Reconfiguring Global Climate Governance: U.S. Withdrawal, Emerging Leadership, and the Adaptive Resilience of the Paris Agreement (2015–2025)

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Abstract

The Paris Agreement marks a pivotal transformation in global climate governance, shifting from the legally binding, and top-down architecture of earlier regimes to a decentralised system anchored in nationally determined contributions, iterative ambition cycles, and normative accountability. This design seeks to reconcile environmental urgency with political feasibility across heterogeneous national contexts. Within this framework, the United States has occupied a structurally significant position due to its historical emissions profile, economic scale, technological leadership, climate finance capacity, and extensive diplomatic networks.

This paper examines the role of the United States in the Paris Agreement from 2015 to 2025, tracing its initial contributions, successive withdrawals, and the broader systemic implications of its policy volatility. Using a qualitative institutional and political-economy approach, the study analyses how the disengagement of a major actor affects regime coordination, climate finance mobilisation, market confidence, and the distribution of leadership responsibilities within a multilateral system that lacks coercive enforcement.

The findings show that although the Paris Agreement has demonstrated notable institutional resilience in the face of inconsistent U.S. participation, the consequences of withdrawal are neither neutral nor evenly distributed. U.S. disengagement has contributed to governance fragmentation, heightened uncertainty in climate finance flows, and increased borrowing and adaptation costs for climate-vulnerable countries. Simultaneously, leadership functions have shifted toward the European Union, China, and emerging economies such as India, producing a more polycentric but also more complex and uneven governance landscape.

Overall, the analysis advances scholarship on multilateral environmental agreements by demonstrating that while regime survival without hegemonic leadership is possible, it entails higher economic, coordination, and equity costs. The Paris Agreement endures, but in a form that requires greater burden-sharing, institutional adaptability, and sustained commitment from a broader constellation of actors to achieve timely and equitable global climate action.

Keywords: Paris Agreement, Global Climate Governance, U.S. Withdrawal, Emerging Climate Leadership, Polycentric Governance, Climate Finance Uncertainty, Institutional Resilience, Equity and Burden-Sharing

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I. Introduction

The adoption of the Paris Agreement in 2015 marked a decisive shift in international climate governance. Unlike earlier regimes such as the Kyoto Protocol, which relied on legally binding emission reduction targets for a limited group of industrialised countries, the Paris Agreement established a universal framework based on nationally determined contributions (NDCs), enhanced transparency mechanisms, and periodic global stocktakes designed to progressively raise ambition [1]. This architecture was intended to reconcile environmental necessity with political feasibility, particularly in major emitting economies where domestic political constraints have historically limited sustained international engagement.

Within this framework, the United States occupies a systemically important position. It is the world's largest historical emitter of greenhouse gases and remains among the largest contemporary emitters, accounting for approximately 13–15% of global emissions in recent years [2]. Beyond emissions, the United States has historically played a central role in climate finance, clean energy innovation, and diplomatic agenda-setting. Consequently, U.S. participation or withdrawal has implications that extend beyond national mitigation outcomes to the functioning of the global climate regime itself.

The U.S. decision to withdraw from the Paris Agreement—first announced in 2017 and implemented in 2020—represented an unprecedented challenge to the regime. The subsequent re-entry in 2021, followed by a renewed withdrawal announcement in 2025, further exposed the vulnerability of multilateral climate cooperation to domestic political volatility in major economies. These developments raise a central research question: to what extent can a multilateral climate regime premised on voluntary commitments remain effective in the absence of consistent participation by a hegemonic actor?

This paper analyses U.S. participation in the Paris Agreement across four phases: initial leadership (2015–2016), first withdrawal (2017–2020), re-entry and expansion (2021–2024), and renewed withdrawal beginning in 2025. It argues that while the Paris Agreement has demonstrated notable institutional resilience, U.S. withdrawal has weakened coordination efficiency, disrupted climate finance flows, and redistributed leadership responsibilities in ways that increase the overall economic and governance costs of global climate action.

2. Literature Review and Theoretical Framework

The literature on multilateral environmental agreements (MEAs) has long examined how international cooperation can be sustained in the absence of central enforcement authority. Early regime theory emphasised the importance of legally binding commitments and compliance mechanisms in ensuring cooperation [3]. Subsequent scholarship, however, highlighted the role of flexibility, learning, and norm diffusion in sustaining participation under conditions of political heterogeneity [4]. The Paris Agreement reflects this latter approach by prioritising inclusiveness and adaptability over coercive enforcement.

Hegemonic stability theory provides a useful analytical lens for understanding the role of the United States in global climate governance. According to this framework, international regimes are more likely to emerge and function effectively when a dominant actor is willing to provide leadership, absorb disproportionate costs, and supply collective goods such as finance and coordination [5]. In the climate context, these goods include mitigation leadership, predictable climate finance, and diplomatic coalition-building.

Complementing this perspective, credibility and commitment theory underscores the importance of policy consistency in shaping expectations among states and market actors. Repeated policy reversals undermine credibility, increase transaction costs, and discourage long-term investment [6]. Applied to climate governance, inconsistent participation by major actors weakens confidence in collective commitments even when formal institutional structures remain intact.

This paper integrates these perspectives to conceptualise U.S. withdrawal as a governance shock—one that affects emissions trajectories, finance mobilisation, leadership dynamics, and institutional trust within the Paris regime.

3. Methodology and Analytical Approach

This study employs a qualitative institutional and political economy approach, analysing developments between 2015 and 2025. Primary sources include UNFCCC decisions, NDC submissions, COP outcomes, and climate finance data from multilateral institutions. Secondary sources include peer-reviewed academic literature and reports from the IPCC, OECD, IMF, IEA, and World Bank. The analysis focuses on three interrelated dimensions:

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(i) climate finance flows,
(ii) leadership and coordination mechanisms, and
(iii) market and investment signals.

The study employs qualitative triangulation by cross-referencing institutional documents, secondary literature, and reported climate finance data to enhance analytical robustness.

4. The United States and the Paris Agreement: Contributions and Leadership

U.S. participation was central to the credibility of the Paris Agreement at its inception. The U.S. NDC submitted in 2015 committed to reducing greenhouse gas emissions by 26–28% below 2005 levels by 2025 [7]. Although insufficient to align with the Agreement's long-term temperature goals, this commitment represented the most ambitious federal-level climate target in U.S. history at the time.

Climate finance constituted another pillar of U.S. leadership. The U.S. pledge of USD 3 billion to the Green Climate Fund (GCF) positioned it as the largest single contributor during the initial capitalisation phase [8]. Empirical evidence suggests that public climate finance plays a catalytic role by lowering investment risk and mobilising private capital, with each dollar of concessional finance leveraging multiple dollars of private investment [9].

However, U.S. climate commitments during this period relied predominantly on executive authority rather than legislative mandates. While this facilitated rapid engagement, it rendered commitments vulnerable to political reversal—an institutional vulnerability that would later shape the consequences of U.S. withdrawal.

5. U.S. Withdrawal from the Paris Agreement

- First Withdrawal (2017–2020)

The Trump administration justified withdrawal on economic and sovereignty grounds, arguing that the Paris Agreement imposed disproportionate costs on the U.S. economy. Subsequent empirical assessments, however, indicated continued growth in clean energy employment, with renewable energy jobs significantly outnumbering fossil fuel jobs during this period [10]. From a governance perspective, the first withdrawal weakened diplomatic momentum and reduced predictability in climate finance, even before formal exit under Article 28.

- Re-entry and Expansion (2021–2024)

The Biden administration's re-entry restored U.S. participation and enhanced ambition, including a net-zero target by 2050 and large-scale domestic investment in clean energy and infrastructure [11]. While widely welcomed internationally, this reversal also underscored the fragility of U.S. climate commitments within a polarised political system.

- Second Withdrawal (2025)

The second withdrawal announcement in 2025 occurred after the Paris Rulebook had largely been operationalised, including advances on transparency and carbon market mechanisms. This timing amplified its impact by reinforcing perceptions of U.S. policy volatility and increasing reliance on alternative leadership arrangements.

6. Impact of U.S. Withdrawal on Global Climate Governance

The withdrawal of the United States from the Paris Agreement has had systemic implications for global climate governance that extend beyond immediate diplomatic symbolism. Given the United States' historical role as a central architect and enabler of multilateral climate cooperation, its disengagement introduced a governance shock that tested the institutional design and adaptive capacity of the Paris framework.

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One of the most significant impacts has been observed in the domain of climate finance. The partial fulfilment and subsequent suspension of U.S. contributions to multilateral climate funds, particularly the Green Climate Fund (GCF), contributed to a measurable shortfall in available concessional finance for mitigation and adaptation projects in developing countries. According to OECD estimates, public climate finance plays a critical catalytic role by lowering project risk and mobilising private capital; uncertainty in public finance flows therefore has a disproportionate impact on investment outcomes (OECD, 2023). In practical terms, this uncertainty translated into delayed project approvals, scaled-down adaptation initiatives, and higher borrowing costs for climate-vulnerable countries.

Beyond finance, U.S. withdrawal also affected institutional coordination and leadership dynamics within the UNFCCC process. The Paris Agreement relies heavily on peer pressure, diplomatic signalling, and coalition leadership to encourage enhanced ambition. The absence of consistent U.S. engagement weakened these informal mechanisms, particularly during negotiations on complex issues such as Article 6 carbon markets, climate finance transparency, and loss and damage. While procedural continuity was maintained, the pace of negotiations slowed, and agenda-setting increasingly shifted toward smaller, issue-specific coalitions rather than broad-based leadership.

The withdrawal also had implications for market confidence and investment behaviour. Empirical evidence suggests that policy stability in major economies is a key determinant of long-term investment in clean energy and climate-resilient infrastructure (IEA, 2024). Repeated reversals in U.S. climate policy introduced uncertainty into global markets, particularly for cross-border investments dependent on predictable regulatory and financial frameworks. Although global clean energy deployment continued to expand, this growth occurred at a higher cost and with greater regional unevenness than would likely have been the case under stable U.S. participation.

Taken together, these developments indicate that U.S. withdrawal did not dismantle the Paris regime, but it did reduce governance efficiency, increase coordination costs, and shift greater responsibility onto other actors.

7. Reconfiguration of Climate Leadership in the Absence of Sustained U.S. Engagement

In the absence of sustained U.S. leadership, global climate governance did not experience a vacuum so much as a reconfiguration of leadership roles. This reconfiguration reflects both the flexibility of the Paris Agreement and the limits of decentralised governance in addressing a collective action problem of this scale.

The European Union emerged as a principal actor seeking to preserve normative and institutional coherence within the Paris framework. Through the European Green Deal, enhanced climate finance commitments, and regulatory instruments such as the Carbon Border Adjustment Mechanism (CBAM), the EU sought to integrate climate ambition with economic and trade policy (European Commission, 2021). This approach reinforced the EU's role as a global standard-setter, particularly in linking climate action with competitiveness and industrial transformation. However, EU leadership has also faced constraints, including internal heterogeneity among member states and concerns among developing countries regarding the distributive impacts of regulatory measures.

China simultaneously expanded its role, particularly in climate finance and infrastructure deployment. Chinese engagement during periods of reduced U.S. participation was characterised by pragmatic investment-led approaches, including renewable energy financing and technology transfer through South–South cooperation mechanisms. While this engagement contributed significantly to mitigation capacity in developing regions, it did not fully substitute the diplomatic and institutional functions traditionally associated with U.S. leadership within the UNFCCC process. As a result, leadership became more functionally fragmented, with different actors leading on finance, implementation, and norm-setting.

India's role during this period illustrates a third pathway of leadership centred on implementation-oriented stabilisation. By prioritising renewable energy deployment, disaster resilience, and institutional platforms such as the International Solar Alliance, India contributed to maintaining trust in the Paris process among developing

countries. Rather than competing for hegemonic leadership, India's approach emphasised practical cooperation and coalition-building, thereby mitigating some of the confidence erosion associated with U.S. withdrawal.

This reconfiguration of leadership sustained momentum but also increased coordination complexity, as no single actor possessed the capacity to integrate finance, diplomacy, and norm-setting at the scale previously associated with U.S. engagement.

8. Post-2024 Developments and the Paris Agreement in the 2025 Context

Developments following 2024 provide critical insight into the evolving functioning of the Paris Agreement under conditions of reduced U.S. participation. The Global Stocktake process reaffirmed a persistent gap between current national commitments and emission pathways consistent with limiting global warming to 1.5°C (IPCC, 2023). While this outcome was widely anticipated, it underscored the growing challenge of translating collective assessments into enhanced national action.

Progress on loss and damage finance represents a notable institutional milestone, reflecting sustained advocacy by vulnerable countries. However, available funding remains significantly below estimated needs, and the absence of predictable contributions from major economies complicates long-term planning. From an economic perspective, delayed investment in adaptation and resilience increases future fiscal burdens, as post-disaster recovery consistently proves more costly than preventive action (IMF, 2022).

The 2025 NDC cycle further illustrates the tension between ambition and feasibility. While many countries reaffirmed commitment to the Paris goals, implementation capacity remains uneven, particularly in developing regions facing fiscal constraints and limited access to concessional finance. In this context, the Paris Agreement increasingly functions as a coordination platform rather than a driver of uniform ambition. Climate action has become more differentiated, relying on regional alliances, sectoral initiatives, and voluntary coalitions rather than universal leadership.

These developments suggest that the Paris Agreement continues to operate, but in a more fragmented and polycentric manner. The absence of sustained U.S. leadership has not halted progress, but it has shifted the regime toward a model characterised by uneven ambition, variable finance flows, and greater reliance on a limited set of proactive actors.

9. Comparative Case Studies: National and Regional Responses to U.S. Withdrawal from the Paris Agreement

To understand the differentiated impacts of U.S. withdrawal from the Paris Agreement, it is necessary to move beyond aggregate global effects and examine how individual countries and regions perceived and responded to the resulting governance and finance disruptions. This section presents a comparative analysis of selected country and regional cases—namely the European Union, China, India, and Small Island Developing States (SIDS)—to illustrate how the absence of sustained U.S. leadership reshaped national strategies, institutional behaviour, and climate action trajectories. These cases are analysed comparatively along three dimensions: leadership strategy, climate finance orientation, and institutional positioning within the Paris framework.

- European Union: From Co-Leader to De Facto Norm Entrepreneur

The European Union perceived U.S. withdrawal primarily as a threat to the normative and institutional coherence of the Paris regime. In response, the EU significantly expanded its leadership role, positioning itself as both a regulator and financier of climate action. The launch of the European Green Deal in 2019 marked a strategic shift from incremental climate policy to a comprehensive transformation agenda linking climate action with industrial policy, trade, and competitiveness [1].

Empirically, the EU increased its collective climate finance contributions during the period of U.S. disengagement, partially compensating for reduced U.S. support to multilateral funds. Between 2017 and 2022, EU institutions and member states together accounted for over one-third of total reported public climate finance provided to developing countries [2]. The introduction of the Carbon Border Adjustment Mechanism (CBAM)

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further reflected the EU's attempt to internalise climate ambition within trade relations, indirectly extending climate norms beyond its borders [3].

However, while EU leadership enhanced regulatory coherence and financial continuity, it also altered perceptions among developing countries. Several countries viewed CBAM and related measures as unilateral and potentially protectionist, raising concerns regarding equity and differentiated responsibilities [4]. This suggests that while the EU partially substituted for U.S. leadership in regulatory and financial terms, it could not fully replicate the convening power and legitimacy traditionally associated with hegemonic leadership. The EU case thus demonstrates how leadership substitution can sustain ambition while simultaneously generating new distributional tensions within the regime.

- **China: Strategic Expansion through Climate Finance and South–South Cooperation**

China's response to U.S. withdrawal was shaped less by normative concerns and more by strategic and economic considerations. Chinese policymakers consistently framed continued engagement with the Paris Agreement as part of a broader commitment to multilateralism, while simultaneously expanding China's influence in climate finance, clean energy manufacturing, and infrastructure deployment [5].

During the period of reduced U.S. engagement, China emerged as a leading provider of renewable energy infrastructure in developing countries, particularly through South–South cooperation and climate-related components of the Belt and Road Initiative (BRI). By 2022, Chinese policy banks and financial institutions had supported several hundred renewable energy projects across Asia, Africa, and Latin America, contributing substantially to global renewable capacity additions [6].

From the perspective of recipient countries, Chinese engagement helped fill immediate financing and infrastructure gaps created by uncertainty in traditional climate finance channels. However, this model differed fundamentally from U.S. and EU approaches. Chinese climate finance was predominantly delivered through bilateral arrangements with limited governance conditionalities and reduced transparency requirements [7]. Consequently, while China's expanding role strengthened implementation capacity and deployment speed, it did not fully replace the institutional, agenda-setting, and procedural leadership functions traditionally exercised by the United States within the UNFCCC process.

- **India: Implementation-Centric Stabilisation and Green Sector Expansion within the Paris Framework**

India's response to U.S. withdrawal represents a distinctive model of climate leadership grounded in implementation credibility, sectoral transformation, and South–South institutional cooperation, rather than finance driven influence. Throughout the period of U.S. disengagement, Indian policymakers consistently reaffirmed commitment to the Paris Agreement, anchoring their position in the principles of equity, sustainable development, and common but differentiated responsibilities (CBDR RC). Instead of interpreting U.S. withdrawal as a rationale for reduced ambition, India utilised the period to accelerate domestic energy transitions, expand green industrial capacity, and strengthen international climate institutions [8].

India's domestic climate strategy during this period was characterised by rapid expansion of renewable energy capacity, underpinned by a suite of national missions, regulatory reforms, and industrial policies. Key developments include:

National Solar Mission (NSM): India scaled solar capacity from 2.6 GW in 2014 to over 130 GW by end of 2025, making it one of the world's fastest growing solar markets. [17]

Wind Energy Expansion: Installed wind capacity surpassed 53 GW, supported by competitive bidding and hybrid wind solar tenders.

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Green Hydrogen Mission (2023): India launched a USD 2.3 billion National Green Hydrogen Mission targeting 5 MTPA of green hydrogen production by 2030, supported by electrolyser manufacturing incentives and demand creation mandates in refineries, fertilisers, and steel.

Battery Storage and E Mobility: Production Linked Incentive (PLI) schemes catalysed 50+ GWh of domestic battery manufacturing capacity. Electric vehicle penetration accelerated through the FAME II scheme, with EV sales crossing 1.5 million units annually by 2024.

Solar Manufacturing Ecosystem: PLI incentives for high efficiency solar modules created an integrated domestic supply chain, raising India's module manufacturing capacity to ~50 GW.

These interventions reduced the cost of utility scale solar to among the lowest globally, strengthened energy security, and positioned India as a major node in global clean energy supply chains.

India's climate governance architecture evolved through multi scalar institutional reforms that enhanced implementation depth:

National Electricity Plan (NEP 2023) projected that over 65% of new capacity additions to 2030 would come from non fossil sources; Carbon Credit Trading Scheme (CCTS) established a national carbon market framework, enabling sectoral baselines and compliance grade trading; Green Open Access Rules (2022) liberalised renewable procurement, enabling industries to directly source green power; and State level climate action plans were updated to integrate adaptation, disaster resilience, and sectoral decarbonisation pathways. These reforms created a predictable investment environment, reducing regulatory risk and mobilising large scale private capital.

India's international climate engagement emphasised practical cooperation, technology diffusion, and resilience building, particularly for developing countries:

International Solar Alliance (ISA): Expanded to over 110 member countries, facilitating solar deployment, risk mitigation instruments, and concessional financing for least developed countries.

Coalition for Disaster Resilient Infrastructure (CDRI): Provided technical assistance and resilience standards to climate vulnerable nations, strengthening adaptation governance.

Global Biofuels Alliance (2023): Advanced sustainable biofuel markets and technology cooperation among emerging economies.

These platforms positioned India as a functional leader capable of delivering tangible outcomes rather than symbolic commitments. From a governance perspective, India's approach played a stabilising role during periods of U.S. withdrawal by: reinforcing trust among developing countries through predictable participation, advocating for scaled up concessional finance and reform of multilateral development banks, promoting technology access, capacity building, and South–South cooperation, and demonstrating credible domestic implementation that aligned developmental priorities with climate objectives.

India's leadership helped mitigate confidence erosion within the Paris regime, particularly among climate vulnerable countries concerned about finance volatility and geopolitical uncertainty. India's green sector expansion reflects a broader structural shift: Renewable energy workforce exceeded 1 million jobs, with strong growth in solar manufacturing, installation, and O&M. Green industrialisation advanced through domestic manufacturing of solar modules, batteries, electrolyzers, and EV components. Green finance mobilisation increased through sovereign green bonds, blended finance platforms, and green taxonomy development. Agriculture and rural transitions were supported through PM KUSUM, enabling farmers to deploy solar pumps and decentralised solar plants. Urban transitions accelerated through Smart Cities Mission, AMRUT, and municipal green infrastructure investments. These developments collectively positioned India as a major emerging green economy hub, capable of influencing global supply chains, technology markets, and climate governance norms.

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The Indian case demonstrates how a middle income country can enhance global regime resilience by prioritising implementation credibility, sectoral transformation, and institutional cooperation over declaratory ambition. India's rise in the green sector—driven by national missions, industrial policy, and international coalitions—helped stabilise the Paris Agreement during periods of geopolitical volatility and contributed to a more polycentric, implementation driven climate governance landscape.

- Small Island Developing States: Disproportionate Vulnerability and Finance Sensitivity

Small Island Developing States (SIDS) represent the group most directly affected by disruptions in global climate governance. These countries contribute negligibly to global greenhouse gas emissions but face existential risks from sea-level rise, extreme weather events, and ecosystem degradation. For SIDS, U.S. withdrawal was perceived less as a diplomatic event and more as a material threat to survival, particularly due to its implications for climate finance predictability.

In this context, the withdrawal of a major climate finance contributor such as the United States translated directly into heightened fiscal and adaptation risk for SIDS. Empirical evidence indicates that delays in adaptation finance significantly increase long-term economic losses in climate-vulnerable regions. The International Monetary Fund estimates that each dollar invested in climate-resilient infrastructure can reduce future disaster-related losses by four to seven dollars [10]. Following U.S. withdrawal, uncertainty and delays affected several adaptation projects in SIDS, including coastal protection, freshwater management, and early warning systems [11].

Politically, SIDS intensified advocacy within the UNFCCC process, contributing to the eventual establishment of the Loss and Damage Fund. However, the scale and predictability of funding commitments remain insufficient relative to assessed needs. The SIDS case underscores the equity implications of governance instability and highlights how leadership volatility disproportionately affects those with the least adaptive capacity.

- Comparative Insights from the Case Studies

Taken together, these case studies demonstrate that U.S. withdrawal did not produce a uniform global response. Instead, it generated differentiated adaptations shaped by economic capacity, strategic priorities, and vulnerability levels. The European Union emphasised regulatory and normative leadership, China expanded finance- and infrastructure-driven engagement, India focused on implementation and coalition-building, and SIDS intensified advocacy for climate justice and finance mechanisms.

Collectively, these responses sustained the Paris Agreement but also transformed its governance structure. Leadership became more dispersed, coordination costs increased, and the burden of maintaining momentum shifted toward a smaller group of proactive actors. Taken together, these cases demonstrate that leadership dispersion can sustain regime continuity, but not without increasing asymmetries in capacity, influence, and risk-bearing, reinforcing the central argument of this paper.

10. Economic Implications of Paris Agreement Developments: Global Trends, Financial Shifts, and Distributional Outcomes

The decade from 2015 to 2025 witnessed a profound restructuring of the global climate economy, shaped by the Paris Agreement's decentralised architecture and the fluctuating participation of major actors such as the United States. The global low-carbon transition accelerated significantly during this period, with clean energy investment rising from USD 1.1 trillion in 2015 to over USD 2.1 trillion in 2024, surpassing fossil fuel investment for the first time in 2023 (IEA, 2024). This shift reflects both technological cost declines and policy-driven market creation across major economies. However, the economic benefits and adjustment costs of this transition have been unevenly distributed, particularly in the context of U.S. withdrawal and the resulting reconfiguration of leadership and finance flows.

1. Global Macroeconomic Shifts in the Low-Carbon Transition

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The Paris Agreement catalysed large-scale investment in renewable energy, energy efficiency, electric mobility, and green industrial capacity. Key global economic trends include:

- Renewable energy costs fell dramatically, with utility-scale solar declining by nearly 90% between 2010 and 2023, and onshore wind by 70%, enabling large-scale deployment even in developing economies.
- Clean energy employment surpassed 35 million jobs globally, compared to 32 million in fossil fuel sectors, indicating a structural shift in labour markets (IRENA, 2023).
- Carbon pricing mechanisms expanded, covering nearly 23% of global emissions by 2024, influencing investment decisions and fiscal planning.
- Green industrial policy surged, with the EU Green Deal, China's manufacturing dominance, and India's PLI schemes collectively reshaping global supply chains.

These developments generated significant economic opportunities but also heightened competition for green manufacturing, minerals, and technology leadership.

2. Economic Consequences of U.S. Withdrawal for Global Climate Finance

The U.S. had pledged USD 3 billion to the Green Climate Fund (GCF) but disbursed only USD 1 billion, contributing to a persistent shortfall in concessional finance. OECD estimates show that climate finance mobilised for developing countries reached USD 89.6 billion in 2021, still below the USD 100 billion annual commitment, with the gap widening during periods of U.S. disengagement. The absence of predictable U.S. contributions increased borrowing costs for climate-vulnerable countries, with sovereign risk premiums rising by 150–400 basis points for several SIDS and LDCs. Delays in adaptation finance resulted in higher long-term economic losses, as every USD 1 invested in resilience avoids USD 4–7 in future disaster costs (IMF, 2022). Thus, U.S. withdrawal had direct macroeconomic consequences, particularly for countries dependent on concessional finance and risk-mitigation instruments.

3. Redistribution of Green-Economy Leadership and Its Economic Effects

The vacuum created by U.S. withdrawal accelerated a redistribution of leadership:

European Union: Increased climate finance contributions to over one-third of global public climate finance. Implemented the Carbon Border Adjustment Mechanism (CBAM), reshaping global trade flows and imposing adjustment costs on carbon-intensive exporters.

China: Became the world's largest provider of renewable energy infrastructure finance, supporting hundreds of solar, wind, and grid projects across Asia, Africa, and Latin America. Consolidated dominance in solar PV manufacturing (over 80% of global capacity) and batteries (over 70%), influencing global price formation.

India: Emerged as a major green-economy hub, with renewable energy capacity exceeding 250 GW by end of 2025, and green industrialisation driven by PLI schemes for solar, batteries, and hydrogen. Launched the National Green Hydrogen Mission (USD 2.3 billion), targeting 5 MTPA production and positioning India as a future exporter. Expanded green jobs to over 1 million, with rapid growth in solar manufacturing, EVs, and grid-scale storage.

This redistribution created a more polycentric climate economy but also increased coordination costs and regulatory divergence.

4. Economic Efficiency and Equity Costs of Fragmented Leadership

The Paris Agreement's resilience in the absence of consistent U.S. participation came with measurable economic costs:

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- Coordination inefficiencies slowed progress on carbon markets (Article 6), delaying the emergence of a unified global carbon price.
- Fragmented leadership resulted in overlapping standards, trade measures, and finance instruments, increasing transaction costs for developing countries.
- Equity gaps widened, as vulnerable countries faced higher adaptation costs, limited access to concessional finance, and exposure to climate-induced economic shocks.
- Investment uncertainty increased during periods of U.S. withdrawal, affecting global clean-energy capital flows and raising risk premiums.
- Despite these challenges, the Paris Agreement continued to function due to the flexibility of its architecture and the emergence of alternative leadership coalitions.

The economic trajectory of the Paris Agreement era can be summarised as follows: Global clean-energy investment doubled, driven by cost declines and industrial policy; Leadership became more distributed, with the EU, China, and India shaping markets, standards, and finance; U.S. withdrawal imposed real economic costs, particularly for vulnerable countries and global coordination mechanisms; and the regime survived, but at the price of higher financial burdens, slower institutional progress, and increased inequality in climate outcomes.

The decade demonstrates that while hegemonic leadership is not strictly necessary for regime survival, its absence increases the economic cost of collective action and shifts the burden toward a smaller set of proactive actors.

11. Conclusion

This paper has analysed the evolving role of the United States in the Paris Agreement from 2015 to 2025, with particular attention to the systemic consequences of its repeated withdrawal for global climate governance. The findings demonstrate that the Paris Agreement has shown considerable institutional resilience, supported by its flexible architecture, universal participation, and reliance on iterative ambition cycles rather than coercive, legally binding obligations.

However, resilience should not be mistaken for optimal functionality. The withdrawal of the United States—a pivotal emitter, financier, and diplomatic actor—has imposed significant governance and economic costs on the regime. These include heightened coordination burdens, reduced predictability of climate finance flows, and a redistribution of leadership responsibilities that has affected both the efficiency and equity of global climate action. Although the European Union, China, India, and other emerging actors have stepped forward to sustain momentum, none has been able to fully replicate the integrative, agenda-setting role historically played by the United States.

From a theoretical standpoint, the Paris Agreement underscores both the strengths and inherent constraints of decentralised, pledge-and-review governance in managing global collective action challenges. While hegemonic leadership is not a prerequisite for regime survival, its absence fundamentally reshapes the allocation of costs, risks, and responsibilities across the international system. These dynamics carry important implications for the future design of multilateral environmental agreements, particularly in an era characterised by geopolitical fragmentation, domestic political volatility, and intensifying climate impacts.

For scholars and policymakers, the central lesson is clear: institutional flexibility enhances durability, but long-term effectiveness depends on the credibility, stability, and sustained engagement of major actors. Future research should explore mechanisms—legal, financial, and institutional—that can buffer multilateral climate commitments from domestic political cycles while preserving the inclusiveness, ambition, and equity principles at the core of the Paris Agreement.

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