, reframing next-generation feedstock alternatives as reliable, sustainable lower-risk alternatives, capable of growing into mainstream industrial markets.

Outcome:

At the World Economic Forum’s Annual Meeting in Davos-Klosters in January 2026, Canopy and its partners announced their intention to explore the mobilization of a \$2 billion blended finance platform to accelerate India’s rapid deployment of Next Gen materials in paper, packaging and textiles.⁷⁰

Notes: * FSC = Forest Stewardship Council, ZDHC = Zero Discharge of Hazardous Chemicals.

**Challenge:**

In 2025, fires accounted for 42% of the 25.5 million hectares (63.1 million acres) of tree cover loss worldwide.⁷¹ Until very recently, the granular data to detect and prevent fires at scale lagged behind what was needed. Existing satellites are built for weather or general Earth observation and typically recorded fires only once they are already large, leaving fire agencies and land managers to act on delayed data.

Solution:

On 7 July 2026, FireSat launched three operational satellites aboard a SpaceX Falcon 9 to initiate the first constellation purpose-built for wildfire detection at a detailed level. Built by the non-profit Earth Fire Alliance (EFA) with satellite manufacturer Muon Space, the constellation will reach its full scale of 50 satellites by the early 2030s. The satellites use multispectral imaging to look through clouds and smoke to detect fires as small as 5x5 metres and when fully deployed will revisit any point on Earth roughly every 20 minutes.⁷² Muon Space estimates that an hourly revisit rate alone could save the United States more than \$1 billion a year in fire damage, protecting 3,500 homes and reducing burned land by 2.3 million acres.

Catalysts and their roles:***Absorbing early risk:***

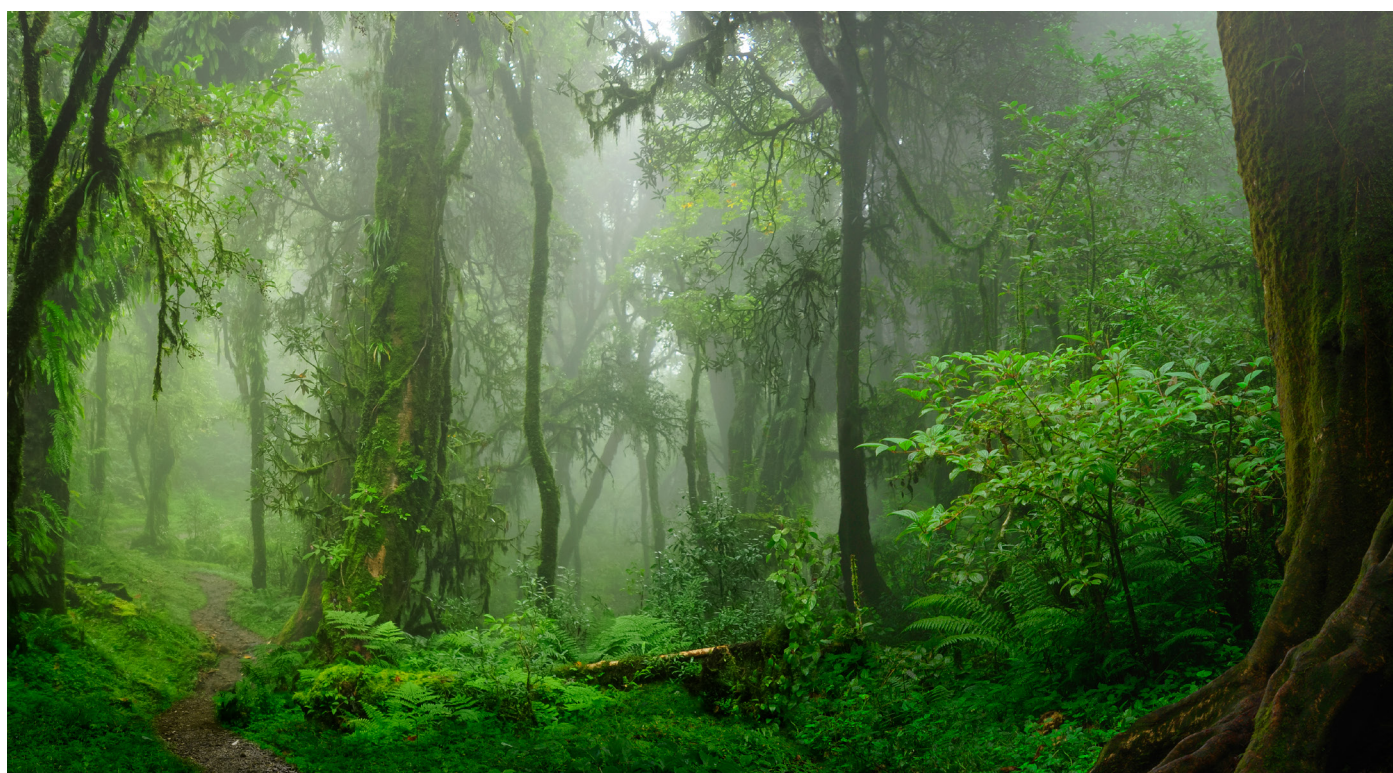
Philanthropies and foundations acted as **Risk-absorbers**, underwriting a capital-intensive first-of-a-kind satellite system. Google.org and the Gordon and Betty Moore Foundation backed FireSat from its inception. More recently, the Bezos Earth Fund committed \$26 million to help FireSat build out its operations and monitor wildfires in regions such as the Amazon Basin. Their philanthropic capital absorbed early risk to build a public-good infrastructure that markets were not yet ready to finance alone.

Changing perceptions:

Philanthropic partners also served as **Narrative-shapers**, using their credibility to signal that dedicated wildfire-detection infrastructure is a viable, urgent investment category rather than a niche research effort.

Outcome:

EFA has structured FireSat as a replicable, public-private-philanthropic model. It is designed so that data stays open and accessible, while building towards a sustainable, multi-payer base over time. Fire agencies and governments, scientific institutions and private-sector partners each engage on different terms. Organizations that are early to adopt this new technology include fire agencies in California, Colorado, Australia and Portugal.





“ A reduction of 160 Gt CO₂ in coal emissions is needed to achieve net zero by 2050.

Ensuring the energy transition delivers for all

The energy sector generates roughly three-quarters of global greenhouse gas emissions, making the decarbonization of power supplies vital to limit warming within the ambitions of the Paris Agreement. According to the latest Net Zero Emissions Scenario of the International Energy Agency (IEA), energy-related CO₂ emissions need to fall by nearly 55%, from 38 billion tonnes (Gt) in 2024 to 18 Gt by 2035.⁷³

Coal is the single largest driver of this problem, accounting for 41% of global CO₂ emissions from fossil fuels and land-use change in 2025, outstripping oil at 32% and natural gas at 21%.⁷⁴ To meet global climate goals, it is essential not only to end the construction of new coal power plants, but also to close many in operation. The IEA estimates that a reduction of 160 Gt CO₂ in coal emissions is needed to achieve net zero by 2050. Two-thirds of this comes from retiring existing coal plants, of which ~60% are in emerging and developing economies.⁷⁵

This presents a substantial challenge. Many plants are quite young, with considerable unrecovered capital investment. Without making such transactions financially viable and attractive to coal plant asset owners, these plants will continue to operate and emit.

Equity of access to energy is also a critical part of the transition, with SDG 7 requiring access to affordable, reliable, sustainable and modern energy for all by 2030. According to the UN, 655 million people globally still lack electricity access and two billion rely on polluting cooking fuels, which put their health at risk. Sub-Saharan Africa accounts for the majority of those affected, with over 560 million living without electricity.⁷⁶

Core challenges to decarbonizing power in line with net-zero goals, while ensuring universal access to sustainable energy, include the following:

- **Every year, around 177 million people need connecting to electricity** to reach SDG7, when taking population growth into account.⁷⁷

- **Renewable capacity must grow 13.7% yearly** — over four times the historical rate.⁷⁸
- **Retiring existing coal plants is the only way to reduce coal emissions fast enough** to align with the IEA's net-zero by 2050 scenario.

Case Study 8 profiles the role of the Global Energy Alliance for People and Planet (GEAPP) since 2021 in mobilizing over \$1 billion of clean energy financing to promote equitable energy access across 40

countries. Case Study 9 looks at how the Self-Employed Women's Association (SEWA) in India catalysed loans for hundreds of women to buy solar pumps, leading to income gains, new jobs and follow-on investment. Case Study 10 analyses how Acumen triggered \$125 million of commercial investment into emerging solar and mini-grid models across low-income communities. Case Study 11 demonstrates the power of catalytic actors in helping a commercial coal plant close early in the Philippines.

CASE STUDY 8

Global Energy Alliance for People and Planet (GEAPP)



Challenge:

The problem that the Global Energy Alliance for People and Planet (GEAPP) addresses is stark: around 655 million people, mostly living in emerging economies, lack access to reliable, affordable electricity. This severely constrains economic opportunity, education and health. Moreover, most energy systems remain carbon-intensive and under-financed. GEAPP's mission is therefore to accelerate equitable energy transitions. The challenge is to expand energy access while accelerating decarbonization. This requires substantial capital, technology deployment and coordinated policy and market action.

Solution:

GEAPP is a coalition-led initiative – launched at COP26 in Glasgow, Scotland, in November 2021 – to meet this dual challenge by scaling-up decentralized renewables, modernizing grids and catalysing productive, job-creating investments. Since its launch, GEAPP has mobilized over \$1 billion in clean energy financing, brought together more than 50 partners, supported 130 projects across 40 countries, averted roughly 147,000 tonnes of CO₂e and supported livelihoods for over 600,000 people.

Catalysts and their roles:

GEAPP's partners – which include governments, philanthropies, DFIs, MDBs, private investors, technical organizations and NGOs – design and implement projects that expand energy access and reduce emissions in ways aligned with local development priorities.

GEAPP itself acts primarily as a Coalition-builder:

Its operational model is catalytic and premised on the potential of sequencing unique roles across diverse actors. With the support of its sponsors, GEAPP underwrites pilots and supports the convening of stakeholders.

Building the financial infrastructure for the energy transition:

GEAPP combines grant funding, blended finance and market structuring to scale up distributed renewables

(including microgrids), grid modernization and productive-use investments that stimulate local economies. DFIs, MDBs and blended-finance vehicles function as **Risk-absorbers** through providing concessional capital and guarantees that mobilize private finance.

Creating innovative approaches to build the market:

Philanthropic capital channelled through GEAPP has played a critical **Market-builder** role by developing innovative financing approaches to early coal plant closure. These include financial restructuring⁷⁹ and developing transition credits⁸⁰ – a new class of carbon credit that monetizes verified emissions from early closure. Philanthropic funds are also supporting the analytical work coal power companies need to do to assess their transition options.⁸¹ GEAPP's technical partners serve as **Data & Standards-setters** by developing measurement frameworks that in turn increase market trust.

Supporting the just transition:

GEAPP has established strong relationships and programmes in three Just Energy Transition Partnership (JET-P) markets: South Africa, Indonesia and Viet Nam, all of whose electricity systems run on coal. In South Africa, GEAPP has played the roles of **Capacity-builder** and **Governance & Equity guardian**, by channelling philanthropic capital to help set up a facility to retrain coal workers with the expertise needed to run a new renewables facility that will replace the closing Komati coal power plant.⁸² GEAPP also supports developers and institutional strengthening.

Outcome:

GEAPP's outcomes to date include accelerating project pipelines across Africa, Asia and Latin America; increasing the flow of private capital into clean energy; demonstrating models for job-rich deployment; and advancing measurable progress toward its targets of broad electrification, emissions avoidance and green employment. In turn, its work is creating templates for scalable, investable energy transitions across emerging markets.

**Challenge:**

Millions of women in India's informal economy (e.g. salt-pan workers, smallholder producers, micro-entrepreneurs) face exclusion from formal finance, high upfront costs for clean technologies, precarious incomes and weak bargaining power. Their reliance on diesel-powered equipment imposes heavy operating costs and health impacts from pollution, while fragmented markets and limited technical skills keep these workers “unbankable” to commercial lenders.

Solution:

The Self-Employed Women's Association (SEWA) in India demonstrates how catalytic interventions can simultaneously advance clean energy transitions and economic justice. SEWA converts rights-based community organization into an investable delivery channel for clean energy and inclusive finance. SEWA's approach yields measurable outcomes: the initial financing of hundreds of solar pumps led to wider commercial uptake, yields income gains for women, creates local jobs in energy services and attracts follow-on investments. This offers a scalable model to expand clean energy access and productive livelihoods in the informal economy.

Catalysts and their roles:***From “unbankable” practices to viable financial frameworks:***

SEWA and its partners have played several critical catalytic roles to transform the financially excluded practices of Gujarat's women salt farmers into viable financial frameworks:

1) Risk-absorber: Backed by philanthropic funding and the IFC, SEWA initiated a 25% first-loss guarantee that de-risked SEWA Bank's financing of 600 solar pumps.

2) Market-builder: This initiative demonstrated proof of concept that prompted the Bank of Baroda to extend loans for 15,000 additional pumps. In partnership with DFIs, commercial banks and impact investors, SEWA Bank and affiliated cooperatives aggregate borrowers' cashflows to bundle and scale-up lending and attract follow-on capital. Loans are metered, performance is community-audited and repayments are pooled to create bankable instruments for commercial lenders.

Training transforms incomes:

Acting as a **Capacity-builder**, SEWA and its partners provided Gujarat's salt farmers with training in financial literacy and maintenance of solar pumps. By providing both training and resources, SEWA has enabled farmers to increase their income by 30%, while reducing production costs by 20%. Some farmers who developed new income streams from solar parks and through working as solar technicians saw their incomes rise by up to 600%.⁸³

Catalysing scale to transform the lives of marginalized workers:

Underlying SEWA's intervention in Gujarat is their role as **Narrative-shaper** and **Governance & Equity guardian**. The initiative has attracted over \$3 million in investment, showcasing how rights-based, women-led finance can advance sustainable energy practices in the informal economy, while ensuring that transition benefits flow to women once paid a pittance for their hard labour. In turn, this transforms millions of marginalized, informal female workers in India from invisible labourers into empowered, self-reliant entrepreneurs.

Outcome:

SEWA's combination of philanthropic first-loss guarantees, technical assistance, loan bundling and performance monitoring enables the underwriting of loans for solar pumps, microgrids and other productive-use technologies for women producers.



Challenge:

The off-grid energy sector is a critical frontier in the fight against energy poverty, but for years it has been dramatically underfunded. When Acumen – a global, non-profit impact investment organization aimed at tackling poverty in low-income communities – began investing in off-grid energy in 2007, over 1 billion people worldwide lacked energy access and 3 billion cooked with dirty fuels. Promising models were emerging – such as pay-as-you-go solar and mini-grids – but pioneering companies were unable to secure funding in the earliest growth stage, where investors have no track record to underwrite and no standardized way to judge an unproven model in a frontier market.

Solution:

In 2017, building on a decade's track record, Acumen formalized its experience into the Pioneer Energy Investment Initiative (PEII): a \$20-22 million, five-year vehicle to invest in and de-risk emerging solar and mini-grid models, build entrepreneur capacity and share sector-wide insights.

Catalysts and their roles:

Acumen's PEII initiative was investable only through tight collaboration between multiple catalysts:

Multi-stakeholder grant funding got the initiative off the ground:

Various foundations played the critical early role of **Risk-absorber**. IKEA Foundation funded a design grant to structure PEII before it even launched, then anchored the vehicle with an initial \$5 million grant within a broader €21.9 million relationship. Osprey Foundation joined as an early funder alongside IKEA Foundation. Later, UK Aid backed Acumen's larger H₂R Catalyze initiative.

Early-stage equity investment and technical assistance build capacities and markets:

Since 2007, Acumen's own patient capital in pioneers such as d.light and M-Kopa have proved pay-as-you-go solar's viability. Acumen's early-stage equity functioned as a first-loss layer – a **Risk-absorber** role. But beyond that, the founding premise of the PEII programme was that "equity investments, unlike grants, create stronger companies with more robust

governance, which make lenders more comfortable with providing the debt needed to scale operations". This combination of patient equity-based commitment, paired with hands-on technical assistance to its portfolio companies, has enabled Acumen to play both **Capacity-builder** and early **Market-builder** roles in helping pioneers develop the operational skills they need to survive their first years.

Investing in research and training builds talent pipeline:

UK Aid, via its Transforming Energy Access (TEA) platform, funded research and evidence generation across the whole off-grid sector. It also funded a postgraduate TEA Learning Partnership and the PowerUp! programme, training 18 national renewable energy agencies across sub-Saharan Africa.⁸⁴ These roles of **Capacity-builder** and **Data & Standards-setter** proved critical in helping build a talent pipeline.

Acumen's broad coalition of actors helped generate scale:

Further co-funders – including Autodesk Foundation, Signify Foundation and FMO (the Dutch entrepreneurial development bank) – were recruited into the multi-stakeholder compact around PEII, joining the earlier foundations in their role as **Coalition-builders**. Meanwhile, UK Aid played a similar role in helping establish the Global Distributors Collective, which today comprises over 200 last-mile distributor members reaching 33+ million customers across 50+ countries.

Outcome:

By 2021, PEII had deployed early-stage equity into 12 companies that reached 1.25 million people, and attracted \$128 million in follow-on capital.⁸⁵ This sequenced deployment of catalytic roles – from patient risk capital and technical assistance, to sector-level standards and coalition infrastructure, which in turn enabled commercial capital to come to the table – is what turned a chronically underfunded opportunity in frontier markets into an investable asset class. It was only by combining risk-absorption, capacity-building, coalition-building and standards-setting that the sector crossed the threshold from isolated pilots to institutional capital. Acumen has since extended the same sequencing through PEII+ and the larger H₂R Catalyze initiative, suggesting this is not simply a one-off success but a repeatable playbook in other frontier-market sectors facing the same early-stage financing challenges.

**Challenge:**

Coal accounts for 36% of global power generation and approximately 10.3 gigatonnes (Gt) of carbon dioxide (CO₂) emissions per year.⁸⁶ Operating the existing global fleet to the full extent of each plant's potential lifespan would use up about half the remaining carbon budget for a 1.5°C future.⁸⁷ The International Energy Agency (IEA) estimates that a reduction of 160 Gt CO₂ in coal emissions is needed to achieve net-zero global emissions by 2050, some two-thirds of which needs to come from early retirements.⁸⁸

However, the challenge of closing large numbers of coal plants early is substantial. Most of these plants have not been operating long enough to recoup the original investment made to build them. This leaves an economic gap which requires bridging in early retirements to incentivize coal power asset owners to participate in any deal.⁸⁹

Solution:

In recent years, catalytic actors have come together to develop innovative financing approaches to deal with this challenge. One such transaction was deployed in 2022 to bring forward the retirement date of ACEN's South Luzon Thermal Energy Corporation (SLTEC) coal plant in the Philippines.⁹⁰ The transaction has involved ACEN, Philippines banks, institutional investors and philanthropies.

Catalysts and their roles:

The transaction showcases the diverse roles catalytic actors can play in the coal-to-clean transition:

Developing a transition plan and a market:

Philanthropies provided multi-dimensional support to develop a just transition plan that enabled the initiative to go ahead. Their roles included **Risk-absorber** and **Capacity-builder** in providing technical grants to develop new market concepts in transition credits, which have enabled asset owners to monetize emissions avoided through early plant closure. They played a vital role as **Market-builders** in providing ongoing support to advance the reality of transition credits and acted as **Data & Standards-setters** by advancing the methodologies and standards needed to ensure the integrity of such transactions.

Asian Development Bank (ADB), through its Energy Transition Mechanism (ETM), provided the inspiration for the structure of the transaction itself, demonstrating how DFIs can fulfil the role of **Coalition-builder** through their country platforms.⁹¹

Outcome:

The SLTEC transaction has yielded impressive results, halving the lifespan of the plant, which will now retire in 2040 – avoiding up to 50 million tonnes of carbon emissions.⁹² ACEN is now looking at deploying transition credits to further accelerate the plant's retirement to 2030.⁹³



Conclusion

Catalytic actors are pioneering a new paradigm that transforms their role from donors to co-creators of commercial opportunities that respect planetary boundaries.

This report has sought to define how catalytic actors – including philanthropy, family offices, foundations, impact investors, fund managers and institutional investors – can be enablers of markets for a sustainable economy. The examples outlined in the three systems (Ocean, Forests and Energy) illustrate the Catalysts' ability to leverage financial and non-financial resources, transforming non-commercial opportunities into viable market realities. Individually, these remain discrete cases. Together, they reveal patterns of collective action that are recalibrating how systems-level solutions can be identified and acted upon to deliver material gains for climate and nature.

Despite the large funding gap of nearly \$10 trillion in annual investment required to meet the 1.5°C and nature-positive targets, this report maintains the challenge is less about the quantum of capital and more about where and how capital is directed. It does not contend that catalytic capital can or should make up for or replace this investment gap. Rather, it is concerned with how both financial and non-financial resources can be strategically deployed to maximize their catalytic impact on the transition to a sustainable economy.

Traditionally, philanthropies, foundations and providers of de-risking capital have operated through a project-based approach, deploying resources as a last resort to fill the gaps where

conventional capital cannot contribute. These efforts remain important. But the reality of today's interconnected global challenges requires a shift away from subsidizing isolated projects with grant funding, towards co-creating regional and global alliances – such as GEAPP and TFFF, profiled in this report – that are capable of generating self-sustaining, commercially viable solutions across landscapes, systems and societies.

This report has identified eight distinct roles that catalytic actors can play in the investment value chain – Risk-absorber, Market-builder, Coalition-builder, Capacity-builder, Data & Standards-setter, Policy-advocate, Narrative-shaper and Governance & Equity guardian – which, when deployed at moments of maximum leverage in coordination with other catalytic actors, can help create the multiplier effects that a single grant or investment cannot achieve alone.

Catalytic actors are not in a position to lead systemic transformation – that is the role of governments, businesses and communities. However, they are uniquely placed to apply their combination of patient capital, technical expertise, policy influence and values-based stewardship to accelerate promising ideas into sustainable, commercial opportunities that deliver prosperity within planetary boundaries.

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