ISETS-EFN
Energy Finance Network

Climate Finance Outlook 2025

Global Trends, Challenges, and Opportunities

ISETS Energy Finance Network / ECF30 Forum
Institute of Carbon Neutrality and Climate Finance

Climate Finance Outlook 2025

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Global Trends, Challenges, and Opportunities

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Executive Summary

Climate Finance Outlook 2025 (the Outlook) draws on multi-source datasets such as the International Energy Agency (IEA), World Bank (WB), Organisation for Economic Co-operation and Development (OECD), Climate Policy Initiative (CPI), Climate Change Laws of the World (CCLW), and multilateral development banks (MDBs) to provide a quantitative assessment of global climate finance flows, market dynamics, and policy frameworks. It consolidates a comprehensive data architecture to illustrate the global transformation trends of public and private capital, supporting the achievement of climate goals. The evidence shows a marked acceleration in climate-related investment in recent years, led by clean energy, which now accounts for the largest share of incremental capital. MDBs' commitments have risen, sustainable bond markets have continued to expand, and carbon pricing mechanisms have broadened—demonstrating growing momentum in global climate action. However, significant financing gaps persist, policy uncertainty has increased, and structural imbalances persist across regions and sectors in terms of access, costs, and capital allocation.

1. Policy Trends

Under the Paris Agreement and the Glasgow Climate Pact, governments have accelerated climate finance policies, with a peak in policy numbers in 2021. Europe leads, while other regions show differentiated advances. Instruments have diversified, combining carbon pricing and emissions trading with climate funds, insurance mechanisms, and blended finance tools. MDBs reform—supported by the Group of Twenty (G20) and the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP) processes—is shifting toward private-capital mobilization and results-orientation, expanding guarantees and blended facilities and establishing unified frameworks for measuring climate outcomes. Climate disclosure regimes are moving from voluntary to mandatory; alongside European Union (EU) regulatory upgrades, the United States (U.S.) and China are advancing climate-reporting rules. However, recent reform progress in the U.S. has faced political and judicial resistance, showing a degree of uncertainty. Climate policy uncertainty has risen globally, with notable spikes at key geopolitical and fiscal junctures. Overall, policy signals emphasize dual fiscal-market approaches, convergence in standards and governance, and a stronger focus on mobilization and accountability to correct structural gaps and enhance leverage.

2. Global Climate Finance Landscape

Global climate finance continues to expand, reaching a record level in 2024. Clean energy remained the main driver of growth, with power generation, grid infrastructure, and end-use electrification accounting for nearly 80% of total investment. Advanced economies and China account for the majority of flows, while emerging and developing economies register rapid growth. Capital channels and instruments are expanding, with sustainable debt issuance totaling United States Dollar (USD) 1.05 trillion in 2024—green bonds comprising roughly 60% and use-of-proceeds formats being the dominant approach. Carbon pricing revenues reached USD 102.2 billion in 2024, with a weighted average compliance-market price of USD 29.06/tCO_2e. MDBs' climate finance commitments stood at USD 136.6 billion—almost double 2020 levels—with 62% directed to low- and middle-income countries (LMICs), primarily through loans, alongside rising shares of guarantees and blended structures.

3. Regional Divergence

Assessment across the U.S., EU, China, and Africa highlights pronounced regional imbalances. Capital remains concentrated in advanced economies and China, while Africa' s share remains misaligned with its population and climate vulnerability. The EU, with a deeply institutionalized multi-layered climate finance architecture, is among the largest global providers. The U.S. market continues to expand but is exposed to political and fiscal cycles. China has established a balanced climate finance mix across policy, banking, and market channels. In Africa, supply-demand imbalances are acute: flows are concentrated in a limited group of donors, concessional finance dominates, and market-based mechanisms and domestic capacity remain constrained. MDBs' commitments are unevenly distributed, with Europe receiving roughly one-third.

4. Challenges and Opportunities

Global climate finance faces persistent supply-demand gaps across mitigation, adaptation, and loss and damage. Bankability constraints hinder clean-energy pipelines, and grids and storage face high development, risk, and capital-cost barriers, while fossil-fuel investment remains elevated. Geopolitical and macro-financial headwinds—including slower growth, rising trade frictions, and sovereign-risk concerns—compound system constraints. On the opportunity side, policy momentum and financial innovation are accelerating. The COP29–COP30 cycle emphasizes transparent, accountable resource mobilization; the Baku-Belém USD 1.3 trillion roadmap prioritizes access, non-debt solutions, and concessional support. Blended finance, first-loss capital, guarantees, and project-preparation facilities are expected to scale private investment, supported by recapitalized multilateral climate funds. Emerging sectors—such as AI-driven grid flexibility, green hydrogen, agrivoltaics, circular food systems, and EV supply-chain expansion—are unlocking new investment demand.

5. Pathways Forward

The path forward emphasizes goal alignment, risk-sharing, results orientation, and regional balance. First, international cooperation should align with the New Collective Quantified Goal (NCQG) and the Baku–Belém roadmap, clarifying the scale, sources, and pace of climate finance commitments. Second, blended finance should remain the core approach, leveraging guarantees, subordinated capital, concessional resources, technical assistance, and early-stage project support, while advancing standardized terms to strengthen private-capital mobilization. Third, MDBs and multilateral climate funds should continue to reform their governance and instruments, shifting toward results-based operations and building robust project pipelines linked to measurable climate outcomes. Fourth, market and regulatory systems require further development, including expanding the Emissions Trading System (ETS) and carbon border adjustment mechanism (CBAM) frameworks, enhancing revenue-use mechanisms, strengthening reporting and verification (MRV) capacity, and converging taxonomies and disclosure standards. Fifth, digital infrastructure will be key, with unified project identification systems and open data platforms improving transparency and pipeline visibility. Ultimately, addressing regional imbalances will require targeted support for climate-vulnerable regions, expanding access to catalytic instruments, and strengthening local capacity and market readiness.

Climate Finance Outlook 2025

Chapter 1

Introduction

1.1 Purpose and Scope

The Outlook draws on data from authoritative international sources and leading analytical reports to provide a comprehensive synthesis of recent global developments in climate finance. It offers a rigorous, system-based assessment designed to serve policymakers, market participants, and researchers as a trusted reference. The Outlook examines how public budgets, development finance, and capital markets interact with policy and regulatory frameworks to support mitigation, adaptation, and co-benefit objectives. Using publicly available datasets, it maps the scale, composition, and direction of climate finance flows and analyzes how these trends respond to regulatory signals such as carbon pricing.

Methodologically, the Outlook maintains the currency conventions and price-year references used in each original dataset to ensure clarity. Monetary values align with source methodologies and are presented in U.S. dollars unless otherwise specified. Where cross-dataset comparisons require harmonization, conversion methods are documented in the chart notes. Where source materials indicate uncertainty or known data gaps, these are explicitly acknowledged (e.g., the latest complete United Nations Framework Convention on Climate Change (UNFCCC) Sixth Biennial Assessment (BA6) aggregation is available through 2022).

The intended audience includes government institutions that align fiscal and financial policy with the Nationally Determined Contributions (NDCs), development finance institutions that structure project pipelines, and investors evaluating sectoral opportunities. By consolidating validated datasets and definitions and clearly stating their scope and limitations, the Outlook aims to provide a reliable evidence base for climate finance decision-making.

1.2 Basic Concept

1 Climate Finance

Climate finance refers to financial resources explicitly directed toward achieving climate objectives—including reducing greenhouse gas (GHG) emissions, enhancing carbon sinks, and strengthening climate resilience (UNFCCC, 2025). It encompasses public and private flows for mitigation and adaptation with a clear climate intent. Consistent with CPI' s bottom-up methodology, this includes concessional and non-concessional lending, grants, equity, guarantees, and proceeds from labeled bonds. Secondary market trading, portfolio reallocations, and speculative activities are excluded (CPI, 2025). In this Outlook, climate finance refers exclusively to flows aligned with UNFCCC and CPI methodologies and climate-driven purposes.

2 Mitigation, Adaptation, Loss and Damage, and Disaster Risk Management

Mitigation refers to human interventions to reduce emissions or enhance carbon sinks, including renewables deployment, energy efficiency, and carbon-sequestration technologies (IPCC, 2023). Adaptation describes adjustments in ecological, social, and economic systems to moderate or avoid climate-related harm (UNFCCC, 2025). Loss and damage cover irreversible impacts that occur when adaptation limits are exceeded, such as biodiversity loss, forced displacement, and ecosystem collapse. Disaster risk management is the application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk, and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses (UNDRR, 2017). Together, these pillars form the core operational framework for climate action in this Outlook.

3 NCQG

At COP29 in Baku (2024), Parties agreed to a new NCQG: developed countries will provide USD 300 billion annually to developing countries by 2035, with an ambition to mobilize USD 1.3 trillion per year through public and private channels (Pettinotti, Tan, and Watson, 2025; UNFCCC, 2025). This Outlook uses the NCQG as a benchmark to guide projections and policy alignment.

4 Carbon Pricing Instruments

Carbon pricing instruments—including ETS and carbon taxes—internalize climate externalities by sending price signals (World Bank, 2025d). Cross-border credit trading, as outlined in Article 6 of the Paris Agreement, complements domestic pricing schemes. This Outlook tracks coverage, price levels, and fiscal revenues using data from the WB and the OECD.

5 Multilateral and Public Finance

Multilateral and public channels form the backbone of the global climate finance architecture. Under the UNFCCC financial mechanism, these include the Global Environment Facility (GEF), the Green Climate Fund (GCF), the Adaptation Fund (AF), the Least Developed Countries Fund (LDCF), and the Special Climate Change Fund (SCCF). MDBs, such as: World Bank Group (WB), African Development Bank (AfDB), Asian Development Bank (ADB), European Investment Bank (EIB), European Bank for Reconstruction and Development (EBRD), Inter-American Development Bank (IDB), also provide significant volumes of climate-aligned capital. This Outlook follows established institutional classifications to ensure comparability.

6 Private Capital Mobilization

Private capital flows—originating from corporates, commercial banks, institutional investors, and households—support climate-aligned investments through capital expenditure, syndicated loans, green bonds, venture financing, and insurance investments (CPI, 2025). Private finance is considered essential to meeting Paris-aligned investment needs.

7 Foreign Direct Investment (FDI)

Foreign direct investment involves cross-border capital flows that establish lasting ownership or control, typically via equity stakes above 10% (UNCTAD, 2025). Project finance is non-recourse or limited-recourse financing in which repayment depends on project cash flows (Esty, 2004). In the climate context, greenfield FDI in renewables and resilient infrastructure acts as a key channel for technology transfer and decarbonization.

8 Venture Capital (VC) Equity (PE) and Private

VC and PE provide high risk capital to early stage and scaling firms developing clean-energy and climate technology solutions. These flows support innovation, commercialization, and deployment at scale (IEA, 2025e). They are included within private climate-investment flows.

9 Labeled Bond Markets

The labeled bond market—including green, social, sustainability, and sustainability-linked bonds (GSS+)—has become a significant conduit for mobilizing private climate capital. Green bonds fund environmental benefits; social bonds target inclusive development; sustainability bonds combine both; sustainability-linked bonds (SLBs) link financing terms to environmental, social, and governance (ESG)-aligned performance targets (World Bank, 2025c). Labeled-bond proceeds are counted toward climate finance totals.

10 Clean-Energy Investment

Clean-energy investment includes capital expenditures to build low emission, resilient energy systems—spanning renewable generation, grids, storage, nuclear, hydrogen, carbon capture, utilization and storage (CCUS), electric mobility, and energy efficiency upgrades (IEA, 2025e). This Outlook uses clean energy investment as a core indicator of progress.

1.3 Data Sources and Methodological Basis

This Outlook draws on rigorously validated datasets from leading international institutions to ensure alignment with globally recognized climate finance standards (CPI, 2025; IEA, 2025e; UNFCCC, 2025; World Bank, 2025a; IMF, 2024; OECD, 2025; UNCTAD, 2025).

The analytical framework primarily builds on CPI's Global Landscape of Climate Finance 2025, which consolidates domestic and international public and private climate finance flows. CPI categorizes finance by source, instrument, sector, and end use, covering mitigation, adaptation, and dual-benefit investments. A harmonized methodology minimizes double counting across bilateral and multilateral channels (CPI, 2025). The framework is further complemented by the IEA's World Energy Investment 2025, which provides detailed estimates of energy-system investment across generation, clean fuels, nuclear, grids, and storage. As energy transition spending accounts for more than two-thirds of global mitigation finance, these data serve as a central quantitative pillar of the Outlook.

UNFCCC's BA6 provides a top-down complement to CPI and IEA tracking, covering official Party-reported public and officially supported climate finance under the UNFCCC and the Paris Agreement (UNFCCC, 2025). BA6 clarifies definitional boundaries between climate finance and broader environmental or sustainability-linked investment, and identifies methodological differences and data gaps among reporting Parties.

To situate climate finance flows within macroeconomic conditions, the Outlook incorporates International Monetary Fund (IMF) fiscal indicators from the World Economic Outlook 2025, including public balance trends, energy subsidies, and green public investment ratios (IMF, 2025) . These datasets enable assessment of how fiscal capacity and economic cycles shape climate investment trajectories. The World Bank's State and Trends of Carbon Pricing 2025 provides comprehensive data on carbon pricing instruments, including coverage, price levels, revenues, and credit issuance in compliance markets.

UNCTAD's World Investment Report 2025 provides FDI and project finance statistics, highlighting the rise of greenfield renewable energy projects and the growing share of climate-aligned capital in global FDI (UNCTAD, 2025). These sources collectively link international capital flows with sectoral deployment outcomes.

1.4 Analytical Framework

The analytical design of this Outlook integrates methodologies from leading global institutions to ensure consistency, transparency, and reproducibility. Fund flows are classified in line with the CPI (CPI, 2025) by objective (mitigation, adaptation, dual benefits), source (public, private, blended), instrument (grants, loans, equity, guarantees, bonds), and sector (energy, transport, buildings, industry, AFOLU, water, and cross-sector systems) (CPI, 2025). This taxonomy enables aggregation and disaggregation at global, regional, and country levels, ensuring comparability with the UNFCCC, IEA, and MDBs reporting frameworks.

1.4.1 Multi-Source Data Integration

The Outlook reconciles bottom-up estimates from CPI, official reporting from the UNFCCC Sixth Biennial Assessment (UNFCCC, 2025), and statistical data from the IEA World Energy Investment 2025 report. Specifically, CPI provides granular tracking of initial financial commitments, while IEA provides deployment (CPI 2025; IEA, 2025e). The Outlook harmonizes time periods and currency units (USD converted at MER) and applies consistent treatment of blended public-private finance. In addition, macroeconomic and fiscal indicators from the IMF situate climate finance flows within broader investment and fiscal-policy environments (IMF, 2023). UNCTAD' s World Investment Report 2025 supplements these with trends in FDI for renewable energy and sustainable infrastructure (UNCTAD, 2025). Together, these multi-layered sources provide a robust foundation for assessing the link between financial commitments and real economic outcomes.

1.4.2 Cross-Sector Analytical Modules

The Outlook employs four analytical modules to assess climate finance dynamics. All modules adopt consistent definitions and boundaries, and use reproducible data and figures as the form of presentation. All monetary values and classifications follow CPI/UNFCCC standards. Annual descriptive statistics, year-on-year and compound growth analysis, and composite trend indicators ensure methodological traceability.

(1) Finance Flow Mapping

In line with CPI/UNFCCC standards, this module aggregates public, private, and blended finance by instrument and objective. Outputs include global and regional capital allocation shares, as well as breakdowns by source and instrument, and a comparison between domestic and cross-border flows. MDBs and national channels are also mapped to identify mobilization capacity and structural gaps under the NCQG.

(2) Sectoral Investment Analysis

Using IEA data, this module constructs time series for clean-energy investments (including generation, storage, and hydrogen) across the transport and industrial sectors. Core indicators include capex growth, sectoral allocation, and regional distribution. The module examines the conversion of commitments into deployment and explains regional and sector-specific performance differences.

(3) Fiscal and Market-Mechanism Analysis

Drawing on IMF and WB datasets, this module assesses the impact of carbon pricing and fiscal measures on capital supply and investment incentives (IMF, 2023; World Bank, 2025c). It evaluates how carbon price trends and coverage shifts influence expected returns, and aligns policy uncertainty peaks with major multilateral milestones (e.g., COP29–COP30 Baku–Belém Roadmap).

(4) Capital Effectiveness Assessment

This module assesses private sector participation, MDBs' private capital leverage ratios, and regional financing distribution in relation to the Sustainable Development Goals (SDGs) and Paris-alignment pathways. It identifies scalable financing structures and cross-border cooperation models (e.g., MDBs-national platform coordination).

These four modules are mutually reinforcing: finance-flow mapping provides macro structure; sectoral analysis reveals technology and industrial drivers; fiscal-market analysis captures price and regulatory signals; and capital-effectiveness assessment evaluates policy and market impacts. Together, they underpin evidence-based scenarios and policy prioritization.

1.4.3 Data Differences and Uncertainty

Data from different institutions vary in definitions, coverage, and valuation methodologies, leading to potential inconsistencies. To address these issues, the Outlook applies three harmonization principles: (1) aligning all datasets to the latest common reporting year (2024); (2) converting monetary values into USD using 2024 MER; and (3) prioritizing official or methodologically transparent data sources.

Where overlaps occur (for example, between MDBs' reporting and UNFCCC submissions), cross-checking institutional metadata helps avoid double counting. Uncertainty ranges and methodological limitations are disclosed through explicit annotations in charts and tables.

1.4.4 Reproducibility

The Outlook ensures transparency by providing full source citations beneath each figure and table. Methodological alignment is maintained with publications, including the IEA World Energy Investment 2025, the CPI Global Landscape of Climate Finance 2025, the UNFCCC BA6 (2025), and the World Bank State and Trends of Carbon Pricing 2025, ensuring cross-institutional consistency. The Outlook also draws on established analytical practices in climate finance, employing indicators such as compound annual growth rates (CAGR), market-share indices, and nominal-to-real conversion factors (Calcaterra et al., 2024; Steffen, 2020). Taken together, this unified methodological approach provides a coherent and replicable framework for tracking progress toward Paris-aligned financial flows through 2030 and beyond.

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Chapter 2

Policy and regulatory environment

Highlights

- This chapter systematically describes the overall characteristics of the global climate policy landscape, with a focus on revealing the evolution trend of climate finance policies.
- Climate finance policies experienced a concentrated leap after the 2015 Paris Agreement and reached their highest level in 2021.
- There are significant differences in the development trajectories of intercontinental climate finance policies, with Europe introducing the largest number of such policies.
- The global climate finance framework has been continuously improved, evolving from bilateral to multilateral mechanisms to promote multi-level and networked cooperation.
- The climate information disclosure system has been refined, and the climate risk management system has been gradually established.
- Global climate policy uncertainty (GCPU) has been on the rise, which may exert significant impacts on climate action.

2.1 Global Climate Finance Policy Trend

2.1.1 Overall Climate Policy

According to Climate Change Laws of the World (CCLW) data, as shown in Figure 2-1, the number of global climate policies has shifted from slow growth to rapid expansion (CCLW, 2025). The total increased gradually from 64 in 2000 to 793 in 2024. Before 2009, the number of enacted policies grew slowly. Between 2009 and 2015, policy enactment accelerated further. The adoption of the Paris Agreement in 2015 established a critical framework for global climate action, pushing the number of climate-related policies above 400. The Glasgow Climate Pact (UNFCCC, 2021) further strengthened the global consensus on climate action. The number of enacted policies rose sharply, reaching a peak of 1,091 in 2021. After peaks, the number of policies declines. Nevertheless, the overall level remains far above that of the pre-2009 period, indicating a sustained strengthening of global commitment to addressing climate change.

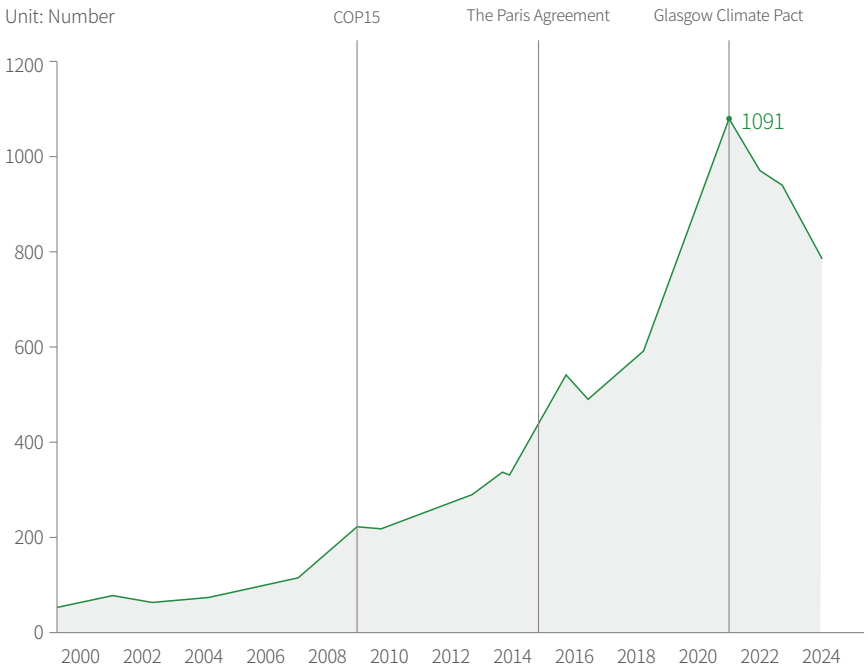


Figure 2-1. Global Trends in Climate Policy

(Source: Climate Change Laws of the World)

2.1.2 Climate Finance Policy

Climate finance policies are drawn from the broader set of global climate policies, which are categorized by specific policy instrument types. They encompass economic instruments (carbon pricing and emissions trading, insurance, and climate finance instruments), direct investment instruments (climate fund provision, nature-based solutions and ecosystem restoration, green procurement, early warning systems, and other direct investments), and regulatory instruments (disclosure obligations). These exclude the irrelevant and unclassified policies. According to CCLW data (Figure 2-2), the number of global climate finance policies increased between 2000 and 2024, with distinct shifts around three major international climate conference milestones (CCLW, 2025).

The development of climate finance policy reached a notable peak in 2012, closely linked to the Durban Conference of 2011, which established the Durban Platform and formally launched the GCF (UNFCCC, 2011). A second surge occurred in 2015 following the Paris Agreement, which elevated financial support to the core of the global climate framework, setting a USD 100 billion annual financing goal and strengthening the transparency framework (UNFCCC, 2015). It is worth noting that the number of global climate finance policies reached its highest level in 2021, primarily driven by the Glasgow Climate Pact. The Glasgow Conference not only reaffirmed developed countries' financing commitments but also called for scaling up funding by 2025 and emphasized the importance of adaptation finance and private sector participation (UNFCCC, 2011).

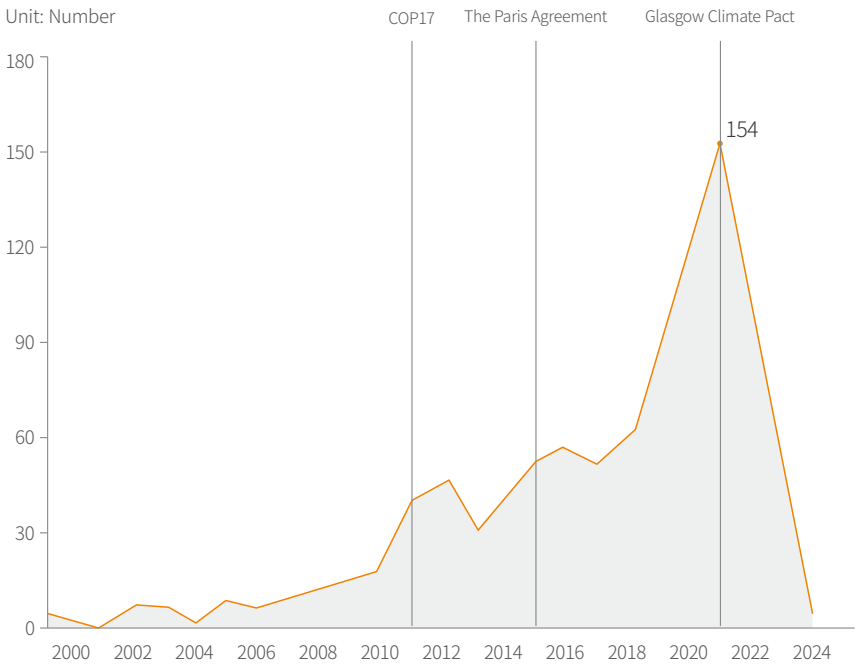


Figure 2-2. Global Trends in Climate Finance Policy

(Source: Climate Change Laws of the World)

Figure 2-3 illustrates that the development trajectory of climate finance policies varies significantly across continents. Europe has recorded more climate finance policies, with totals increasing steadily after 2009 and peaking around 2021, closely aligned with the momentum generated by the Glasgow Climate Pact (UNFCCC, 2011). During this period, Europe accelerated institutional reforms in carbon pricing mechanisms, green bond regulation, and financial disclosure standards, resulting in a concentrated wave of policy enactments. Asia shows a fluctuating upward trend, with notable increases around 2012 and 2015 and another peak in 2021. By contrast, North America, South America, Africa, and Oceania display lower overall levels and more gradual trajectories. Nonetheless, each region has experienced a general expansion in climate finance policy issuance since the Paris Agreement. These regional imbalances underscore the crucial role of international cooperation in bridging policy gaps and promoting the global implementation of climate finance frameworks.

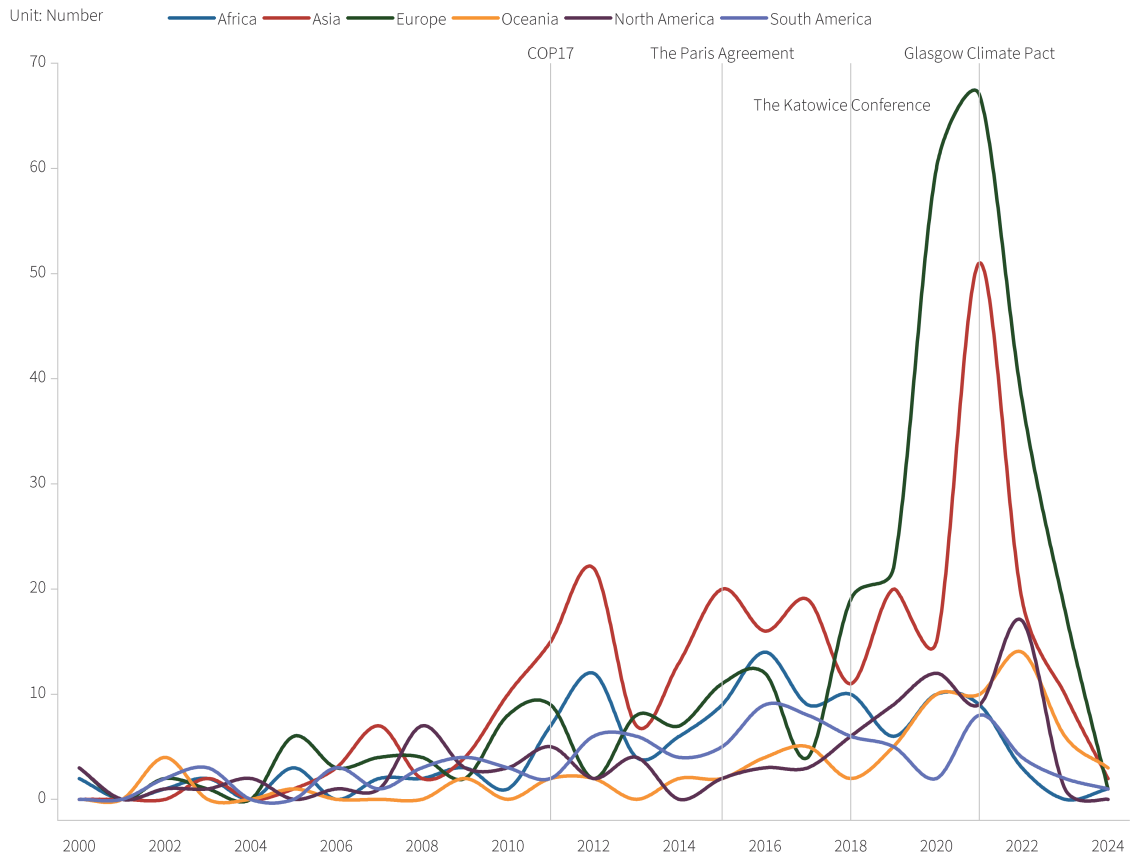


Figure 2-3. Climate Finance Policy Trends across Continents

(Source: Climate Change Laws of the World)

2.1.3 Climate Finance Policy Categories

(1) Enforcement of Climate Finance Policies

Climate finance policies are categorized into legislation and policy documents (CCLW, 2025). Figure 2-4 presents trends in legislative and policy issuance from 2000 to 2024 (a), along with their structural proportions (b). The trend indicates that policy documents outnumber legislative ones and exhibit greater volatility. Beyond the peaks following COP17 in 2011 and the Paris Agreement in 2015, a sharp surge occurred in 2021 after COP26, when the number of policy documents far exceeded that of legislative instruments. Although legislative documents also show an overall upward trend, their growth is steadier. Even during peak periods, the increase in legislation is significantly smaller than that of policy documents, reflecting the longer-term institutional framework of climate finance at the national level. The two types of documents also display synchronized growth in certain key years, suggesting a degree of interdependence between legislative and policy actions. In structural terms and over the total samples between 2000 and 2024, policy documents account for 67.75%, while legislative documents represent 32.25%. The executive-issued policies have been more active and have served as the main engine of climate finance expansion. Nevertheless, legislative instruments, though fewer in number, provide stability and establish the institutional foundation for long-term development. The two are mutually reinforcing, jointly advancing progress in climate finance.

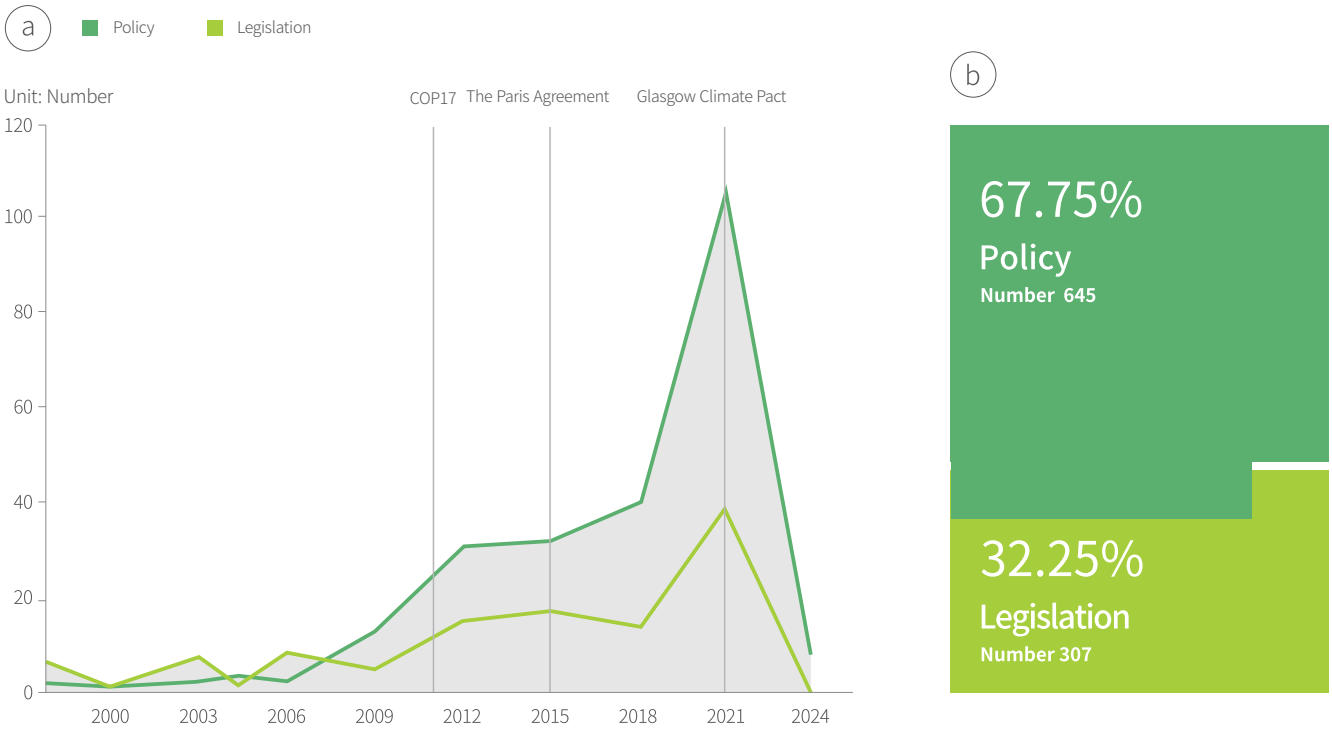


Figure 2-4. Classification of the Enforcement of Climate Finance Policies

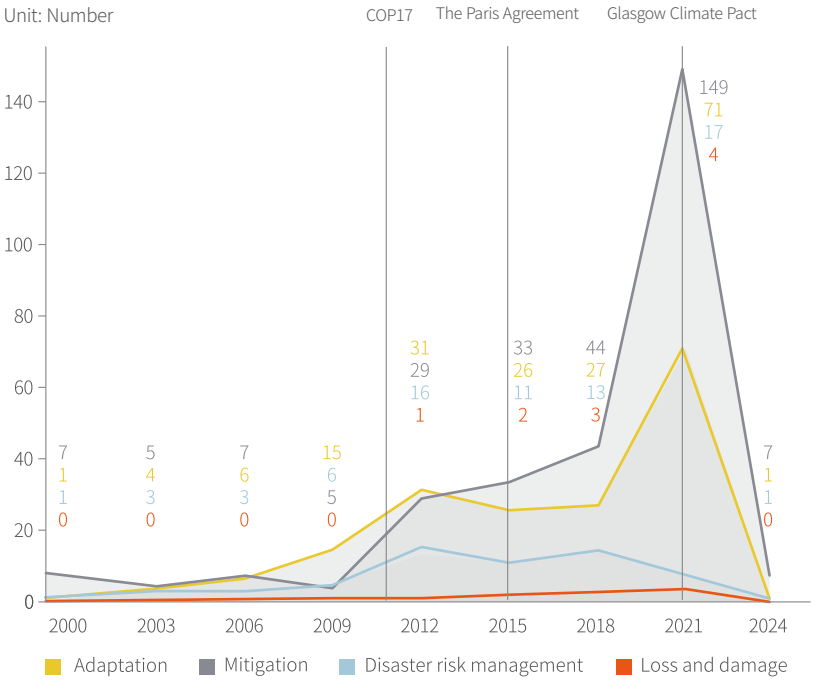
(Source: Climate Change Laws of the World)

(2) Functions of Climate Finance Policies

Climate finance policies are categorized into four functional groups: mitigation, adaptation, loss and damage, and disaster risk management (CCLW, 2025). Figure 2-5 (a) shows that all four categories have increased steadily from 2000 to 2024, with mitigation and adaptation policies dominating in terms of numbers and serving as the primary drivers of climate finance system development. Mitigation policies show the most pronounced growth. Their expansion accelerated after the Paris Agreement in 2015 and peaked in 2021 (COP26). This reflects the global prioritization of mitigation-oriented climate finance actions such as carbon reduction and green investment. Adaptation policies have shown marked growth since 2015, closely related to the NDCs under the Paris Agreement (2015). The 2021 Glasgow Climate Pact (UNFCCC, 2011) once again emphasized adaptation finance, driving another concentrated wave of policy issuance in this category.

Although disaster risk management policies remain relatively limited in number, some years have seen periodic growth. Policies addressing loss and damage are few but have gradually emerged in recent years, gaining recognition within the climate finance policy framework. In terms of structural composition (Figure 2-5 b), mitigation accounts for 51.58%, adaptation for 6.09%, and disaster risk management for 2.63%. of the total number of policies between 2000 and 2024.Notably, multifunctional policies account for 39.71%. This highlights the intersectional and integrated nature of climate finance policy, demonstrating that countries are increasingly favoring measures that achieve multiple climate finance goals within a single framework.

a



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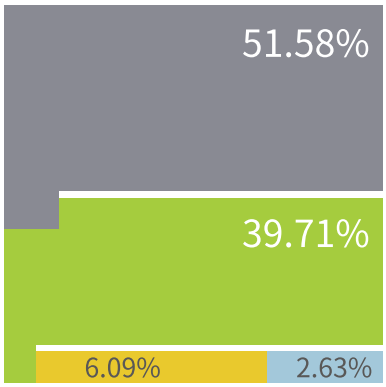


Function	Number
Adaptation	58
Mitigation	491
Disaster risk management	25
Multiple functions	378

Figure 2-5. Classification of the Function of Climate Finance Policies

(Source: Climate Change Laws of the World.

Note: Multiple functions refer to policy documents that serve two or more of the following four functions: adaptation, mitigation, disaster risk management, and loss and damage)

(3) Economic Sectors Targeted by Climate Finance Policies

Climate finance policies are also classified into the following sectors: agriculture; transport; energy; waste; environment; tourism; land use, land-use change, and forestry (LULUCF); industry; buildings; water resources; health; and the public sector (CCLW, 2025) . Figure 2-6 presents the total number of policies associated with these sectors (a) and shows the share of those that can be attributed to a single economic sector (b). Policies that apply to multiple sectors are grouped under the "multiple economic sectors" category. In terms of total volume, the energy, transport, and LULUCF sectors are the most intensively covered by climate finance policies. The energy sector has the most significant number of policies, underscoring its central role in the climate finance landscape and the global energy transition. Transport and LULUCF follow closely, both representing key directions of climate finance support. Agriculture, buildings, and industry also account for significant shares, indicating that high energy–intensive and high emission sectors remain the primary focus of climate finance.

From a structural perspective, while policies targeting single sectors such as energy, LULUCF, and transport occupy a meaningful share, the proportion of multi-sectoral policies is strikingly high at 48.31%. This demonstrates the strong cross-sectoral coordination embedded in climate finance policy. Climate finance policies focus not only on key emission-reduction sectors such as energy but also integrate resources through multi-sector coordination, indicating a shift toward a more systematic and holistic institutional framework.

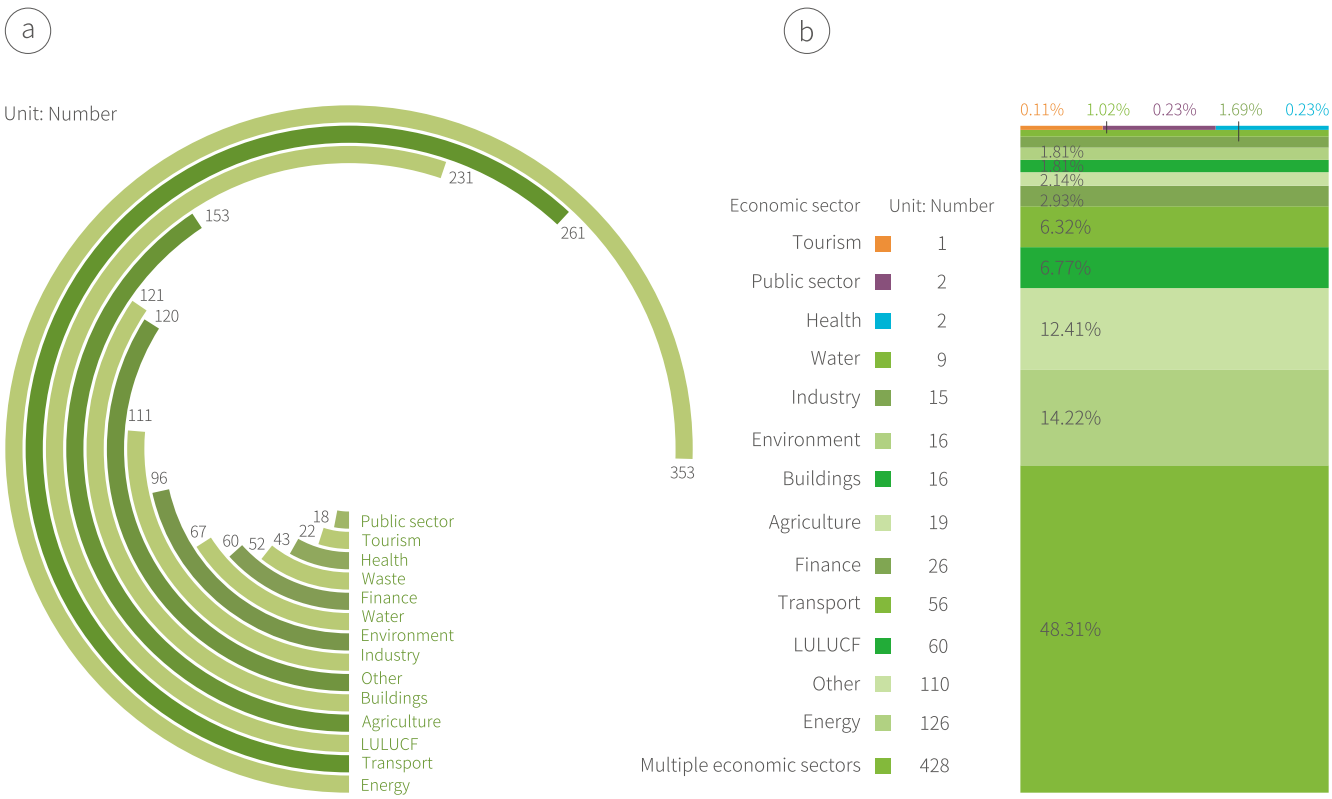


Figure 2-6. Classification of the Economic Sector of Climate Finance Policies, 2000-2024

(Source: Climate Change Laws of the World.

Note: Multiple economic sectors refer to policy documents that cover two or more of the fourteen economic sectors)

(4) Climate Finance Policy Instruments

Climate finance policies are classified by the instruments employed, including carbon pricing and emissions trading, insurance, climate finance tools, climate fund provision, nature-based solutions and ecosystem restoration, green procurement, early warning systems, other direct investments, and disclosure obligations (CCLW, 2025). From Figure 2-7 (a), climate fund provision ranks first by a wide margin, highlighting the central role of fund mechanisms in mobilizing and directing climate finance flows. The prominence of nature-based solutions and ecosystem restoration reflects growing emphasis on financial measures tied to natural systems. Climate finance instruments and early warning systems also maintain a substantial scale, indicating a strong focus on financial innovation and risk management. These instruments collectively form the implementation pathways of climate finance policies, providing multidimensional support for climate action.

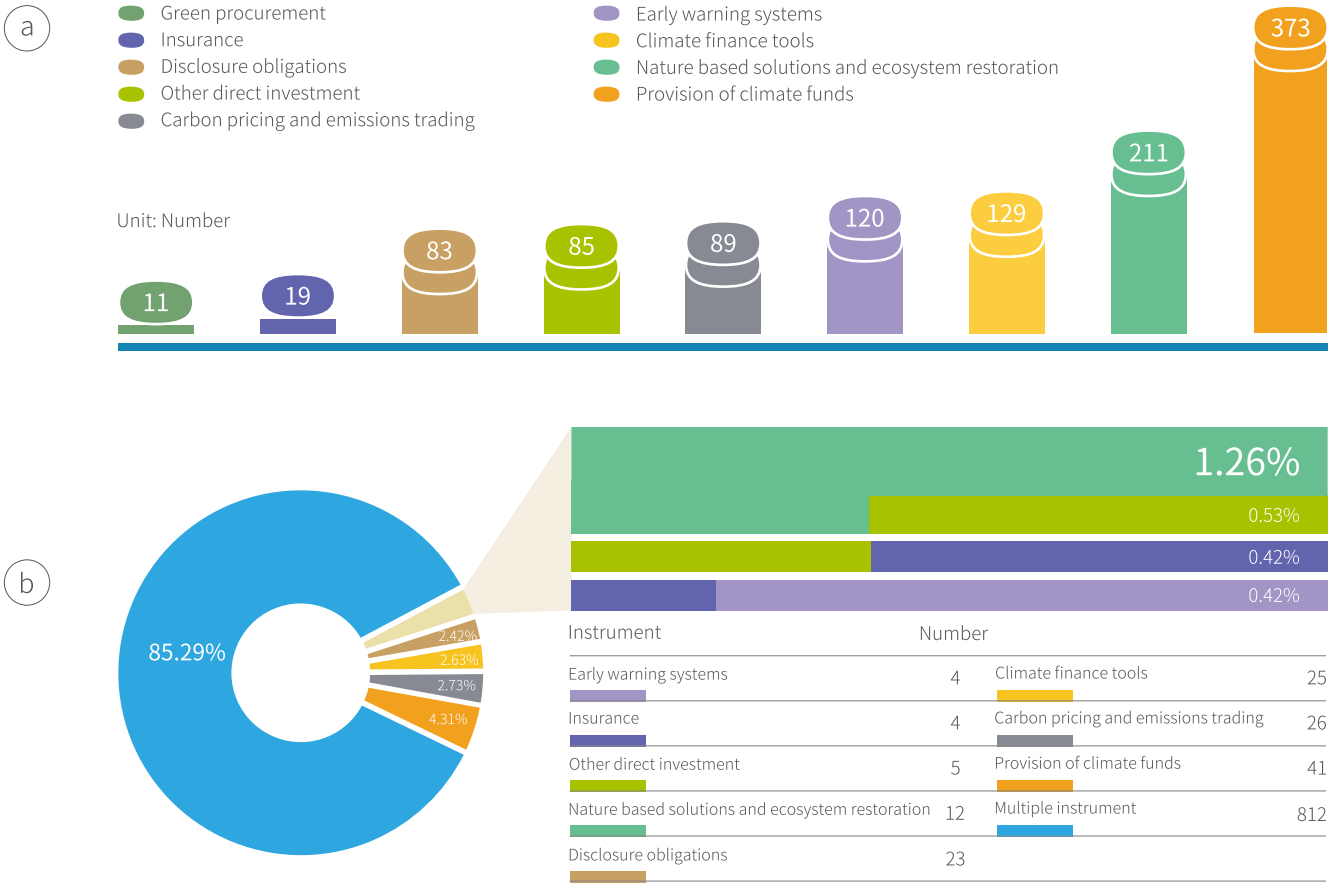


Figure 2-7. Classification of the Instruments of Climate Finance Policies, 2000-2024

(Source: Climate Change Laws of the World.

Note: Multiple instrument refers to policy documents that involve two or more of the nine policy instruments)

Figure 2-7 (b) shows the structural composition of climate finance policy instruments from 2000 to 2024. Policies employing multiple instruments account for as much as 85.29%, far exceeding any single-instrument category. This indicates that climate finance policy design generally emphasizes the combined use of tools to achieve more effective global climate governance. Among single-instrument policies, the climate fund provision remains the primary pillar of national financial support, accounting for 4.31% of the total, followed by Carbon pricing and emissions trading (2.73%) and climate finance instruments (2.63%).

2.2 Key Policy and Institutional Development

2.2.1 NCQG

Article 2.1 (c) of the Paris Agreement for the first time explicitly requires "making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development" (UNFCCC, 2015). To achieve this ambitious goal, Article 9.3 of the agreement stipulates that developed country contracting parties shall set an NCQG by 2025 at the latest, with an annual minimum starting point of USD 100 billion. This marks a critical milestone for the global climate finance system.

(1) Limitations of Old Goals and New Challenges

According to data from the United Nations Climate Action, in 2009, developed countries agreed to mobilize USD 100 billion annually in climate finance for developing countries. It was not until 2022 that developed countries met this target for the first time. The limitations of the old target primarily stem from funding delays and shortfalls. Although developed countries have repeatedly committed to providing USD 100 billion annually by 2025 at international forums such as the G20 and UNFCCC, the actual disbursement of funds has been slow, constraining climate action in developing countries.

The new challenges are reflected in three key aspects. First, the expansion of funding needs: global climate finance demand has jumped from the hundreds of billions to the trillions of USD, and public funds alone are far from sufficient to fill the gap. Second, systemic issues: the topic of climate finance has expanded to broader areas such as debt relief for developing countries and reform of the global financial system, obscuring the principle of Common but Differentiated Responsibilities under the UNFCCC. Third, turbulent global conditions: factors such as geopolitical conflicts and economic instability have introduced uncertainty into climate negotiations, undermining countries' motivation to increase their climate ambition.

(2) Negotiation Differences and Ultimate Goals

There are certain divergences between developed and developing countries in the negotiations on the NCQG. On one hand, conflicts exist over funding amounts and sources: developing countries demand that the new target be significantly higher than USD 100 billion and emphasize the leading role of public funds. In contrast, developed countries tend to lower the amount and expand private sector contributions. On the other hand, developing countries advocate for a balanced allocation between adaptation finance and mitigation finance, with a particular focus on supporting vulnerable countries. Developed countries, however, are more inclined to invest in mitigation projects that could generate economic returns.

Regarding the progress toward the final target, COP29, known as the Finance COP, has identified NCQG as a core agenda item. The new target aims to assist vulnerable countries in adopting clean energy and building climate resilience, and is scheduled to replace the original USD 100 billion target by 2025. Negotiation directions include: strictly linking the funding scale to temperature control goals based on the outcomes of the Paris Agreement's global stocktake; and requiring developed countries to specify their financial contributions in the NDCs submitted in 2025, as well as explain how to use the outcomes of the global stocktake to enhance ambition.

2.2.2 Reform of MDBs

To address the increasingly pressing global climate challenges and respond to calls from international platforms such as the G20, MDBs are undergoing profound transformations. They are shifting from traditional development finance institutions to catalytic platforms capable of mobilizing private capital at scale and channeling climate finance efficiently, thereby helping to fill the significant global climate financing gap.

(1) The Motivation and Roadmap for Reform

The primary motivation of MDBs' reform is the order-of-magnitude gap between the current scale of climate finance and the goals of the Paris Agreement; second is the international pressure to strengthen cooperation and optimize processes in response to requests from the G20 and parties to the UNFCCC; finally, environmental risks such as climate change and biodiversity loss have been recognized as threats to financial stability and need to be incorporated into core management frameworks.

In response to the international consensus under the G20 framework, the reform roadmap of MDBs has shifted from macro-objectives to specific implementation pathways. The reform focuses on four core dimensions: first, aligning operations with the Paris Agreement—ensuring that investment and financing decisions are consistent with climate goals, establishing transparent monitoring mechanisms, and disclosing assessment results; second, innovating private capital mobilization—reducing private sector investment risks through instruments such as guarantees and risk-sharing, and promoting blended finance instruments to leverage private capital; third, strengthening the greening of domestic financial systems—assisting developing countries in adjusting regulatory policies and disclosure standards, addressing the needs of small and medium-sized enterprises (SMEs), and adopting differentiated strategies; fourth, promoting just transition and strategic synergy—supporting client countries in formulating just transition plans, and synergizing the advancement of the NDCs, SDGs, and biodiversity objectives.

(2) Progress in Reform of MDBs

The overall progress of MDBs' reform is reflected in two key aspects. First, the expansion of funding scale: in their joint statement at COP29, MDBs committed to providing annual climate finance of USD 120 billion to LMICs by 2030, of which USD 42 billion will be allocated to adaptation, and USD 50 billion to high-income countries (HICs). Compared to the 2019 target, direct climate finance has increased by 25%, and mobilized private sector capital has more than doubled. Second, the deepening of systematic cooperation: MDBs issued the consensus statement on the country climate action platform to promote collaboration among host countries, MDBs, and the private sector; they also developed the standard methodology for measuring climate outcomes, establishing a universal framework for quantifying climate outcomes for the first time.

2.2.3 Carbon Pricing Mechanism

(1) Carbon Tax, ETS, and Carbon Credit

Carbon pricing mechanisms mainly cover carbon taxes, ETS, and carbon credit mechanisms. The three jointly promote carbon emission reduction through synergy across dimensions such as policy instruments, market mechanisms, and international cooperation:

- Carbon tax clarifies the cost of carbon emissions through administrative means, serving as a policy tool that directly levies a fixed tax rate on GHG emissions. Its core advantage lies in providing price certainty; however, since the government sets the tax rate, it cannot directly guarantee a specific volume of emission reduction, making it a government-led, rather than a market-driven mechanism.
- ETS is centered on the cap-and-trade model: first, a total emission cap is set for a specific region, industry, or other scope, then allowances are allocated to enterprises, and market trading is permitted—enterprises with high emission reduction efficiency can sell surplus allowances, while those facing difficulties can purchase allowances. This mechanism ensures emission reduction volumes but is subject to significant price volatility due to market supply and demand, as well as policy adjustments, and is therefore market-driven. Allowances are initially allocated for free and gradually shift to auctions as the system matures, improving resource allocation efficiency.
- The carbon credit mechanism generates tradable emission reduction credits by supporting abatement projects, such as those involving renewable energy and carbon sinks. Such credits can either enter the voluntary carbon market, where enterprises or individuals voluntarily purchase them to offset their own emissions, or supplement allowances in the compliance carbon market to help enterprises fulfill part of their emission reduction obligations. It complements the functions of carbon taxes and the ETS, and holds unique value, especially in promoting international cooperation on emission reduction.

(2) The Current Status of the Carbon Market

Based on Figure 2-8, most carbon credit mechanisms and carbon pricing instruments have entered the Implemented stage, while a large number remain in the development or adjustment stage—reflecting the global pace of promotion and dynamic optimization characteristics of carbon market and Among carbon credit mechanisms (Figure 2-8 a), implemented account for 74.07%, under development for 20.37%, and abolished and removed together account for less than 6%. For carbon pricing instruments (Figure 2-8 b), the breakdown is as follows: implemented accounts for 61.07%, under consideration accounts for 19.08%, under development accounts for 11.45%, and abolished accounts for 8.4%.

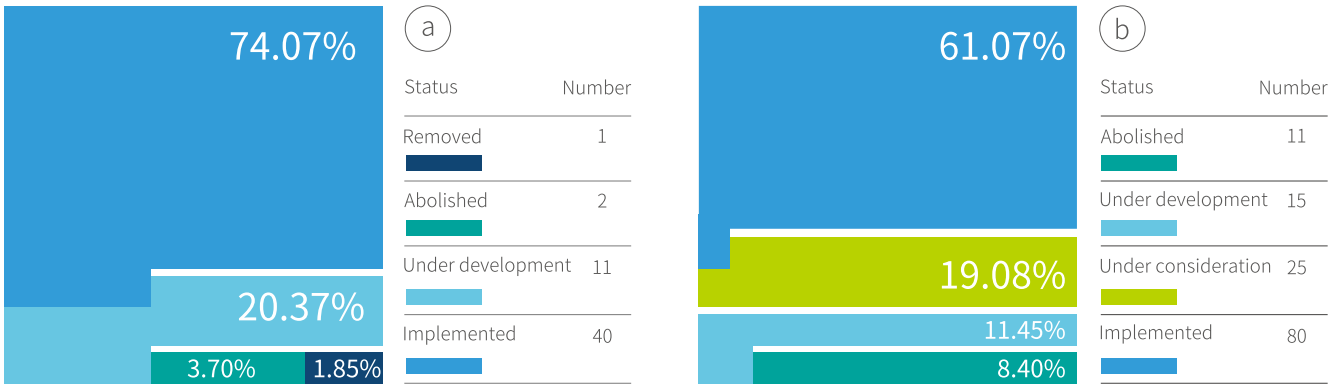


Figure 2-8. Classification Data of the Carbon Credit Mechanism and the Carbon Pricing Instrument Status in 2025

(Source: World Bank)

2.2.4 Financing Mechanisms

Global climate finance and investment mechanisms have undergone a profound evolution over the past three decades—from broad to refined, single-dimensional to multi-faceted, and public-led to public-private partnership. As of December 2024, the implementing partner network of Green Climate Fund comprises 139 accredited entities, with a project portfolio that includes 286 ongoing projects. The total committed funds amount to USD 15.9 billion, with actual disbursements reaching USD 5.2 billion. Developing countries can access support through MDBs, international commercial banks, UN agencies, as well as directly via accredited public and private sector national, regional, and subnational implementing institutions.

1 System Evolution: From Basic Implementing Agencies to Specialization and Refinement Financing Mechanisms

As shown in Figure 2-9, most early institutions were comprehensive development or financial entities, with climate action as just one of their functions. Over time, however, newly established institutions and mechanisms have become increasingly specialized.

Early Stage (1940s-1990s): Global and regional backbone implementing agencies were established, such as the WB, regional development banks (AfDB, ADB, IDB), national development agencies (USAID, JICA), and export credit agencies (Ex-Im). These provided core implementation channels for climate finance and investment. Mid-term (1990s-2000s): The launch of the GEF in 1991 marked the emergence of specialized climate funds, signaling the professionalization of mechanisms targeting global environmental issues. As a financial mechanism under the UNFCCC, the GEF administers the LDCF and the SCCF, supporting national adaptation plans through small-scale projects. **Explosive Growth (2005-2008):** Under the Kyoto Protocol framework, multilateral mechanisms such as the AF, Climate Investment Funds (CIF) and its sub-funds, and the Forest Carbon Partnership Facility (FCPF) were established, along with bilateral initiatives like Germany's International Climate Initiative and Norway's NICFI. Climate finance and investment emerged as an independent professional field. **Focused and Innovative 2009 to Present)**: Mechanisms have become increasingly targeted, as exemplified by the CVF/V20 Fund for vulnerable countries, the regional African Adaptation Acceleration Program (AAAP), and the JETPs, reflecting further refinement and innovation. The establishment of the Fund for Responding to Loss and Damage (FRLD) in 2022 marked the expansion of its scope to impacts that cannot be avoided through mitigation and adaptation.

2 Category Expansion: From Mitigation and Adaptation to the Third Pillar of Loss and Damage

Most funds established around 2008, as shown in Figure 2-9 (e.g., Clean Technology Fund (CTF), SREP, PPCR, AF), fall under the categories of mitigation or adaptation. The Global Shield and the FRLD have built upon early risk insurance mechanisms (e.g., ARC in 2014), focusing on financial solutions for climate impacts that have already occurred, marking an improvement in the financial safety net.

The operational model of the FRLD was negotiated in 2023 and approved at the 28th Conference of the Parties (COP28). COP29 confirmed it as a Financial Intermediary Fund (FIF), with the WB hosting its secretariat until COP33. Currently, it remains unclear whether the funding arrangements for addressing loss and damage will be incorporated into the NCQG.

3 Multi-Party Collaboration: From Multilateral Coordination to Multi-Level and Networked Collaboration

The most common mode in financing mechanism practice is multilateral financing, jointly implemented by bilateral and multilateral institutions. For example, funds from the GCF will be allocated to institutions such as the WB or GIZ in Germany for specific implementation. This networked collaboration greatly enhances the efficiency and coverage of capital flow.

Some countries have established dedicated bilateral climate funds, and currently, a significant portion of public climate financing is still spent in bilateral form. Multilateral institutions, such as the World Bank and the United Nations Development Programme (UNDP), and multilateral funds, such as GCF and GEF, are the cornerstone of the system, responsible for setting standards, pooling funds, and managing large-scale projects. Bilateral funds and initiatives, such as IKI and NICFI, are more flexible, serving as supplementary and innovative experimental fields, further enhancing the efficiency of capital flow.

4 Strategic Focus: From Global Universality to Regional and National Autonomy

Climate finance and investment are increasingly emphasizing national ownership and localized solutions to ensure funds align with local needs. For instance, the Amazon Fund in Brazil is managed by the Banco Nacional de Desenvolvimento Econômico e Social (BNDES), with commitments of USD 1.93 billion from countries including Norway and Germany. Many countries have proposed establishing national climate funds in their climate change strategies. Initially, the UNDP often manages these funds to enhance donor trust, and its responsibilities are gradually transferred to national institutions.

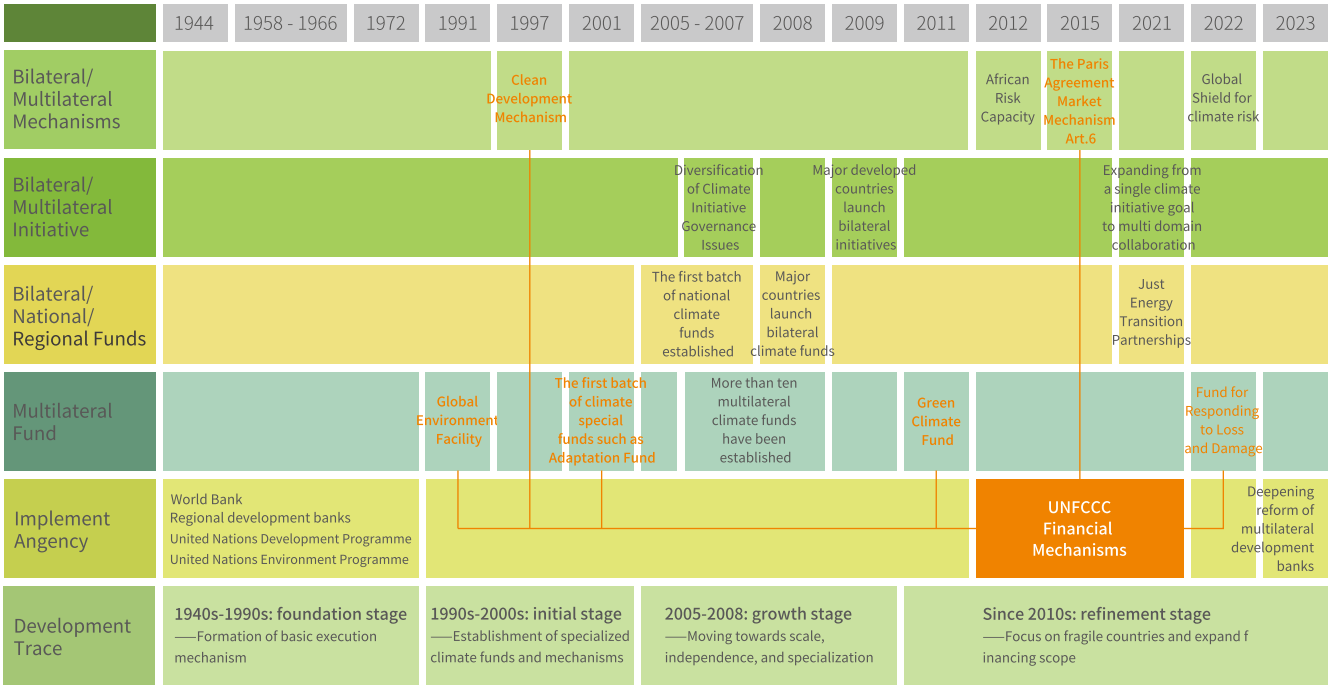


Figure 2-9. Development History of Global Climate Finance Architecture

(Source: Constructed by the authors)

2.2.5 Disclosure and Supervision Policies

(1) Climate Information Disclosure System

The Development History of the Information Disclosure System in International Organizations. Figure 2-10 shows that international climate information disclosure has evolved from fragmented, voluntary reporting to a cohesive, mandatory global framework. The Global Reporting Initiative (GRI), established in 1997, initiated sustainability reporting with its Guidelines for Sustainability Reporting (2000) and later the GRI Standards 2021, which presented a systematic, three-tier framework with general, sectoral, and issue-specific standards. The Climate Disclosure Standards Board (CDSB), founded in 2007, promoted the amalgamation of environmental and financial disclosures. The establishment of the Task Force on Climate-related Financial Disclosures (TCFD) in 2015 marked a notable accomplishment, with its four-pillar framework—governance, strategy, risk management, and metrics—emerging as the international benchmark for corporate climate risk reporting. The adoption of GCL Integrated's blockchain-based carbon management platform by numerous companies demonstrated its practical utility. The establishment of the International Sustainability Standards Board (ISSB) under the International Financial Reporting Standards Foundation (IFRS Foundation) in 2021, along with the release of IFRS S1 and S2 in 2023, standardized global disclosure protocols, resulting in the first comprehensive benchmark presently endorsed by over forty countries.

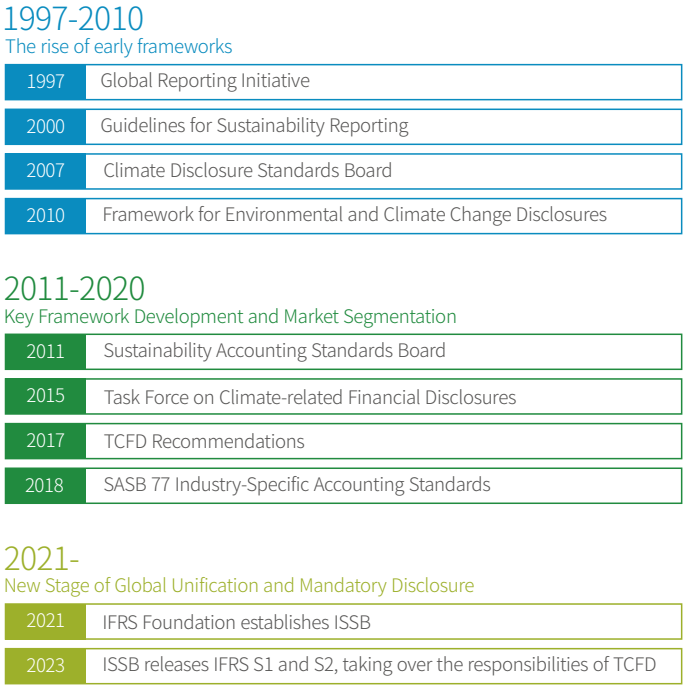


Figure 2-10. Development History of International Organizations' Climate Information Disclosure System

(Source: Constructed by the authors)

National-Level Information Disclosure Terms and Regulations. As shown in Figure 2-11, major economies are accelerating the transition from voluntary to mandatory climate information disclosure through regulatory measures. Twelve nations, including the United Kingdom (UK), Switzerland, Japan, and Singapore, have integrated the TCFD framework into compulsory disclosure requirements. The EU maintains its global leadership by evolving from the Non-Financial Reporting Directive (NFRD) in 2014 to the Corporate Sustainability Reporting Directive (CSRD) in 2022. This directive mandates comprehensive ESG reporting for non-EU corporations, integrating the double materiality approach and necessitating third-party verification. The U.S. enacted the SEC Climate Disclosure Rule in 2024, whereas California's law includes Scope 3 emissions beginning in 2027. In 2024, China implemented a disclosure system that includes stock exchange sustainability regulations and the Basic Standard for Enterprise Sustainability Disclosure, achieving 46% reporting coverage among A-share companies by 2025. Complementary initiatives, such as the UK's Transition Plan Taskforce and Canada's Climate Risk Management Guidance, foster global alignment on unified, transparent climate disclosure requirements.

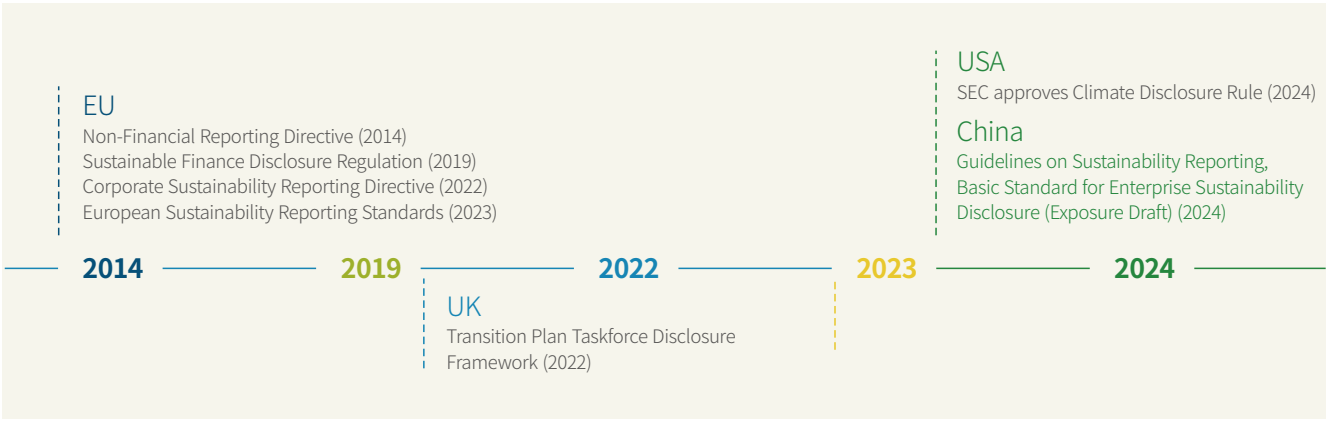


Figure 2-11. Climate Information Disclosure Terms and Systems of Major Global Economies

(Source: Constructed by the authors)

(2) Climate Risk Regulation in Financial Sector

The Regulatory Framework is Led by International Organizations. As shown in Figure 2-12, the Basel Committee on Banking Supervision (BCBS) published the Principles for Effective Management and Supervision of Climate-Related Financial Risks in 2022, outlining 12 principles that mandate banks to integrate climate considerations into their governance, capital adequacy, and stress testing. In 2024, BCBS will provide a comprehensive Climate Scenario Analysis (CSA) tool to facilitate risk identification, process optimization, capital evaluation, and strategic planning, addressing both physical and transition hazards. The International Association of Insurance Supervisors (IAIS) and the Sustainable Insurance Forum (SIF) jointly published the Regulatory Application Paper on Climate-Related Risks in the Insurance Sector (2021), thereby establishing the inaugural global regulatory framework for climate risk in the insurance industry.

Policy Practices of Major Economies. The EU has fully integrated climate risks into regulation. The European Central Bank released the Guidelines on Climate and Environmental Risks in 2020, setting 13 supervisory expectations for banks, and incorporated climate stress tests into the European Green Deal in 2021. The UK enacted Regulatory Statement 3/19 in 2019, mandating financial institutions to manage climate risks, and launched the two-year Climate Biennial Exploratory Scenario (CBES) in 2021. The U.S. has strengthened regulation through a dual-committee mechanism. The Federal Reserve established the Supervisory Climate Committee (SCC) and the Financial Stability Climate Committee (FSCC) in 2021. It promoted the development of the Principles for Climate-Related Risk Management for Large Financial Institutions. China has organized climate risk stress tests for the banking sector since 2021. In 2022, it issued the Implementation Plan for the High-Quality Development of Green Finance in the Banking and Insurance Sectors, promoting the integration of climate risks into comprehensive risk management.

The Financial Supervisory Authority of Canada released the Guidance on Climate Risk Management in 2023, requiring large banks and insurance companies to complete climate risk stress tests and disclose management plans by the end of 2024.

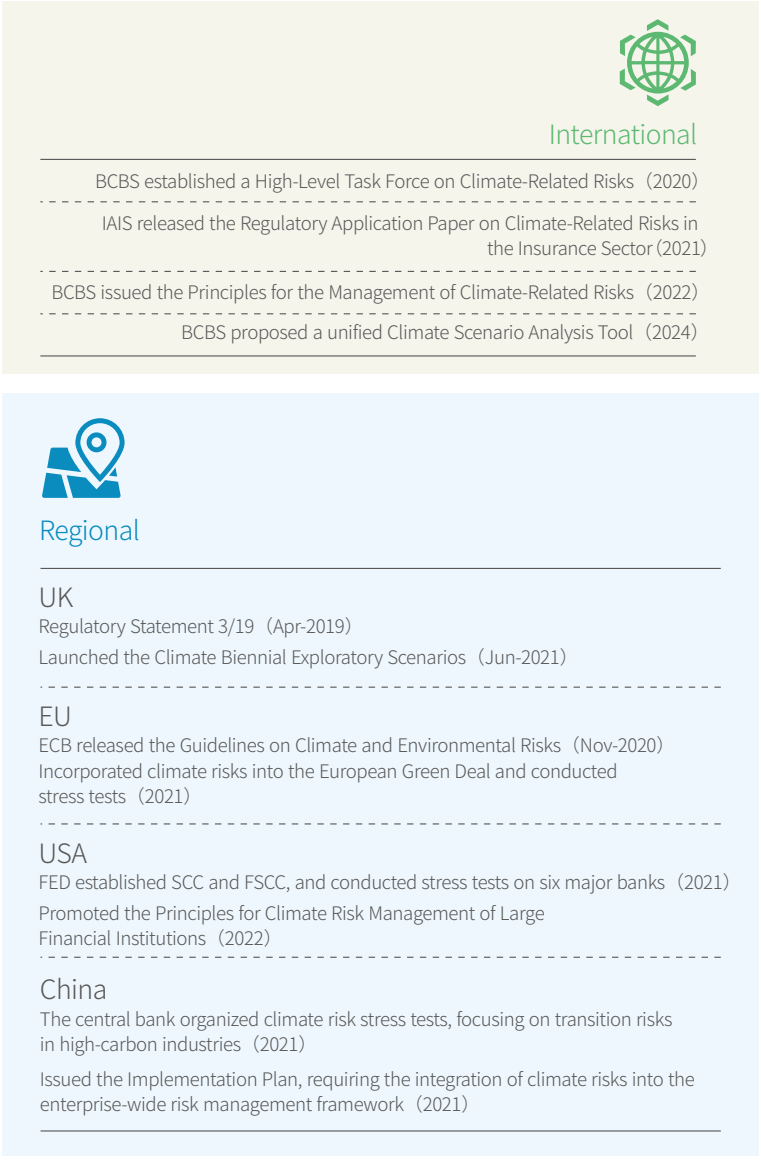


Figure 2-12. Construction Process of the Global Climate Risk Regulatory Framework

(Source: Constructed by the authors)

2.3 Climate Policy Uncertainty (CPU)

The implementation effectiveness of climate finance policies is facing severe challenges from CPU. This type of uncertainty is being directly translated into specific financial risks, endangering policy effectiveness and market stability. Therefore, after examining policy trends, it is essential to assess in depth the risks associated with such uncertainty.

2.3.1 Method of Construction

CPU refers to the risks arising from uncertainties in policy direction, implementation intensity, and long-term stability during the formulation and implementation of climate policies by various countries. Such uncertainty often stems from the complexity of international negotiations, domestic political and economic contradictions, and external events such as energy security shocks. Against the backdrop of increasingly urgent global emission reduction goals, this uncertainty not only undermines policy effectiveness but also has a significant impact on financial markets. In financial markets, CPU directly increases volatility in related asset prices by altering market expectations for high-carbon industries and green sectors, ultimately affecting the global financial system.

The GCPU Index (Ji et al., 2024; Ma et al., 2024) employs a text-based econometric methodology to quantify this phenomenon by calculating the co-occurrence frequency in news reports of three categories of keywords: climate, policy, and uncertainty. The final dataset covers China, Japan, South Korea, India, South Africa, the U.S., Canada, Brazil, the UK, France, Germany, and Australia, with a time span from 2000 to 2024.

2.3.2 Global Dynamics

(1) Short-Term Trend

Figure 2-13 shows the monthly trend of the GCPU Index from 2000 to 2024. The index displays a gradual upward trend throughout the entire period, with distinct peaks emerging around major international conferences or policy turning points. A notable surge occurred at the time the Intergovernmental Panel on Climate Change (IPCC) released its Fourth Assessment Report (AR4) in February 2007, which firmly concluded that climate change is primarily driven by human activity, leading to heightened global attention to climate action (IPCC, 2007). The convening of the UN Climate Change Conferences (COP), the adoption of the Paris Agreement, and the policy shift following President Trump's inauguration all contributed to the rise in GCPU.

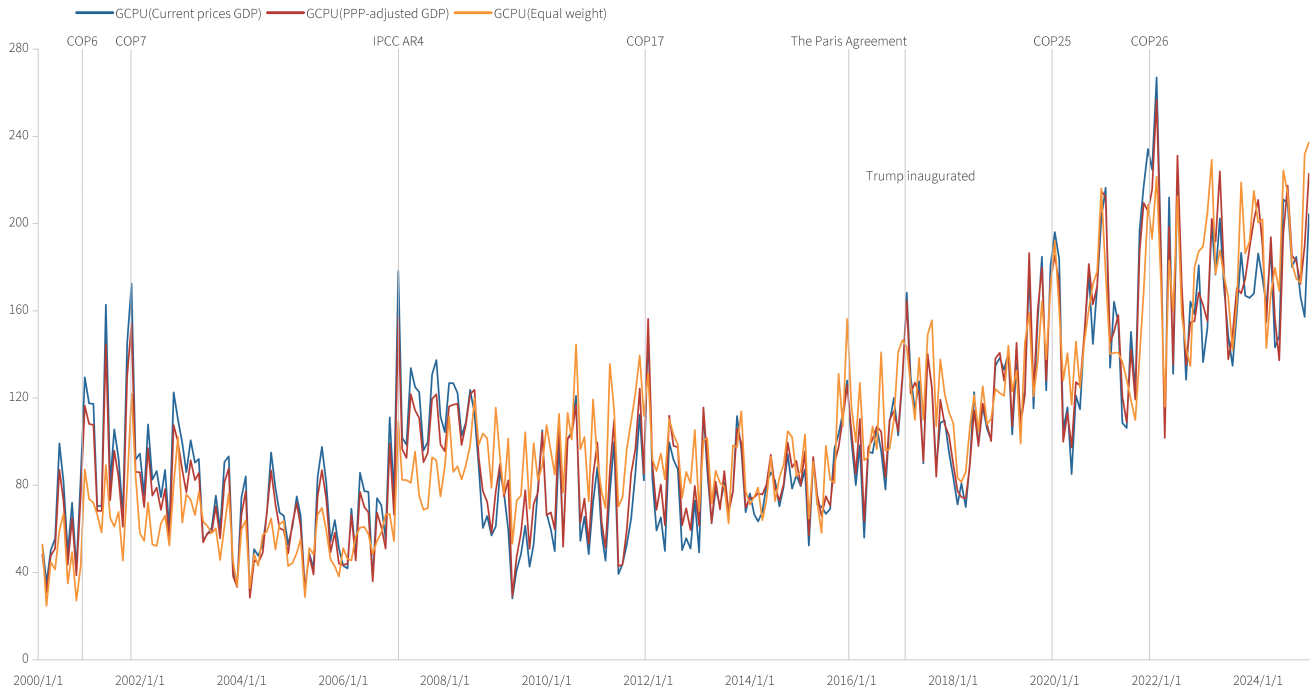


Figure 2-13. The Monthly Trend of the GCPU Index

(Source: Ji et al., 2024)

(2) Long-Term Trend

Figure 2-14 presents the annual trend of the GCPU Index from 2000 to 2024. The index has shown an overall gradual upward trend, with sharp surges following key climate events—indicating the growing importance of global climate policy issues in international governance.

The IPCC Synthesis Report was adopted on November 17, 2007, driving the GCPU to a phased peak. The 2015 Paris Agreement marked another critical juncture, pushing the GCPU Index into a new upward phase. Subsequently, varying magnitudes of peaks emerged during the UN Climate Change Conferences (COP23, COP25, and COP26).

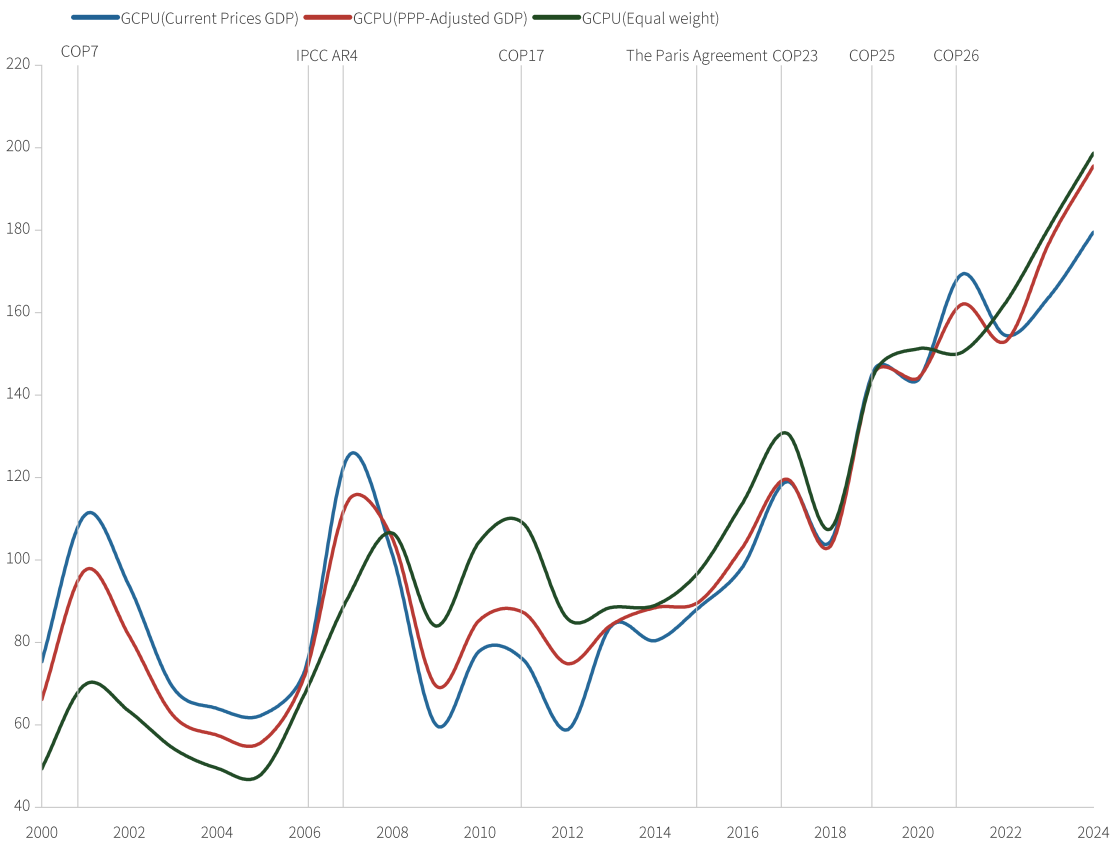


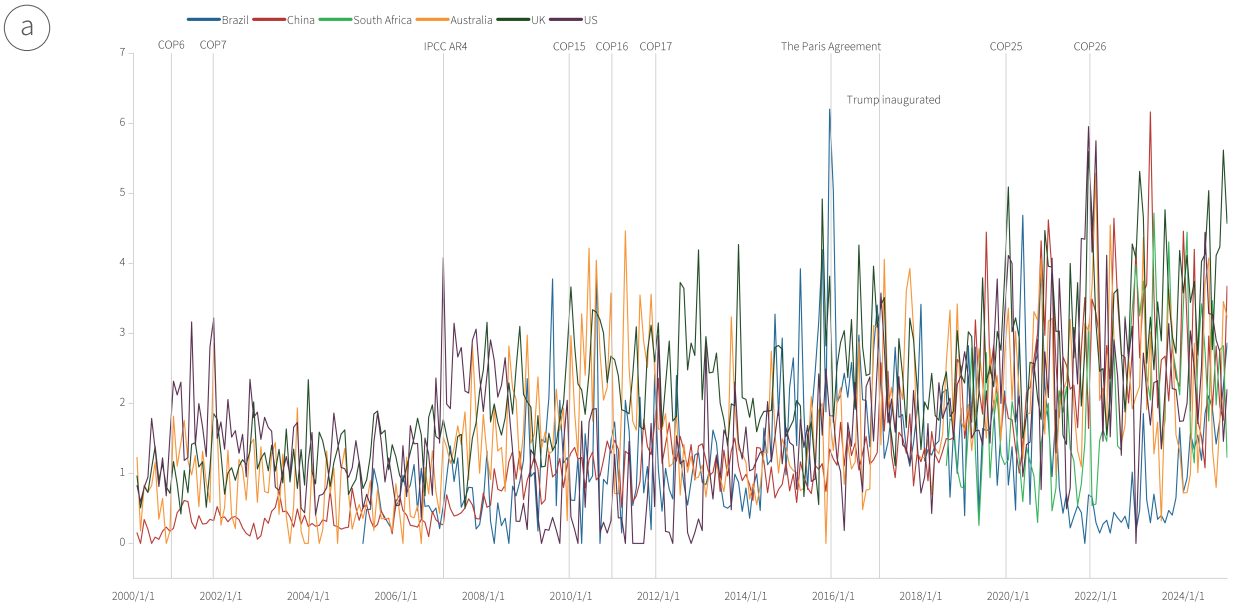
Figure 2-14. The Annual Trend of the GCPU Index

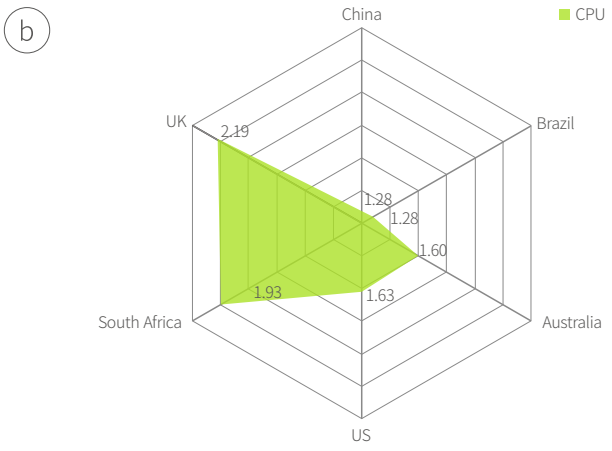
(Source: Ji et al., 2024)

2.3.3 Country-Level Patterns

(1) Comparison of CPU across Major Countries

Figure 2-15 (a) presents the monthly trends of the CPU Index for six major countries. While the coverage intervals of the CPU index vary across countries, they all show an overall upward trend. The CPU index of the U.S. and the UK has long remained in the higher range. Notably, following President Biden's inauguration in 2021, the U.S. announced its re-entry into the Paris Agreement and reaffirmed its commitment to addressing climate threats, which drove the country's CPU to a new high.





The monthly average CPU Index across major countries (Figure 2-15 b) reveals significant differences in their average uncertainty levels. The UK has the highest monthly average climate uncertainty level (2.19); South Africa ranks second, closely followed by an average of 1.93; and the U.S. ranks third in terms of monthly average CPU index (1.63). The monthly average CPU levels of other countries are relatively low.

Figure 2-15. The Monthly Trends and Structural Patterns of the CPU Index across Major Countries

(Source: Ji et al., 2024)

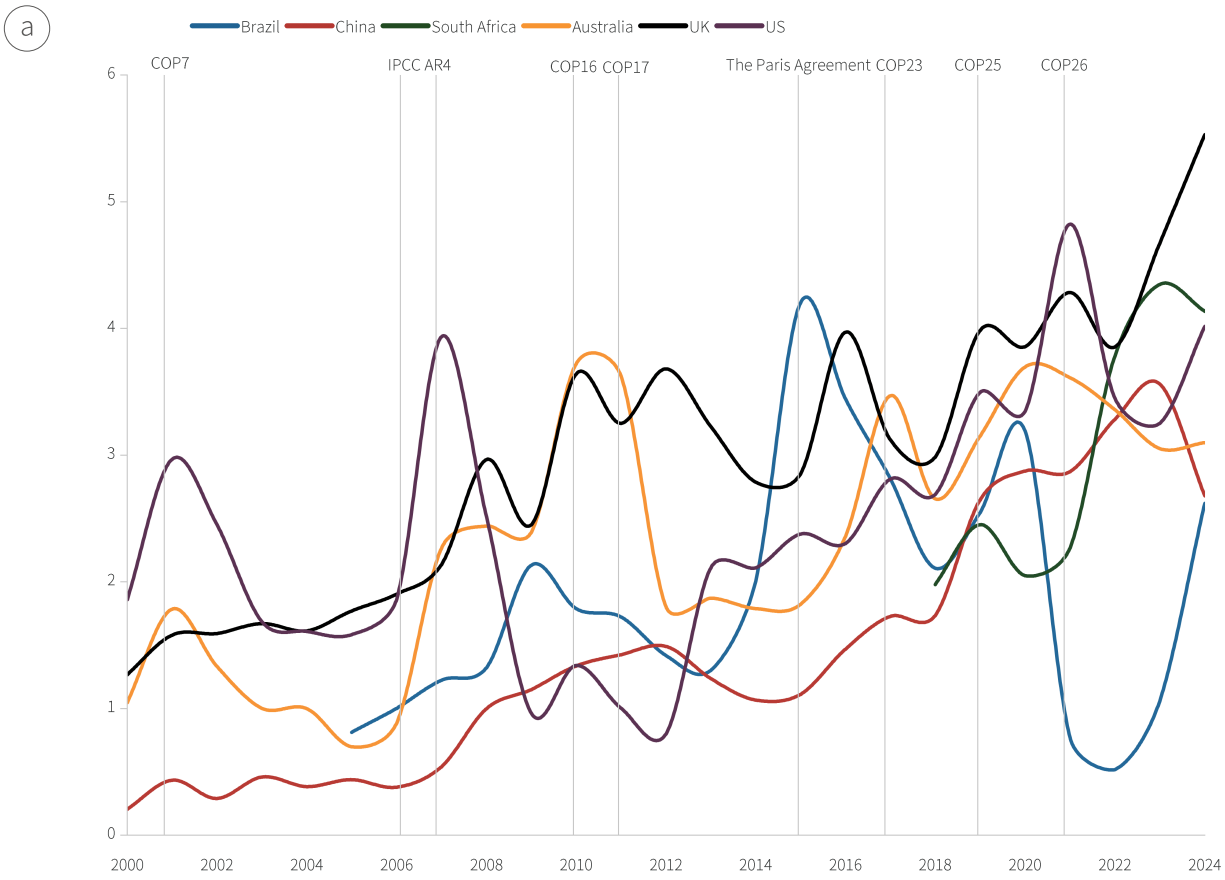


Figure 2-16 illustrates the annual trends (a) and structural patterns (b) of CPU across major countries. China's CPU has continued to rise since 2015, reaching a peak in 2023, while the UK has consistently remained at a high level. Although South Africa's data became available later, its CPU has maintained a high level of performance.

In terms of annual average CPU, South Africa (3.00) and the UK (2.99) remain among the highest, while China (1.43) and Brazil (1.90) have relatively low annual average CPU index.

Figure 2-16. The Annual Trends and Structural Patterns of CPU across Major Countries

(Source: Ji et al., 2024)

(2) Analysis of Differences in CPU: Developed vs. Developing Countries

Figure 2-17 classifies the 12 countries covered by the GCPU Index into developed and developing countries, presenting the monthly development trends of CPU across different types of economies. Developed countries maintained significantly higher uncertainty levels in the early stages, reflecting their characteristic of recognizing climate risks earlier and scaling up climate actions. As climate risks have intensified and global attention to climate issues has increased, developing countries have gradually engaged in global climate governance. The frequent introduction of evolving climate policies has driven a rapid rise in their monthly CPU.

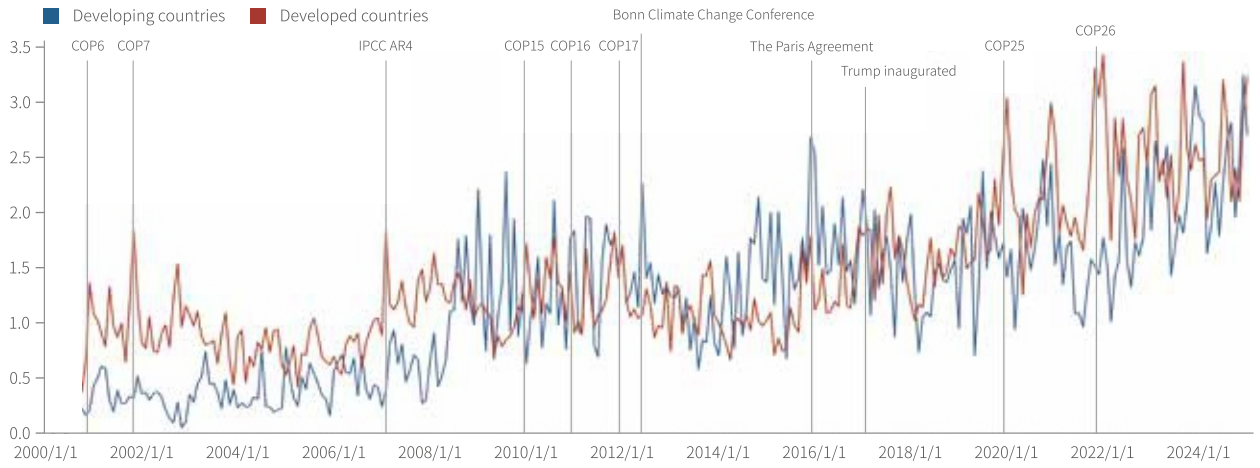


Figure 2-17. The Monthly Trends of CPU in Developed and Developing Countries

(Source: Ji et al., 2024)

Figure 2-18 presents the annual development trends of CPU in developed and developing countries. Developed countries have exhibited a relatively slow upward trend in uncertainty, with mild annual fluctuations. In contrast, developing countries have exhibited a strong upward momentum in CPU coupled with significant volatility. These characteristics underscore the growing prominence of developing countries in global climate governance. Notably, in 2024, the CPU of developing countries reached its highest peak, which is closely linked to the NCQG on climate finance at COP29 (UNFCCC, 2024). Focused on climate finance, developing countries face numerous challenges, including financing needs and international collaboration on this agenda, which have collectively fueled their significant CPU.

Figure 2-18. The Annual Trends of CPU in Developed and Developing Countries

(Source: Ji et al., 2024)

Climate Finance Outlook 2025

Chapter 3

Market development

Highlights

- Global climate finance volume has exceeded USD 2 trillion in 2024.
- MDBs' climate finance commitments reached a new peak of USD 136.6 billion in 2024.
- The cumulative market size of aligned GSS+ rose to USD 5.65 trillion by the end of 2024, with an annual value of USD 1.05 trillion in 2024 (11.30% growth from the previous year).
- Carbon pricing is scaling, with government revenues from carbon pricing reaching USD 102.2 billion and covering 28% of global GHG emissions in 2024.
- Clean energy investment amounted to USD 2.03 trillion in 2024, underscoring a structural reallocation of capital from fossil energy toward clean technologies.

3.1 Overview of Global Climate Finance

The total volume of global climate finance remains a contested but vital metric, with estimates varying across institutions due to differing definitions, scopes, and methodologies. According to the latest reports from 2024 and early 2025, figures range from approximately USD 1.3 trillion to USD 2.1 trillion annually.

According to the CPI, global tracked climate finance reached an all-time high of USD 1.9 trillion in 2023, representing a 15% increase from 2022 levels. Notably, CPI also estimates that annual climate finance surpassed USD 2 trillion for the first time in 2024 (CPI, 2025). CPI' s methodology includes both public and private flows, covering domestic and international investments for mitigation and adaptation.

In contrast, energy-focused estimates from the IEA and BloombergNEF (BNEF) report higher figures, primarily covering mitigation-related flows such as clean energy investments. The IEA records clean energy investment at USD 2.03 trillion in 2024 (IEA, 2025e), while BNEF states total low-carbon energy investment at USD 2.08 trillion in 2024 (BloombergNEF, 2025).

These discrepancies stem from three primary factors:

1. **Scope**
   whether estimates include only international flows or also domestic investments;
2. **Sources**
   whether both public and private capital are included;
3. **Purpose**
   some estimates cover only mitigation (e.g., energy transition), while others also account for adaptation and cross-sectoral projects.

Understanding these differences is essential to accurately assessing the state of global climate finance and evaluating progress toward long-term goals.

3.2 Commitments by MDBs

3.2.1 Composition

(1) Distribution of MDBs' Commitment by Income Group

In 2024, total climate finance commitments by MDBs reached USD 136.61 billion, with USD 85.12 billion allocated to LMICs and USD 51.49 billion to HICs. The WB Group was the largest individual provider, committing USD 41.12 billion to LMICs and USD 2.84 billion to HICs (total USD 43.96 billion). The EIB displays a distinctive high-income profile—USD 43.03 billion to HICs and USD 4.45 billion to LMICs (total USD 47.48 billion). Two other large, multi-regional MDBs—the ADB and the EBRD—delivered substantial volumes oriented toward LMICs. The ADB committed USD 12.28 billion (of which USD 12.28 billion was allocated to LMICs) , and the EBRD committed a total of USD 11.01 billion, with USD 8.10 billion allocated to LMICs and USD 2.91 billion to HICs (Figure 3-1).

Regional MDBs focused on their home constituencies. The Inter-American Development Bank Group (IDBG) provided USD 6.86 billion in total (USD 5.59 billion to LMICs and USD 1.27 billion to HICs), while the AfDB committed nearly all of its total of USD 5.53 billion to LMICs. Among more recently established or smaller institutions, the Asian Infrastructure Investment Bank (AIIB) committed USD 5.61 billion (LMICs USD 5.19 billion; HICs USD 0.42 billion); the Islamic Development Bank (IsDB) USD 2.39 billion (LMICs USD 2.36 billion; HICs USD 0.03 billion); the Council of Europe Development Bank (CEB) USD 1.00 billion (LMICs USD 0.02 billion; HICs USD 0.99 billion); and the New Development Bank (NDB) USD 0.50 billion (all to LMICs).

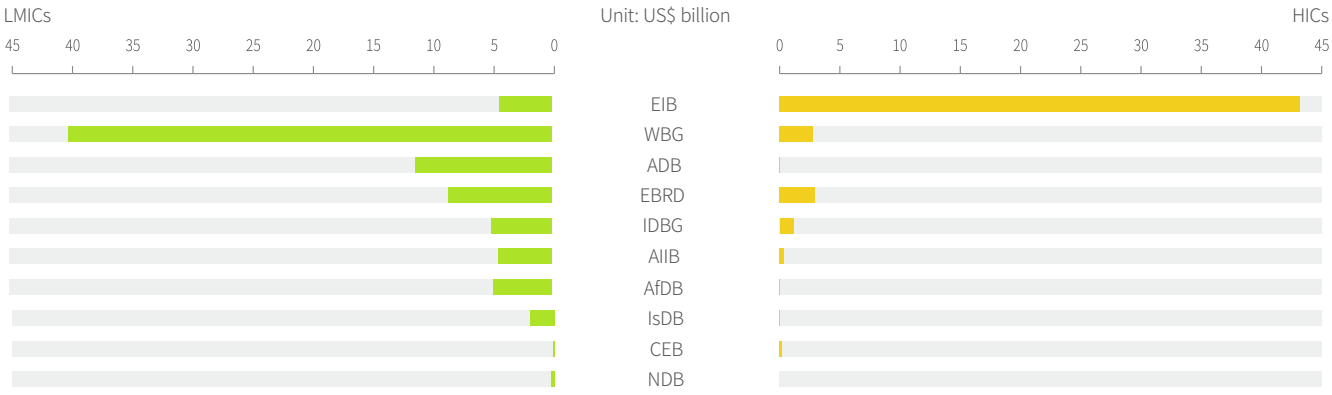


Figure 3-1. MDBs' Climate Finance by MDBs and Income Group in 2024

(Source: European Investment Bank)

(2) Distribution of MDBs' Commitment by Objectives

At the aggregate level, LMICs received 62.31% of total MDBs climate finance in 2024, with HICs receiving 37.69%. This distribution reflects two realities (Figure 3-2). First, MDBs remain central to addressing climate-investment gaps in LMICs where the cost of capital is higher and private finance is less accessible. Second, MDBs' activities in HICs—primarily through the EIB and EBRD—support large-scale decarbonization and energy security investments with strong public-good characteristics (e.g., cross-border interconnections, industrial decarbonization, and energy efficiency renovation waves). The composition by objectives aligns with this pattern: mitigation dominates globally, while adaptation's share is materially higher in LMICs, in line with vulnerability profiles and the financing needs of water, agriculture, nature-based solutions, and resilient urban infrastructure.

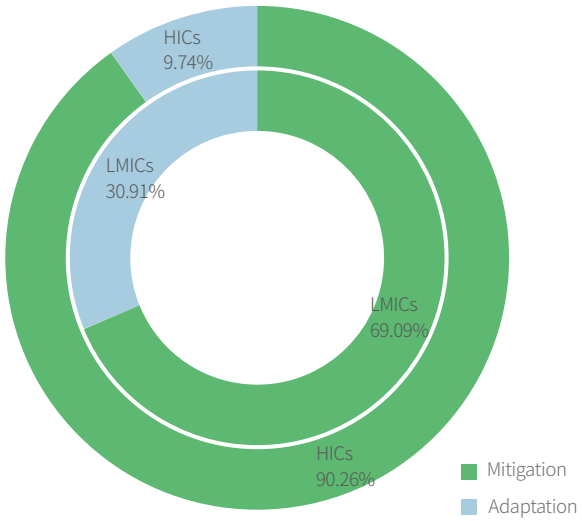


Figure 3-2. MDBs' Climate Finance by Income Group and Use in 2024

(Source: European Investment Bank)

3.2.2 Trends

MDBs' climate finance nearly doubled over five years, rising from USD 66.00 billion in 2020 to USD 136.40 billion in 2024. The trajectory accelerates after 2021, with annual totals of USD 82.50 billion (2021), USD 97.80 billion (2022), USD 124.90 billion (2023), and USD 136.40 billion (2024). The step-up coincides with mainstreaming climate across MDBs' core operations and a stronger emphasis on mobilization, particularly in the wake of pandemic recovery packages and rising energy security priorities. The income-group split confirms that LMICs consistently received the majority share.

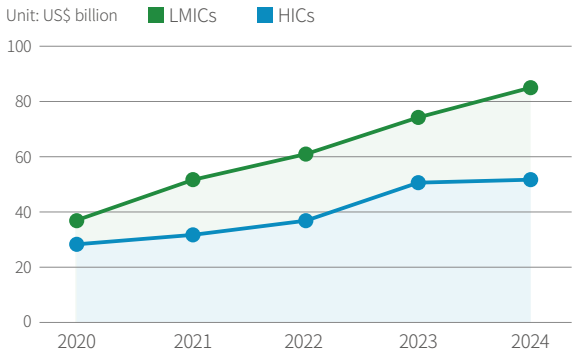


Figure 3-3. MDBs' Climate Finance Commitments

(Source: European Investment Bank)

In 2024, MDBs committed USD 85 billion to LMICs and USD 51 billion to HICs, maintaining LMICs dominance despite rising LMICs volumes, particularly with large European programs. The growth in LMICs-related climate finance primarily reflects the EIB's rising role in EU decarbonization and security-of-supply investments; EIB's total climate finance grew from USD 24.60 billion (2020) to USD 43.00 billion (2024), while maintaining a smaller LMICs envelope.

Among LMIC-focused institutions, rising trends are pronounced. The WB Group increased LMIC climate finance from USD 21.30 billion (2020) to USD 41.10 billion (2024), reflecting larger mitigation and adaptation programs and sustained use of policy-based operations and guarantees to unlock private investment. The ADB expanded from USD 5.30 billion to USD 12.30 billion in LMICs between 2020 and 2024, driven by renewable power, transport electrification, and resilience projects across South and Southeast Asia. The EBRD scaled LMIC climate finance from USD 2.30 billion to USD 8.00 billion, while maintaining roughly USD 2.90 billion in HICs in 2024, consistent with its dual geography.

The AfDB increased LMIC climate finance from USD 2.10 billion to USD 5.50 billion, aligning with a growing emphasis on adaptation, water security, and energy access. The IDBG's climate finance for LMICs rose from USD 2.50 billion in 2020 to USD 5.60 billion in 2024, anchoring sustainable transport, urban green programs, and biodiversity initiatives in Latin America and the Caribbean (LAC). The AIIB expanded LMIC commitments from USD 1.10 billion to USD 5.20 billion, highlighting increasing participation in climate-aligned infrastructure. The IsDB grew from USD 0.30 billion to USD 2.40 billion over the period, while the NDB exhibited cyclical flows with USD 0.50 billion in 2024.

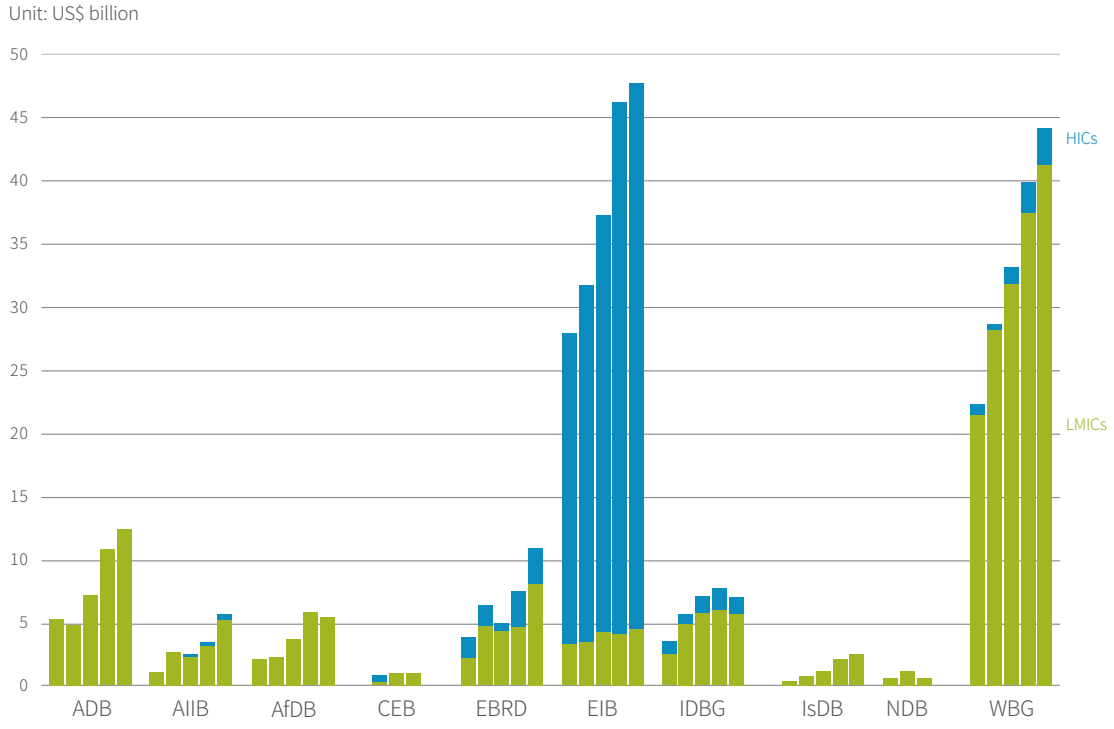


Figure 3-4. MDBs' Climate Finance Commitments, 2020-2024

(Source: European Investment Bank)

3.2.3 Instruments

In 2024, MDBs deployed a diversified instrument mix, delivering USD 136.61 billion in climate finance. Investment loans remained the core channel at USD 93.54 billion (68.47% of total), with USD 53.91 billion allocated to LMICs and USD 39.63 billion to HICs. Investment loans are suitable for capital-intensive climate projects, renewable energy generation, network upgrades, urban transportation, water and sanitation, resilient agriculture, where borrowers need long tenors and predictable servicing aligned with project cash flows.

Policy-based lending (PBL) was the second-largest instrument at USD 13.13 billion (9.61% of total), overwhelmingly oriented to LMICs (USD 12.66 billion). Guarantees totaled USD 11.09 billion (8.12%), with USD 5.19 billion to LMICs and USD 5.90 billion to HICs. Lines of credit through financial intermediaries amounted to USD 5.60 billion (4.10%), with HICs (USD 3.66 billion) exceeding LMICs (USD 1.94 billion), consistent with on-lending models for commercial bank participation. Results-based financing (RBF) reached USD 4.39 billion (3.22%), predominantly in LMICs (USD 4.22 billion), reflecting pay-for-performance programs in energy access, efficiency, forestry, and nature-based solutions. Grants totaled USD 4.52 billion (3.31%), with almost all flows to LMICs (USD 4.49 billion). Equity commitments totaled USD 2 billion (1.46%), supporting funds and innovative technologies, while MDBs-related green bonds totaled USD 1.09 billion (0.80%), helping develop local capital markets and labeled-debt ecosystems. Advisory services and other instruments together accounted for less than 1.00% of the total, but are critical for project preparation, capacity building, and transaction structuring, which, in turn, raise investment readiness and mobilization potential.

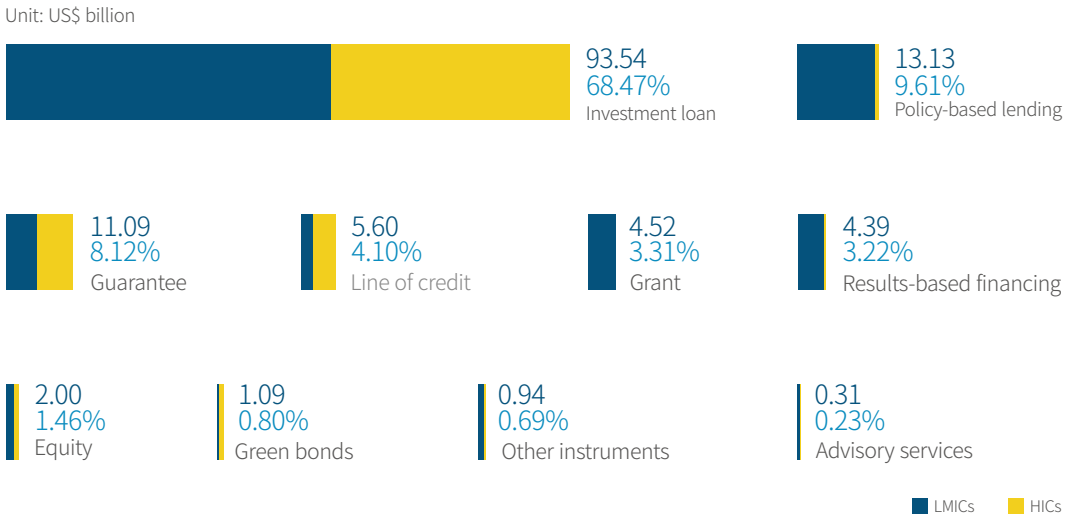


Figure 3-5. MDBs' Climate Finance Commitments by Instrument in 2024

(Source: European Investment Bank)

3.2.4 Regional Distribution

The regional allocation of MDBs' climate finance commitments in 2024 shows both concentration and breadth. Europe (EU) was the largest destination, accounting for USD 45.22 billion (33.10%), entirely within HICs. Sub-Saharan Africa received USD 17.25 billion (12.63%), with priorities spanning renewable power, climate-resilient agriculture, water security, and urban resilience. LAC absorbed USD 15.78 billion (11.55%) of the total. South Asia recorded USD 14.96 billion (10.95%), driven by large solar and grid projects, clean cooking initiatives, resilience investments, and coastal protection efforts. Europe (non-EU) received USD 13.04 billion (9.54%), mainly through EBRD operations across the Western Balkans, Türkiye, Eastern Europe, and the Caucasus. East Asia and the Pacific totaled USD 11.28 billion (8.25%), reflecting sovereign climate lending and private-sector mobilization in Indonesia, Viet Nam, and the Philippines.

Smaller regional envelopes included Regional (multi-country) at USD 6.83 billion (5.00%), Central Asia at USD 5.51 billion (4.03%), and Middle East and North Africa at USD 5.24 billion (3.83%). Global (USD 0.63 billion, 0.46%) and multi-regional (USD 0.87 billion, 0.64%) allocations remained limited, covering technical assistance and cross-regional initiatives. The income split embedded in these regional totals indicates that LMICs account for USD 85.12 billion (62.31%) versus HICs at USD 51.49 billion (37.69%) in 2024.

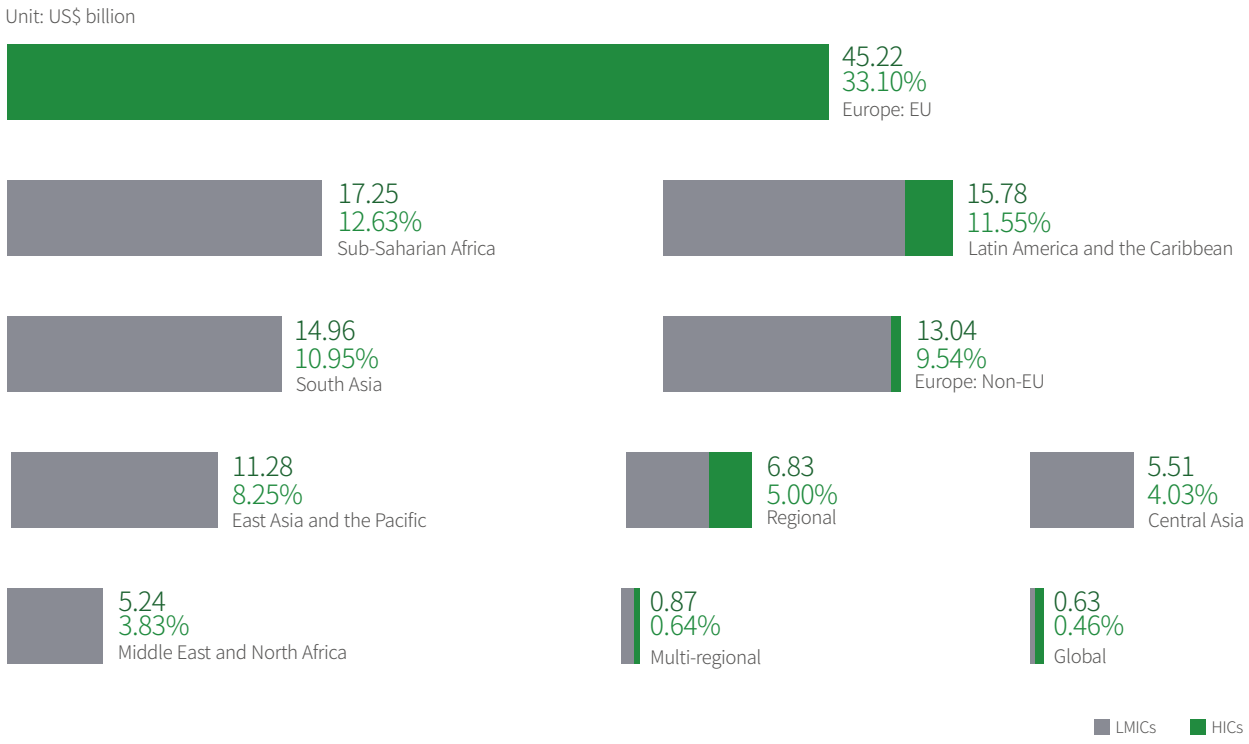


Figure 3-6. MDBs' Climate Finance Commitments by Region in 2024

(Source: European Investment Bank)

3.3 Labeled Bond Market

3.3.1 Size of Market

As of the end of 2024, the cumulative issuance of aligned GSS+ reached a total market size of USD 5.65 trillion, reflecting significant global uptake of labeled sustainable debt instruments (Climate Bonds Initiative, 2025). Among the different bond types, green bonds account for the largest share, representing 62% (USD 3.50 trillion) of the total aligned GSS+ market (Figure 3-7). Green bonds remain the primary instrument for financing climate mitigation and environmentally sustainable projects, such as renewable energy, clean transportation, and green buildings. Social bonds totaled USD 1.10 trillion, accounting for 19.49% of the aligned GSS+ market. These instruments have gained traction, particularly in the wake of the COVID-19 pandemic, with proceeds directed toward public health, education, and affordable housing projects. Sustainability bonds, which combine environmental and social objectives, accounted for an additional USD 1 trillion (17.68% share), reflecting increasing investor interest in integrated sustainable development approaches. Despite growing attention, SLBs, which tie financial or structural features to predefined sustainability performance targets, represented only USD 0.05 trillion, or less than 1% of the aligned market.

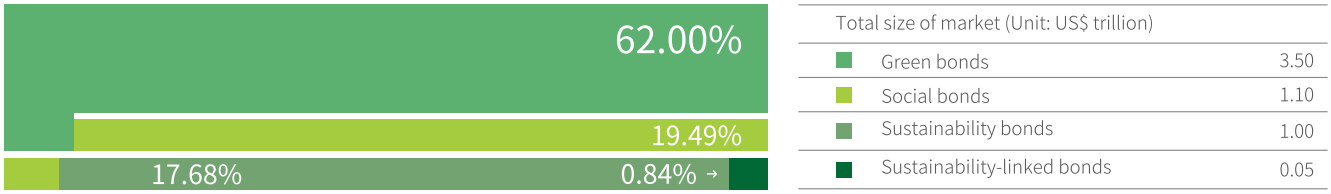


Figure 3-7. Cumulative Size and Composition of Aligned GSS+ Market in 2024

(Source: Climate Bonds Initiative)

3.3.2 Market Growth

Between 2020 and 2024, the aligned GSS+ market demonstrated notable volatility but maintained an overall upward trend, reflecting evolving investor preferences and market maturity (Climate Bonds Initiative, 2025). The total annual issuance of aligned GSS+ instruments increased from USD 727.2 billion in 2020 to USD 1.05 trillion in 2024, representing an average annual growth rate of approximately 10% over the period. The market experienced its strongest expansion in 2021, when total aligned issuance surged by 46.44%, reaching USD 1.06 trillion. This sharp rise was driven mainly by the rapid scaling of green bonds, which more than doubled from USD 298.1 billion in 2020 to USD 522.7 billion in 2021, alongside a remarkable increase in SLBs to USD 118.8 billion as new frameworks were introduced globally.

However, this momentum slowed in 2022, when total issuance declined by 20.87%, mainly due to tightening global financial conditions and a market recalibration after the post-pandemic surge. The market regained stability in 2023 and 2024, with moderate growth rates of 12.35% and 11.30%, respectively. Green bonds continued to dominate, accounting for over 60% of total annual aligned issuances, while sustainability bonds grew steadily, rising from USD 162.5 billion in 2020 to USD 206.3 billion in 2024. Social bond issuance, initially boosted by pandemic-related financing needs in 2020, stabilized at around USD 150–170 billion annually thereafter.

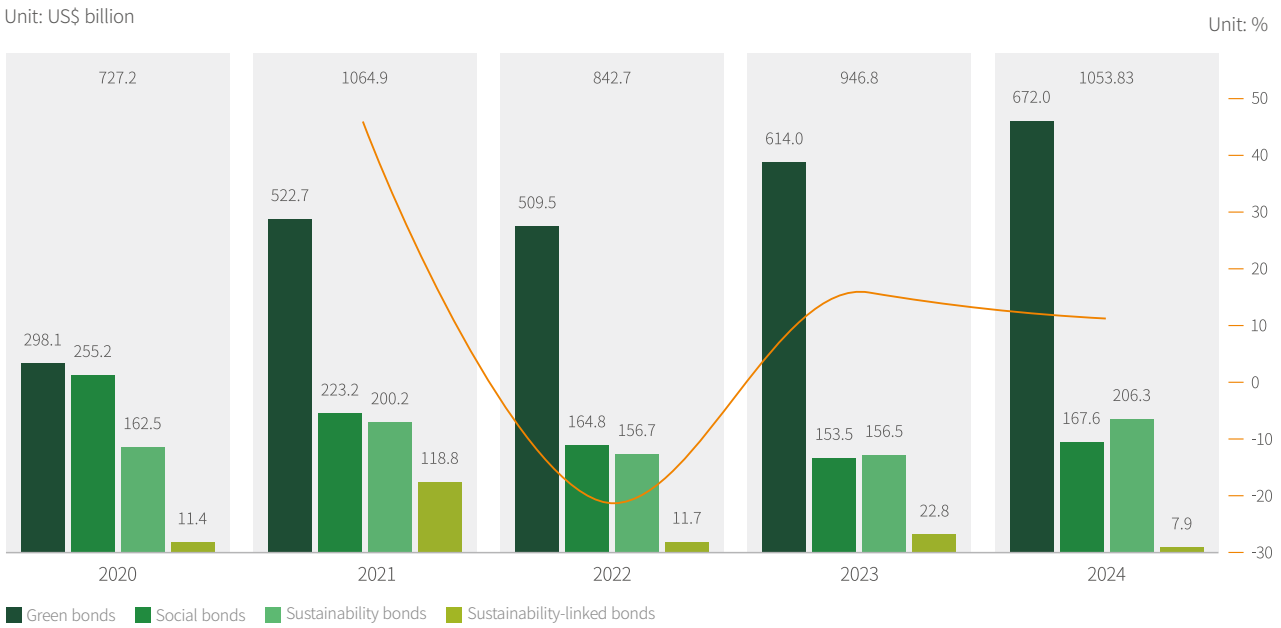


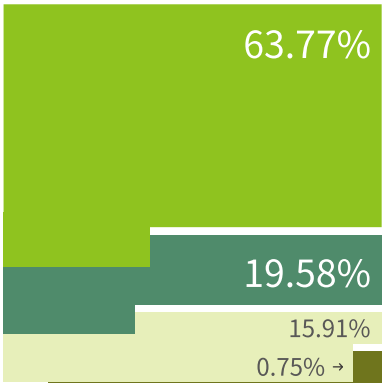
Figure 3-8. Annual Market Growth and Composition of Aligned GSS+

(Source: Climate Bonds Initiative)

3.3.3 Composition of Aligned GSS+

In 2024, the aligned GSS+ market totaled USD 1.05 trillion, comprising four principal instruments—green, social, sustainability, and sustainability-linked bonds (Climate Bonds Initiative, 2025). Green bonds accounted for the majority share, reaching USD 672 billion, or 63.77% of the total aligned issuance. This underscores the sustained investor appetite for financing projects that advance environmental objectives, such as renewable energy, energy efficiency, and low-carbon infrastructure. Sustainability bonds followed with USD 206.3 billion (19.58% share), reflecting growing interest in instruments that integrate both environmental and social outcomes.

Social bonds, amounting to USD 167.63 billion (15.91% share), continued to play a vital role in supporting inclusive growth, particularly in healthcare, education, and social housing sectors. SLBs accounted for a minor share, totaling USD 7.9 billion, or 0.75% of the aligned market. Their relatively small share highlights the stricter alignment criteria the Climate Bonds Initiative applies to classify performance-based instruments as aligned, despite broader issuance activity globally. The composition data reveal that the GSS+ market remains heavily weighted toward green finance, but there is steady diversification across other thematic instruments. This diversification enhances the market's role in addressing multidimensional sustainability challenges by integrating environmental, social, and performance-linked dimensions within labeled debt structures.



Type	Unit: US$ billion
Sustainability-linked bonds	7.9
Social bonds	167.63
Sustainability bonds	206.30
Green bonds	672

Figure 3-9. Composition of Aligned GSS+ by Type in 2024
(Source: Climate Bonds Initiative)

3.3.4 Regional Distribution

The regional distribution of aligned GSS+ issuances in 2024 underscores a highly uneven geographical concentration, dominated by advanced economies and supranational institutions. Europe remained the global leader, accounting for USD 474.22 billion or 45% of total aligned issuances (Climate Bonds Initiative, 2025). The region's prominence reflects its mature sustainable finance frameworks, strong regulatory alignment with the EU Taxonomy, and the continued leadership of European sovereign and corporate issuers in green and sustainability financing. The Asia-Pacific region ranked second with USD 274 billion (26% share), primarily driven by active issuance from China, Japan, and Australia. Growing national taxonomies and policy-driven initiatives have supported the rapid expansion of green bond markets in these economies. The U.S. followed with USD 168.61 billion (16% share), maintaining a significant presence in corporate and municipal green bond issuance, though the market remains more fragmented than Europe's.

Supranational issuers (SNAT) contributed USD 73.77 billion (7%), emphasizing the continued role of MDBs and international institutions in catalyzing sustainable finance globally. LAC and Africa collectively accounted for only 6% of the global aligned market, with USD 52.69 billion and USD 10.54 billion, respectively. Despite growing interest, both regions face structural barriers, including limited domestic capital market depth, currency risks, and high issuance costs.

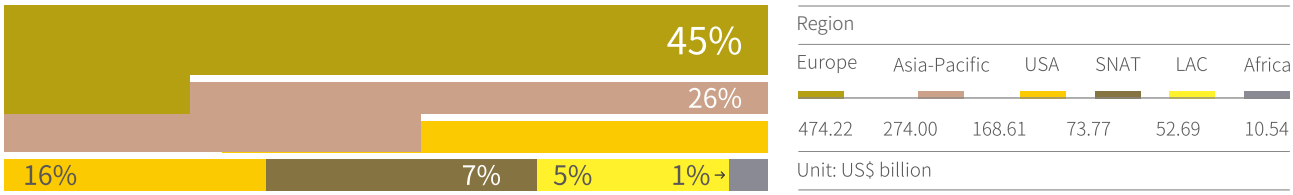


Figure 3-10. Regional Distribution of Aligned GSS+ in 2024

(Source: Climate Bonds Initiative)

3.4 Carbon Pricing Mechanism

3.4.1 Revenue and Coverage

Figures 3-11(a) and (b) illustrate, respectively, the trend in government revenues from carbon pricing and the share of global GHG emissions covered by different types of carbon pricing instruments in 2024. Global government revenues from carbon pricing instruments, ETS, and carbon taxes rose to USD 102.19 billion in 2024, marking a new historical high in fiscal receipts linked to carbon pricing (World Bank, 2025d) . Of this total, ETS-generated revenues accounted for USD 69.09 billion, or 67.61%, mainly from allowance auctions and compliance surcharges. Carbon-tax revenues contributed USD 33.10 billion, or 32.39%, collected through statutory levies on fossil-fuel use across multiple jurisdictions (Figure 3- 11a). As illustrated in Figure 3-11(b), as of 2024, 28% of total global GHG emissions were covered by explicit carbon pricing, 23% through ETS, and 5% through carbon taxes (World Bank, 2025d).

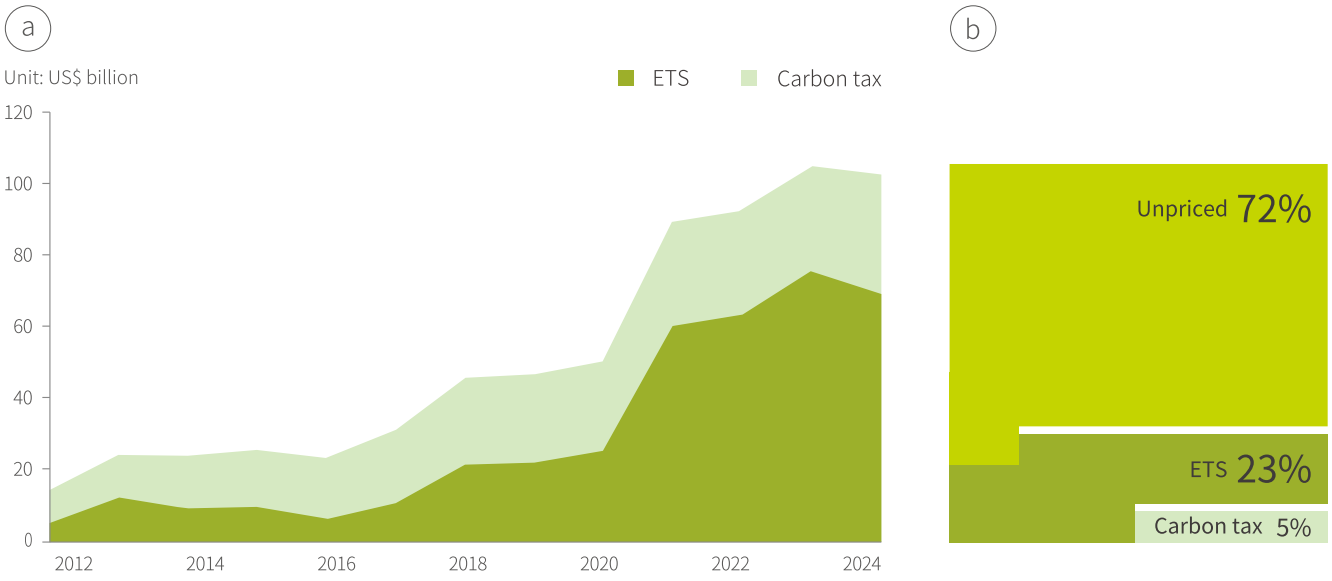


Figure 3-11. Carbon Pricing Revenue and Coverage in 2024

(Source: World Bank)

3.4.2 Carbon Pricing Trends by Regions

According to data from the WB (World Bank, 2025d), based on the development trend of carbon prices in some regions from 2012 to 2025 in Figure 3-12, it can be seen that although the prices of carbon taxes have fluctuated, the overall trajectory is dominated by policies; The price trend of ETS products is more market elastic, especially the rapid growth of European Union Emissions Trading System (EU ETS) in the later stage, reflecting the dynamic adjustment law of prices driven by the market.

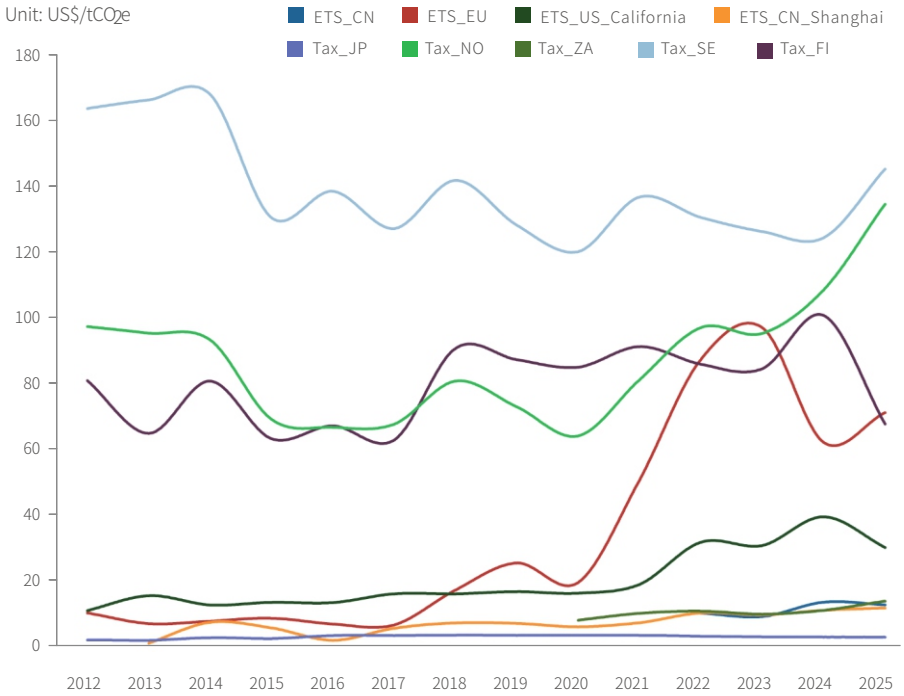


Figure 3-12. Development Trend of Carbon Prices in Some Regions

(Source: World Bank)

3.4.3 Carbon Credit Development Trends

Combining Figure 3-13 with the development trend of carbon credits from 2010 to 2024, the scale changes of different types of carbon credits show stage characteristics: in the early stage, international carbon credits were the mainstay, and around 2012, the amount of international carbon credits reached its peak, reflecting the first mover advantage of international emission reduction projects; The rapid growth of independent and government carbon credits in the later stage indicates that the carbon credit mechanism is gradually expanding from a single international cooperation to the participation of multiple entities, further verifying its supplementary role in carbon taxes and ETS, as well as its flexibility in global emission reduction cooperation (World Bank, 2025d).

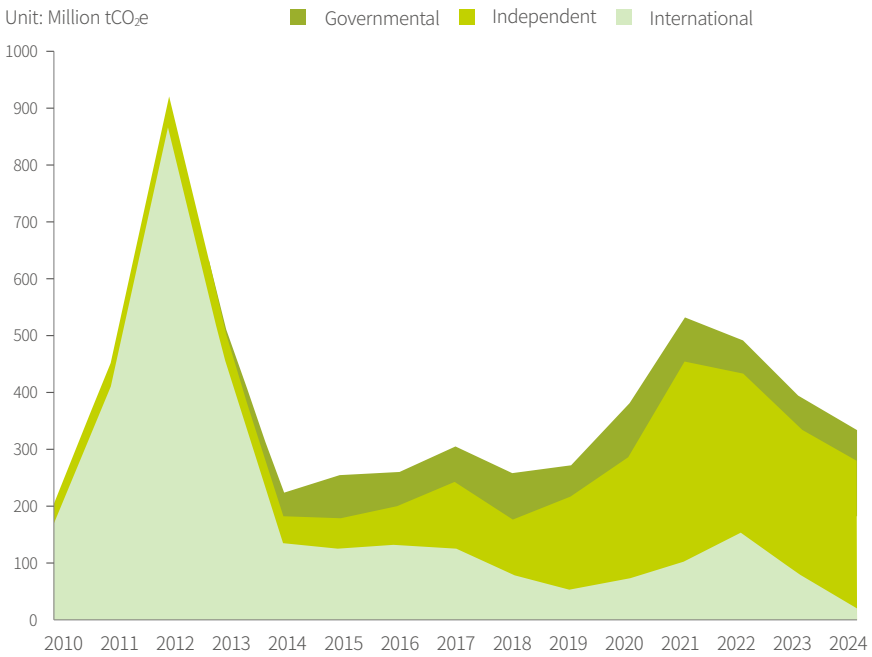


Figure 3-13. Carbon Credit Development Trends

(Source: World Bank)

3.4.4 Market Value of Carbon Credit Issuance

Global carbon-credit issuance and valuation trends between 2015 and 2024 reveal how market expansion and price signals have evolved under compliance systems (World Bank, 2025d). As shown in Figure 3-14, total annual issuance rose from 38.91 $MtCO_2e$ in 2015 to 46.52 $MtCO_2e$ in 2024, with intermediate fluctuations linked to policy changes and market reforms (World Bank, 2025d).This combination of moderate volume growth and significant price appreciation drove total annual market value from USD 0.64 billion in 2015 to USD 1.35 billion in 2024.

The 2024 data thus indicate a decoupling of value and volume, higher overall market capitalization driven by stronger price signals rather than expanded issuance. This trend is consistent with stricter emissions targets in the EU ETS, UK ETS, and Canada's federal system, as well as increased participation from China's national program. It also reflects continued differentiation between compliance markets and the rapidly growing voluntary carbon market, which operates under distinct methodologies and governance frameworks (UNFCCC, 2025). The continued expansion of ETS and integration of voluntary mechanisms under Article 6 of the Paris Agreement could further deepen carbon markets and enhance their role in mobilizing climate finance.

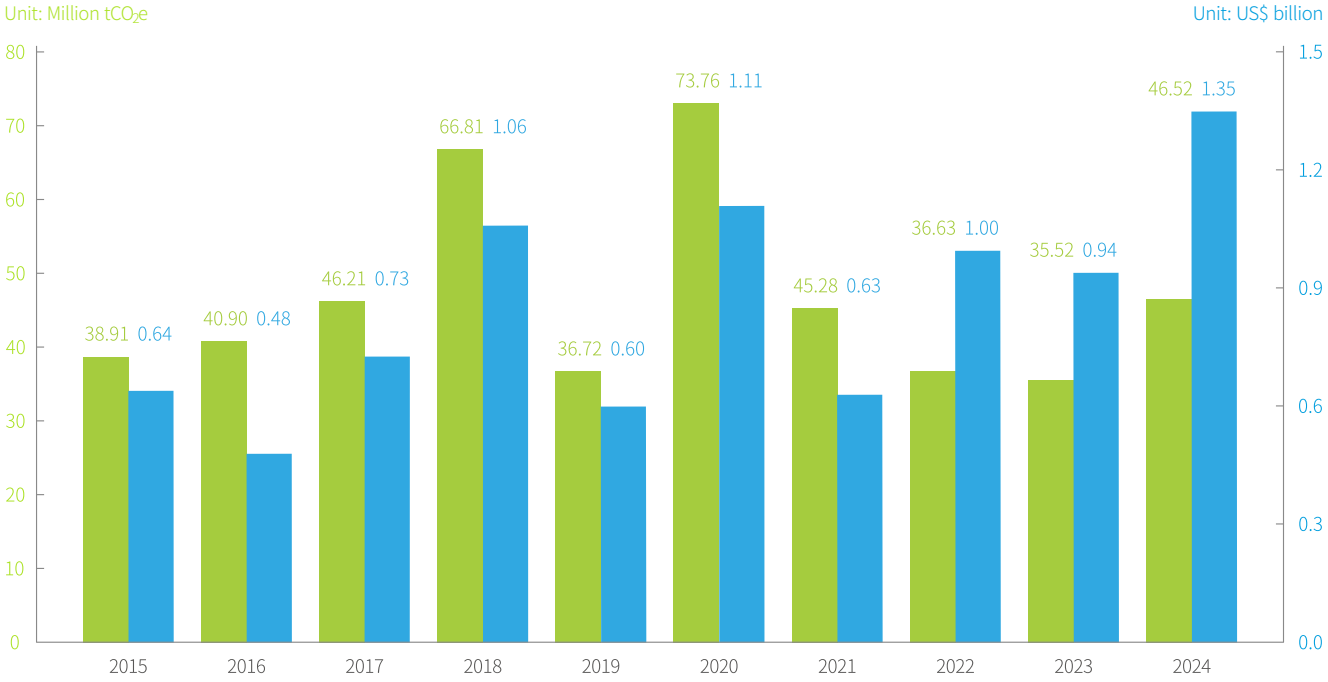


Figure 3-14. Global Carbon Credit Issuance and Market Value

(Source: World Bank)

3.5 Clean Energy Investment

3.5.1 Investment Volumes

Global clean energy investment expanded steadily from USD 1.21 trillion in 2015 to USD 2.03 trillion in 2024 (IEA, 2025e). The steady growth underscores the increasing integration of climate objectives into energy market structures. Clean energy investment includes renewables, electricity networks, battery storage, clean fuels, CCUS, and end-use electrification.

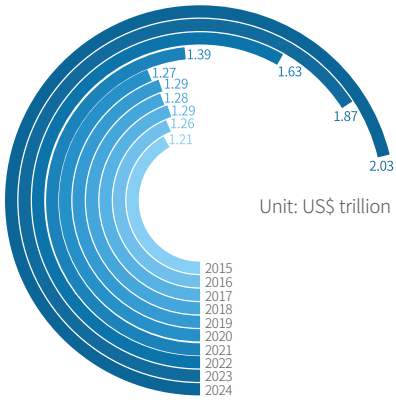


Figure 3-15. Global Clean Energy Investment

(Source: International Energy Agency)

3.5.2 Investment Trends

The momentum of global clean energy investment strengthened significantly after 2020, as illustrated in Figure 3-16. Between 2020 and 2024, annual clean energy spending grew by nearly 70%, while the compound annual growth rate (CAGR) rose from 0.93% during 2015–2020 to 12.53% post-pandemic (IEA, 2025e). This acceleration marks a structural transition in capital allocation. The most rapid annual expansions occurred in 2021 and 2022, with growth rates of 9.86% and 17.05%, respectively. This was followed by continued double-digit increases through 2023 (14.73%) and moderate expansion in 2024 (8.67%). These figures reflect a sustained global reallocation of capital toward clean technologies driven by rising energy security concerns, inflation-adjusted fiscal incentives, and improved financial market integration for green assets.

Figure 3-16. Clean Energy Investment Growth Rates

(Source: International Energy Agency)

3.5.3 Sectoral Distributions of Investment

(1) Distribution by Major Sectors

Global clean energy investment exhibited significant structural shifts over the 2015–2024 period. As illustrated in Figure 3-17, the investment landscape in 2024 remained anchored in four primary categories: Power, End-use, Fuels, and Transitional fossil fuels. Among these, the Power sector retained the largest share, accounting for approximately 62.95% of total clean-energy investment. End-use sectors, encompassing electrification and efficiency improvements in transport, buildings, and industry, accounted for about 35.88%. From 2015 to 2019, the Power sector consistently led investment volumes, driven by utility-scale deployment of solar PV, wind, and hydroelectricity. End-use investment remained substantial but secondary. The pandemic-induced disruptions of 2020 briefly altered this trajectory, but global recovery packages and energy transition commitments reinforced growth in both Power and End-use segments post-2020.

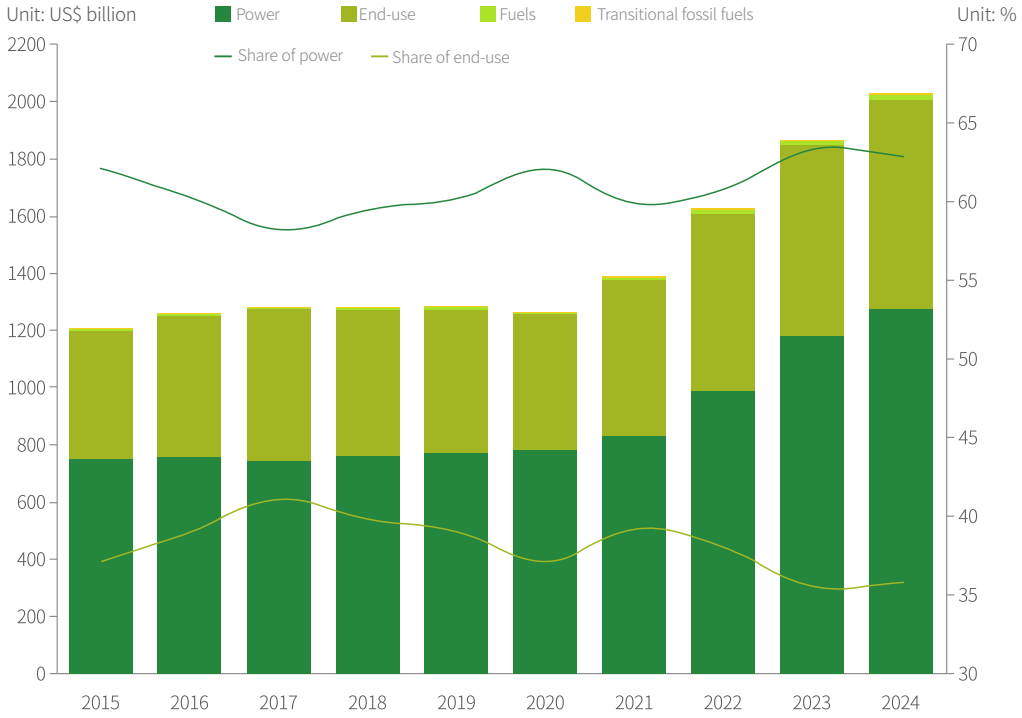


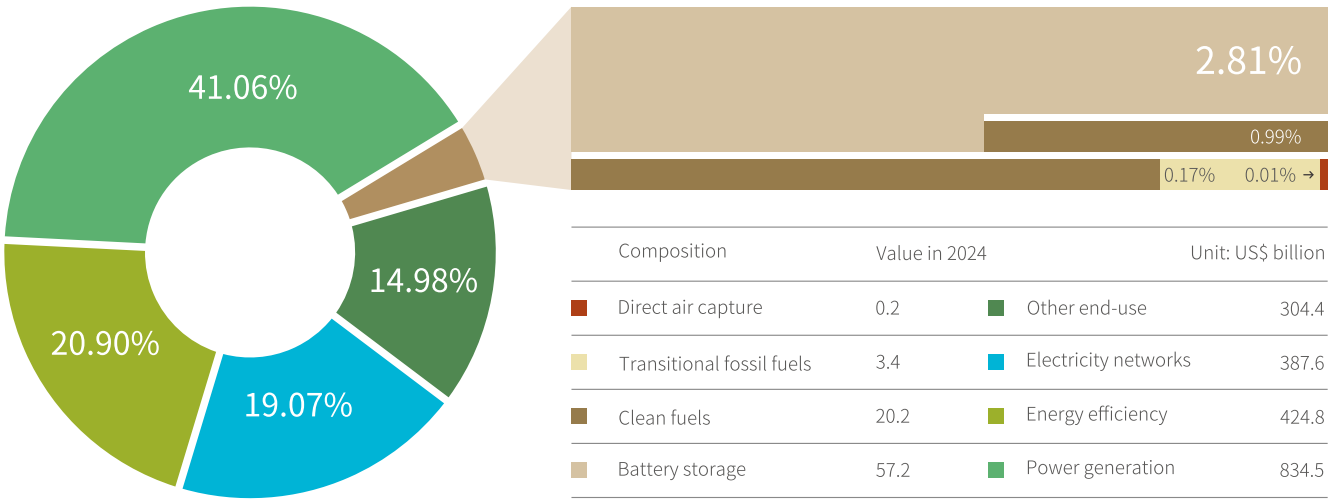
Figure 3-17. Global Clean Energy Investment by Category

(Source: International Energy Agency)

(2) Distribution by Subsectors

A closer examination of the 2024 sub-sectoral distribution, presented in Figures 3-18, reveals more detailed investment dynamics. Power generation attracted the highest volume of investment at USD 834.5 billion, or 41.06% of the total. Energy efficiency followed, at USD 424.8 billion (20.9%), and Electricity networks at USD 387.6 billion (19.07%). Together, these three sub-sectors represented over 80% of global clean energy spending in 2024. Battery storage investment rose sharply over the decade, increasing from less than USD 10 billion in 2015 to USD 57.2 billion in 2024. This expansion supports the integration of variable renewable sources into electricity systems and contributes to system stability (IEA, 2025e).

In parallel, end-use electrification projects—such as electric vehicle (EV) infrastructure, high-efficiency appliances, and industrial electrification—garnered increased capital flows, reflecting both market growth and supportive policy environments. Clean fuels and DAC technologies, although still in their early stages of development, are receiving growing attention. These technologies accounted for roughly 1% of total clean energy investment in 2024. Emerging demonstration projects and long-term offtake agreements support their upward trend. Transitional fossil fuels remained a small segment, receiving approximately USD 3.4 billion, indicating a limited yet still present role in some national strategies.



Composition	Value in 2024		Unit: US$ billion
Direct air capture	0.2	Other end-use	304.4
Transitional fossil fuels	3.4	Electricity networks	387.6
Clean fuels	20.2	Energy efficiency	424.8
Battery storage	57.2	Power generation	834.5

Figure 3-18. Composition of Clean Energy Investment in 2024 (by Subsector)

(Source: International Energy Agency)

3.5.4 Regional Distribution

The regional distribution of clean-energy investment in 2024 reveals stark contrasts across economies (IEA, 2025e). As shown in Figure 3-19, total investment reached USD 992.3 billion in Advanced Economies, USD 967.3 billion in Emerging Market and Developing Economies (EMDEs), and USD 625.2 billion in China (IEA, 2025e). Together, these accounted for nearly all global clean-energy spending. Power dominates across all regions, reflecting its role as the core enabler of decarbonization. Advanced Economies allocated USD 580.0 billion to power-sector assets, representing nearly 60% of their total capital allocation. China followed with USD 469.9 billion (75% of its total), driven by the rapid deployment of renewables and grid infrastructure. EMDEs invested USD 699.5 billion in power, but with a lower share of end-use investments due to financing and infrastructure limitations.

End-use spending—encompassing efficiency and electrification—was strongest in Advanced Economies (USD 399.5 billion), driven by robust regulatory frameworks and consumer incentives. China's end-use investment (USD 151.5 billion) was primarily driven by transport electrification and industrial upgrades, while EMDEs invested USD 257.0 billion, reflecting growing clean-cooking, distributed solar, and appliance-efficiency programs. Fuels and Transitional Fossil Fuels remained marginal across regions.

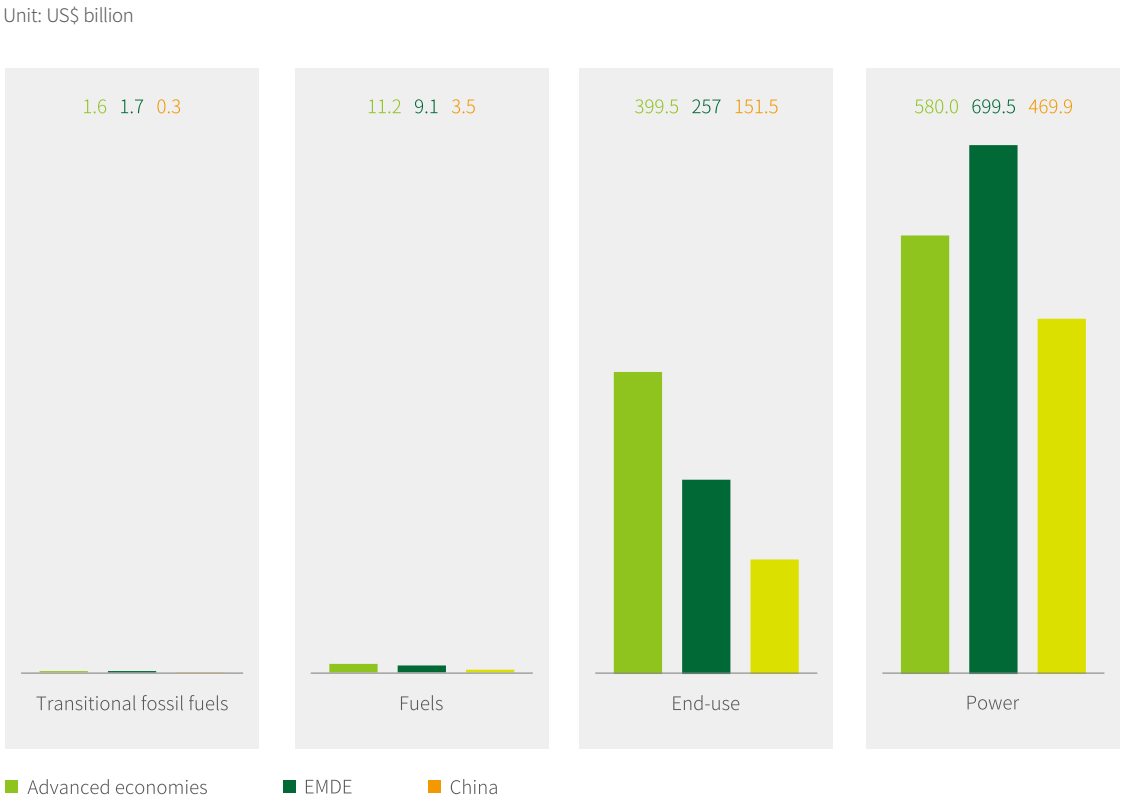


Figure 3-19. Regional Composition of Clean Energy Investment in 2024

(Source: International Energy Agency)

Climate Finance Outlook 2025

Chapter 4

Regional development

Highlights

- This chapter highlights the structural characteristics and evolutionary pathways of regional climate finance systems across four representative areas—the U.S., the EU, China, and Africa.
- Climate investment and finance in the U.S. have expanded steadily, though political and fiscal cycles continue to introduce uncertainty.
- The EU has established a multi-layered, institutionalized, and sustainable climate finance system centered on the carbon market.
- China has developed a balanced climate finance model by strengthening its green finance policy framework and advancing green credit and bond markets.
- In Africa, climate finance remains primarily driven by international assistance and public funding, with limited participation from private capital.

4.1 U.S.

The U.S. has one of the most developed capital markets and a dynamic set of policy instruments in the world. This scale gives the U.S. unparalleled capacity for capital mobilization and risk absorption, positioning it as a major driver of global climate finance. This section examines the structure of U.S. climate investment and finance across three dimensions: (1) overall trends and composition;(2) budgetary mechanisms for funding allocation and disbursement; and market mechanisms reflected in capital markets and evolving financial instruments.

4.1.1 Expansion of Clean Energy Investment

Leveraging its deep capital markets and mature financial infrastructure, the U.S. has established a solid institutional foundation for climate finance. Following the implementation of the Inflation Reduction Act (IRA) and a series of federal clean energy incentive programs, climate-related investment in the U.S. is growing rapidly, with a more diversified structure and strong, sustained momentum.

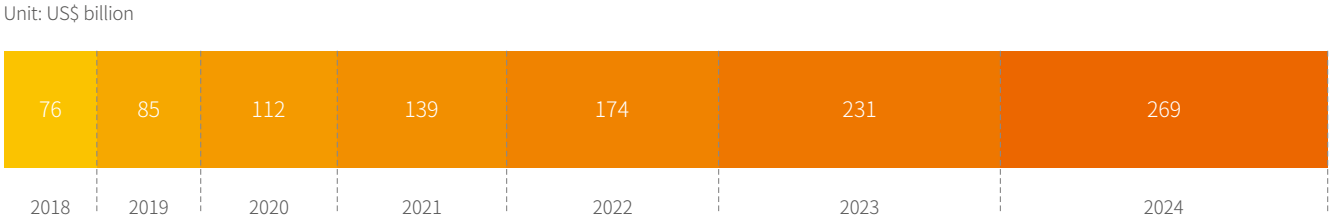


Figure 4-1. U.S. Clean Investment

(Source: Rhodium Group-MIT\Center for Energy and Environmental Policy Research Clean Investment Monitor)

Figure 4-1 illustrates changes in U.S. clean energy investment from 2018 to 2025. The annual total investment rose from less than USD 76 billion in 2018 to around USD 269 billion in 2024 (in constant 2024 dollars), more than doubling over the six years.

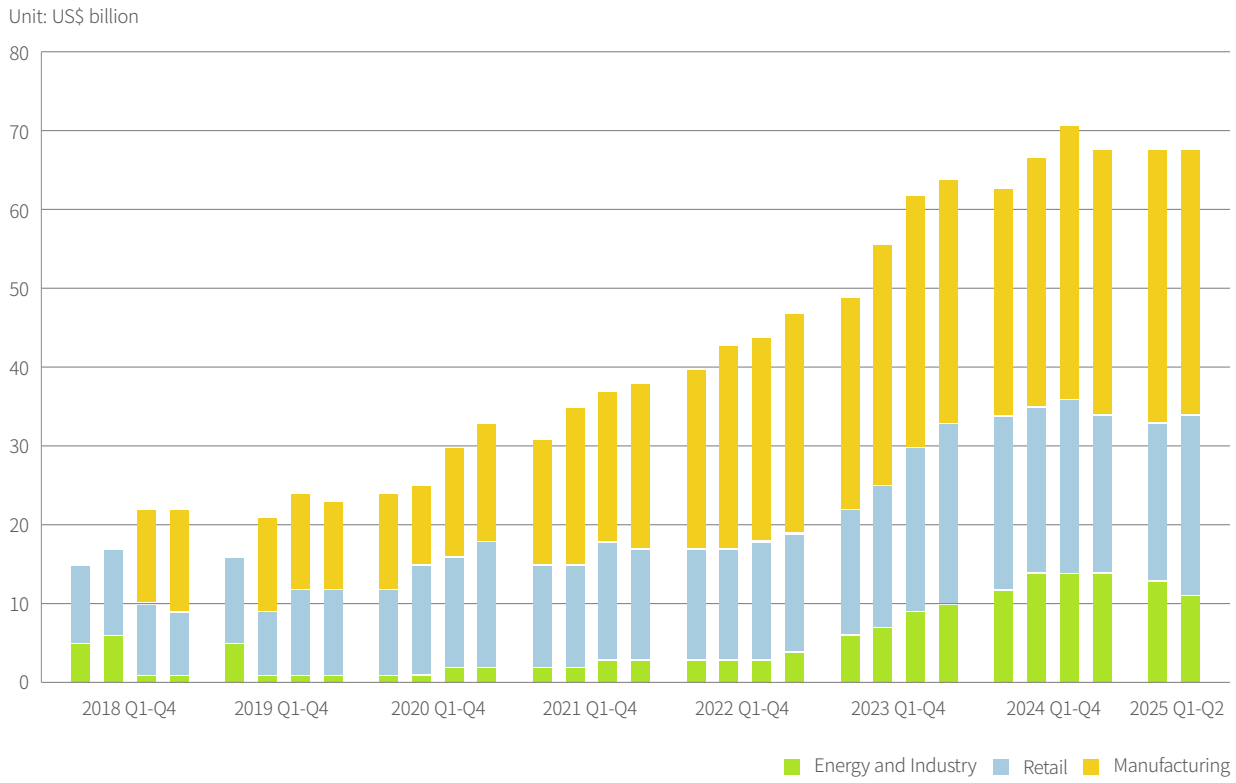


Figure 4-2. U.S. Clean Investment by Segment

(Source: Rhodium Group-MIT\Center for Energy and Environmental Policy Research Clean Investment Monitor)

The expansion of clean energy investment is mainly concentrated in the manufacturing, energy, and industry sectors (Figure 4-2). Manufacturing remains the dominant driver of overall growth, while investment in energy and industry increased significantly after 2023. Investment in the retail sector has continued to rise steadily.

4.1.2 Obstacles of Climate Policy Implementation

As a core pillar of the U.S. climate finance system, the fiscal mechanism plays a central role in coordinating climate-related budgets and fulfilling international commitments. However, unlike the EU' s long-term and programmatic budgetary approach, the U.S. fiscal framework is marked by pronounced political cyclicality and policy uncertainty.

As shown in Figure 4-3, U.S. international climate finance displays clear cyclical fluctuations. Although the Biden administration significantly increased its budget request for climate finance in 2024, the proposed amount declined again in 2025. Despite remaining a major contributor to multilateral and bilateral climate finance channels (see Figure 4-4), the overall fiscal scale remains limited. Between 2022 and 2025, U.S. annual appropriations to major multilateral funds—such as the GCF, GEF, and CTF—were consistently below pledged levels, and actual disbursements fell well short of initial requests. This "high-commitment, low-disbursement" pattern highlights a structural tension within the U.S. climate finance system: a strong global influence but weak fiscal stability.

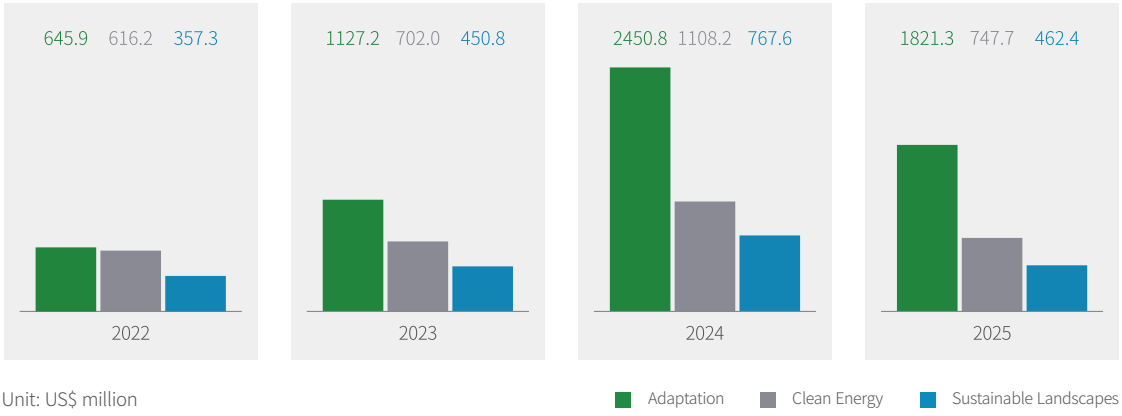


Figure 4-3. U.S. Budget for International Climate Finance

(Source: U.S. Department of State, 2022-2025)

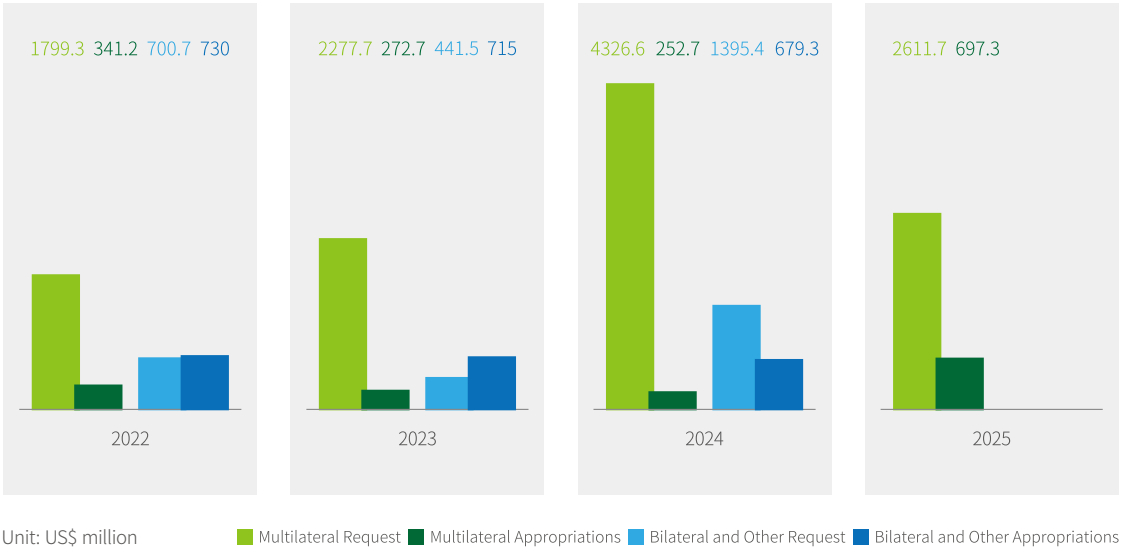


Figure 4-4. U.S. International Climate Finance: Budget Requests vs. Appropriations, Multilateral and Bilateral

(Source: U.S. Department of State, 2022-2025)

4.1.3 Rapid Growth of Market-Based Instruments

Capital markets are increasingly filling fiscal gaps and driving investments in climate change mitigation. The rapid expansion of green and sustainability bonds, as well as blended-finance funds, is building a market-centered mobilization mechanism within the U.S. climate finance system.

Figure 4-5 illustrates the trend of the U.S. green bond market. Overall, U.S. green bond issuance rose sharply from USD 34 billion in 2018 to USD 84.7 billion in 2024, This trajectory reflects a dynamic, increasingly mature market segment characterized by active financial innovation, diversified instruments, and strengthened capacity for capital mobilization. Despite limited fiscal support and persistent political uncertainty, market mechanisms have partially offset public funding constraints, underscoring the central role of private finance in the U.S. climate finance architecture.

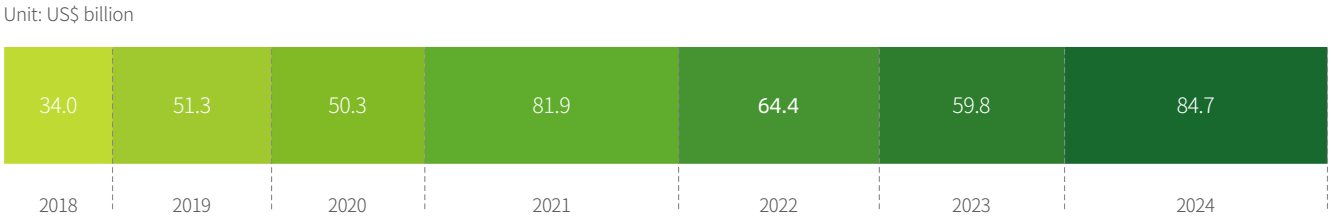


Figure 4-5. U.S. Green Bond Issuance

(Source: Climate Bonds Initiative)

4.2 EU

The EU plays a leading role in global climate governance. It is both the world' s largest provider of international climate finance, accounting for approximately one-third of global flows, and the first regional bloc to establish an institutionalized climate finance system. The EU' s climate finance architecture is characterized by (1) a large and steadily expanding funding scale, (2) a multilayered structure that combines fiscal transfers, dedicated programs, regional funds, development banks, and private capital, and (3) a carbon-market-centered framework in which the EU ETS links policy, markets, and capital allocation, offering a model for global climate finance governance.

4.2.1 Policy Coordination and Green Investment Expansion

A long-term focus and a well-established institutional framework characterize the EU' s climate investment. Unlike the U.S., which relies primarily on market incentives and fiscal stimulus, the EU has established a multilayered fiscal framework supported by strong policy coordination. Strategic initiatives such as the European Green Deal, Fit for 55, and REPowerEU ensure continuity across policy cycles and coherence among member states. As shown in Figure 4-6, total energy investment in Europe increased from approximately USD 369.3 billion in 2015 to USD 575.8 billion in 2025, with clean energy investment rising from USD 247.6 billion to USD 494.4 billion, thereby increasing its share from approximately 67% to nearly 86%. Compared with the more volatile U.S. investment curve, the Europe' s investment pattern demonstrates greater stability, predictability, and long-term strategic planning.

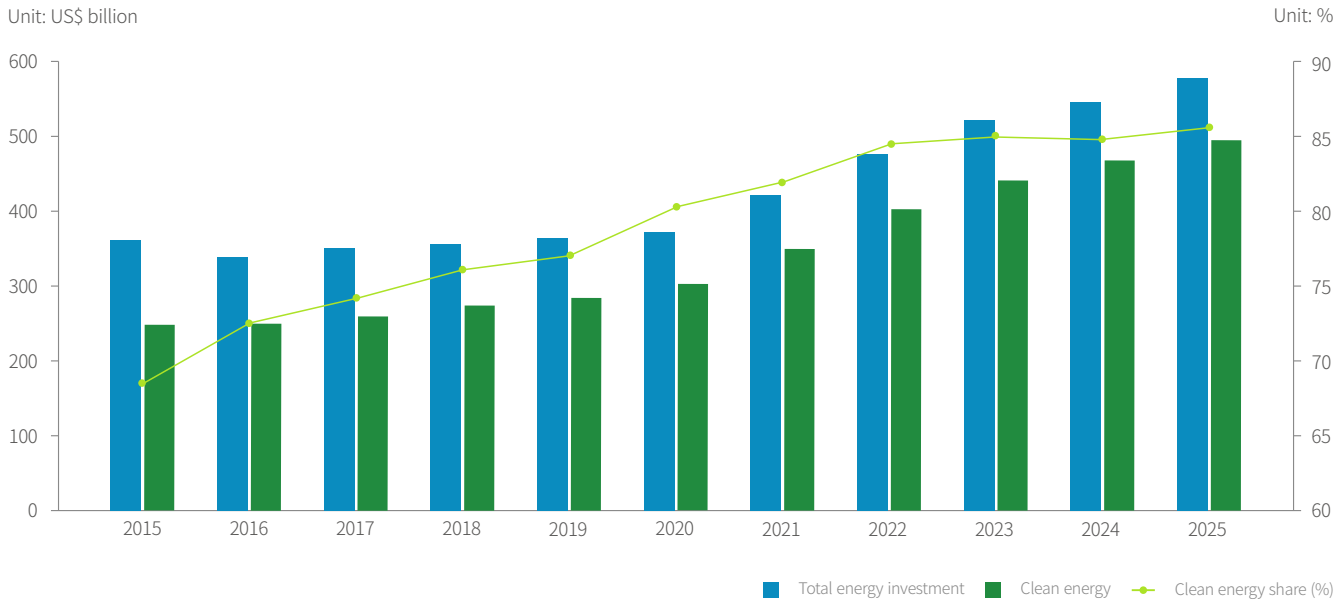


Figure 4-6. Clean Energy Investment in Europe

(Source: International Energy Agency)

The private sector serves as the primary financial driver of the EU's green transition. As shown in Figure 4-7, annual private investment in climate mitigation increased steadily from approximately USD 62.78 billion in 2014 to USD 95.29 billion in 2023—an overall rise of more than 50%. The pace of growth accelerated after 2017, coinciding with the implementation of key policy frameworks, including the Energy Union Strategy, the European Green Deal, and the Fit for 55 packages. Despite disruptions from the pandemic and energy price volatility, investment continued to expand steadily, reflecting the EU's strong institutional resilience and policy stability.

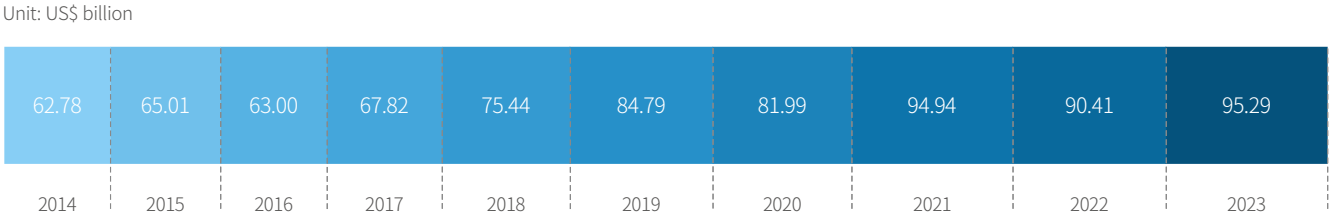


Figure 4-7. Private-Sector Mitigation Investment in the EU

(Source: Eurostat)

4.2.2 The EU Climate Finance System

The diversification of the EU's climate finance system is reflected in the depth of its policy framework and the multilayered nature of its institutional design. The EU has built a comprehensive, end-to-end architecture that integrates fiscal budgets, dedicated funds, regional policies, sectoral investment programs, development financing, and risk-sharing mechanisms. At its core, the system is anchored in the EU's budget, coordinated through the Multiannual Financial Framework (MFF), and co-financed with member states to ensure policy coherence and long-term continuity. Dedicated funds and cohesion instruments help balance regional disparities and reinforce policy alignment, while sector-specific tools and development finance institutions translate policy objectives into market-based investment operations. Together, these components form a closed-loop system that links resource mobilization with project implementation. Table 4-1 summarizes the key institutional instruments underpinning the EU's climate finance framework (IIGF, 2024).

Category	Instrument	Description
Fiscal Support Instruments	EU-Level – MFF	Introduces the Climate Mainstreaming Approach and establishes an expenditure tracking system.
	Member-State Level – NextGenerationEU (NGEU)	Supports national climate-related spending through the Recovery and Resilience Facility (RRF).
Dedicated Funding Programs	L' Instrument Financier pour l' Environnement (LIFE Programme)	Established in 1992 as the EU's only fund fully dedicated to environment and climate action (€5.4 billion for 2021–2027). Includes four sub-programs, with adaptation support mainly under "Climate Change Mitigation and Adaptation."
	Horizon Europe Program	EU' s R&D and innovation framework (2021–2027), requiring at least 35% of total spending to target climate-related actions.
Cohesion Policy and Related Funds	Cohesion Fund	Finances environmental and trans-European transport projects, enhancing the resilience of energy and transport systems.
	European Regional Development Fund (ERDF)	Strengthens economic, social, and territorial cohesion; prioritizes green and climate-resilient growth.
	Just Transition Mechanism (JTM)	Comprises the Just Transition Fund, InvestEU Scheme, and Public Sector Loan Facility to support regions most affected by the green transition.

Category	Instrument	Description
Sector-Specific Instruments	Connecting Europe Facility (CEF)	Funds cross-border transport, energy, and digital infrastructure projects.
	European Agricultural Fund for Rural Development (EAFRD)	Supports sustainable agriculture and rural development.
	European Maritime, Fisheries and Aquaculture Fund (EMFAF)	Backs sustainable blue economy, marine biodiversity protection, and climate resilience in maritime sectors (2021–2027).
Multilateral Development Bank Financing	EIB & EBRD Adaptation Initiatives	Provide direct and blended financing, project-based risk assessments, capacity building, monitoring systems, and policy support for climate adaptation across key sectors.
Climate Disaster Insurance	EU Climate Disaster Risk Financing and Insurance Mechanism	Comprising the EU Solidarity Fund, Civil Protection Mechanism, and development banks (EIB, EBRD) with private insurers; provides emergency funding, risk sharing/reinsurance, data sharing, and insurance innovation.

Table 4-1. Institutional Support Instruments of the EU' s Climate Finance Framework

Source: Institute of International Green Finance (2024).

The diversification of the EU' s climate investment and finance is most evident in the evolution of its financial instrument structure. Domestically, the EU supports long-term climate and energy transitions through instruments such as the MFF, the NextGenerationEU recovery fund, and various cohesion and innovation funds. Internationally, initiatives like the Global Gateway provide climate-related aid and investment financing to developing countries. The EIB and the EBRD leverage loans, guarantees, and blended-finance instruments to mobilize private capital and foster public–private collaboration. At the same time, sustainable bonds have become a key bridge between public budgets and capital markets, widely financing projects in clean energy, transport, and building renovation. The expansion of equity investment and innovative financing tools has further broadened funding channels for green projects and emerging technologies.

Figure 4-8. Euro Area Issuances of Sustainable Debt Securities

(Source: Centralized Securities Database)

For example, Figure 4-8 illustrates issuance trends for sustainable bonds in the euro area. Overall, the sustainable debt market has expanded steadily, with total outstanding volume rising from Euro (EUR) 0.45 trillion in early 2021 to EUR 1.74 trillion by September 2025. Green bonds account for the largest share and remain the main driver of growth, followed by social and sustainability bonds, both of which show a stable upward trajectory. In contrast, sustainability-linked bonds still represent a relatively small segment of the market. This trend highlights the rapid growth of the euro area' s sustainable finance market and the sustained demand from investors for instruments aligned with environmental and social responsibility objectives.

4.2.3 EU Carbon Market

Since its launch in 2005, the EU ETS has evolved into the world' s largest and most mature carbon market. Over the past two decades, emissions from covered sectors have declined by about 50%, making the ETS a central driver of the EU' s overall decarbonization progress. As shown in Figure 4-9, the price of European Union Allowance (EUA) has undergone a remarkable transformation over the period from 2005 to 2024. From 2005 to 2017, carbon prices remained persistently low, typically below EUR 10 per tonne. Beginning in 2018, prices rose sharply, reaching a peak of around EUR 96 per tonne in 2023—roughly a tenfold increase from earlier years—reflecting the transition of the EU carbon market into a phase of structural tightening and strong policy-driven price signals.

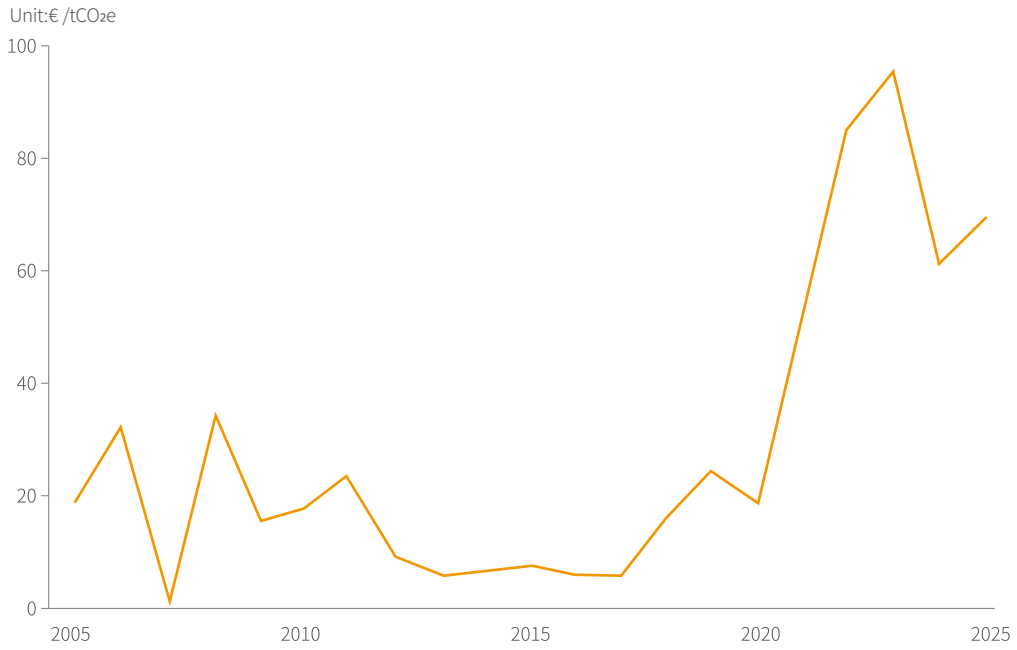


Figure 4-9. EU ETS Price Trend

(Source: World Bank)

Figure 4-10 shows that the total market value of EUA increased sharply from 2018 to 2024. From 2018 to 2020, the market value increased from EUR 129.74 billion to EUR 260.07 billion—more than doubling—driven by higher carbon prices and increased trading activity. In 2021, it surged to EUR 682.5 billion, nearly three times the 2020 level, marking the EU ETS' s transition into a phase of rapid expansion. Between 2022 and 2024, the market value remained elevated at EUR 751.46 billion, EUR 770 billion, and EUR 781 billion, respectively, indicating slower but stable growth. Overall, the EUA market value increased more than fivefold from 2018 to 2024, underscoring how rising carbon prices and expanding transaction volumes have jointly deepened the marketization and financial scale of the EU ETS.

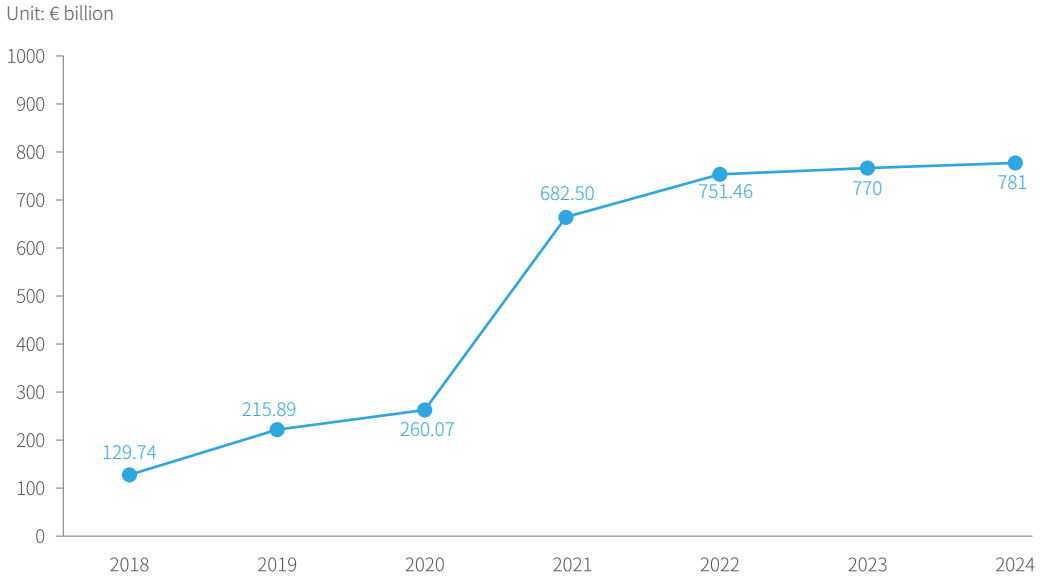


Figure 4-10. EUA Market Value

(Source: Carbon Market Year in Review 2021,2022. Refinitiv)

Figure 4-11 illustrates the evolution of fiscal revenues generated under the EU ETS. Overall, as carbon prices rose and auction volumes expanded, revenues from the EU carbon market increased substantially. Before 2013, ETS revenues were relatively modest, remaining at only a few billion USD annually. Since the sharp rise in carbon prices in 2018, revenues have surged, reaching the peak of USD 47.3 billion in 2022, This upward trend closely reflects both the increase in EUA prices and the auctioning reforms introduced under Phase IV. In aggregate, carbon pricing revenues have become a significant source of funding for EU climate policy, supporting the Innovation Fund, the Social Climate Fund, and member states' green transition programs—signifying the ETS' s evolution from an environmental governance tool into a broader fiscal and investment mechanism.

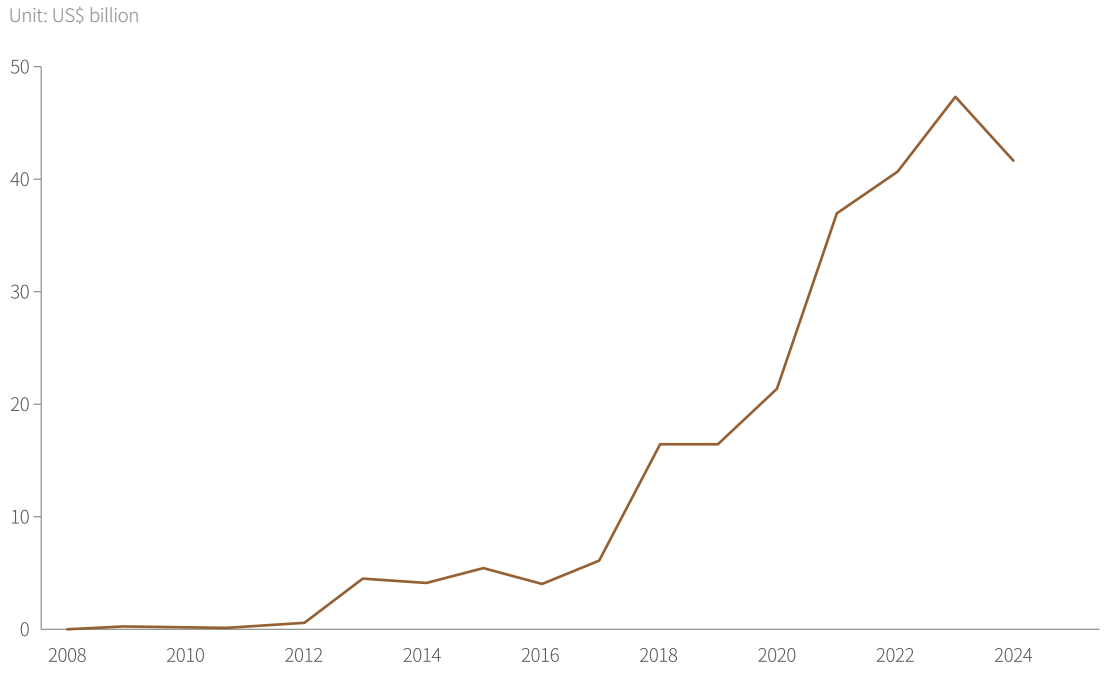


Figure 4-11. Fiscal Revenues from Carbon Pricing under the EU ETS

(Source: World Bank)

4.3 China

The combined roles of policy banks, commercial financial institutions, active market participation, and large industrial enterprises shape China' s climate finance landscape. This section examines the key characteristics of China' s climate investment and finance from three perspectives:(1) he structure and trends of climate-related funding;(2) the main financial instruments and mechanisms, including green credit, green bonds, and green funds;(3) and the national carbon emissions trading system, which functions as both a systemic price signal and a resource-allocation mechanism.

4.3.1 Structure and Trends of Climate Finance

According to the CPI data, China' s total climate finance reached USD 659.48 billion in 2023, marking a 63.54% increase from 2021 and accounting for roughly one-third of the global total (CPI, 2025). Domestic sources dominate the financing landscape, with a strong focus on mitigation activities in the energy and transport sectors. China' s financing structure highlights the combined roles of households, corporate self-financing, and bank credit, forming an investment system in renewable energy, power grids, energy storage, and transportation that is primarily driven by market-based instruments. This configuration reflects both China' s robust financial capacity and its strong policy coordination, embodying a strategic orientation centered on a China-style green finance system.

As shown in Figure 4-12, households and individuals represent the largest source of climate-related investment, amounting to USD 179.45 billion—demonstrating the rapid rise of public participation through green wealth management and energy efficiency improvements. Commercial and policy financial institutions play complementary roles: the former supporting industrial transition through market-based tools, and the latter focusing on long-term infrastructure projects. Corporate entities and state-owned financial institutions also play pivotal roles in industrial emission reduction and policy implementation, together forming an integrated chain of public participation, market operation, and policy support.

In terms of instruments, China' s climate finance is dominated by equity and debt, underscoring the decisive role of markets in resource allocation. Equity financing reached USD 316.1 billion, serving as the primary funding source for green projects. In contrast, total level of debt, including debt financing, market-rate debt, and low-cost project debt is approximately USD 310 billion. This indicates that many high-quality climate projects have achieved commercial viability and are increasingly attractive to private investors.

On the allocation side, China' s climate finance remains heavily focused on mitigation. Mitigation projects accounted for approximately USD 648.14 billion (over 98% of the total), with the majority concentrated in the energy system and transport, particularly supporting strategic industries such as solar, wind, and EV. Although adaptation (USD 6.44 billion) and cross-cutting projects (USD 4.87 billion) remain relatively small, they already encompass emerging areas such as ecosystem protection and climate resilience, reflecting the policy shift toward integrating green finance with ecological and adaptive development.

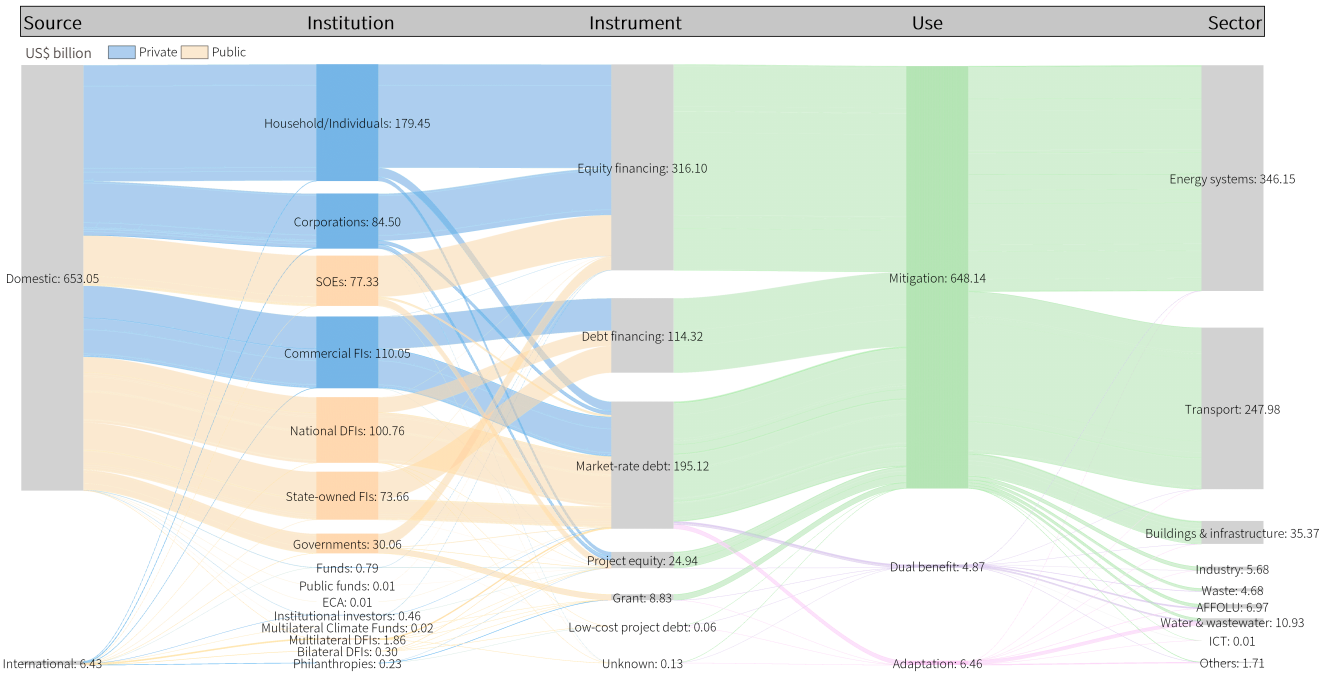


Figure 4-12. Scale and Distribution of China' s Climate Investment and Finance in 2023

(Source: Climate Policy Initiative, Global Landscape of Climate Finance 2025.

Note: AFFOLU refers to Agriculture, Forestry, Other Land Uses, and Fisheries, ICT refers to Information and Communications Technology, and Others refers to Other sectors.)

4.3.2 Climate Finance Instruments and Market Mechanisms

As China' s market continues to mature, its green finance system has evolved into a three-engine structure centered on green credit, green bonds, and green funds, which together drive the sustained development of climate finance. The focus of financial innovation has also shifted from quantitative expansion to qualitative improvement.

Green credit serves as the cornerstone of China' s climate investment and finance framework. Under the combined guidance of regulators and the proactive engagement of the banking sector, its scale has expanded steadily, and its structure has become increasingly refined. According to data from the People' s Bank of China, the outstanding balance of green credit rose steadily from 2018 to 2024, with its share of total lending increasing year by year (see Figure 4-13) (People's Bank of China, 2024). This trend indicates that green credit has been fully integrated into supervisory assessments and has become a key instrument for banks to implement their green finance strategies. Policy banks provide long-term funding, while commercial banks focus on inclusive green lending, together forming a multilayered credit supply system.

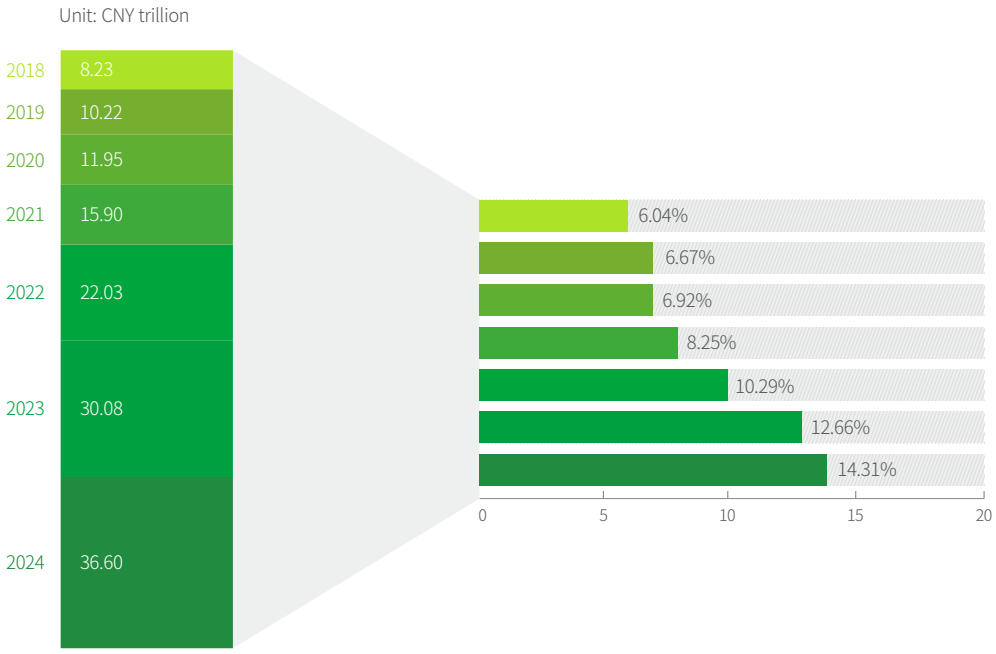


Figure 4-13. Overall Scale of China' s Green Credit and Its Share in Total Bank Lending

(Source: People' s Bank of China, Statistical Report on the Loan Direction of Financial Institutions)

Green credit in China primarily targets green infrastructure upgrades and clean energy industries, while also supporting energy conservation and environmental protection initiatives. As shown in Figure 4-14, by 2024, loans for green infrastructure had reached RMB 15.68 trillion, covering projects such as green buildings and smart grids aligned with new urbanization and low-carbon development goals. Loans to clean energy industries totaled approximately RMB 9.89 trillion, mainly supporting the solar and wind power value chains. Meanwhile, loans for energy efficiency, environmental protection, and other sectors totaled around RMB 11.03 trillion, together forming a diversified structure characterized by core-industry leadership and broad sectoral coverage.

Policy support has also been continuously strengthened. The Implementation Plan for High-Quality Green Finance Development in the Banking and Insurance Sectors (January 2025) urges banking and insurance institutions to incorporate green credit (and other green finance products) performance into their internal evaluation and supervisory systems, to enhance professional capacity, develop product innovation, and lifecycle financing for low-carbon transition assets. Overall, the steady expansion of green credit demonstrates the institutional strengths and policy effectiveness of China' s financial system, providing essential credit and liquidity support for the development of green bonds and green funds.

Figure 4-14. Sectoral Distribution of Green Credit in 2024

(Source: People' s Bank of China, Statistical Report on the Loan Direction of Financial Institutions)

With improvements in regulatory frameworks and the establishment of a green taxonomy, green bonds have become a key bridge linking policy objectives with market-based financing. Over the past decade, China's green bond market has expanded rapidly, driven by regulatory reforms and growing investor acceptance.

Following the release of the Guidelines for Establishing the Green Financial System in 2016, China formally launched its green bond taxonomy, with issuance reaching RMB 207.28 billion that year. Since then, the market has continued to grow steadily, with total issuance climbing to RMB 1.39 trillion by 2020. The introduction of the Green Bond Endorsed Project Catalog in 2021 unified standards across regulatory agencies. It propelled issuance to RMB 2 trillion, accompanied by a sharp rise in the share of officially labeled bonds (see Figure 4-15).

Although issuance volumes slightly declined between 2022 and 2024, the annual average remained above RMB 1.5 trillion. The number of issuances also skyrocketed after 2020, surpassing 1,000 in 2021 and remaining high thereafter. Overall, China's green bond market has evolved from a fragmented, exploratory phase into a standardized system characterized by both policy guidance and market-based dynamics, becoming a central component of the country's climate finance architecture.

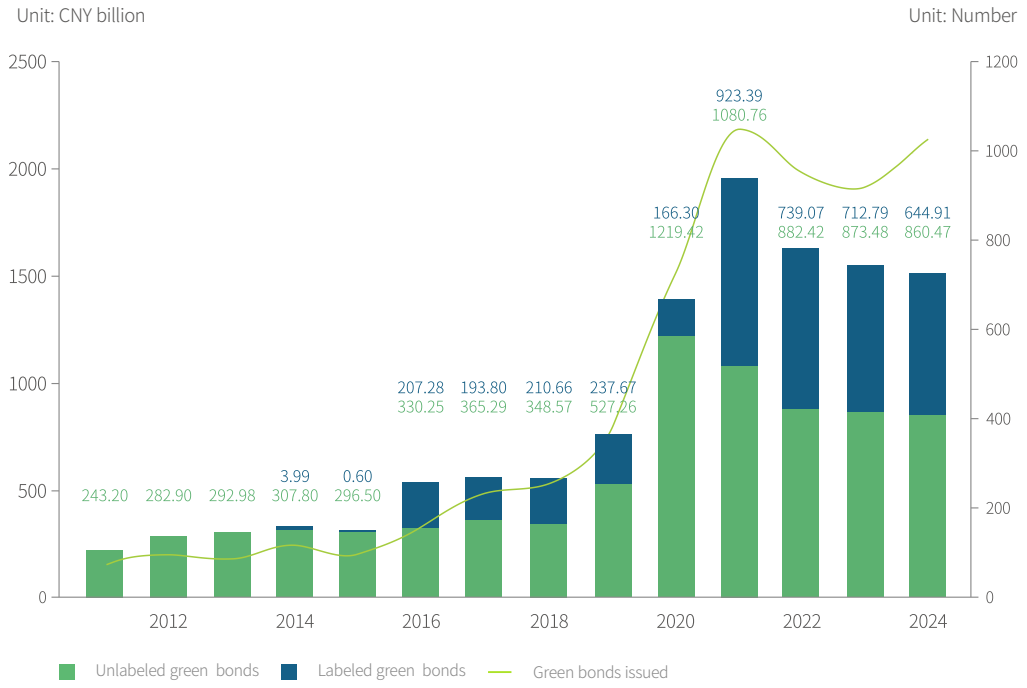


Figure 4-15. Green Bond Issuance Volume

(Source: ChinaBond – Green and Low-Carbon Transition Bond Database)

The issuer structure of China's green bond market remains dominated by state-owned entities (see Figure 4-16). As of 2024, local state-owned enterprises (1,362 issues) and local governments (1,167 issues) together accounted for more than 60% of total issuances, followed by central state-owned enterprises with 830 issues. The leading role of state-owned issuers ensures strategic alignment in capital allocation and provides a solid credit foundation for the stability and credibility of China's green bond market.

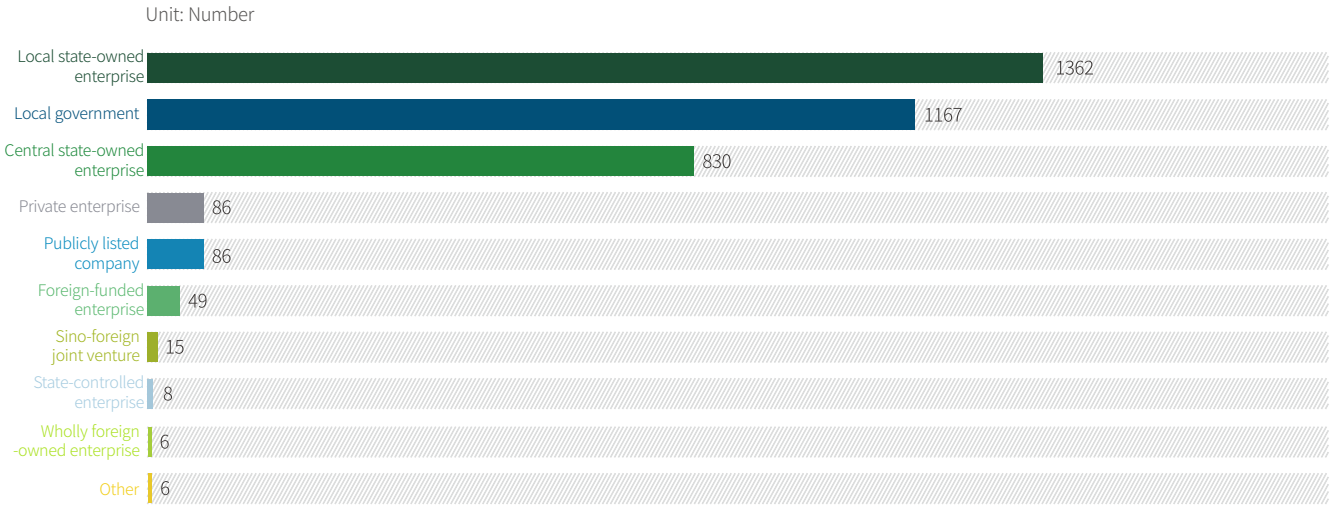


Figure 4-16. Distribution of Outstanding Green Bonds in China by Issuer Type in 2024

(Source: ChinaBond – Green and Low-Carbon Transition Bond Database)

The investment orientation of China's green bonds aligns closely with the SDGs (see Figure 4-17). Among them, SDG 11 (Sustainable Cities and Communities) is linked to the largest number of projects (2,102 issues), followed by SDG 9 (Industry, Innovation and Infrastructure) and SDG 12 (Responsible Consumption and Production). Overall, China's green bond market has evolved from a policy-driven phase to one of standardization and market-based expansion, transitioning from government-led initiatives toward market self-sustainability, and becoming a cornerstone of the country's green finance system.

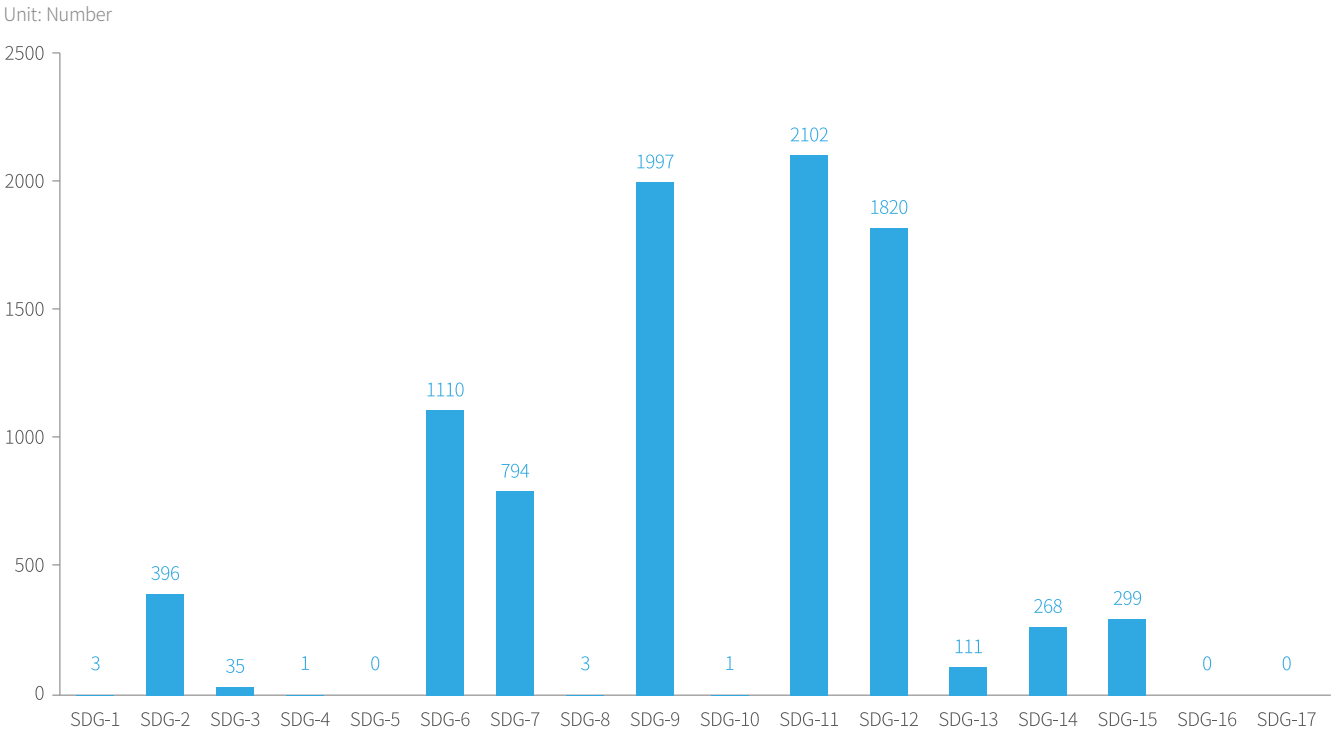


Figure 4-17. Alignment of Outstanding Green Bonds in China with SDGs in 2024

(Source: ChinaBond – Green and Low-Carbon Transition Bond Database)

Green funds (ESG funds) represent a key market-based innovation within China's climate finance system and are a central force in the greening of capital markets. With growing market recognition, their total scale has expanded rapidly. According to Wind data, the total value of green funds rose from RMB 10.36 billion in 2004 to RMB 990.82 billion in 2024 (see Figure 4-18). This sharp growth reflects investors' shift from short-term returns to long-term value creation, driven by both rising public environmental awareness and the integration of ESG factors into the risk management frameworks of institutional investors.

China's green fund market has evolved through three distinct stages

2004–2017 — **Initiation stage**

which was focused mainly on pollution control and energy conservation, with a limited number of funds.

2018–2021 — **Expansion stage**

The rapid emergence of ESG strategy funds, extending the investment logic from environmental protection to broader ESG dimensions.

2022–present — **Diversification stage**

A growing emphasis on social- and governance-oriented funds, with investment expanding from emission reduction to comprehensive sustainable development.

Overall, the rise of green funds signifies a transition in China's climate finance system from policy-driven growth to concept-driven evolution, underscoring the increasingly central role of private and institutional capital in advancing sustainable investment.

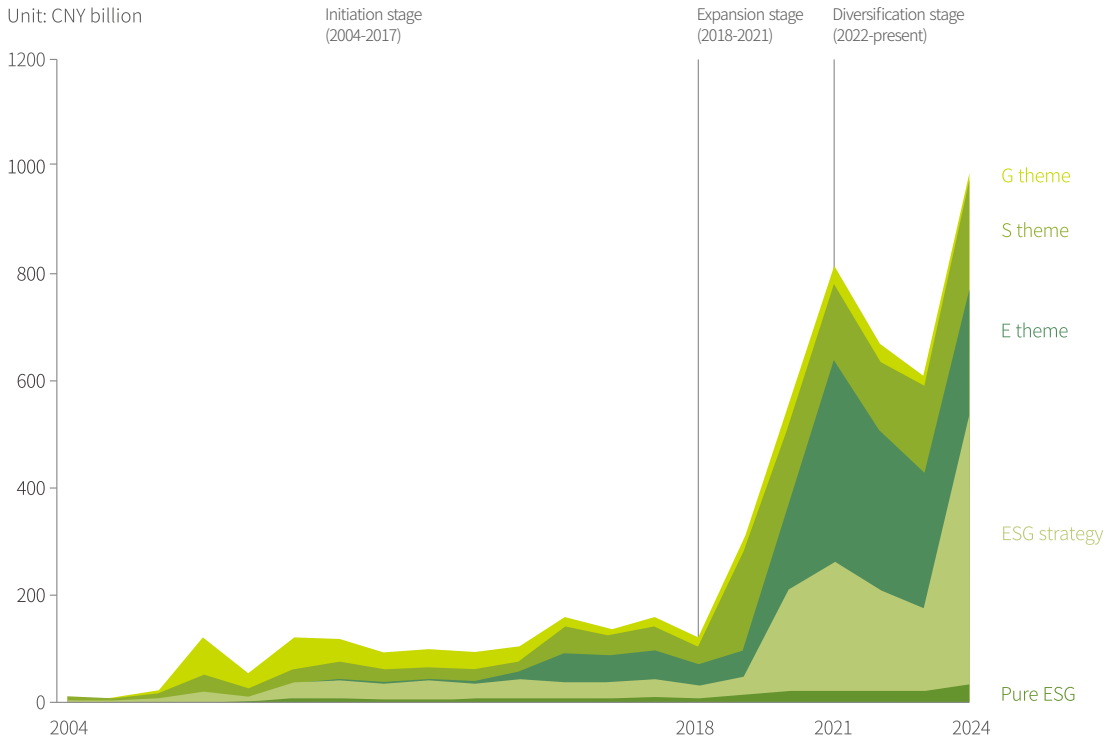


Figure 4-18. Trends in the Total Scale and Number of Green (ESG) Funds in China

(Source: Wind Database)

4.3.3 Carbon Market in China

Between 2013 and 2024, China' s carbon market evolved from a set of regional pilot programs into a unified national system. From 2013 to 2020, trading was concentrated in eight pilot regions, including Guangdong, Hubei, and Shanghai, with annual transaction values generally below RMB 1.5 billion. In 2021, the launch of the national ETS marked a significant institutional shift, with an annual transaction value of RMB 7.66 billion, a significant increase over the pilot period (see Figure 4-19). Since then, the national market has rapidly become dominant, with a trading value of RMB 18.11 billion in 2024, accounting for more than 90% of the total, as regional pilots were progressively integrated. This transition signifies both institutional unification and rapid market expansion. Overall, the establishment of the national ETS has laid a critical foundation for forming a unified carbon price .

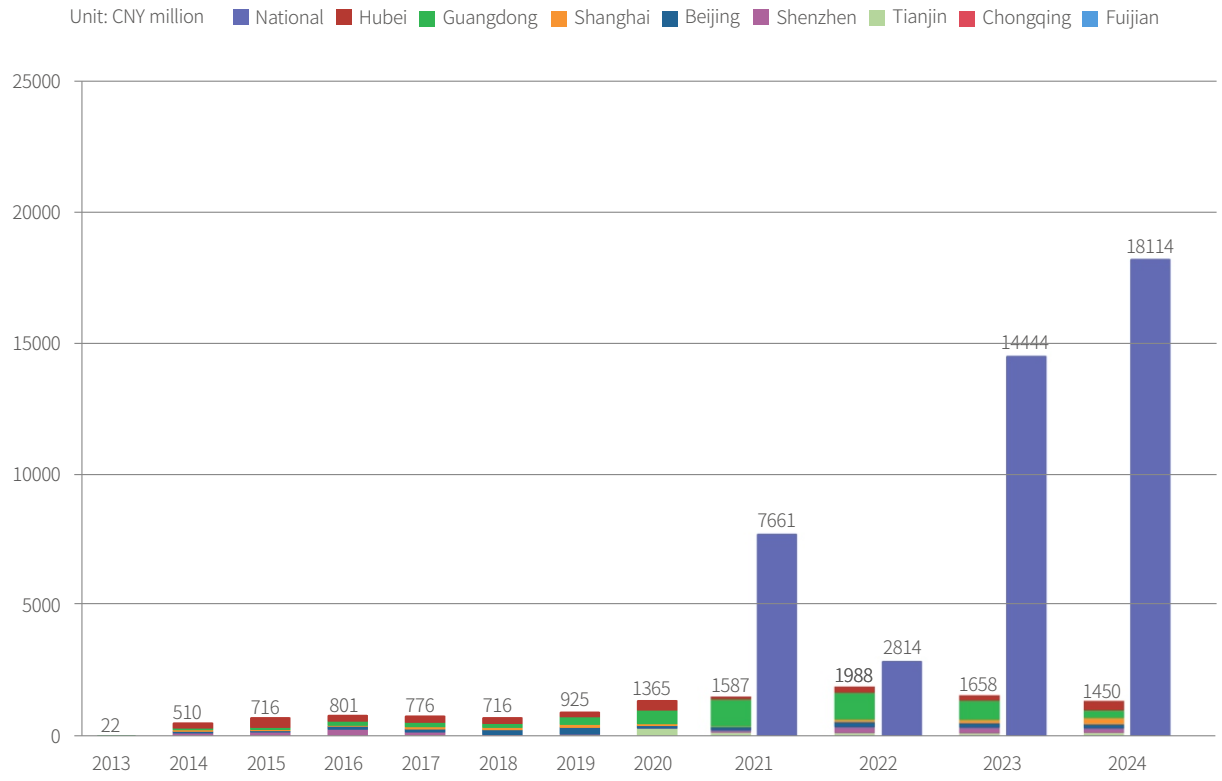


Figure 4-19. Transaction Value of the National Carbon Market and Eight Pilot Carbon Markets

(Source: China National Emissions Exchange and pilot regional emissions exchanges.

Note: Data for the Fujian ETS are missing for 2022–2024)

Between 2013 and 2024, China' s carbon market exhibited significant price volatility, reflecting variations in institutional design and market dynamics across regions and phases. In the early pilot stage, carbon prices in Shenzhen, Guangdong, and Beijing were relatively high, ranging from RMB 30 to 70 per tonne. However, due to overallocation of allowances, limited trading volumes, and weak compliance incentives, prices generally declined, with some pilots falling to approximately RMB 10 per tonne by 2016 (see Figure 4-20). With the launch of the national ETS in 2021, the initial carbon price was around RMB 50 per tonne and has since risen steadily to nearly RMB 80 per tonne by 2024, reflecting growing market maturity and more vigorous compliance enforcement. Over the same period, regional market prices began to converge, though they still showed some divergence: Guangdong and Shenzhen rebounded above RMB 80 per tonne, while Hubei, Shanghai, and Tianjin remained relatively stable.

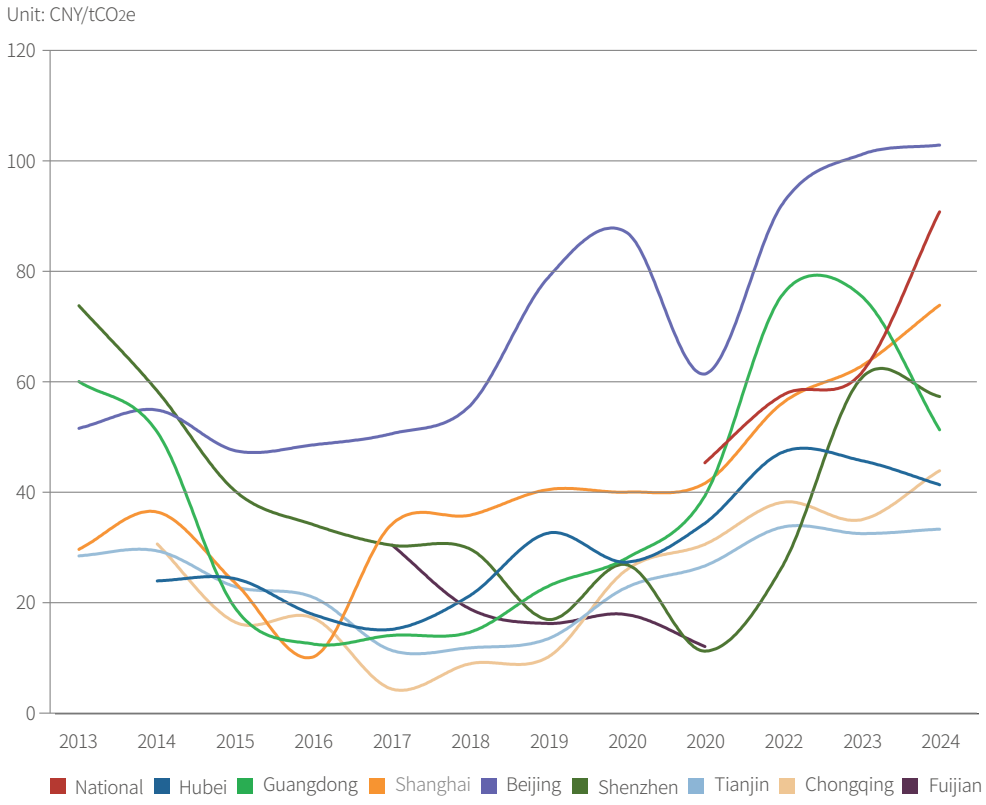


Figure 4-20. Average Transaction Price of the National Carbon Market and Eight Pilot Carbon Markets

(Source: China National Emissions Exchange and pilot regional emissions exchanges)

4.4 Africa

Africa, as one of the most climate-vulnerable regions in the world, faces strong and growing demand for climate finance. Although financial flows to the continent have increased over the past decade, they still fall far short of actual needs. African climate finance is dominated by concessional public funding and project-level grants. While investment in clean energy has been rising, it still lags behind fossil fuel investment in several subregions. Overall, Africa' s climate finance structure is characterized by high dependence on external aid, limited domestic market depth, and substantial exposure to climate risks. This section examines Africa' s climate finance landscape through three dimensions: the financing gap and trends (comparing actual flows with estimated needs); the sources and distribution of international assistance; and the structural allocation between mitigation and adaptation investments.

4.4.1 Climate finance gaps

Africa' s climate finance system remains heavily dependent on international assistance, characterized by high dependency, weak stability, and low market orientation. Although the overall funding volume has increased gradually (see Figure 4-21), it still falls far short of actual needs. According to national NDC estimates, the continent requires around USD 2.8 trillion annually to implement the Paris Agreement, yet in 2023, it received only USD 18.8 billion—less than 0.1% of global climate finance (CPI, 2022). This severe funding gap has heightened Africa' s vulnerability to extreme weather events such as droughts and floods, underscoring the persistent structural imbalance in the global allocation of climate finance.

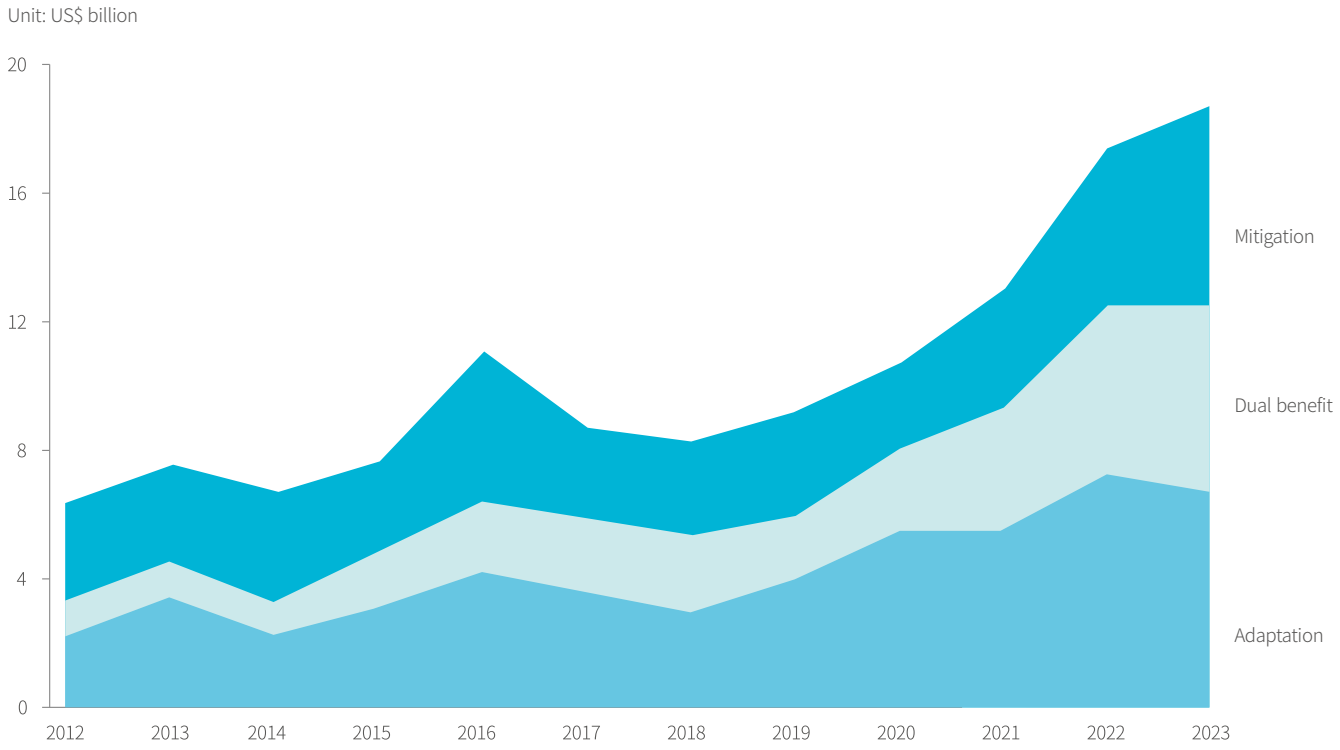


Figure 4-21. International Climate Finance Flows to Africa

(Source: Organisation for Economic Co-operation and Development, Climate-Related Development Finance Database)

Africa's climate finance inflows are highly concentrated. According to Climate-Related Development Finance (CRDF, 2023), Germany (USD 3.29 billion), the U.S. (USD 3.12 billion), France (USD 2.75 billion), and EU institutions (USD 2.65 billion) together accounted for more than half of total climate finance to Africa (see Figure 4-22). This heavy reliance on a limited group of donor countries makes the system highly vulnerable to shifts in their domestic policies. Meanwhile, private sector participation remains extremely low, standing in sharp contrast to the World Economic Forum's projection that Africa could unlock up to USD 3 trillion in climate investment potential by 2030, highlighting the still limited role of market mechanisms in the region's climate finance landscape.

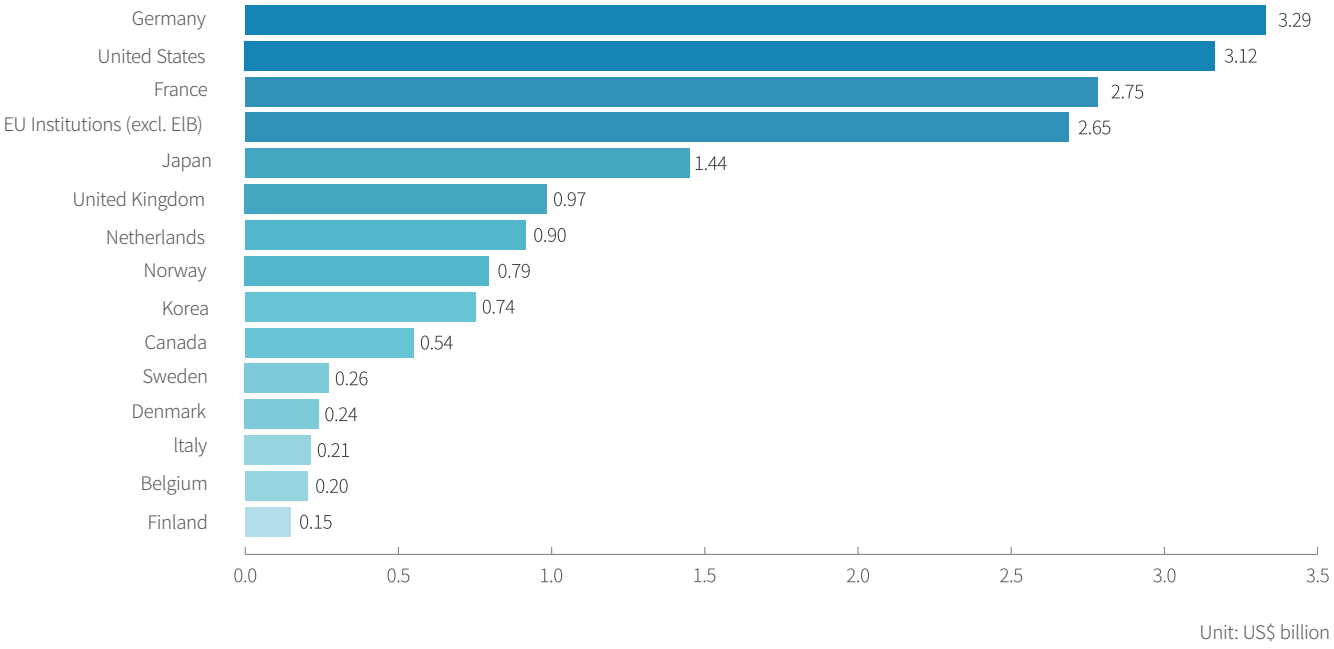


Figure 4-22. Sources of Climate Finance to Africa in 2023: Major Contributors and Institutional Distribution

(Source: Organisation for Economic Co-operation and Development, Climate-Related Development Finance Database)

Africa's climate finance allocation remains poorly aligned with its actual investment needs. According to the IEA World Energy Investment Report 2025 (see Figure 4-23), although mitigation, adaptation, and cross-cutting finance appear broadly balanced in aggregate, they do not correspond to the continent's structural energy requirements (IEA, 2025e). Clean energy investment rose from USD 28.8 billion in 2015 to USD 47.4 billion in 2024, yet still lagged far behind fossil fuel investment—over USD 100 billion in 2015 and nearly USD 65 billion in 2024. The share of high-carbon energy has declined only slowly, while low-carbon investment remains modest and sluggish, revealing the delayed pace of Africa's energy transition. Long-term financing continues to favor fossil-based assets, suggesting that international assistance has had limited effectiveness in steering the continent toward a cleaner energy mix.

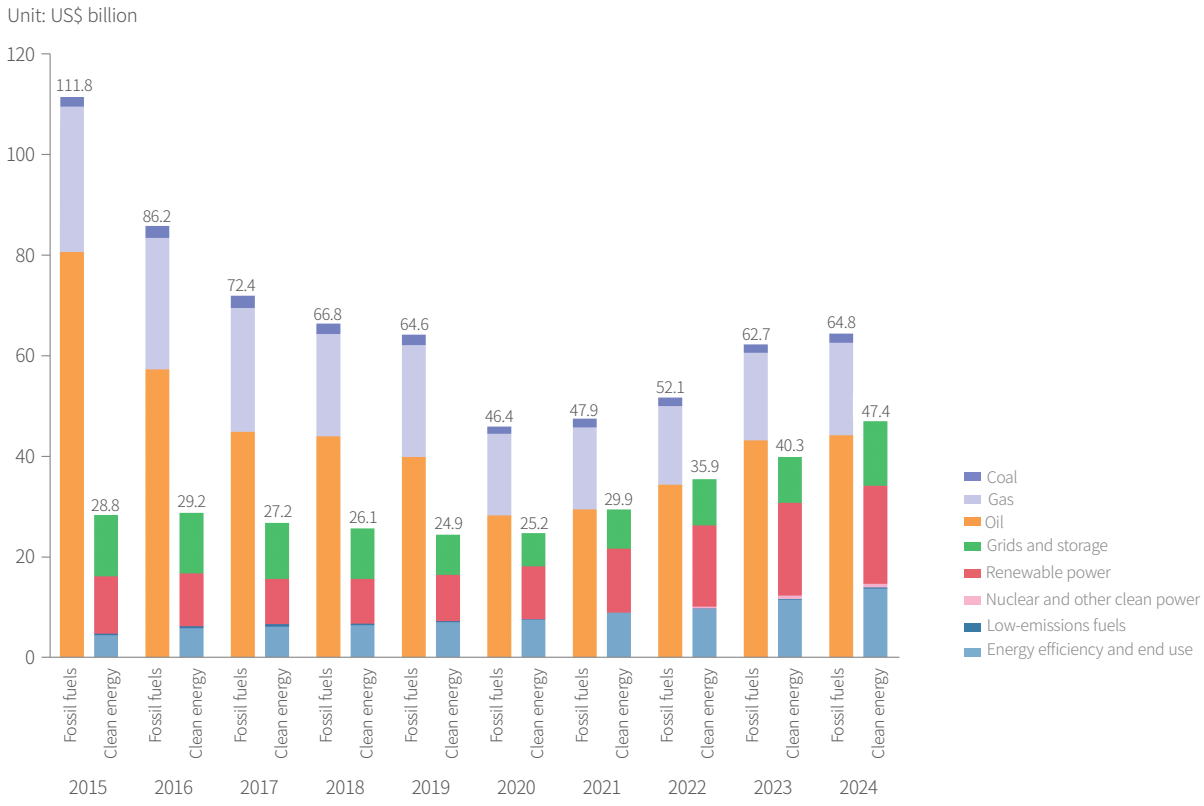


Figure 4-23. Energy Investment Distribution in Africa

(Source: International Energy Agency, World Energy Investment 2025)

4.4.2 Sources and Distribution of International Assistance

The structure of financing instruments in Africa remains highly concentrated, constraining the long-term sustainability of climate finance. According to CRDF (2023), grants account for 63.90% of international climate finance to Africa, While debt and equity together account for less than 10% (see Figure 4-24). This overwhelming reliance on public concessional funding underscores the absence of mature market-based financing channels.

While the dominance of grants aligns with Africa's limited debt-carrying capacity, it also introduces several challenges. First, short project cycles and limited funding amounts make it difficult to sustain large-scale, long-term investments such as solar power, electricity infrastructure, or irrigation systems. Second, excessive reliance on external aid weakens domestic capacity-building in the finance sector. Third, donor-imposed conditionalities often result in a misalignment between project design and local needs, reinforcing a passive, dependency-driven financing pattern.

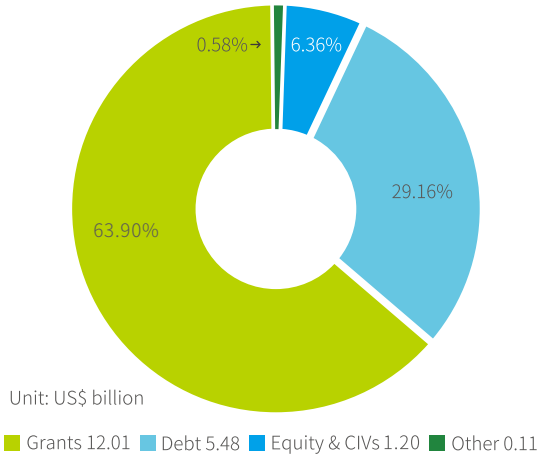


Figure 4-24. Distribution of International Climate Finance to Africa by Financial Instrument in 2023

(Source: Organisation for Economic Co-operation and Development, Climate-Related Development Finance Database)

Uneven regional distribution further widens the adaptation capacity gap across Africa. According to CRDF (see Figure 4-25), three countries—Egypt, Ethiopia, and South Africa—received more than 25% of total climate finance. At the same time, highly vulnerable states such as Gabon, Equatorial Guinea, and Eritrea obtained only about USD 5 million. This "Matthew effect" has deepened disparities in climate-response capacity: countries with ample funding can advance renewable energy projects, whereas resource-constrained nations struggle to implement even basic water management and resilience initiatives. Such imbalances undermine regional coherence and collective effectiveness in Africa's climate governance.

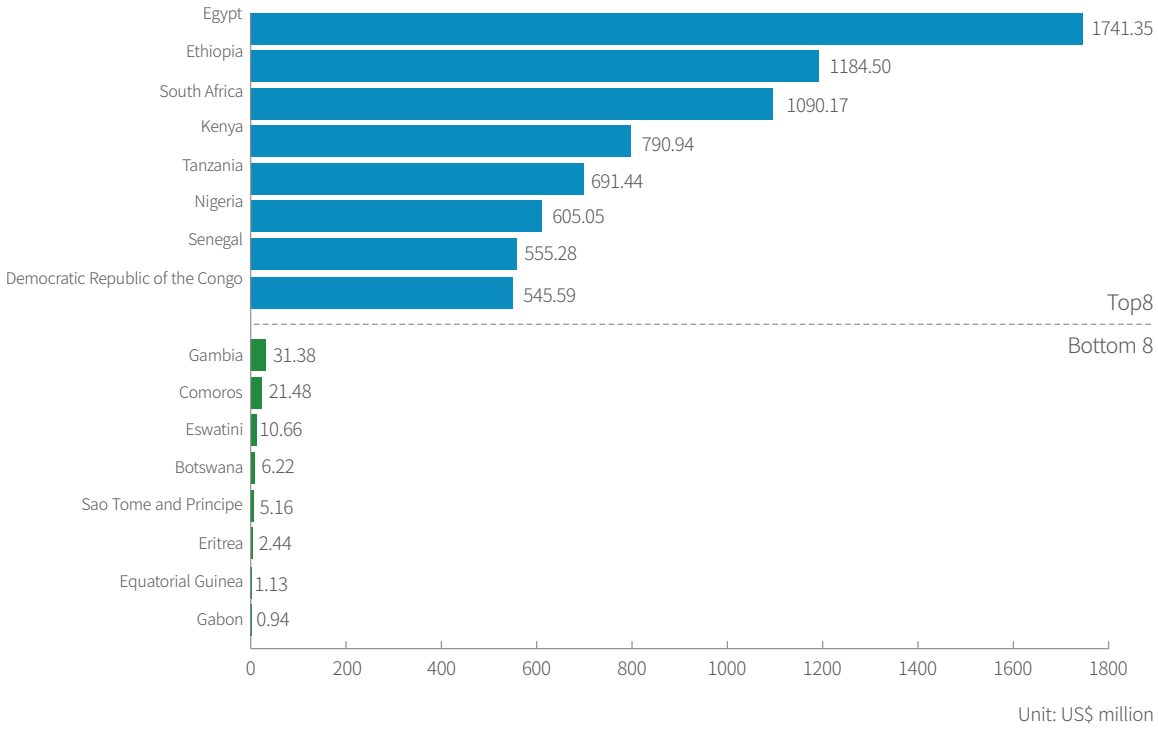


Figure 4-25. Distribution of Climate Finance to Africa by Recipient Region in 2023

(Source: Organisation for Economic Co-operation and Development, Climate-Related Development Finance Database)

4.4.3 Investment: Adaptation and Mitigation

According to CRDF (see Figure 4-26), Africa's climate finance remains fragmented. Adaptation funding, primarily for agriculture (USD 2.47 billion), population, and water projects, is widely scattered, limiting scale and impact. Mitigation finance is similarly dispersed, with renewable energy (USD 1.73 billion) and transport and storage (USD 1.6 billion) spread across numerous small projects. In contrast, concentrated investments by institutions such as the AfDB in wind and solar projects deliver more substantial demonstration effects. Overall, excessive fragmentation constrains scale, coordination, and capacity, weakening the overall effectiveness of climate finance in Africa.

a

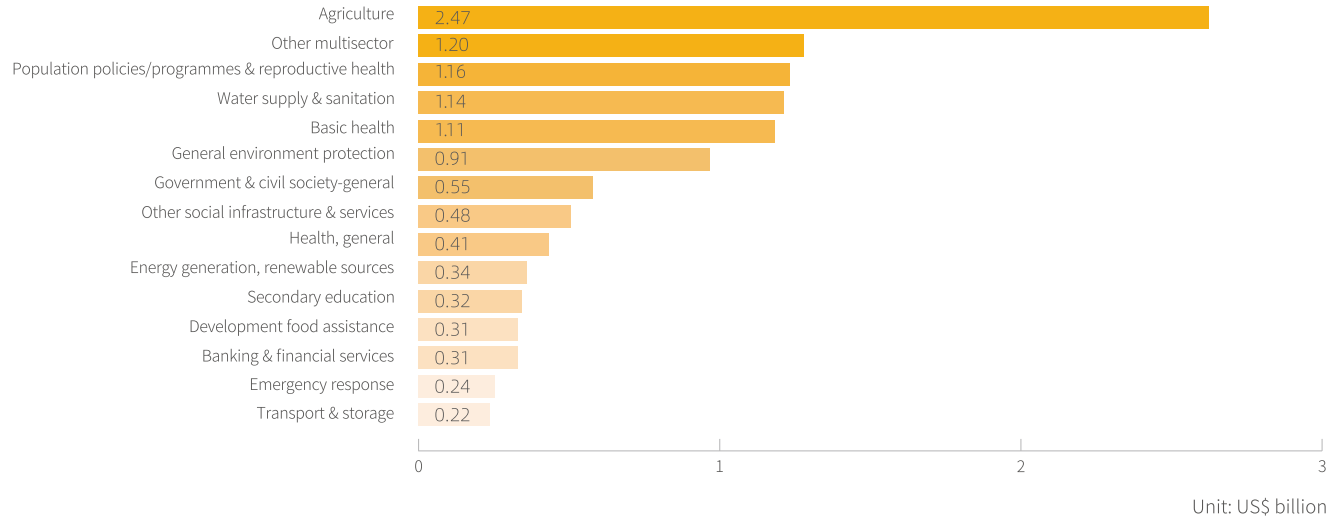


Figure 4-26 (a). Adaptation Projects Ranking in Africa in 2023 (Top 15)

(Source: Organisation for Economic Co-operation and Development, Climate-Related Development Finance Database)

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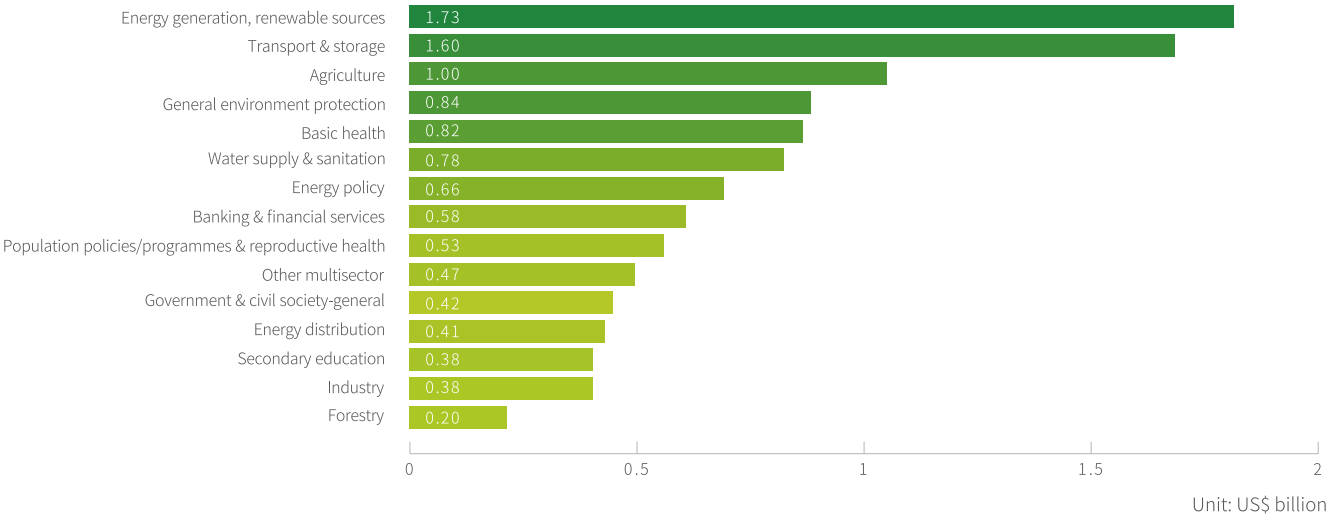


Figure 4-26 (b). Mitigation Projects Ranking in Africa in 2023 (Top 15)

(Source: Organisation for Economic Co-operation and Development, Climate-Related Development Finance Database)

Climate Finance Outlook 2025

Chapter 5

Challenges and opportunities

Highlights

- Global climate finance faces a persistent gap between demand and supply, with annual flows covering less than half of the investment needed to meet 1.5°C targets.
- Regional imbalances remain significant, as Africa and Small Island Developing States receive under 5% of global climate finance, despite their high vulnerability.
- Rising geopolitical tensions and fragmentation of multilateral cooperation threaten the predictability and efficiency of cross-border climate funding.
- Digitalization, blended finance, and public–private partnerships are emerging as key mechanisms to unlock new capital and reduce financing costs.
- The transition from COP29 to COP30 offers an unprecedented opportunity to reshape climate finance architecture through enhanced transparency, accountability, and global collaboration.

5.1 Current Challenges

5.1.1 Demand-Supply Mismatch

(1) Global Climate Finance Gap

CPI estimates indicate an annual global climate finance gap of roughly USD 4.4–8.0 trillion in 2023 (CPI, 2025). In the same year, as reported in Figure 5-1, tracked climate finance flows were about USD 1.9 trillion, underscoring the scale of under-investment relative to needs. CPI's 2025 report further indicates that at least USD 6.3 trillion per year (2024–2030) is required to keep a 1.5°C-consistent path in reach, helping explain why the 2023 gap bracket (USD 4.4–8.0 trillion) is so wide (CPI, 2025).

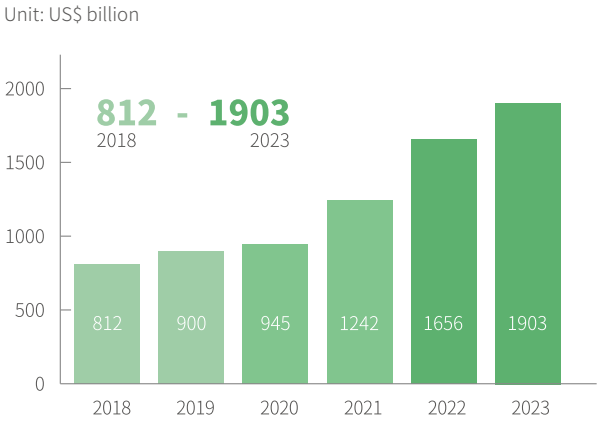


Figure 5-1. Tracked Annual Climate Finance Flows

(Source: Climate Policy Initiative)

(2) Fossil Fuel Misallocation

In 2024, around USD 1.2 trillion was allocated to new fossil-fuel production and distribution (oil & gas upstream, midstream, refining, and coal supply), according to the IEA's latest investment breakdown (IEA, 2025e). This level of spending persisted even as clean-energy investment rose to about USD 2.03 trillion in 2024, highlighting a continued diversion of capital toward high-emitting assets. Reallocating even a fraction of this fossil supply spending would materially narrow the climate finance shortfall. Using CPI's 2023 gap range (USD 4.4–8.0 trillion), the 2024 fossil-supply outlay is equivalent to roughly 15–27% of the annual gap, illustrating the scale of the misallocation opportunity (CPI, 2025).

As shown in Figure 5-2, the IEA notes fossil investment is set to fall to about USD 1.15 trillion in 2025 (about 2% below 2024), but remains substantial relative to pathways consistent with climate goals (IEA, 2025e). Redirecting capital from fossil supply toward grids, storage, efficiency, and low-emissions fuels would better align with system needs and reduce future transition and stranded-asset risks.

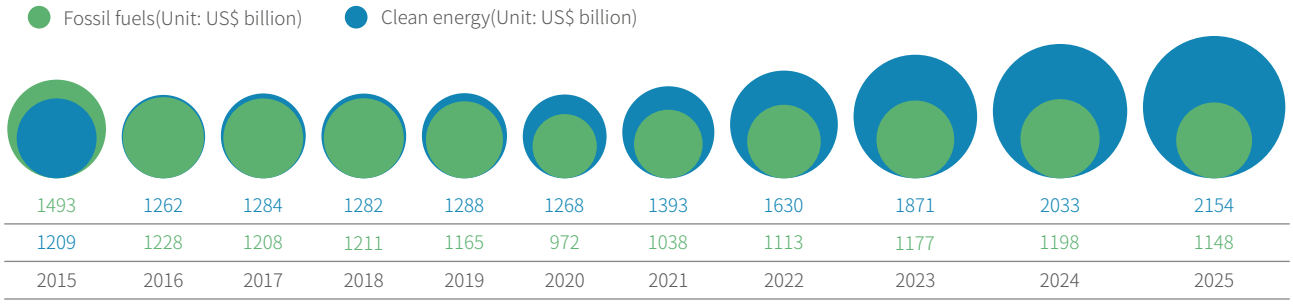


Figure 5-2. Global Investment in Clean Energy and Fossil Fuels

(Source: International Energy Agency)

(3) Weak Support from Financial Markets

According to data from the Securities Industry and Financial Markets Association (SIFMA), global fixed-income and equity markets remained broadly stable in 2024, with new long-term bond issuance reaching approximately USD 27.4 trillion (SIFMA, 2024). Comparing this with climate finance needs and actual capital flows estimated by CPI suggests that the primary constraint on climate investment is not market capacity, but rather the allocation structure of capital. Given that actual global climate finance flows amounted to only around USD 1.9 trillion in 2023, directing even a small share of annual new bond issuance toward climate-related sectors would, in principle, significantly narrow the multi-trillion-dollar financing gap identified (CPI, 2025).

5.1.2 Regional Inequality in Access

(1) Financing Allocation to Least Developed Countries (LDCs) and Emerging Economies

As shown in Figure 5-3, data from the latest Global Landscape of Climate Finance published by CPI indicate that in 2023, only about 2.26% of global climate finance, approximately USD 43 billion, was directed to or utilized within LDCs, while EMDEs received only around 17.44% (approximately USD 332 billion) (CPI, 2025). This distribution pattern underscores a persistent imbalance in capital allocation, particularly among the most vulnerable country groups.

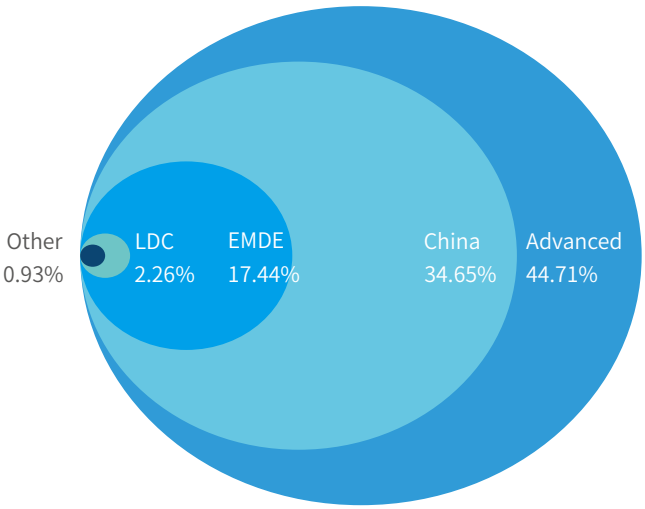


Figure 5-3. Climate Finance Flow Allocation in 2023

(Source: Climate Policy Initiative)

(2) Regional Investment Patterns

The IEA's 2025 World Energy Investment underscores a stark imbalance in regional investment patterns (IEA, 2025e). China and the U.S. lead both the fossil fuel and clean energy investments. In contrast, Africa captures only about 2% of global clean energy investment while accounting for about 20% of the world's population. CPI's Global Climate Finance Data (Figure 5-4) also shows that only 5% of total global climate finance in 2023 went to or within Africa (in which 2.44% flowed to Sub-Saharan Africa, and 2.36% to Middle East and North Africa), and just 3.69% (abut USD 70 billions) to South Asia, underscoring an uneven finance pattern within the planet (IEA, 2025e).

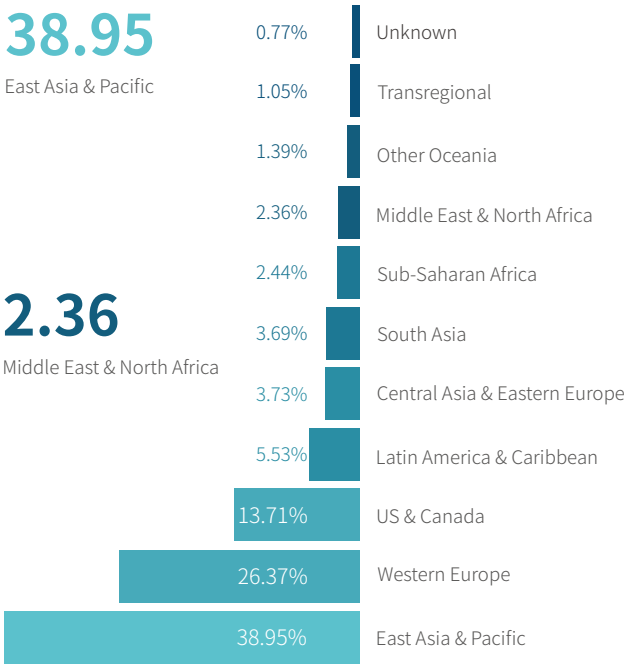


Figure 5-4. Climate Finance Flow Patterns in 2023

(Source: Climate Policy Initiative, Global Landscape of Climate Finance Data Dashboard)

5.1.3 Geopolitical and Systemic Barriers

(1) Trade Barriers Impact

The WB links the recent rise in trade barriers and policy uncertainty to a weaker global baseline. It projects world growth to slow to 2.3% in 2025, followed by only a tepid recovery thereafter (World Bank, 2025c). Slower trade and softer investment momentum compress fiscal and private balance sheet space, making it harder to mobilize long-tenor, cross-border capital for climate projects, especially in EMDEs where pipeline bankability already depends on concessionality and de-risking. Furthermore, escalating trade frictions and industrial policy measures (e.g., tariffs, export restrictions on critical minerals, and subsidy races) could dampen investment and raise transition costs by disrupting clean-tech supply chains and increasing input price volatility, further tightening the adequate supply of climate finance.

(2) Geopolitical Risks and Climate Finance

Rising geopolitical tensions and heightened policy uncertainty are lifting global risk premiums, constraining cross-border capital flows, and significantly increasing the cost of climate finance. According to IMF analysis, geopolitical frictions have been a key driver of surging macroeconomic and policy uncertainty, amplified tail risks in financial markets, and widening sovereign spreads (IMF, 2024). The WB similarly observes that sharply elevated policy uncertainty is severely dampening global cross-border investment appetite and slowing international capital movements (World Bank, 2025b). Collectively, these factors are tightening the availability of climate finance, rapidly widening the funding gap for global climate adaptation and resilience, and substantially delaying infrastructure development and energy-transition projects in highly climate-vulnerable regions.

(3) Loss and Damage Implementation

The Loss and Damage Fund agreed at COP27 was only partially operational. Figure 5-5 reports that, as of March 26, 2025, countries had pledged about USD 768.41 million to the new Fund, but no large-scale disbursements have yet been made (only USD 321.33 million received by the Fund). This highlights a wide gap between political commitment and deployable finance for the most climate-vulnerable countries. Even counting all pledges, the Fund' s capitalization remains orders of magnitude below the needs for addressing losses and damages. Predictable and additional resources (including innovative sources) and streamlined access will be essential for the Fund to matter at scale.

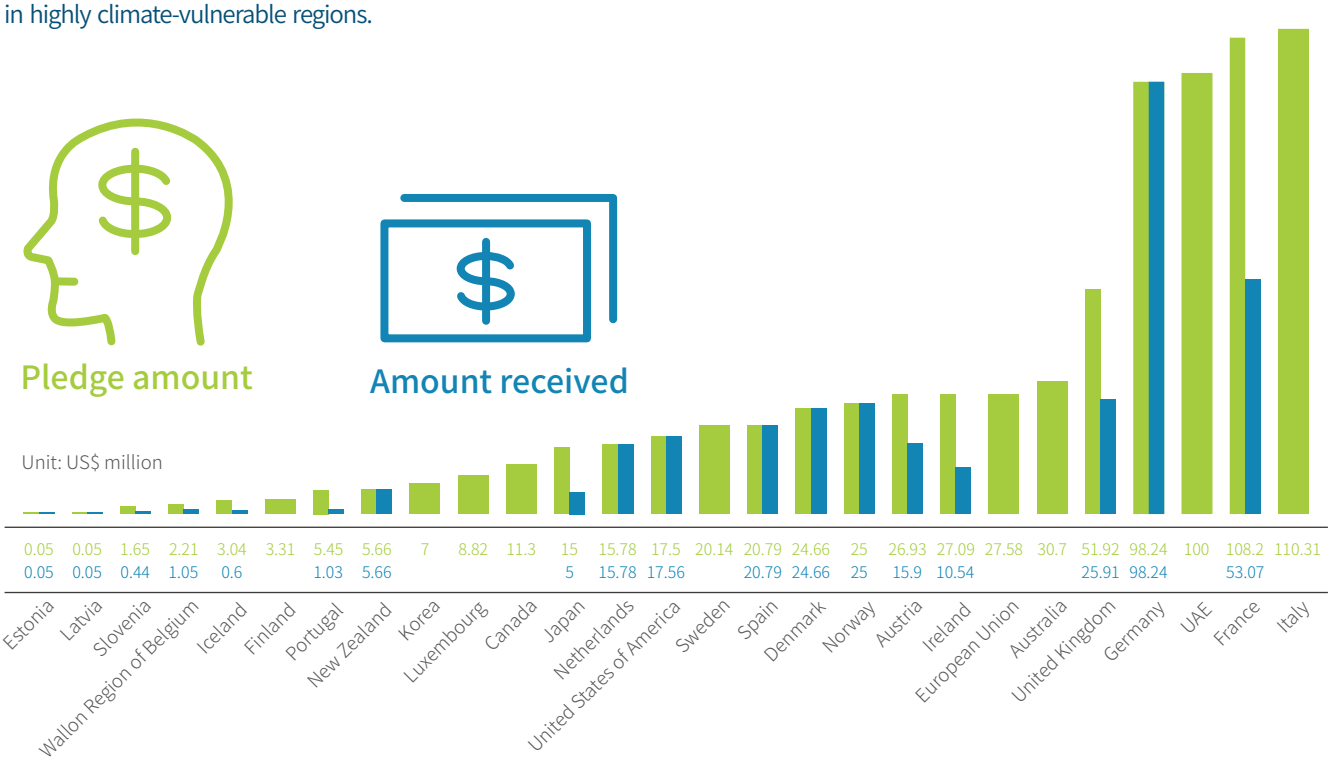


Figure 5-5. Status of Resources in the Loss and Damage Fund (as of March 26, 2025)

(Source: United Nations Framework Convention on Climate Change, 2025, Status of resources report of the Trustee)

5.2 Forecasted Trends and Projections

5.2.1 Short-Term Outlook

(1) Current Trends

CPI' s latest assessment indicates that global climate finance has already reached USD 1.9 trillion in 2023. It is estimated to exceed USD 2 trillion for the first time in 2024, driven mainly by clean-energy supply, grids, and end-use electrification, even as overall macro conditions remain challenging (CPI, 2025) . Energy-sector capital spending also confirms this promising trend. As shown in Figure 5-6, the IEA projects USD 3.3 trillion total energy investment in 2025, with about USD 2.2 trillion (over 60%) going to clean energy, roughly double fossil spending, suggesting sustained pipeline depth for climate-aligned assets through 2027 if financing costs and permitting risks are contained (IEA, 2025e).

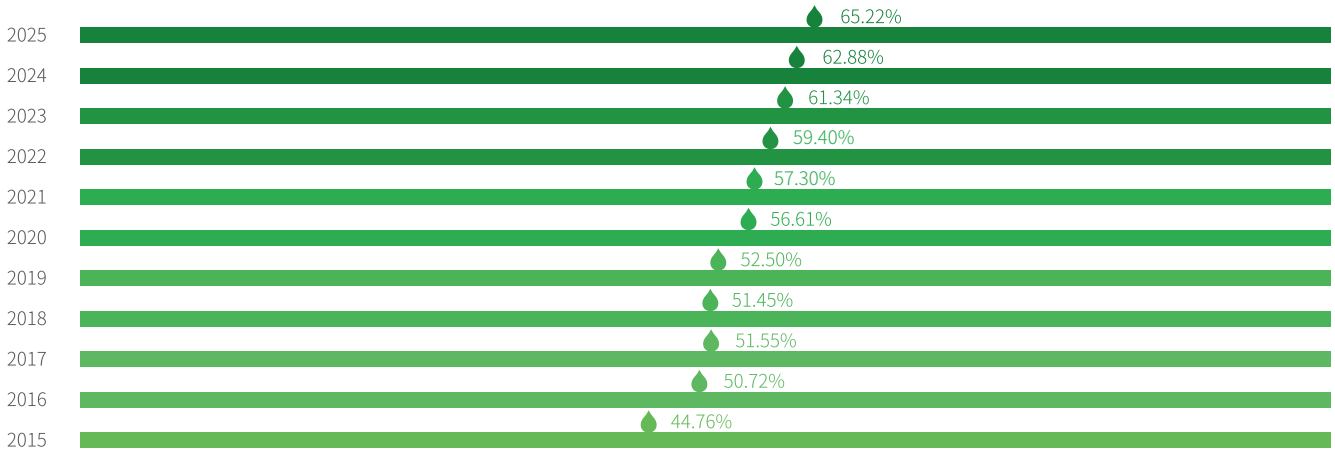


Figure 5-6. Share of Clean Energy Investment over Total Energy Investment

(Source: International Energy Agency)

(2) Renewable Investment Shifts

Equipment prices have dropped sharply, reshaping near-term investment patterns. As shown in Figure 5-7, the IEA reports a record low in early 2024 for the clean energy equipment price index (IEA, 2024, 2025e). Chinese solar panel prices are down 60% and wind turbine prices 50% since 2022, driving record solar deployment and improving project economics across many markets (even as turbine prices rose in parts of Europe). These declines are reinforcing the bias of new capital toward solar-heavy buildouts and near-term pipeline growth, with grids and flexibility assets becoming the key bottleneck rather than pure generation costs.

The IEA also shows that solar will account for 80% of total renewable capacity additions over 2025-2030, followed by wind, hydro, bioenergy, and geothermal (IEA, 2025e). However, the forecast also indicates that policy design, auction visibility, and grid connection timelines will determine how fully these cost gains are translated into actual investment, especially for wind.

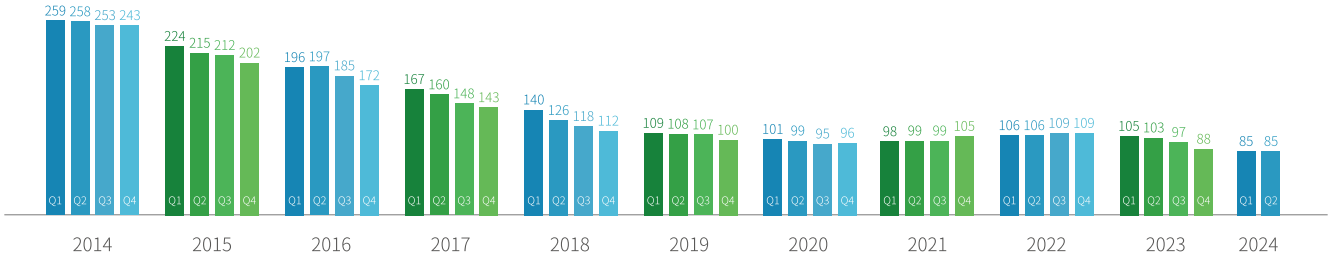


Figure 5-7. Clean Energy Equipment Price Index

(Source: International Energy Agency)

(3) Policy-Dependent Growth

Climate finance growth is heavily dependent on policy and regulatory support, especially for low-emissions fuels (LEF) such as clean hydrogen, e-fuels, and sustainable aviation fuels. The IEA notes that LEF investment is set to reach a new high in 2025 (as shown in Figure 5-8), at USD 40 billion, but remains small in absolute terms, and these projects remain heavily dependent on policy and regulatory support and are particularly prone to policy uncertainty (IEA, 2025e). IEA' s Global Hydrogen Review 2025 also emphasizes uncertainties about costs, infrastructure readiness, and evolving regulatory frameworks as barriers to faster deployment and finance, again pointing to the central role of stable, bankable policy frameworks in mobilizing private capital at scale (IEA, 2025c) .

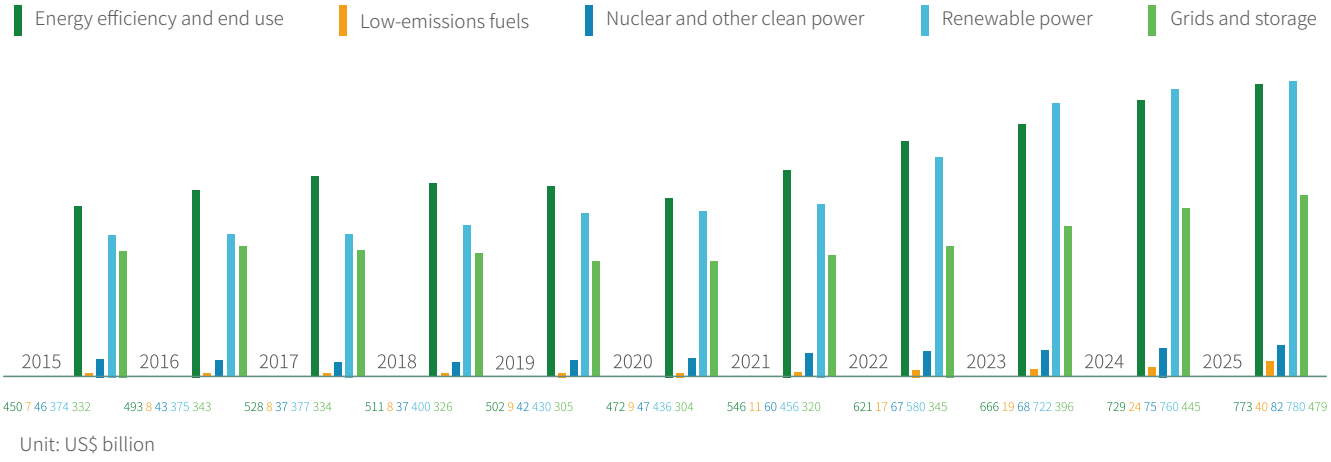


Figure 5-8. Global Investment in Clean Energy Patterns

(Source: International Energy Agency)

(4) Equity Focus

Translating an equity lens into action hinges on vehicles that prioritize vulnerable country groups. As reported in Table 5-1, from 2025 to 2027, several platforms are explicitly geared toward needs- and vulnerability-based allocation. Together, these near-term actions create a practical path to align rising global totals with equitable allocation by vulnerability.

Initiative / Window	How it advances equity-based allocation
GCF	maintains a portfolio target of a 50:50 balance between mitigation and adaptation, and commits that at least 50% of adaptation funding will go to LDCs, SIDS, and African states (GCF, 2025)
WB IDA21	Large, predictable concessional envelope aligned to country plans; de-risks pipelines in LDCs/fragile states(World Bank, 2024)
IMF Resilience & Sustainability Trust (RSF)	Affordable, long-dated finance to implement climate-macro reforms that crowd in private capital (IMF, 2023)
AfDB–ADF Climate Action Window (CAW)	Upstream Technical Assistance (TA) and prep support to convert needs into bankable pipelines where access is weakest (African Development Bank, 2024)
FRLD	Channels additional vulnerability-targeted resources for loss & damage beyond mitigation/adaptation pots (UNFCCC, 2025)

Table 5-1. Typical Policy-to-Allocation Lists
(Source: Constructed by the authors)

5.2.2 Medium-Term Shifts

(1) Tripling Climate Finance

At COP29, Parties adopted the NCQG that (i) calls on all actors to scale finance to developing countries to at least USD 1.3 trillion per year by 2035 and (ii) sets a core goal of at least USD 300 billion per year by 2035 for developing countries (UNFCCC, 2024) . The decision also aims to at least triple annual outflows from UNFCCC funds from 2022 levels by 2030, signaling an earlier step-up before 2035.

(2) Systemic Change Focus

CPI' s work shifts attention from counting dollars to how finance catalyzes market- and system-level change(CPI, 2025). High-quality climate finance is defined as finance that deliberately pursues transformational outcomes beyond one-off projects, incubates and aggregates solutions at the market level, and enables durable shifts in the broader system. CPI calls for a shared language and principles to assess such change, and for providers to design upstream with a theory of change so that interventions (e.g., guarantees, concessional equity, programmatic facilities) target demonstration effects, competition, skills, and enabling-environment reforms that persist over time (CPI, 2025)

(3) Adaptation Finance Growth

Meeting rising climate impacts will require double-digit growth in adaptation finance this decade. UNEP' s 2024 Adaptation Gap Report shows international public adaptation finance to developing countries rose from USD 22 billion (2021) to USD 28 billion (2022), but is still far below the estimated needs of USD 215–387 billion per year, and the report calls for a sustained step-up through 2030 (UNEP, 2024). In parallel, the COP29 NCQG decision to triple UNFCCC fund outflows by 2030 implies a 15% compound annual growth rate (CAGR) for those funds this decade—illustrating the order of growth required system-wide to close the gap (Thwaites, 2024).

(4) Carbon Pricing Expansion

The medium-term evolution of climate finance policies is shifting from conventional carbon pricing instruments toward border adjustment mechanisms, with the CBAM emerging as a pivotal institutional innovation signaling systemic transformation. The EU CBAM entered its transitional phase on October 1, 2023 (2023–2025), requiring importers to submit carbon content reports, and will move into full implementation on January 1, 2026, when importers must purchase corresponding CBAM certificates. The initial coverage includes cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen, with plans to expand by 2030 to more downstream products and all categories covered under the EU ETS.

Policy spillovers are rapidly taking shape. The UK has announced that its UK CBAM will take effect on January 1, 2027, initially covering seven sectors—aluminum, cement, ceramics, fertilizers, glass, hydrogen, and iron and steel—each defined by specific commodity codes (GOV.UK., 2024). In the coming years, the rollout of CBAMs will drive supply chains to enhance MRV-based emission reductions and data governance, while providing measurable, verifiable financial anchors for trade-related decarbonization investments, process upgrades, and green power procurement.

5.2.3 Long-Term Landscape

(1) Sustainable Finance Integration

By the early to mid-2020s, climate-related taxonomies have moved from pilots to policy infrastructure. The UNFCCC' s report notes that 21 jurisdictions have published or are using sustainable-finance/climate taxonomies, with 38 more under development, indicating rapid mainstreaming across regions (UNFCCC, 2024) . These frameworks aim to reduce greenwashing, align disclosures and capital allocation, and improve interoperability with NDCs and national transition plans, laying the groundwork for the long-term integration of sustainability criteria into the broader financial system.

Convergence work is also accelerating; initiatives such as the EU–China Common Ground Taxonomy and regional efforts (e.g., the ASEAN Taxonomy) aim to harmonize definitions and improve cross-border comparability, which is critical for scaling private flows across markets in the next decade (Climate Bonds, 2024) . As more supervisors and markets embed taxonomy-based reporting and eligibility criteria in the long term, sustainable finance will become a system property rather than a niche label, enabling larger, cheaper, and more reliable long-term capital mobilization for climate objectives.

(2) Just Transition Frameworks

UNFCCC underscores that shifting finance must be mindful of broader socio-economic impacts, aligning climate investment with decent work and fairness principles that underpin a just transition (UNFCCC, 2024). The CPI' s 2025 work also highlights a stronger focus on just transition, which means designing climate finance to actively manage the socio-economic impacts of decarbonization on workers, communities, and regions (CPI, 2025). In its quality framework, CPI explicitly calls for allocating finance to programs that address the socio-economic fallout from mitigation actions and for delivery models that embed country and local ownership, ensuring that benefits (jobs, skills, affordability) persist after concessional capital exits. This reframes success from single-project outputs to market-level outcomes that are equitable and durable.

(3) Global Architecture Evolution

The UNFCCC' s BA6 documents ongoing needs for convergence in methodologies for tracking flows and improving transparency, thereby reducing double counting and enabling portfolio- and program-based operations across institutions (UNFCCC, 2024). By 2031–2035, the global climate finance architecture is expected to become more "system-of-systems." Under the Paris Agreement and the NCQG, roles for public and private capital are more clearly embedded across multi-layered channels, such as multilateral climate funds, MDBs/IDFC, bilateral windows, and national/regional climate funds, while converging on a demand-led approach built around country platforms that balance mitigation, adaptation, and loss and damage (GCF, 2025).

Policy milestones reinforce this evolution. For example, the COP29 decision on the NCQG established anchors for 2035: at least USD 300 billion per year, led by developed countries, and a broader mobilization effort toward USD 1.3 trillion from all sources (UNFCCC, 2024). This can shift finance from project-by-project to a platform- and a pipeline-based approach, and improve access for vulnerable countries through new and existing mechanisms.

5.3 Future Opportunities and Strategic Pathways

5.3.1 Untapped Sectoral Potential

(1) Digital Economy and AI

Rapid growth in AI and cloud computing is transforming data centers into a structurally significant driver of electricity demand, which is a new frontier for climate finance. The IEA' s Energy & AI report projects global data-center electricity consumption to reach 946 TWh by 2030 in the base scenario, as shown in Figure 5-9, with the North America (45.88%), Asia Pacific (39.96%), and Europe (11.95%) leading the demand (Figure 5-10) (IEA, 2025a). In advanced economies, data centers alone are set to account for 20% of electricity-demand growth to 2030, underscoring the need for accelerated clean-power procurement, grid reinforcement, storage, and flexibility solutions that climate finance can underwrite at scale (IEA, 2025d).

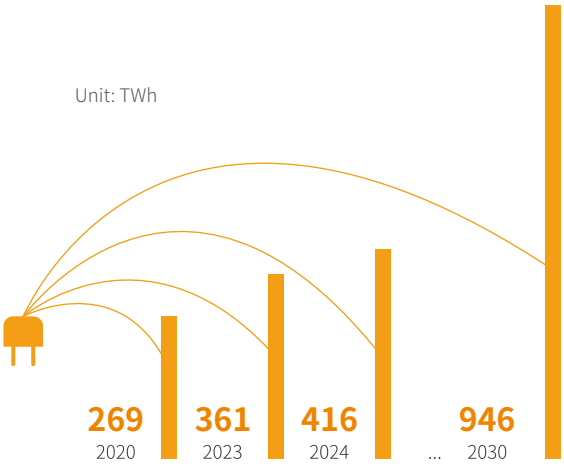


Figure 5-9. Global Electricity Consumption

(Source: International Energy Agency)

Moreover, the IEA finds that most incremental energy investment needs tied to data-center load are in networks (transmission and distribution), not just new generation (IEA, 2025c). Moreover, this creates bankable opportunities for green bonds and sustainability-linked loans focused on grid upgrades, demand-response, and battery storage. These investments, coupled with AI-enabled grid optimization (e.g., unlocking latent transmission capacity), can reduce curtailment and accelerate the integration of variable renewable energy sources.

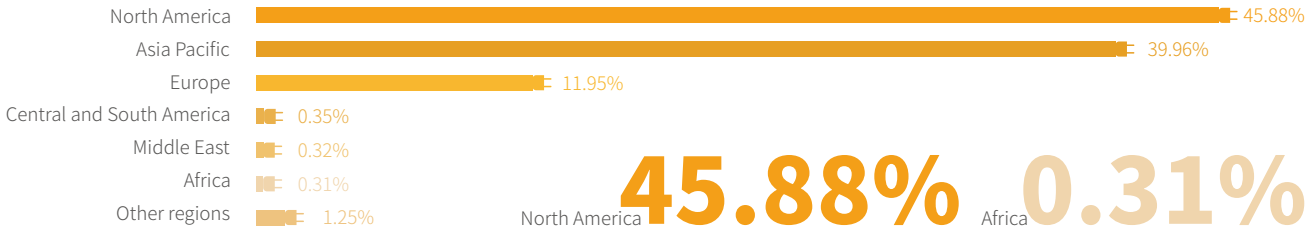


Figure 5-10. Share of Total Electricity Consumption in the 2030 Base Scenario

(Source: International Energy Agency, Energy and AI 2025)

(2) Clean Hydrogen Deployment

Clean hydrogen is transitioning from announcements to capital deployment, opening near-term opportunities for climate finance in electrolyzers, CCUS-equipped hydrogen, and end-use conversions (refining, chemicals, direct reduced iron steel, shipping fuels). The IEA Global Hydrogen Review 2025 reports that capital spending on low-emissions hydrogen reached USD 4.3 billion in 2024, an 80% increase from 2023 (IEA, 2025c). Moreover, based on projects that have reached final investment decisions (FID), capital spending is expected to increase by another 80% to nearly USD 8 billion in 2025, with China and Europe leading the spending, and electrolysis accounting for approximately 80% of the capital expenditure in 2025.

(3) Agrivoltaics and Circular Food Systems

Agrivoltaics and circular food system solutions (e.g., reducing food loss and waste, waste-to-value, solar-powered cold chains) are emerging mitigation options with rapid scaling potential, opening an ample yet under-financed space for climate investment. CPI estimates that current climate mitigation finance for agrifood systems accounts for only 3.8% of total finance, despite agrifood' s outsized share of global emissions, which reached 30% in 2021/2022 (CPI, 2025). This indicates substantial headroom for blended capital to crowd in private investment at the farm, processing, and logistics levels.

(4) EV Market Growth

The momentum of global EV remains strong. As shown in Figure 5-11, electric car sales exceeded 17 million in 2024, with a market share above 20% of new cars, despite policy recalibrations in parts of Europe and the US (IEA, 2025b). China led with 11.3 million sales, and nearly half of its new-car market consisted of EV. Meanwhile, the US sales passed 1.5 million. Looking ahead, the IEA expects 2030 sales to reach 40 million, implying continued needs for charging networks, grid upgrades, localized battery supply chains, and second-life/recycling capacity. These areas represent prime pipelines for climate finance via green bonds, SLBs tied to lifecycle-emissions KPIs, and blended-finance structures for infrastructure in EMDEs.

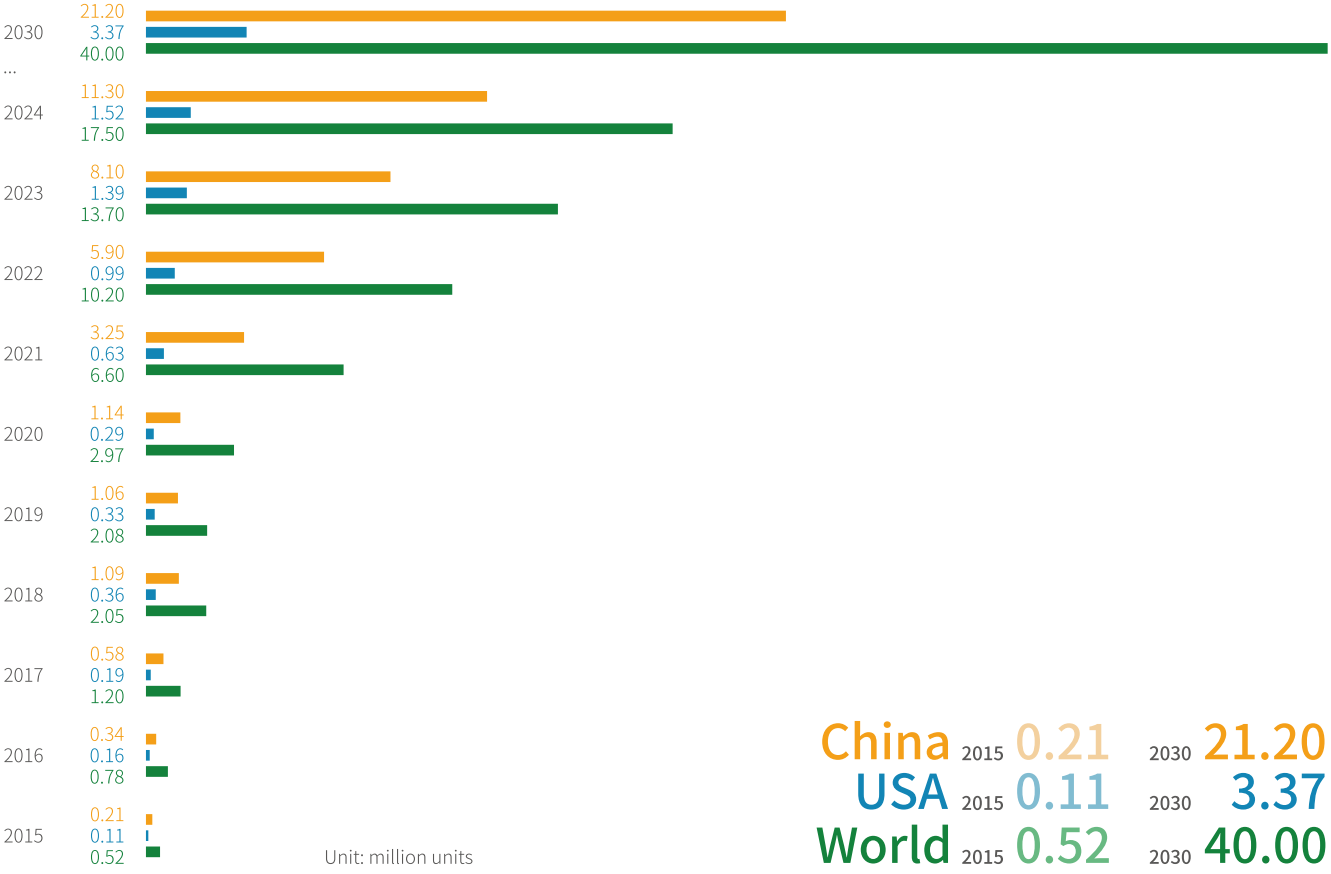


Figure 5-11. Global Electric Car Sales (BEV and PHEV)

(Source: International Energy Agency)

5.3.2 Technology and Innovation Leverage

(1) Carbon Credit Market Development

High-integrity removals are increasingly priced as a premium product. The WB's 2025 State and Trends of Carbon Pricing reports that buyers paid premiums of roughly 20–40% for nature-based removal credits relative to other categories (World Bank, 2025d). That forward prices were also higher, demonstrating that quality (durability, MRV) and co-benefits command mark-ups even as average voluntary prices have softened. Simultaneously, compliance demand is reshaping market structure; nearly one-quarter (24%) of global credit retirements in 2024 came from compliance uses, which helped support prices for credits eligible under schemes such as CORSIA, even though overall supply still exceeds retirements.

(2) AI-Driven Investment Analysis

AI-producing sectors (semiconductors, data centers, cloud) are becoming macro-relevant investment drivers. The IEA's Energy & AI finds data center capex doubled since 2022 and could exceed USD 800 billion per year before 2030, totaling USD 4.2 trillion (2025–2030) in the Base Case (IEA, 2025a). The report also notes tech firms' USD 300 billion AI-related capital expenditure plans for 2025, underscoring how AI-producing sectors now shape power market demand, infrastructure timing, and upstream supply chains. These facts make AI an essential lens for climate finance allocation (grids, storage, clean power from firms, demand flexibility).

(3) Digital Platforms for Climate Finance

Digital platforms, particularly those utilizing distributed ledgers, can reduce transaction costs and enhance transparency by making climate finance flows and outcomes traceable from end to end. For example, blockchain-enhanced transparency and tracking can be considered as a near-term enabler for higher-quality finance. Real-world builds point the same way, for instance, the WB's Climate Warehouse prototypes a decentralized, public metadata layer for carbon assets so registries can interoperate and reduce double-counting (World Bank, 2025a) Moreover, when paired with digital Monitoring, Reporting, and Verification (MRV), this can compress verification cycles and build trust in results-based finance.

5.3.3 Cross-Border Collaboration Models

(1) Baku to Belém Roadmap

The COP29 decision launched the Baku to Belém Roadmap to 1.3T (UNFCCC, 2024), tasking the COP29 and incoming COP30 Presidencies with outlining how finance can scale up for developing countries from 2024 to November 2025. The roadmap complements the NCQG anchors, that is, at least USD 300 billion per year in public-led finance by 2035 and a broader mobilization effort toward USD 1.3 trillion per year, by focusing on practical steps that improve access, align public and private sources, and expand non-debt and concessional instruments (UNFCCC, 2024). Moreover, UNFCCC' s Road to Belém process and Baku to Belém Roadmap to 1.3T work plan emphasize: (1) mapping barriers and solutions for developing country access; (2) clarifying roles for multilateral climate funds, and (3) producing a Presidency report ahead of COP30 summarizing actions and options.

(2) Blended Finance Approaches

Blended finance remains the most direct way to translate scarce public/concessional capital into larger pools of market-rate investment for climate projects in EMDEs. Recent market evidence shows that every dollar of concessional capital can mobilize 2.65 dollars of additional private capital in 2023 and 4 dollars when the deal size is over USD 250 million (Convergence, 2024) . Guarantees and junior/subordinated tranches remain the most catalytic instruments, especially when paired with technical assistance and project preparation.

(3) Multilateral Climate Funds

Multilateral climate funds (GCF, the Fund for Responding to Loss and Damage, and the AF) are broadening their contributor base and instruments just as developing-country needs surge. Recent tracking shows that, by December 2024, these three global funds had received USD 142 million in pledges from subnational contributors (GCF, 2025). This is a sign that cities and regions are becoming material co-founders alongside national donors, serving as a lever to accelerate locally-led access.

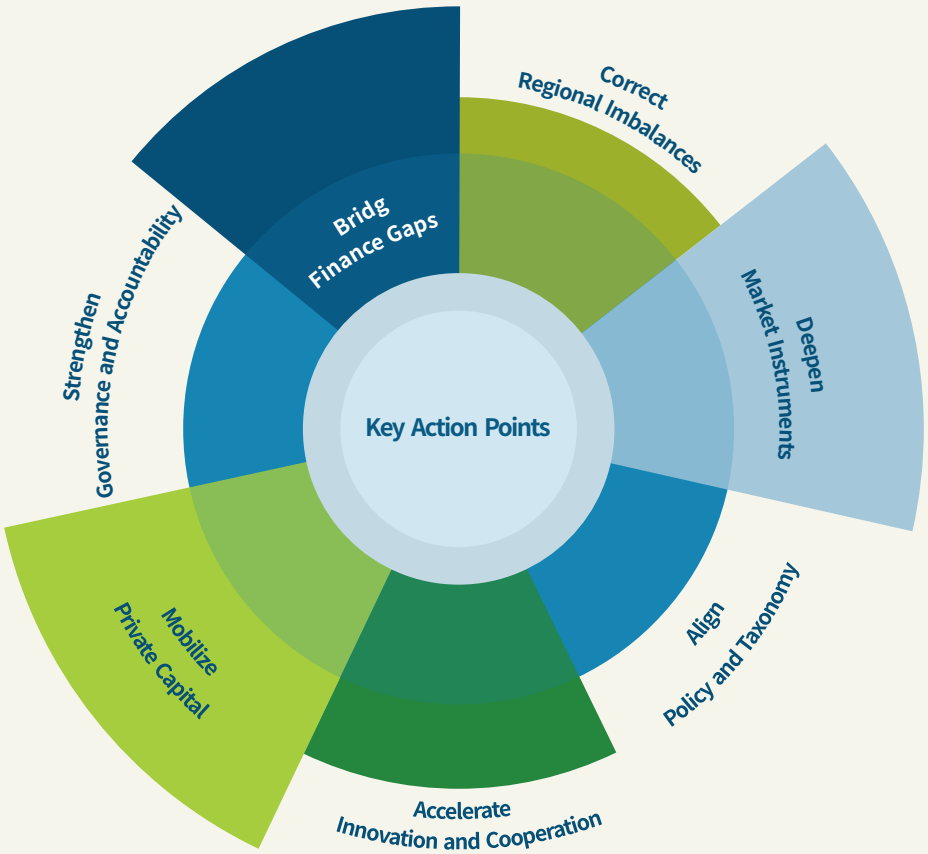
Operationally, pipelines and capacity are also strengthening. The GCF entered its second replenishment (GCF-2), with USD 13.6 billion pledged and 139 accredited entities as of January 2025. The FRLD has been set up as a WB-hosted FIF to channel support for loss and damage, with pledges tracked by the trustee.[See more information at: https://www.worldbank.org/en/programs/funding-for-loss-and-damage] These moves, along with the NCQG' s push to triple multilateral fund outflows by 2030, position funds to deliver more concessional, non-debt instruments and programmatic windows, particularly for adaptation and loss and damage.

Climate Finance Outlook 2025

Chapter 6

Summary and implications

The findings of The Outlook underscore that while climate finance is scaling globally, it has not yet reached the levels or distribution patterns necessary to align with the investment needs of a Paris-consistent pathway. Accelerating progress requires coordinated reform across fiscal policy, market architecture, and institutional governance. The need for greater concessional and blended finance remains particularly urgent for adaptation and resilience. Likewise, geographic disparities in climate finance allocation and underdeveloped market instruments hinder equitable progress and long-term stability. Seven priority actions summarize the key insights and implications, including bridging finance gaps, correcting regional imbalances, deepening market instruments, aligning policy and taxonomy, accelerating innovation and cooperation, mobilizing private capital, and strengthening governance and accountability. These strategic actions aim to support a durable, inclusive, and high-impact climate finance system capable of meeting global development and decarbonization targets through 2030 and beyond.



See more information at: https://www.worldbank.org/en/programs/funding-for-loss-and-damage

6.1 Bridge Finance Gaps

Closing the persistent mismatch between the global demand for climate finance and the limited supply of affordable capital remains a top priority. Current evidence suggests that concessional and blended flows still represent less than one-fifth of total tracked climate finance, leaving significant unfunded needs in adaptation and resilience programs. Governments, development banks, and institutional partners, therefore, need to scale catalytic instruments that can mobilize private finance at multiples of every public dollar invested.

Priority actions include expanding first-loss facilities, performance guarantees, and subordinated tranches within blended finance structures. These mechanisms de-risk early-stage or lower return projects that private investors would otherwise avoid. Special attention should be directed toward adaptation projects, where private participation accounts for less than 10% of total global climate finance commitments. Establishing regional liquidity facilities that recycle repayments into new pipelines can transform concessional capital into a revolving resource base rather than a one-off grant mechanism.

Domestic green funds should be aligned with internationally recognized taxonomy frameworks to enhance the bankability of projects. Requiring sovereign and subnational climate funds to adhere to taxonomy-based eligibility criteria prevents fragmentation and reduces transaction costs. Cross-border mutual recognition of green taxonomy standards—for instance, between the EU, ASEAN, and Africa's continental taxonomy initiatives—would allow credible transition projects to be listed across multiple jurisdictions, expanding their investor reach.

Access to concessional windows must also extend beyond central governments. Many cities and subnational entities lack credit ratings, restricting their participation in international capital markets. Pooled financing facilities, backed by partial guarantees from regional development banks, can enable groups of municipalities to issue joint green bonds for renewable energy and resilience infrastructure. To attract long-term investors, these pooled portfolios should be securitized into investment-grade instruments tradable on secondary markets.

A further structural improvement would be a global pipeline-visibility platform, hosted by a multilateral agency, that lists early-stage climate projects with standardized information on readiness, expected impacts, and financing needs. Such transparency would shorten due diligence cycles and match investors with credible projects in real time, accelerating financial closure and capital deployment.

6.2 Correct Regional Imbalances

The distribution of global climate finance remains geographically uneven. In 2024, over 80% of tracked flows were concentrated in advanced economies and China, while regions such as Sub-Saharan Africa and South Asia continued to receive a disproportionately small share relative to their population and climate vulnerability. Addressing this imbalance requires both reallocating concessional resources and creating region-specific financial instruments.

First, replenishment mechanisms for multilateral climate funds should be redesigned. Instead of static three- or five-year cycles, replenishments could be linked to project-disbursement milestones, ensuring that funds are recapitalized when actual delivery accelerates. Donor commitments should be indexed to inflation and exchange-rate variations to preserve the real value of contributions. At the same time, regional climate finance platforms—co-investing alongside national development banks—can channel resources in local currency, reducing exchange-rate risk and stabilizing investor returns.

To attract commercial lenders to higher risk markets, MDBs and insurers can replicate successful renewable energy insurance consortia used in small island economies. Expanding parametric insurance products to cover pre-construction and early-development costs would shield investors against the highest probability default stage in the LDCs. Complementary foreign exchange hedging facilities, supported by multilateral currency-swap arrangements, can further enhance the predictability of returns for offshore investors.

A portion of each multilateral climate fund allocation should finance technical assistance and capacity-building programs for local financial institutions. Training in climate risk assessment, project appraisal, and blended-finance structuring can increase the number of bankable projects while reducing reliance on external consultants. This approach aligns financial and human-capital development, producing a self-sustaining local pipeline of investment-ready initiatives.

Finally, establishing an open, geospatial dashboard of climate finance flows—standardized by sector and taxonomy code—would enhance transparency and allow benchmarking of regional equity in financing. Consistent disclosure of both concessional and private flows would enable objective tracking of progress toward fair-share principles in global climate finance.

6.3 Deepen Market Instruments

Liquid and transparent markets are essential for scaling private participation in climate finance. The rapid growth of ETSs and voluntary carbon markets has improved price discovery, yet fragmentation and uneven quality assurance continue to limit investor confidence. Strengthening the architecture of carbon and transition-finance markets is therefore a strategic priority.

The regional integration of carbon-credit registries and the adoption of standardized verification protocols can prevent double-counting and improve fungibility between compliance and voluntary markets. Establishing linkages among ETSs—for example, between the EU ETS and the UK ETS, as well as emerging systems in Asia—would enlarge liquidity pools and reduce volatility. Market authorities should also encourage the listing of carbon-indexed exchange-traded funds (ETFs) and derivatives that provide diversified exposure to carbon-price movements, offering institutional investors standardized access to decarbonization assets.

Expanding the spectrum of transition finance instruments is equally important. Transition bonds, aimed at hard-to-abate industries such as steel, cement, and shipping, must operate under clearly defined taxonomies that ensure verifiable emission-reduction pathways. Mandatory disclosure of baseline emissions, interim milestones, and verification methodologies will strengthen credibility and reduce the risk of greenwashing. Development banks can catalyze this market by providing credit-enhancement tranches or partial guarantees that lower entry barriers for mainstream fixed-income investors.

To further improve liquidity, small and distributed renewable projects can be bundled into standardized asset-backed securities (ABS). Recognizing these securities as eligible collateral for central bank repo operations would reduce funding costs and attract larger financial institutions to clean energy portfolios. Over time, this securitization approach could convert fragmented, illiquid project loans into a tradable climate finance asset class, bridging the gap between capital market investors and local developers.

6.4 Align Policy and Taxonomy

A coherent policy and classification environment underpins investor confidence in climate finance markets. Divergent definitions of green, transition, and adaptation activities currently create uncertainty, which increases due diligence costs and discourages cross-border capital flows. Establishing taxonomy convergence is therefore fundamental.

A standing coordination platform, operating under multilateral oversight, should harmonize taxonomy elements across jurisdictions. This platform would maintain a standard reference table of activity codes and threshold values for greenhouse-gas reduction, resilience, and social co-benefits. Requiring all new financial instruments to reference recognized taxonomy codes would facilitate comparability across issuers and investors, minimizing the risk of mislabeling.

Fiscal policy should also be integrated with carbon-pricing frameworks. Allocating a defined share of carbon-pricing revenues to national climate finance facilities can directly link market incentives to investment pipelines. At the same time, phasing out inefficient fossil fuel subsidies and redirecting those savings to energy efficiency credit lines and transition-bond guarantees would reinforce budget neutrality while advancing decarbonization objectives.

To ensure predictability, governments should adopt multi-year climate finance strategies aligned with their NDCs. Each strategy should specify funding sources, targeted sectors, instrument mixes, and performance milestones. Embedding regular review cycles that adjust incentives based on measured outcomes would close the feedback loop between policy ambition and delivery—an area identified as weak in current practice.

6.5 Accelerate Innovation and Cooperation

Innovation—both technological and financial—is essential for scaling the climate finance system to meet global goals. Digital tools, new financial structures, and international partnerships can jointly improve transparency, efficiency, and impact measurement.

First, digital transformation should underpin future climate finance tracking. Blockchain-enabled registries can record the lifecycle of each climate finance transaction—from commitment to verified outcome—eliminating duplication and improving traceability. Interoperable digital project identifiers across MDBs, development agencies, and private platforms would enable seamless data exchange, enhancing accountability and transparency.

Second, a Global Climate Finance Innovation Laboratory could serve as a testing ground for new blended-finance products. Potential pilots include pay-for-performance contracts, sustainability-linked exchange-traded products, and hybrid debt-equity instruments tied to verified emission reductions or resilience outcomes. Development banks should allocate a portion of their risk capital to such pilots, subject to strict evaluation of scalability and measurable impact.

Third, modernizing power grids and clean-energy logistics requires deeper public-private partnerships (PPPs). National utilities can be encouraged to sign long-term offtake agreements denominated in local currency, supported by multilateral guarantee facilities that reduce counterparty risk. This arrangement would facilitate large scale integration of renewable energy into transmission networks, alleviating one of the key bottlenecks identified in this Outlook.

Cross-border cooperation must also intensify. The Baku-to-Belém Roadmap process provides a mechanism for aligning commitments between G20 members and developing economies on scaling climate finance. Annual peer-review panels and scorecards can maintain accountability for finance mobilization and policy alignment. In parallel, South-South and triangular cooperation should be expanded by linking regional development banks and sovereign wealth funds to co-invest in renewable energy manufacturing, green hydrogen production, and climate-resilient infrastructure.

Finally, open-source climate finance data platforms should integrate information on both public and private investments. Standardized reporting of project costs, emission reductions, and financial returns would create a shared evidence base for benchmarking performance and supporting continuous learning across the global climate finance ecosystem.

6.6 Mobilize Private Capital

Private capital will ultimately determine whether the world meets the scale of investment required for a net-zero and climate-resilient economy. To date, private flows account for approximately 60–65% of total climate finance but remain concentrated in advanced economies. Expanding participation in emerging and developing markets requires transparent risk-return frameworks and predictable policy environments.

Creating standardized term sheets for blended-finance structures can clarify risk allocation and expected cash flows, enabling institutional investors to evaluate opportunities with greater confidence and certainty. Regulatory approval for capital-relief treatment of first-loss positions held by pension funds or insurers would further encourage their participation in early-stage or higher-risk climate projects.

Sovereigns can strengthen market discipline by issuing SLBs tied to measurable policy outcomes—such as renewable energy capacity additions or emission-reduction targets. Coupon adjustments triggered by verified performance provide clear accountability and reduce information asymmetry between issuers and investors. Transparent disclosure of methodologies and trigger events is essential for maintaining market integrity.

Expanding green credit guarantee schemes can improve access for small and medium-sized enterprises (SMEs) engaged in clean technology supply chains. Linking these guarantees to national credit information systems will enhance risk assessment and lower default rates. For early stage technologies, targeted fiscal incentives—including tax credits and accelerated depreciation—should be tied to verified emission-reduction or resilience outcomes, ensuring that incentives reward results rather than activities.

Finally, creating climate-themed infrastructure funds with blended capital structures can attract global institutional investors seeking long-duration assets. Such funds should emphasize transparent governance, independent evaluation, and currency-hedging facilities to maintain competitiveness against conventional infrastructure benchmarks.

6.7 Strengthen Governance and Accountability

Effective governance and rigorous accountability are foundational to the credibility and longevity of climate finance. Transparent reporting, standardized evaluation, and inclusive oversight ensure that financial flows translate into measurable climate outcomes.

National governments should embed climate finance governance within their budgetary frameworks. Ministries of finance can publish annual reports detailing climate-related expenditures, leverage ratios, and project outcomes using harmonized taxonomy categories. This approach aligns fiscal transparency with environmental accountability, facilitating peer comparison.

Within development banks, independent monitoring and evaluation units should assess the additionality, alignment, and integrity of financed projects. Publishing results through annual performance scorecards would strengthen stakeholder confidence and help refine future programming. These evaluations should integrate both financial and environmental metrics, linking directly to NDC targets.

To ensure inclusivity, beneficiary disclosure and community participation must become standard for large scale adaptation and mitigation initiatives. Representation of local stakeholders on project-governance boards promotes equitable benefit distribution and improves social acceptance. Furthermore, third-party verification of environmental outcomes should accompany financial audits, ensuring that funding eligibility in subsequent cycles is contingent upon demonstrated impact.

Finally, establishing an international registry of verified climate finance results, maintained under multilateral oversight, would consolidate data from national reports and MDBs disclosures. Such a registry would serve as the authoritative source for tracking global progress and reinforcing trust in reported achievements.

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List of Abbreviations

Abbreviation	Full Term
ADB	Asian Development Bank
AF	Adaptation Fund
AfDB	African Development Bank
AIIB	Asian Infrastructure Investment Bank
BCBS	Basel Committee on Banking Supervision
BNDES	Banco Nacional de Desenvolvimento Econômico e Social
CBAM	Carbon Border Adjustment Mechanism
CBES	Climate Biennial Exploratory Scenario
CCLW	Climate Change Laws of the World
CCUS	Carbon Capture, Utilization, and Storage
CDSB	Climate Disclosure Standards Board
CEB	Council of Europe Development Bank
COP	Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC)
CPI	Climate Policy Initiative
CSRD	Corporate Sustainability Reporting Directive
CTF	Clean Technology Fund
EBRD	European Bank for Reconstruction and Development
EIB	European Investment Bank
EMDEs	Emerging Market and Developing Economies
ESG	Environmental，Social，and Governance
ETS	Emissions Trading System
EU ETS	European Union Emissions Trading System
EUA	European Union Allowance
FIF	Financial Intermediary Fund
FSCC	Financial Stability Climate Committee
G20	Group of Twenty
GCF	Green Climate Fund
GCPU	Global Climate Policy Uncertainty（Index）
GEF	Global Environment Facility
GHG	Greenhouse Gas
GRI	Global Reporting Initiative
GSS+	Green，Social，Sustainability and Sustainability-Linked Bonds
HICs	High-income countries

Abbreviation	Full Term
IDBG	Inter-American Development Bank Group
IEA	International Energy Agency
IFRS Foundation	International Financial Reporting Standards Foundation
IIGF	Institute of International Green Finance
IMF	International Monetary Fund
IRA	Inflation Reduction Act
IsDB	Islamic Development Bank
ISSB	International Sustainability Standards Board
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
LIFE	L' Instrument Financier pour l' Environnement（The LIFE Programme）
LMICs	Low- and middle-income countries
MDBs	Multilateral Development Banks
MDBs	Multilateral Development Banks
MFF	Multiannual Financial Framework
NCQG	New Collective Quantified Goal on Climate Finance
NDB	New Development Bank
NDC	Nationally Determined Contribution
NFRD	Non-Financial Reporting Directive
OECD	Organization for Economic Co-operation and Development
SCC	Supervisory Climate Committee
SCCF	Special Climate Change Fund
SDG	Sustainable Development Goal
SFDR	Sustainable Finance Disclosure Regulation
SIFMA	Securities Industry and Financial Markets Association
SLBs	Sustainability-Linked Bonds
TCFD	Task Force on Climate-related Financial Disclosures
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD / EUR	United States Dollar / Euro
WB	World Bank

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