Background Guide

COP

Conference of Parties

Agenda :

Operationalizing WHO's Integrated Framework for Mental Health Crisis Response and Digital Health Governance in the Post-Pandemic Era

I. Letter from the Executive Board

Dear Delegates,

We are delighted to welcome you to the simulation of the Conference of the Parties (COP) at DPSA MUN 2025. It is both a privilege and a responsibility for us to serve as your Executive Board, guiding you through the proceedings of what promises to be a challenging, engaging, and intellectually stimulating committee.

This Background Guide has been crafted to provide you with an informed starting point for the agenda at hand — Assessing the Need for Amendments to the Paris Climate Accord in Light of Ongoing Global and Technological Advancements. While it offers a comprehensive overview, it is by no means exhaustive. Delegates are strongly encouraged to undertake independent and extensive research, drawing upon credible and up-to-date sources to deepen their understanding. The content of this guide should serve as a foundation, not as conclusive evidence, during committee sessions.

We recognise that MUN conferences can be intense, especially when navigating topics as multifaceted as climate change, sustainable development, and international cooperation. However, our expectations are not limited to how experienced or eloquent you may be; rather, we are looking for your ability to negotiate, adapt, and balance competing priorities — respecting diverse perspectives while safeguarding your nation's interests. The art of diplomacy lies in crafting solutions that reconcile differences and foster consensus, without losing sight of the urgency and gravity of the matter at hand.

Climate change is one of the most pressing challenges of our era. The decisions and policies debated here have implications far beyond the walls of this committee room. In a rapidly evolving world — with breakthroughs in green technology, shifting political landscapes, and the dire warnings of science — reform and innovation in climate agreements are no longer optional, but essential.

At any stage of your preparation, do not hesitate to reach out to us for clarifications, suggestions, or guidance. We are here to ensure this experience is not only productive but also enjoyable. We look forward to witnessing thought-provoking debates,

Warm regards,

Akash P Videsh

Danush M

II. Committee Background & Mandate

The Conference of the Parties (COP) serves as the principal decision-making body of the United Nations Framework Convention on Climate Change (UNFCCC), an international treaty adopted in 1992. These annual gatherings bring together representatives from all "Parties" – the countries that have agreed to be bound by the UNFCCC – to assess global efforts to combat climate change, negotiate new measures, and review progress towards the Convention's overarching goal.

The fundamental mandate of the UNFCCC is to "stabilise greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system." The UNFCCC functions as an "umbrella" agreement, under which subsequent binding decisions, such as the Paris Agreement, are developed and implemented. COPs are crucial in the global effort against climate change, as they provide a forum for governments to measure collective progress, negotiate effective solutions, and elevate global attention to the climate crisis. Beyond governmental delegations, these conferences also involve a diverse array of non-Party stakeholders, including the private sector, civil society organizations, industry representatives, and individuals, recognizing that a comprehensive response to climate change requires broad engagement.

Within the COP structure, specific roles are defined to facilitate the proceedings. The COP President is responsible for ensuring the observance of the rules of procedure and working with country delegations to achieve consensus on key issues, while also aiming to raise international ambition on climate action. The host government of the COP provides the necessary premises, facilities, equipment, and services, including translation into the six official UN languages and media facilities. The host also plays a leadership role in engaging both governments and non-Party stakeholders to ensure the smooth preparation and successful delivery of the conference. The selection of a host country typically rotates among the five United Nations regional groups, with the chosen country formally offering to host the conference to the UNFCCC secretariat.

This committee's specific agenda, "Assessing the Need for Amendments to the Paris Climate Accord in Light of Ongoing Global and Technological Advancements," directly aligns with the COP's broader mandate to continuously review and enhance global climate action. It underscores the inherent focus on the Paris Agreement's efficacy and its potential evolution to meet contemporary challenges. The annual convening of the COP, alongside its mandate to "negotiate new measures, and review Parties' progress," inherently demonstrates a system designed for adaptive governance. This structure acknowledges that climate change is a dynamic and evolving challenge, necessitating continuous assessment and adjustment of international responses. Consequently, considering "amendments" to the Paris Agreement is not a deviation from the COP's core function but rather an intrinsic part of its role in ensuring the climate regime remains effective in a changing world. Furthermore, the essential involvement of the private sector, civil society, industry, and individuals alongside governments at COPs signals a significant shift towards a more inclusive, multi-stakeholder approach to global governance. This acknowledges that effective climate action extends beyond traditional state actors and requires broad societal engagement. For a committee assessing potential amendments, this implies that any proposed changes must consider the perspectives and capacities of these diverse actors, and that successful implementation will heavily rely on their active participation.

III. Historical Context of the Paris Accord

The journey towards the Paris Agreement is marked by a quarter-century of intensive international climate diplomacy, reflecting an evolving understanding of the climate crisis and the complexities of global cooperation.

The international climate change discourse began to gain traction with the First World Climate Conference in 1979. By the late 1980s, the scientific community's recognition of the climate threat intensified, leading to the establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988. The IPCC's first assessment report in 1990, coupled with calls from the second World Climate Conference, spurred negotiations for a global treaty on climate change. This culminated in the adoption of the United Nations Framework Convention on Climate Change (UNFCCC) text in 1992 at the Earth Summit in Rio de Janeiro, which subsequently entered into force in 1994. A foundational principle established by the UNFCCC was "common but differentiated responsibilities and respective capabilities" (CBDRRC), acknowledging that countries vary in their historical contributions to climate change and their capacities to address it, thus implying varied obligations. This principle recognized that industrialized nations, having contributed more to environmental degradation through earlier industrialization, should bear a greater responsibility for climate change mitigation than developing countries.

Following the inaugural Conference of the Parties (COP 1) in Berlin in 1995, negotiations intensified, leading to the adoption of the Kyoto Protocol in December 1997 at COP 3. This protocol represented a significant step, legally binding developed country Parties to specific emission reduction targets. Consistent with the CBDRRC principle, it did not impose new commitments on developing countries. The Kyoto Protocol's first commitment period spanned 2008-2012, with a second period from 2013-2020. However, its effectiveness was limited; it covered only approximately 12% of global emissions, largely due to major emitters not being signatories or declining to participate in the second commitment period. The United States, for instance, did not ratify the Protocol, and other developed countries declined to participate in the second commitment period, highlighting the challenges of a top-down, legally binding approach without broad participation.

The limitations of the Kyoto Protocol prompted a renewed push for a more comprehensive and inclusive global agreement. The 2007 Bali Road Map, agreed at COP 13, charted a course towards a post-2012 outcome. This was followed by the Copenhagen Accord, drafted at COP 15 in 2009, which set a goal of limiting global temperature increase to 2˚C and called on all countries to put forward non-binding mitigation pledges. Despite the presence of over 100 world leaders, the Accord was only "taken note of" by the COP rather than formally adopted, due to objections from a few countries, signaling the difficulty of achieving universal consensus on binding targets. The Cancun Agreements in 2010 were regarded as an interim arrangement, keeping the door open for a future legally binding successor.
A pivotal moment arrived at COP 17 in Durban, South Africa, in 2011, with the adoption of the Durban Platform for Enhanced Action. This launched talks aimed at achieving a comprehensive new agreement that would commence in 2020, leaving open its legal nature and how it would address differentiation between developed and developing countries. Intensive negotiations under the Ad Hoc Group on the Durban Platform (ADP) from 2012 to 2015 culminated in the adoption of the Paris Agreement.
The Paris Agreement, adopted at COP 21 on December 12, 2015, marked a new direction in the global effort to combat climate change. It represents a hybrid approach, combining elements of the "top-down" Kyoto model with the "bottom-up" approach seen in the Copenhagen and Cancun agreements. This structure established common binding procedural commitments for all countries, while allowing each nation to determine its non-binding "nationally determined contribution" (NDC). The Agreement entered into force in late 2016, much earlier than anticipated, demonstrating a widespread political will to move forward.

The evolution of international climate negotiations, from legally binding but limited agreements like Kyoto to more inclusive but flexible frameworks like Paris, demonstrates a continuous learning process from past limitations. The design of the Paris Agreement, particularly its hybrid nature and reliance on NDCs, directly reflects lessons learned from the failures of previous instruments. The Kyoto Protocol's fixed, legally binding targets, while effective for signatories, proved insufficient due to limited participation, covering only a small fraction of global emissions. The Copenhagen Accord, despite aiming for broader pledges, failed to achieve formal adoption due to a lack of universal consensus. The Paris Agreement's "bottom-up" NDC approach, where countries self-determine their contributions, combined with binding procedural commitments, was a strategic pivot. This flexibility was instrumental in securing approval from nearly every country in the world, representing an adaptation of the international regime to political realities to ensure broad participation.

Furthermore, this historical progression illustrates a subtle but significant shift in the interpretation and application of Common But Differentiated Responsibilities and Respective Capabilities (CBDRRC). While formalized in the UNFCCC and leading to strict differentiation under Kyoto, where only developed countries had binding targets, the Paris Agreement applies CBDRRC in a more nuanced and dynamic manner. It blurs the distinction by requiring all Parties to submit NDCs, emphasizing a "progression beyond the Party's then current nationally determined contribution and reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances." This signifies that responsibility is shared, but the degree of action differentiates based on evolving national circumstances, making the framework more adaptable and potentially more effective by engaging all major emitters.

Table: Evolution of International Climate Agreements

Agreement Name	Year Adopted/Entered into Force	Key Provisions/ Goals	Nature of Commitments	Scope/Participation	Key Strengths/ Weaknesses
UNFCCC	Adopted 1992, Entered 1994	Stabilize GHG concentrations; establish CBDRRC	Framework treaty, non-binding targets	Near-universal (197 Parties)	Established foundational principles; lacked strong enforcement mechanisms.
Kyoto Protocol	Adopted 1997, Entered 2005	Legally binding emission	Binding for developed countries,	Limited (192 Parties); covered ~12% of global	Strong legal force for

		reduction targets for developed countries	non-binding for developing	emissions	signatories; limited participation, especially from major emitters (e.g., US withdrawal).
Copenhagen Accord	Drafted 2009	Non-binding mitigation pledges; 2°C goal	Non-binding pledges	Broad participation, but not formally adopted	Signaled broader engagement; lacked legal teeth and consensus for formal adoption.
Paris Agreement	Adopted 2015, Entered 2016	Limit warming to well below 2°C, pursue 1.5°C; NDCs; Global Stocktake; finance, adaptation,	Hybrid: binding procedural, non-binding NDC content	Near-universal (195 Parties)	Broad participation, "ratchet mechanism" for ambition; NDCs are self-determined and not legally enforceabl

IV. Details about the Paris Record

The Paris Agreement, adopted in 2015, represents a landmark international treaty on climate change, encompassing mitigation, adaptation, and finance. It establishes a comprehensive framework designed to strengthen the global response to the threat of climate change.

A central aim of the Agreement, articulated in Article 2, is to keep the rise in global average temperature this century "well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius." This ambitious temperature goal is recognized as critical for significantly reducing the risks and impacts of climate change. To achieve this, greenhouse gas emissions should be reduced as soon as possible, aiming for net zero by the middle of the 21st century. Specifically, to stay below 1.5˚C, emissions need to be cut by roughly 50% by 2030.

The core mechanism for achieving this goal is the system of Nationally Determined Contributions (NDCs), outlined in Article 4. NDCs are national climate action plans submitted by each country, detailing how they intend to reduce greenhouse gas emissions and adapt to the impacts of climate change.

A fundamental requirement of the Paris Agreement is that NDCs must be updated every five years, demonstrating "increasingly higher ambition." This iterative process is often referred to as the "ratchet mechanism." While countries are mandated to submit these pledges, the specific content of the NDCs is self-determined, and there is limited formal accountability for meeting the stated targets. Each successive NDC is expected to represent a progression beyond previous commitments and reflect the highest possible ambition, taking into account common but differentiated responsibilities and respective capabilities. The third round of NDCs, for instance, is due in 2025 and will detail countries' intended climate actions through 2035.

To monitor collective progress and inform future ambition, the Agreement established the Global Stocktake (GST) under Article 14. The GST is a periodic process, occurring every five years, designed to assess the collective progress towards achieving the purpose and long-term goals of the Paris Agreement. The first GST concluded at COP28 in December 2023. This process involves three components: information collection, technical assessment, and consideration of outputs. The findings of the GST are intended to provide guidance and strengthen subsequent NDCs. Notably, the first GST affirmed that global efforts are "insufficient" and the world is "not on track to limit global warming to 1.5 degrees Celsius."

Climate Finance, addressed in Article 9, is another critical pillar. The Agreement reaffirms the obligation of developed countries to take the lead in providing financial assistance to less endowed and more vulnerable developing countries for both mitigation and adaptation efforts. It also encourages voluntary contributions from other Parties. The provision of scaled-up financial resources is intended to achieve a balance between adaptation and mitigation needs. Developed countries had committed to a collective mobilization goal of US$100 billion annually by 2020, a target that was not met by that year. The Green Climate Fund (GCF) stands as a key UN entity facilitating climate financing. Article 2.1(c) of the Paris Agreement further aims to make "finance flows consistent with a pathway towards low greenhouse gas (GHG) emissions and climate-resilient development," implying a broader alignment of all financial systems, including the private sector, with climate goals.

Adaptation, as per Article 7, establishes a global goal focused on enhancing adaptive capacity, strengthening resilience, and reducing vulnerability to climate change, all within the context of the Agreement's temperature goal. All Parties are expected to engage in adaptation efforts, including the formulation and implementation of National Adaptation Plans. Adaptation is recognized as a global challenge necessitating international support and cooperation. The Agreement also calls for strengthening the knowledge, technologies, practices, and efforts of local communities and indigenous peoples in adaptation.

Technology Development and Transfer (Article 10) is envisioned to fully realize the potential of technological advancements for both improving climate resilience and reducing greenhouse gas emissions. The Agreement establishes a technology framework and mechanism to accelerate this crucial process.

Complementing this, Capacity-Building (Article 11) places significant emphasis on strengthening climate-related capabilities in developing countries, with a request for developed countries to enhance their support in this area.

An Enhanced Transparency Framework (ETF), outlined in Article 13, requires Parties to report regularly on their climate actions and progress, including mitigation efforts, adaptation measures, and support provided or received, with reporting commencing in 2024. This framework includes international procedures for reviewing submitted reports, and the information gathered feeds directly into the Global Stocktake process.

Finally, Voluntary Cooperation / Market- and Non-Market-Based Approaches (Article 6) acknowledge the possibility of Parties collaborating to achieve higher ambition. Article 6.2 specifically allows for "internationally transferred mitigation outcomes" (ITMOs) that countries can use towards their NDCs. Article 6.4 establishes a Sustainable Development Mechanism (SDM) for generating "Article 6.4 Emission Reductions" (A6.4ERs) as offset credits, with a portion of the proceeds dedicated to adaptation projects in vulnerable countries. Article 6.8 defines a framework for non-market approaches to sustainable development.

The five-year cycle of increasingly ambitious NDCs, informed by the Global Stocktake, represents a fundamental innovation designed to continuously raise global ambition and overcome the limitations of previous agreements. This "ratchet mechanism" is a deliberate design choice that ensures dynamic ambition. The requirement for "progression beyond the Party's then current nationally determined contribution" means that even if initial NDCs are insufficient, the system is built for continuous improvement. The first GST's finding that the world is "not on track" directly triggers the need for stronger NDCs in 2025, demonstrating this mechanism at work.

The effectiveness of the Paris Agreement relies on the synergistic operation of its various pillars. Deficiencies in one area can undermine progress in others. For instance, many NDCs from developing countries are explicitly conditional on international support in terms of finance, technology, and capacity-building. If climate finance targets, such as the US$100 billion goal, are not met, it directly impacts the ability of vulnerable nations to implement their NDCs for both mitigation and adaptation. Similarly, the transparency framework is crucial for the Global Stocktake to accurately assess collective progress and identify gaps. A breakdown or insufficiency in any single area, such as finance, can therefore create a cascading failure across the entire framework, hindering the overall goal of limiting warming to 1.5˚C.

V. Reasons for Potential Changes/Amendments to the Paris Accord

A. Ongoing Global Advancements and Scientific Assessments

The latest scientific findings unequivocally underscore the urgent need for more ambitious climate action, highlighting a widening gap between current global efforts and the Paris Agreement's 1.5˚C temperature goal.

Earth's average temperature has risen by approximately 2˚F (1.1˚C) since the pre-industrial era (1850-1900), with the rate of warming accelerating to 0.36˚F (0.20˚C) per decade since 1982. The year 2024 stands as the warmest on record, with a global mean near-surface temperature of 1.55 ± 0.13 ˚C above the 1850-1900 average, making it likely the first calendar year to exceed the 1.5˚C threshold. All ten warmest years in the historical record have occurred within the past decade (2015-2024).

Accompanying this warming trend are record concentrations of greenhouse gases in the atmosphere. Atmospheric concentrations of carbon dioxide, methane, and nitrous oxide reached their highest levels in 800,000 years in 2023, with real-time data indicating continued increases into 2024. The global average carbon dioxide concentration hit a new record high of 422.7 parts per million (ppm) in 2024, representing a 50% increase compared to pre-industrial levels and the largest one-year increase on record. The annual increase in atmospheric carbon dioxide has accelerated to 2.6 ppm per year in the last decade (2015-2024), a rate 100-200 times faster than the increase at the end of the last ice age.

The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6), released between 2021 and 2023, provides the most current physical understanding of the climate system, its impacts, adaptation strategies, and mitigation options. This report unequivocally states that human activities are the cause of global warming, with global surface temperature reaching 1.1˚C above pre-industrial levels in the 2011-2020 period. The Synthesis Report of AR6 specifically informed the 2023 Global Stocktake.

The UN Environment Programme's (UNEP) Emissions Gap Report 2024 further highlights the significant disparity between current country commitments and the emissions reductions required to limit global warming to 1.5˚C. The report indicates that global emissions must fall by 42% by 2030 and 57% by 2035 (compared to 2019 levels) to align with a 1.5˚C pathway. Critically, current plans are projected to lead to a global temperature increase of 2.6-3.1˚C this century. To achieve the 1.5˚C goal, a 7.5% annual reduction in emissions is needed until 2035.

Table 1: Key Global Climate Indicators (2023-2024)

Indicator	2023/2024 Status	Implications for 1.5°C Goal
Global Mean Surface Temperature Anomaly (above 1850-1900 average)	1.55 ± 0.13 °C (2024, likely first calendar year above 1.5°C)	Signals rapid approach/exceedance of critical threshold; "wake-up call" for increased action.
Atmospheric CO2 Concentration	422.7 ppm (2024 new record, 50% higher than pre-industrial)	Indicates increasing radiative forcing and continued warming; highest in 800,000 years.
Annual CO2 Increase	3.75 ppm (2024, largest one-year increase on record)	Accelerating rate of human-induced emissions overwhelming natural carbon sinks.
Required Emissions Cuts by 2030 (for 1.5°C pathway)	42% below 2019 levels	Highlights the significant ambition gap between current NDCs and necessary reductions.
Required Emissions Cuts by 2035 (for 1.5°C pathway)	57% below 2019 levels	Emphasizes the need for increasingly steeper and rapid decarbonization efforts.

The fact that 2024 likely exceeded 1.5˚C warming, even if temporarily, serves as a critical signal that the world is rapidly approaching or even surpassing key thresholds. This represents a "wake-up call" that the Paris Agreement's long-term goal is becoming increasingly precarious, providing a strong impetus for reassessing its adequacy.

Further, the "10 New Insights in Climate Science" report for 2024/2025 reveals a more complex and interconnected set of climate impacts that extend beyond simple temperature increases. These include surging methane levels, which necessitate enforceable policies; the climate implications of reduced air pollution, which reveal the full extent of warming caused by historical greenhouse gas emissions; increasing heat making parts of the planet uninhabitable; climate extremes harming maternal and reproductive well-being; and concerns about the stability of major ocean circulation patterns like El Niño and the Atlantic Meridional Overturning Circulation due to unprecedented ocean warming. The report also highlights the Amazon rainforest nearing tipping points and the growing vulnerability of critical infrastructure to cascading disruptions. These are not merely additional problems but represent feedback loops and systemic vulnerabilities that accelerate warming or amplify impacts, potentially pushing parts of the planet beyond "habitable limits." This suggests that the current policy framework may not adequately address these complex, interconnected risks, and that future enhancements might need to explicitly consider potentially controversial interventions like Solar Radiation Modification (SRM), which currently lack a formal governance regime. The report urges policymakers at COP29 to use these insights during negotiations, including on climate finance, emphasizing that with urgent, decisive action, unmanageable outcomes can still be avoided.

B. Technological Advancements

Rapid innovations in renewable energy and carbon capture technologies are transforming the landscape of decarbonization, offering new pathways while simultaneously highlighting implementation challenges.

In 2024, global renewable electricity capacity expanded by 15.1%, with China contributing over 60% of new additions. This significant growth is driven by various technological breakthroughs. Key innovations in renewable energy include perovskite solar cells, which are lightweight, flexible, and hold the potential to surpass silicon in performance and affordability, revolutionizing the solar industry. Green hydrogen is emerging as a zero-carbon fuel, critical for decarbonizing sectors that are difficult to electrify, such as heavy industry and long-haul transportation. Advances in energy storage solutions, including solid-state, flow, and thermal batteries (like molten salt systems), along with Lithium Iron Phosphate (LFP) cells, are enhancing the reliability and dispatchability of renewable power. Bifacial solar panels, designed to capture sunlight from both sides, can increase energy output by up to 30% in reflective environments. Floating solar farms, or "floatovoltaics," offer a solution to land scarcity while also benefiting from the cooling effect of water, which can boost efficiency by up to 15%. Furthermore, advancements in wind turbine technology, such as floating turbines for deeper offshore waters, larger blades, and the use of wooden towers, are increasing energy output and sustainability. Innovative applications like agrivoltaic systems, which combine agriculture with solar energy production, are also scaling up. The integration of digital energy services and Artificial Intelligence (AI) is enhancing grid stability, optimizing energy demand and supply, and streamlining operations, making it easier to integrate renewable energy into the grid.

Parallel advancements are occurring in Carbon Capture, Utilization, and Storage (CCUS) technologies. As of the first quarter of 2025, operational CO_2 capture and storage capacity exceeded 50 million tonnes (Mt), with projections indicating a rise to approximately 430 Mt CO_2 per year by 2030 based on the current project pipeline. The year 2024 marked several "firsts" in CCUS deployment, including the first natural gas power plant with CCS in the UK, the largest CO_2 removal project in Sweden, the world's first plant to capture CO_2 emissions from cement production in China, and the world's first large-scale storage project in a depleted gas field in Australia. Direct Air Capture (DAC) pilot projects are also under construction in various regions, including Kenya and the United States. Innovations extend to mineralization techniques that convert CO_2 into stable solid forms for commercial applications, such as incorporation into concrete and synthetic products. Investments in CCUS have tripled since 2022, reaching $6.4 billion, with 628 projects in the pipeline. Collaborative approaches, such as "hub models" where multiple industry players share resources, and cross-border CO_2 networks, are emerging to reduce investment burdens and operational risks. The CCUS industry is set to continue its development in 2025, with major projects like the world's largest capture project at a cement plant in Norway and the world's largest DAC plant in the United States becoming operational.

While technological potential for deep decarbonization is rapidly increasing, the UNEP Emissions Gap Report indicates that current emissions trajectories remain far off track. This suggests that the primary barrier to meeting climate goals is no longer purely technological feasibility but rather the rate and scale of deployment, which is significantly influenced by policy frameworks, financial incentives, and political will. The impressive innovations and growth rates in renewable energy and CCUS demonstrate that it is technically possible to achieve a 1.5˚C pathway. However, the continued emissions gap implies that the bottleneck lies in the enabling environment for widespread adoption. Amendments or strengthened implementation under the Paris Agreement could therefore focus on accelerating policy frameworks, investment incentives, and regulatory certainty to bridge this deployment gap.

Furthermore, the scaling of new energy solutions, particularly those reliant on critical minerals, introduces new geopolitical dependencies and climate justice considerations that the Paris Agreement may need to explicitly address. The shift from fossil fuels to renewables creates a burgeoning demand for raw materials, potentially shifting geopolitical power dynamics and exacerbating socio-environmental impacts, especially in the Global South. The dominance of certain nations, such as China, in green technologies, fostered by state support, has already led to "green industrial policies" and trade tensions with other major economies. This necessitates closing governance gaps in the energy transition minerals value chain to ensure a just and equitable energy transition. Therefore, amendments or enhanced guidance within the Paris Agreement might need to consider responsible sourcing, supply chain resilience, and equitable benefit-sharing related to these new resource dependencies.

C. Effectiveness and Limitations of the Paris Agreement

Despite its near-universal adoption and foundational role in global climate action, the Paris Agreement faces significant challenges in achieving its ambitious goals, primarily due to an ambition and implementation gap.

A critical limitation is the ambition gap: current Nationally Determined Contributions (NDCs) are collectively insufficient to meet the 1.5˚C temperature goal, with projections indicating a warming of 2.6-3.1˚C based on current plans. To stay below 1.5˚C, global emissions need to be cut by approximately 50% by 2030. This is further compounded by an implementation gap: there is a notable discrepancy between the emissions reductions pledged in NDCs and those actually projected under current domestic policies. Many countries remain off track in delivering on their already insufficient 2030 NDCs. Some countries, like Switzerland, Australia, Brazil, and Japan, have either not significantly increased their ambition or have even weakened their targets in subsequent NDC submissions, thereby breaking the "progression" requirement central to the Agreement's design.

Table: NDC Ambition vs. 1.5°C Pathway

Metric	Current Trajectory (based on NDCs)	Required for 1.5°C Pathway (relative to 2019 levels)
Projected Global Warming	2.6-3.1°C this century	Well below 2°C, pursuing 1.5°C
Emissions Cuts by 2030	Insufficient to meet 1.5°C goal	42% reduction
Emissions Cuts by 2035	Insufficient	57% reduction
Annual Emissions Reduction Rate Needed (until 2035)	Not on track	7.5% annually

A key structural limitation of the Paris Agreement lies in its lack of strong formal accountability. While countries are required to submit NDCs and periodic reports on their implementation, the content of these pledges is self-determined, and there are few direct consequences for failing to meet targets. The primary formal consequence for non-compliance is typically a meeting with a global committee of neutral researchers to assist in developing new plans. The Agreement is largely premised on transparency and the expectation that national reports and the Global Stocktake will "inspire climate ambition." Compliance mechanisms are broad, focusing on dialogue and assistance rather than concrete punitive measures. This reliance on informal pressure, such as "naming and shaming," highlights the absence of a robust enforcement framework.

The flexibility embedded in the Paris Agreement, which allows for self-determined NDCs, was instrumental in achieving its near-universal approval. This design choice aimed to overcome the limitations of the Kyoto Protocol's top-down, legally binding targets, which resulted in limited participation. However, this very flexibility now presents a primary impediment to achieving the Agreement's core temperature goals, as it permits countries to set insufficient targets without significant formal repercussions. This creates a situation where nations can make pledges that are "nowhere near" the 1.5˚C pathway without direct legal consequence, contributing directly to the observed ambition and implementation gaps. This paradox suggests a need to re-evaluate how commitments can be strengthened without sacrificing the broad participation that is a hallmark of the Paris Agreement.

Furthermore, the limited formal compliance mechanisms within the Paris Agreement create an "accountability deficit." This shifts the burden of pressure onto informal mechanisms and significantly elevates the critical, yet often informal, role of non-party stakeholders such as civil society organizations, media, and research groups in driving accountability. The Compliance Committee established under Article 15 has a broad mandate focused on dialogue and assistance, rather than functioning as an enforcement or dispute settlement mechanism. This provides little direct incentive for nations to adhere to the Agreement beyond reputational considerations. Consequently, non-party stakeholders become crucial in supporting member states in adhering to climate obligations, bridging transparency gaps, and scrutinizing how nations translate their targets into reality. This suggests that any amendments or enhancements to the Paris Agreement's compliance framework might need to formalize or strengthen the role of these non-state actors, recognizing their de facto contribution to accountability in a system that lacks strong formal enforcement.

Additional challenges include the persistent difficulties in climate finance and technology transfer. Many NDCs from developing countries are conditional on international support, yet climate finance remains fragmented, and clean technology and knowledge are often not adequately transferred to countries that need them. Moreover, some countries have failed to update their NDCs with increased ambition or have even weakened them, thereby breaking the "progression" requirement central to the Agreement's design.

D. Evolving Climate Justice and Equity Considerations

The discourse on climate justice has deepened significantly since the inception of the Paris Agreement, moving beyond abstract principles to concrete considerations of human rights, vulnerability, and equitable transitions.

The principle of Common But Differentiated Responsibilities and Respective Capabilities (CBDR-RC), formalized in the UNFCCC, remains a cornerstone. It acknowledges that developed countries, having industrialized earlier, bear a greater historical responsibility for emissions and should lead in combating climate change. The Paris Agreement reflects CBDR-RC by requiring all Parties to submit NDCs that "reflect its highest possible ambition, reflecting its common but differentiated responsibilities and respective capabilities, in the light of different national circumstances." This principle is crucial for fostering cooperation among states and providing incentives for them to implement their obligations, recognizing that pollution transcends political boundaries.

The interrelation between human rights and climate change is explicitly recognized in the Paris Agreement's preamble, encompassing rights to shelter, clean water, food, and a healthy environment. The Agreement calls for protecting indigenous peoples, local communities, migrants, children, persons with disabilities, and people in vulnerable situations, recognizing that climate change disproportionately affects low- and moderate-income people and communities of color. The International Court of Justice (ICJ) advisory opinion has further reinforced states' duties to mitigate emissions, manage private sector emissions, prevent serious environmental damage, cooperate with vulnerable nations, and uphold fundamental human rights, including the right to a clean and healthy environment. This opinion also indirectly addressed the importance of military emissions reporting and decarbonization, suggesting that military emissions should be accounted for in national inventories and NDCs.

A significant development in climate justice is the agreement on a distinct finance mechanism for unavoidable Loss and Damage, reached at COP27 in 2022. This fund is crucial for vulnerable countries severely impacted by climate disasters, acknowledging that not all climate impacts can be addressed through mitigation and adaptation alone. This fund aims to provide financial help, particularly for countries in the Global South, most affected by climate change.

The concept of a just transition is also emphasized, particularly the "imperatives of a just transition of the workforce." Climate justice demands ensuring that poor and minority communities are not disproportionately burdened by the costs of decarbonization and that affected communities are meaningfully involved in the transition, including ensuring job security for those in impacted industries. This also extends to public health, as climate change impacts, such as temperature-related illnesses and extreme weather events, disproportionately affect vulnerable communities.

The evolution of climate justice, particularly with the operationalization of the Loss and Damage fund and the ICJ's advisory opinion, transforms it from a guiding principle into a more concrete legal and moral imperative for action and accountability. While CBDR-RC has always been a foundational principle, the agreement on the Loss and Damage fund represents a significant step from merely acknowledging vulnerability to establishing a financial mechanism to address it, albeit with details still under negotiation. Furthermore, the ICJ advisory opinion explicitly confirms states' duties to uphold fundamental rights, including the right to a clean and healthy environment, and suggests that failure to mitigate emissions could constitute a breach of international law. This elevates climate justice from a policy aspiration to a potential basis for legal accountability and demands for "climate reparations," adding a new dimension to potential amendments or enhanced compliance mechanisms.

Climate justice is increasingly understood as deeply intertwined with broader social, economic, and human rights issues, meaning that effective climate policies must adopt an intersectional approach to avoid exacerbating existing inequalities. The "10 New Insights in Climate Science" report specifically highlights the harm to "maternal and reproductive well-being" and the disproportionate impacts on "poor and minority communities." This implies that amendments to the Paris Agreement, or its implementation guidelines, must integrate these social dimensions. Policies focused solely on emissions reductions without considering a "just transition" or equitable distribution of burdens and benefits risk public resistance and could undermine the very goals of sustainable development and poverty eradication.

E. Geopolitical Shifts and International Cooperation

Climate action is no longer solely an environmental concern; it has become a fundamental driver of geopolitical shifts, reshaping resource dependencies, trade relations, and international power dynamics.
The global shift towards decarbonization, aimed at removing carbon and other greenhouse gases from energy systems and broader economies, will profoundly affect future resource demand. This transition presents significant risks for traditional oil-exporting economies, which face the challenge of stranded assets, while simultaneously creating opportunities for mineral-exporting countries that possess resources critical for green technologies. The increased extraction of raw materials, particularly "critical raw materials" (CRM), for these new technologies introduces new supply chain risks, potential social disputes, and even the possibility of conflict. For instance, China's leading position in green technologies, fostered by state support and subsidies, has prompted other major economies like the United States and the European Union to develop their own "green industrial policies" to "home-shore" value chains and "de-risk" production. This has already led to trade tensions, including the introduction of tariffs on electric vehicles and countervailing measures.

Beyond decarbonization, the direct costs and damages of climate change—such as economic decline, rendering areas uninhabitable, and the uneven distribution of impacts—are themselves shifting geopolitics. These effects are increasingly becoming a source of both domestic and international tension and contestation. The current global landscape is further complicated by concerns about a "crisis" of multilateralism, widespread conflict, and escalating climate hazards, which collectively impede effective international cooperation. Critics argue that the UN climate process is not accelerating emissions cuts rapidly enough, adequately addressing fossil fuels, or mobilizing sufficient climate funds for developing countries, leading to calls for a "major strategic rethink and more fundamental reforms."

The transition to a low-carbon economy is transforming from a purely environmental imperative into a domain of strategic competition, where industrial policies, trade measures, and control over critical minerals become tools of geopolitical influence. The example of China's dominance in green technologies and the retaliatory "green industrial policies" by the US and EU, including tariffs, demonstrates that climate targets are becoming deeply intertwined with economic power plays and national security interests. This implies that future amendments to the Paris Agreement might need to consider mechanisms to manage these new geopolitical tensions, ensure fair competition, and prevent climate action from becoming a source of trade wars or resource conflicts.

Moreover, the uneven distribution of climate change impacts, coupled with existing geopolitical fragilities and the "crisis of multilateralism," creates a feedback loop where climate change exacerbates instability. Climate impacts are "unevenly distributed" and "will increasingly be a source of both domestic and geopolitical tension and contestation." This suggests that climate change is not merely an external threat but also an internal destabilizer for states, potentially leading to increased migration, resource scarcity conflicts, and economic decline, which then feed back into international relations. The presence of "widespread conflict" further complicates the ability of nations to cooperate effectively on climate. Therefore, any amendments to the Paris Agreement must consider how to build resilience against these compounded geopolitical risks and foster cooperation even within a fragmented international landscape.

G. Enhancing the Global Stocktake Process

The Global Stocktake (GST) is a critical component of the Paris Agreement, designed as an "ambition mechanism" to periodically assess collective progress and guide future climate action.

The purpose of the GST is for countries and stakeholders to collectively evaluate where they are making progress towards meeting the Paris Agreement's goals, identify existing gaps, and collaboratively chart a more effective course forward. The first GST concluded at the UN Climate Change Conference (COP28) in December 2023. Its outcome affirmed that while some progress has been made, leading to near-universal climate action, overall efforts are "insufficient," and the world is "not on track to limit global warming to 1.5 degrees Celsius."

The GST process involves three main components: information collection and preparation, a technical assessment (which includes technical dialogues with experts), and the consideration of outputs. The findings and guidance from the GST are intended to inform and strengthen the next round of Nationally Determined Contributions (NDCs), which are due in 2025. The outcome of the first GST specifically outlined key actions and commitments necessary to return to a 1.5˚C pathway, including tripling renewable energy capacity and doubling energy efficiency by 2030, and transitioning away from fossil fuels. However, the ultimate effectiveness of the GST hinges not on the assessment itself, but on the "global response" by countries in the form of "higher ambition and accelerated action."

The stark conclusion of the first GST that the world is "not on track" places immense pressure on the Paris Agreement's "ambition mechanism" to deliver a substantial increase in NDCs by 2025. This will be a crucial test of whether the framework can truly self-correct. The GST was designed as the central feedback loop to inform future NDCs. Its finding that current efforts are "insufficient" is not merely a data point, but a direct challenge to the Agreement's efficacy. If the upcoming NDCs do not reflect a dramatic increase in ambition, as called for by the Emissions Gap Report, it would suggest a fundamental flaw in the "ratchet mechanism" itself, potentially necessitating amendments to strengthen accountability or the prescriptive nature of the GST's outputs.

Furthermore, the GST's role in synthesizing the "best available scientific information" and translating it into policy recommendations highlights the persistent challenge of bridging the gap between scientific understanding and political will and action. The technical assessment component of the GST is meant to be informed by the latest science, including IPCC reports. However, the continued "insufficient" progress despite this scientific input indicates that knowledge alone is not enough to drive action. This implies that future enhancements to the GST process, or related amendments to the Paris Agreement, might need to focus on strengthening the mandate for Parties to directly incorporate GST findings into their national policies. This could involve more prescriptive reporting requirements or stronger peer review mechanisms to ensure that the scientific "wake-up call" translates into concrete policy shifts.

H. Article 6 Reform Proposals

Article 6 of the Paris Agreement provides critical mechanisms for international cooperation and carbon markets, which are essential for achieving higher ambition and cost-effective emissions reductions. However, its operationalization has faced significant challenges.
The primary purpose of Article 6 is to allow Parties to voluntarily cooperate in implementing their NDCs and pursuing higher ambition targets through both market-based and non-market-based approaches.
Key mechanisms include:

- Article 6.2 (Cooperative Approaches/Internationally Transferred Mitigation Outcomes - ITMOs): This provision allows for the transfer of "mitigation outcomes" (emission reduction credits) between countries. To prevent double counting of emissions reductions, the host country must apply "corresponding adjustments" to its greenhouse gas inventories.
- Article 6.4 (Sustainable Development Mechanism - SDM): This establishes a centralized mechanism for generating "Article 6.4 Emission Reductions" (A6.4ERs), which serve as offset credits. A notable feature of the SDM is the requirement that a share of the proceeds be used to fund adaptation projects in vulnerable countries.
- Article 6.8: This defines a framework for non-market approaches to sustainable development.

Despite the potential for Article 6 to unlock significant ambition, its implementation faces several challenges. A major bottleneck is the slow approval of methodologies: currently, only adaptations from the Clean Development Mechanism (CDM) methods have been accepted under Article 6.4, meaning new projects cannot be registered until new methodologies are approved. This delay prevents the mechanism from fully mobilizing its potential. Furthermore, there is a recognized need to ensure adequate safeguards and human rights protection within both the ITMO and SDM frameworks, drawing lessons from existing safeguard policies to prevent negative social or environmental impacts. Robust accounting and transparency are crucial to ensure environmental integrity and prevent issues like "greenwashing."

Despite these hurdles, interest in Article 6 mechanisms is growing. As of November 2024, there have been 51 cooperative approaches (including bilateral agreements and memoranda of understanding) and 29 letters of authorization, with countries like Norway, Singapore, and Switzerland actively preparing to engage and purchase ITMOs. Norway, for example, is set to invest over USD 740 million in purchasing ITMOs from Zambia, Benin, Senegal, and Jordan.

The slow approval of methodologies and the necessary focus on robust safeguards represent significant bottlenecks, preventing Article 6 from fully unlocking its potential to drive higher ambition and finance. While Article 6 is designed to "allow for higher ambition" by facilitating cost-effective mitigation, the fact that "new projects cannot be registered until methodologies have been approved" points to a critical operational delay. The emphasis on "safeguards" and "environmental integrity, transparency and robust accounting" indicates a recognition of past failures in carbon markets, where projects might have lacked real climate benefits or had negative social impacts. This suggests that while the framework exists, its effective implementation requires overcoming these technical and governance hurdles, potentially through accelerated processes or more prescriptive guidance within the Paris Agreement.

The ongoing debate and challenges in operationalizing Article 6 also reflect a fundamental tension between maximizing economic efficiency in emissions reductions and ensuring environmental integrity, human rights protection, and equitable distribution of benefits, especially for adaptation finance. For example, Article 6.2 (ITMOs) does not mandate a share of proceeds for adaptation, unlike Article 6.4 (SDM). This highlights a potential equity gap where bilateral deals might prioritize cost-effectiveness for buyer countries over broader climate justice objectives. The need for "safeguards" and "robust accounting" underscores concerns about "greenwashing" or negative local impacts. Therefore, any amendments or enhanced decisions related to Article 6 within the Paris Agreement would need to carefully navigate this balance, potentially by making adaptation contributions mandatory for all Article 6 mechanisms or strengthening human rights due diligence to ensure that the pursuit of efficiency does not undermine the Agreement's broader goals of sustainable development and equity.

Conclusion

The assessment of the need for amendments to the Paris Climate Accord in light of ongoing global and technological advancements reveals a compelling case for its continuous evolution. The scientific evidence is unequivocal: global warming is accelerating, greenhouse gas concentrations are at unprecedented levels, and current climate action, as reflected in Nationally Determined Contributions (NDCs), is insufficient to meet the critical 1.5˚C temperature goal. The likely exceedance of 1.5˚C in 2024 serves as a stark reminder that the world is rapidly approaching or surpassing key thresholds, underscoring the precariousness of the Agreement's long-term objective. New scientific insights further reveal compounding risks and systemic vulnerabilities, such as surging methane levels, ocean instability, and critical infrastructure exposure, which demand a more comprehensive policy response than currently in place.

While technological advancements in renewable energy and carbon capture offer increasingly feasible pathways for deep decarbonization, a significant gap persists between technological potential and actual deployment. This indicates that the primary barriers are now policy, finance, and political will, rather than technical feasibility. Furthermore, the scaling of these new energy solutions introduces new geopolitical dependencies and climate justice concerns related to critical minerals, suggesting a need for the Agreement to explicitly address responsible sourcing and equitable transitions.

The Paris Agreement's inherent flexibility, which facilitated its near-universal adoption, paradoxically contributes to its current limitations. The self-determined nature of NDCs, coupled with weak formal accountability mechanisms, creates an ambition and implementation deficit. This places a greater burden on informal accountability mechanisms and highlights the crucial, though often informal, role of non-party stakeholders in driving climate action.

Evolving climate justice and equity considerations are transforming from guiding principles into concrete legal and moral imperatives. The operationalization of the Loss and Damage fund and the International Court of Justice's advisory opinion underscore the need for greater accountability for historical emissions and support for vulnerable populations. The intersectional nature of climate justice, linking it to human rights, health, and socio-economic disparities, demands that future climate policies adopt a holistic approach to avoid exacerbating existing inequalities.

Geopolitical shifts are increasingly intertwined with climate action, transforming the transition to a low-carbon economy into a domain of strategic competition over resources and technologies. The uneven distribution of climate impacts, compounded by existing geopolitical fragilities, further amplifies instability and complicates international cooperation.

The current climate finance architecture is structurally inadequate and inequitable, failing to meet the substantial needs of developing countries and hindering global climate action. The persistent shortfall in the US$100 billion commitment and the reliance on loans rather than grants indicate that fundamental reforms are needed not just in the quantity but also in the modalities of finance. Achieving the Paris Agreement's goals necessitates a broader transformation of global financial flows, extending beyond climate-specific funds into wider financial regulation and investment policy.

Finally, while the Global Stocktake serves as the Agreement's built-in ambition mechanism, its first conclusion that the world is "not on track" places immense pressure on the framework to self-correct through significantly enhanced NDCs in 2025. This highlights the persistent challenge of translating scientific understanding into political will and concrete action, suggesting a need to strengthen the mandate for Parties to incorporate GST findings directly into national policies. Similarly, the operationalization of Article 6, while promising for cost-effective emissions reductions, faces bottlenecks in methodology approval and the need for robust safeguards to ensure environmental integrity and human rights protection. This reveals a fundamental tension between economic efficiency and equitable outcomes, which must be carefully balanced in any future enhancements.

In conclusion, the evidence strongly suggests that while the Paris Agreement provides a robust framework, its effectiveness is being challenged by accelerating climate impacts, a persistent ambition-implementation gap, evolving geopolitical realities, and an insufficient financial architecture. The committee's deliberations on potential amendments should therefore explore mechanisms to strengthen accountability, enhance the ambition and enforceability of NDCs, reform climate finance to meet developing countries' needs, integrate climate justice more deeply into policy, and adapt to the new geopolitical landscape shaped by decarbonization and climate impacts. The goal is to ensure the Accord remains a dynamic and effective instrument capable of steering the world towards a sustainable, 1.5°C-aligned future.