*Delegates,*

Welcome to Kennesaw State’s High School United Nations (HSMUN) 2025 and the Group of 20. My name is John Ross Carman, and I will be your director for this year’s conference. Recently, I came back from a five-months study abroad at Al-Akhawayn University in Ifrane, Morocco, where I learned a great deal about trans-cultural competency and politics in the Global South. Currently, I am in my junior year of college, majoring in International Affairs with a concentration on Latin America and the Global South. Additionally, I am participating in the Peace Corp Prep Program, as I plan to join the corps after completing my undergrad, before returning to the States to get my MBS in the Study of Foreign Affairs. Currently, this is my 7th year of doing Model United Nations, and I am irrevocably excited to be your director for the 2025 Conference; it is my esteemed hope that all delegates will engage in meaningful, cooperative discussion on the complex topics presented by the committee.

The Assistant Director is Ian Taylor, he is in his senior year of college, majoring in Software Engineering with a minor in Political Science and Computer Science. This is his first HSMUN conference, but he participated in MUN throughout both high school and college. He is ecstatic to be serving as Chair for this committee during this 2025 conference. The Chair for our committee is Jace Freeman. Jace is in his freshman year of college, majoring in Political Science with a concentration in Corporate Law. This is his first time participating in Model United Nations, and he is elated to be serving as the Assistant Director for this 2025 conference.

**The topics under discussion for the Group of 20 are:**

1. **Restructuring the International Aid and Loan System to Reflect a Changing International Order**
2. **Strengthening Institutions and Governance to Address the Impacts of Climate Change and Energy Transportation Inefficiencies**

Each Member State delegation within this committee is expected to submit a position paper which covers both of the agenda topics. A position paper is a short essay describing your Member State’s history and position on the issues at hand. There are three key parts to any successful position paper: history, current status of the issue, and possible solutions for the future. Information for properly formatting the position papers, as well as valuable advice for writing a quality paper, can be found in the Delegate Preparation section of the HSMUN webpage (https://conference.kennesaw.edu/hsmun/). Delegates are reminded that papers should be no longer than two pages in length with titles in size 12 and text in size 10-12 Times New Roman. Citations should be footnoted in Chicago style formatting, such as those used inside this guide. Furthermore, plagiarism in an academic setting is unacceptable and will nullify any score for the paper in question. During the grading process, we will be utilizing the university’s plagiarism checker. Wikipedia is a wonderful place to begin researching, but we highly encourage the use of peer-reviewed academic articles or trusted media sources. The objective of a position paper is to present the diplomatic position of your Member State on both agenda topics as accurately as possible. ***All position papers MUST be sent to ksuhsmun2025@gmail.com by February 21st, 2025. Late papers will be accepted until February 26th, 2025 with points penalized.***

**History of Group of 20**

***Introduction***

The Group of 20 (G20) is a grouping of the world’s 21 largest economies, consisting of Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Mexico, Russia, Saudi Arabia, South Africa, South Korea, Turkiye, the United Kingdom (UK), and the United States (US), alongside the European Union and African Union.[[1]](#footnote-1) Traditionally, the block has existed to confront global macroeconomic problems, a mission stemming from both the nature of the G20’s makeup, and from the organization’s inciting event: the 1999 Asian Financial Crisis.[[2]](#footnote-2) It exists as the most recent iteration in a long line of similar organizations.

***Predecessor of the G20***

Prior to the creation of the G20 in 1999, many similar such organizations existed and saw use in the latter half of the 20th century. Firstly, there was the Group of Ten (G10), a group of leading industrial Member States that met from 1963 to 1974, primarily dedicated to resolving crises related to the Bretton Woods System, a collection of economic institutions established in the aftermath of World War II.[[3]](#footnote-3) Following the G10 came the Group of Seven (G7), a more selective group of the leading economies of the world, consisting of Canada, France, Italy, Japan, the United Kingdom, the US and West Germany. Although the organization initially had a very narrow focus, in time, the focus would broaden to confront any relevant global crises persisting at a given time. Evidence of the G7’s prevalence can be found with the passing of the Financial Action Task Force on Money Laundering (FATF) and the Financial Stability Forum in (FSF) in 1989 and 1999 respectively.[[4]](#footnote-4) However, even prior to the creation of these initiatives, the growing scope of the body could be seen with the 1980 Venice Summit which discussed the Soviet Invasion of Afghanistan. That in mind, G7 policymakers determined that the body should return to a macroeconomic focus and that the institution should become more formalized; they sought the establishment of a permanent Secretariat and expansions of the members list. Representative of this was the 1998 expansion to include Russia, although this would ultimately only be for a limited time in the short-lived Group of Eight (G8). As the world entered the new millennium, Canada led discussions on expanding consensus-building to a much greater scope, as to reflect the changing global order; this proposal, called at the time, the L-20, would go on to become the G20 it is known today.

***Infancy of the Organization***

The formation of the G20 was announced and established formally during the G7 Finance Ministers’ meeting on September 25th,1999.[[5]](#footnote-5) Considering the 1997 Asian financial crisis, the primary intention of this international forum is to “broaden the dialogue on key economic and financial policy issues among systemically significant economies and promote co-operations to achieve stable and sustainable world economic growth that benefits all.”[[6]](#footnote-6) By including the 20 most advanced economies to discover viable economic solutions, the G20 forum sought to address challenges experienced in emerging economies and to provide guidance through example and consensus. For example, an early influential achievement includes codifying and endorsing internationally accepted standards established to improve the transparency and strength of financial and economic systems.[[7]](#footnote-7) Soon after its inception, the G20 began discussion of other topics such as renewable energy, sustainable development, economic inequality, and others. As the global market consistently expands, the integrative trade and economic solutions introduced by the G20 remain paramount in ensuring peaceful negotiation. Through frameworks including debt relief treatments and other international commitments, the bloc has offered viable economic and financial solutions to distressed economies around the world.[[8]](#footnote-8) Notwithstanding the age of the council, the G20 stands as a prime example of an effective international organization predicated on commitment to effective economic and financial reform.

***Post-2008: The G20 Reborn***

Following the 2008 revamp to the organization, the G20 became more effective and empowered when it came to addressing a myriad of global issues. First and foremost, the G20 reiterated its longstanding commitment to free trade and policy against protectionism, alongside reforms to global financial institutions[[9]](#footnote-9). Post-2008, the G20 began a significant push away from the general economic focus that had defined the organization during much of its infancy. To illustrate this, the G20 met in 2009 to discuss a secret Iranian nuclear plant, an issue indisputably different than the traditional macro-economic matters that the organization would discuss[[10]](#footnote-10). Additionally, as the years progressed, the G20 began to increasingly lean into discussions surrounding climate change. Indicative of this was the 2016 Summit held in China, which saw the joint announcement of both Washington and Beijing’s intent to participate in the Paris Climate Accords[[11]](#footnote-11). Similar climate-oriented agreements were reached in 2021, 2022 and 2023 at the Rome, Bali and New Delhi Summits respectively[[12]](#footnote-12). Some scholars, such as Risto Penttila, argue that the rise of the G20 as a form of global governance can be viewed as *multilateralism light*[[13]](#footnote-13), whereby formal multilateral institutions such as the United Nations (UN) must operate in tandem with comparatively informal multilateral institutions, such as the G20.

***The Modern Setting***

The G20 cemented its effectiveness as an international organization with its tactful response to the 2008 financial crisis, involving roughly $4 trillion USD contributed to combat the crisis[[14]](#footnote-14). However in years since, trust in the effectiveness of the G20 has begun to falter, as the organization has failed to achieve goals relating to policy coordination, economic growth and institutional corruption; cooperation is faltering, as the administrations of G20 nations have begun to pursue isolationist, unilateral actions as opposed to global collaboration. Moreover, new challenges face the world, with the War in Ukraine resulting in significant food and energy crises across the world, and the fallout of the COVID-19 pandemic sowing the seeds for a global debt crisis[[15]](#footnote-15). Nonetheless, the organization remains relevant as a conversational device between its Member States, with the most prominent, economically powerful members of both the Global North and the Global South coming together to pursue collaboration with an equal voice.

1. **Restructuring the International Aid and Loan System to Reflect a Changing International Order**

***Introduction***

Today, international aid is distributed through two primary means: bilaterally and multilaterally. Bilateral aid consists of the aid one Member States donates directly to another, often via agreements reached between two governments. On the other hand, multilateral aid consists of the aid that is collected from many sources and distributed by non-governmental actors, such as charities and international organizations. Most pertinently, this aid is often distributed via the numerous Bretton Woods Institutions that exist today, such as the International Monetary Fund (IMF) and the World Bank, the latter consisting of, among other entities, the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA). These organizations are complex institutions, with significant intricacies and goals that differentiate them from one another, however one common factor shared by all of them is that they are not UN bodies; the whole of the Bretton Woods System exist outside of the UN, meaning that institutions such as the G20 possess much greater capabilities to influence these organizations, without the many bureaucratic and procedural barriers that exist to insulate the various UN bodies from external influence and adjustment.

The guiding philosophy of the current world order is rooted in neoliberalism, an ideology which argued heavily in favor of free trade and anti-regulations, praising the elimination of tariffs, creation of floating exchange rates and the encouragement of globalization.[[16]](#footnote-16) The current international aid and loan system, alongside the whole of the international economic order has received increasing criticism from many voices, primarily in the Global South about the ineffectiveness of these institutions. Notably, much of the opposition to these institutions is aimed at their neoliberal element, a component which has been worsened by the various global economic crises either attributed to, or worsened by the implementation of neoliberal policies. Increasingly, organizations such as the Brazil, Russia, India, China and South Africa (BRICS) economic pact have voiced considerable desire to create a global alternative to the existing system, and have already created institutions to this end, such as with the New Development Bank (NDB). Worth remembering, this opposition to neoliberalism, and indeed liberalism as a whole, is not new, with efforts to resist it dating back as far as the Cold War. Traditionally, opposition has come primarily from the Global South, although these efforts gained little traction until the turn of the 21st century.

***History of the International Aid System***

Prior to the conclusion of World War II in July, 1944, heads of state and financial ministers from across the globe met together in Bretton Woods, New Hampshire to establish the foundations for what would become the new international economic order from the post-war period and into the future; this included the creation of the Bretton Woods institutions, including the IMF and World Bank.[[17]](#footnote-17) Initially, these organizations operated off of the ideal of Keynesian Economics, whereby liberal ideals of free-trade and entrepreneurship were encouraged, however the importance of governmental regulation was recognized.[[18]](#footnote-18) This structure began to change towards the end of the 20th century, with the development of the Washington Consensus. The application of the Washington Consensus was emblematic of the rise of neoliberalism. Unsurprisingly, the impacts of this shift in ethos have been vast, with tangible economic benefits being observed for some actors, alongside real economic failures and shortcomings for others.

As for the structure of the international aid and loan system, one must understand the specific entities at play, that being the IMF and World Bank. Firstly, the IMF is to be understood as more than just a development aid; as the primary aid of the institution is not aiding the growth of developing Member States, but rather addressing balance-of-payments crises, whereby a given Member State is losing more money than it is generating.[[19]](#footnote-19) The IMF seeks to combat these crises via the disbursement of conditional loans. Conditionality is the concept of attaching a significant degree of conditions relating allocation, expenditures, structural adjustments and repayment to the loans provided by the IMF.[[20]](#footnote-20) Generally, conditionality can be found with nearly every type of loan that exists in the world today, be it IMF packages, governmental grants, or private loans for individuals or corporations. The problem with conditionality often comes with the specific conditions attached. IMF loans have been known to include a large number of conditions that often encourage the implementation of structural adjustment programs, which would see Member States make large changes to their general economic policy as well as more specific fiscal and monetary policy. Historically, these conditions have called for the adoption of painful austerity measures as well as the embracement of neoliberal policy changes, both of which have the near-inevitable result of creating short-term discomfort for the receiving Member State.[[21]](#footnote-21)

Conversely, there is the World Bank, which is actually made of several different organizations, including the IBRD and IDA. Unlike the IMF, the World Bank is explicitly dedicated to helping developing Member States achieve growth, recover from crises, and improve overall living conditions. That in mind, it does this via a very similar methodology as the IMF, that being the disbursement of loans to developing Member States with conditions attached.[[22]](#footnote-22) Of course, the specifics of these loans are very different from those disbursed by the IMF. On one hand, there is the IBRD, which provides low-interest loans to poor Member States that must be repaid in, on average, 12-15 years. On the other hand, there is the IDA, which provides no to very-low interest loans to the poorest of Member States that must be repaid in, on average, 35-40 years.[[23]](#footnote-23) Above all else, the most common criticism levied against the IMF and World Bank is their inherently undemocratic structures. In contrast to the UN General Assembly, where every one Member State has one vote, Member States in the IMF and World Bank have weighted votes, whereby the power of their votes is determined by the amount of money their Member States have given to the organization. Consequently, this has meant that the US has effective veto over all policy decisions of both the IMF and IBRD, as both organizations require an 85 percent vote to pass any amendments, policy decisions, etc, and the US has over 15.1 percent weighted vote in each organization.[[24]](#footnote-24) Importantly, that is not to say that IDA is free of this, as even without Washington possessing an effective veto. The IDA, alongside the rest of the Bretton Woods Institutions, suffer from overall dominance by the Global North. As of December 2015, China’s vote weight increased from 3.8 percent to roughly 6 percent granting them greater power in the assembly, but still not as much as the US and its allies.[[25]](#footnote-25)

***Opposition from the Outside***

Ever since the creation of the international aid and loan system in 1944, centered in the liberal ideals of the ‘First World’, there has been significant opposition to the various institutions that make up the system. During the Cold War, this came most directly from the communist ‘Second World’, as the ideological differences between economic liberalism and communism put the First and Second World into direct, fundamental opposition.

***Global Debt Crises***

Following the abolition of the gold standard by US President Nixon and the Oil Shocks of the 1970s, the world was rocked by the First Global Debt Crisis.[[26]](#footnote-26) As the price of oil spiked, oil-importing Member States developed large capital account deficits, leading these Member States to seek loans to balance their payments; these loans often were provided from organizations such as the IMF. In the following years, when the price of oil spiked again, commercial banks raised interest rates tremendously, resulting in the Member States that had recently taken out loans in response to the prior oil shock now possessing unsustainable loans. Moreover, the problem was exasperated by the fact that many of these Member States possessed unadaptable financial policies and had little access to the financial market. The consequences of the initial debt crisis would never truly be resolved, with subsequent crises resulting in these Member States getting further indebted, thus making their ability to pay it off all the more unlikely. However, it wasn’t until the 2010s that the modern global debt dilemma emerged via the fourth debt disaster, brought on by the 2008 Global Financial Crisis; this event in particular is relevant to the G20, as it was the impetus for the revitalization of the body that occurred in 2008-2009. Furthermore, it was this crisis that truly aggravated much of the Global South to the perceived failure of neoliberal policies.[[27]](#footnote-27) Throughout this time, the UN has been somewhat of a backseat in combating these issues, as many creditors and leading economies have signified a preference to resolve these matters via global financial institutions, such as the World Trade Organization. Nonetheless, in 2015, the UN General Assembly produced the Basic Principles on Sovereign Debt Restructuring Process, A/69/319, which established nine basic tenets on how the international aid and loan system should go about restructuring sovereign debt.[[28]](#footnote-28) These principles, among other things, emphasized the importance of equitable restructuring, whilst encouraging capacity-building measures that would see indebted Member States create the economic resources necessary to pay back their bilateral and multilateral loans. However, in a move that was less appealing to many developing Member States, A/69/319 also implores that such restructuring be conducted in accordance with neoliberal, or at least liberal economic principles, such as privatization and the removal of trade barriers. Naturally, this provision has put the resolution under increasing scrutiny by many Member States.

***Current Situation***

Presently, the vast majority of international policymakers have been questioning the efficacy of neoliberal policies.[[29]](#footnote-29) That being said, restructuring the international economic order would not be easy. Many solutions have been put forward, but ultimately any real adjustment must take into account the many specific criticisms levied at the existing system, as well as the motivations behind those wishing for more seismic changes to the international aid and loan system. One of the largest criticisms levied against the current international aid and loan system is the high prevalence of debt recidivism; currently, Member States that take out loans from the IMF or World Bank or highly likely to end up unable to pay off said loans, thus necessitating the acquisition of more loans, leading to a crushing debt-cycle. Additionally, many Member States have criticized the perceived apathy of organizations like the IMF. These organizations have long-cited the idea that their policy adjustments are like “...walking through the desert”, meaning that developing Member States will have to suffer temporary growing pains before the benefits of the structural adjustment programs can be felt.[[30]](#footnote-30) Inevitably, the populations of developing Member States were already upset at the idea of temporary suffering, however the reality this supposedly temporary suffering has had much more persistence than expected has served to only enrage these Member States against these policies.

Moreover, the increasing prevalence of conditionality in loans has frustrated developing Member States, and further pushed these Member States to believe that the current system is designed to exploit their resources and trap them in debt-cycles. This can be observed empirically, with the average number of conditionalities per IMF loan increasing from 19.5 over 2011-2013 to 26.8 over 2016-2017.[[31]](#footnote-31) Many Member States, already aggravated by the ineffectiveness of the loan adjustment programs, have been significantly irritated by their lack of agency over the establishment of these conditionalities and control over the policy decisions of these organizations as whole. Naturally, this harkens back to the weighted voting systems of these bodies, which deprive developing Member States, or even Member States outside. Many Member States have continued to call for a change to this system, however, there has been generally very low mobility on this front.[[32]](#footnote-32) Accordingly, it is evident that something has to change, although the degree of that change and ways in which it should manifest will certainly ignite great debate amongst the various policy-makers and stakeholders across the globe.

Furthermore, it is worth considering that global financial institutions have expressed willingness to embrace changes put forth by global leaders. Amidst the COVID-19 pandemic, the IMF’s Member States agreed to allocate massive funds towards both the Catastrophe Containment and Relief and Poverty Reduction and Growth Trusts, signifying a significant resolve to approach looming fiscal crises outside of traditional methodology.[[33]](#footnote-33) Furthermore, IMF Managing Director Kristalina Georgieva has repeatedly signified recognition of the IMF’s failure to combat poverty and the global debt crises via the use of structural adjustment programs based in neoliberalism, highlighting a desire to return to Keynesian economic principles.[[34]](#footnote-34)

Finally, perhaps the most significant development on the global stage has been the increased strength of the Brazil, Russia, India, China and South Africa (BRICS) economic pact. Undeniably, the rise of BRICS has seen the creation of a vast litany of discussion topics as it relates to the international economic order, however the most pertinent of these would have to be BRICS’s proposed New Development Bank (NDB). Established in 2015, the NDB has aimed to provide developing Member States with very low interest loans aimed at construction and infrastructure projects in developing Member States.[[35]](#footnote-35) In addition to this, China specifically has led the creation of the Asian Infrastructure Investment Bank (AIIB) and the Asian Development Bank (ADB), seeking to fund giga-projects in Asian Member States. Above all else, these organizations are united by two guiding principles: a) Opposition to liberalism as the de jure international economic approach, and b) opposition to the existing international economic order.[[36]](#footnote-36) Naturally, these factors have made many of those in the traditional centers of policy-making and discussion rather uncomfortable, although, at the same time many have expressed a willingness to cooperate with the changing economic order. Emblematic of this is the participation of Australia, Germany, Italy, the Republic of Korea and the United Kingdom in the AIIB.[[37]](#footnote-37)

***Actions Taken by the G20***

Perhaps the most significant measure that the G20 has taken to combat the global debt crisis, was in May, 2020, with the creation of the Debt Service Suspension Initiative (DSSI) and the following Common Framework for Debt Relief (CF).[[38]](#footnote-38) Both initiatives spawned as responses to the COVID-19 pandemic and the subsequent debt crisis; however the success of these measures has been somewhat up to debate. The DSSI was appreciated a great deal by developing Member States, who saw their loan repayments temporarily frozen as lenders recognized the pandemic would likely hamper the abilities to make repayments. However, the DSSI expired at the end of the 2022, leaving the CF to do a majority of the legwork in addressing the global debt crisis; by and large, the CF has failed to do so.[[39]](#footnote-39) Overall, the CF hosts a complex legal and ethical framework of ideals, but the core tenants relate to critical cooperation efforts, between traditional Member State lenders, private creditors, the IMF and non-traditional creditors, such as China, India and Saudi Arabia. Although the CF’s determined inclusion of private creditors represents a positive change for effective debt restructuring, fundamentally the CF has still suffered from a great many different ills. First and foremost, it has been slowed by bureaucracy: both its own bureaucracy as well as the bureaucracies of Member States that would need to carry out implementation of the CF.[[40]](#footnote-40) Moreover, it has struggled to convince the powerful, entrenched oligarchs of many developing Member States to cooperate in the proceedings of the CF; this has had the result of only four Member States ever attempting to utilize the CF, those being Chad, Ethiopia, Zambia and Ghana.[[41]](#footnote-41) To address these concerns, the G20 would go on to create the Global Sovereign Debt Roundtable (GSDR) in 2023 to restructure the framework, featuring representatives from all G20 Member States, as well as the IMF and World Bank.[[42]](#footnote-42) Undoubtedly, the GDSR does represent a significant commitment to greater inclusivity in discussions and an essential avenue for restructuring the CF; that in mind, the GDSR has not as of yet produced any tangible changes to the CF.

***Conclusion***

The current international aid and loan system, established in 1944 with the Bretton Woods System, is under fire from the Global South. Generally, the benefits promised by steep structural adjustment policies have not only failed to materialize, but have been perceived by many as nearly malicious lies from those in power. In parallel to this, the rising power of the Global South, seen primarily via the emerging economies of Member States such as China, India and Brazil, have strengthened calls for a fundamentally more equitable system. In the more tame realm of debate, Member States have proposed adjusting the weighted voting systems of Bretton Woods institutions. Conversely, in the comparatively revolutionary realm, Member States have proposed new alternative organizations, to either exist alongside the Bretton Woods institutions or even potentially supplant them. Regardless, it is clear something needs to change, as debt recidivism continues to persist and economic growth in developing Member States continues to, at best, stagnate and at worst, decrease.

***Committee Directive***

Member States in the G20 must consider all the implications of a restructured economic order, as it relates to the ability of their own Member States to achieve their desired policy outcomes and as it relates to the strengthening of global governance. Fundamentally, any changes to the existing system will likely see developed Member States surrendering a not-insignificant amount of power and influence on the global stage. However, failure to adapt to the new global paradigm will result in the disaffection of developing Member States, inevitably undermining the tenets of global governance and pushing the Global North and Global South further towards confrontation. Member States in the Global North must weigh their options and see what benefits they are willing to surrender for greater functionality in the global system. Conversely, Member States in the Global South must be able to present a cohesive, yet measured plan for restructuring the international system, lest the Global North turn any proposed changes down on principle.

1. **Strengthening Institutions and Governance to Address the Impacts of Climate Change and Energy Transportation Inefficiencies**

***Introduction***

The mitigation of climate change and its affiliate impacts have been pressing concerns of numerous Member States since the early 1990s. Caused primarily by fossil fuel emissions, global climate change has produced a plethora of problems, from worsened air quality to the mass extinctions of entire species.[[43]](#footnote-43) For this, individual Member States and the UN have devoted incredible efforts aligned within the Sustainable Development Goals, such as developing and implementing effective technologies and policies which aim to achieve goals such as carbon neutrality by 2050.[[44]](#footnote-44) The improvement of energy transmissions and related technologies, though, have remained a largely under-discussed and overlooked solution to a multitude of climate-related issues. A substantial amount of electricity is lost each year due to inefficient systems and technological aging, creating environmental and humanitarian obstacles. Therefore, the augmentation of electrical systems, climate-related policies, and the expansion of renewable energy sources shall significantly enhance efforts to achieve the ambitious climate goals set forth by multilateral institutions.

***History of International Climate Research and Diplomacy***

For centuries, international contributions to climate research have unearthed substantial risks to global health and security. Since the discovery of carbon dioxide in 1640 by Johann Baptista van Helmolt, researchers and scientists have developed insightful evidence that has culminated in the observation of immediate global impacts chiefly derived from excess greenhouse emissions.[[45]](#footnote-45) To effectively combat these issues, multiple international organizations like the Intergovernmental Panel on Climate Change (IPCC) have been established to collect ecological and geographical data, formulate meaningful reports, and develop policies that mitigate the deleterious effects of climate-related changes. With the topics of climate change and global warming only receiving international attention since the 1970s, both introduce relatively new areas of science that require profusions of research and support. Through solutions such as developments in energy efficiency and reductions in carbon dioxide emissions, members of the international community possess a critical potential to shift the dynamic of climate change and its havoc upon the planet.

During the mid-twentieth century, air pollution arose as a sizable environmental concern for a significant range of countries. The accumulation of various greenhouse gasses in the atmosphere, like carbon dioxide and methane, causes negative environmental and human health effects. The Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) in 1988, tasked with preparing a comprehensive review and recommendations about climate change and its implications.[[46]](#footnote-46) From 1990 to current time, the IPCC has released six total assessment reports that provide extensive climate related research and recommendations that have influenced global decision making by the UN and individual countries.[[47]](#footnote-47) Notable results of these reports include but are not limited to the creation of the United Nations Framework Committee on Climate Change (UNFCCC), the Kyoto Protocol, the scientific input for the Paris Agreement, and carbon neutral goals. The Kyoto Protocol, launched by the UNFCCC in December of 1997, substantially influenced the Paris Agreement and legally bound participating developed countries to emission reduction targets and established emissions trading. The Paris Agreement, adopted by 196 participating countries at the UN Climate Change Conference of 2021, aims to prevent global temperatures from rising above 2 Celsius, but preferably below 1.5 Celsius. For this, participating countries are required to submit their nationally determined contributions (NDCs), with each successive NDC reflecting increasingly ambitious goals to achieve long-term strategies.[[48]](#footnote-48) With this, the IPCC and the UNFCCC strongly serve as a provider for climate change research and development for the international community.

Other notable conferences include the Earth Summit of 1992 and the Conference of the Parties 21 and 26, taking place in Rio de Janeiro, Paris, and Glasgow, respectively. These conferences concentrated on the mitigation of climate change and the advancement of climate technologies and policies. During the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro, world leaders addressed the impacts of human socio-economic activities upon the environment. They found that these elements were interdependent, and that the adoption of an efficacious but broad agenda was necessary to function as a guide for international action. Conclusively, this summit united countries against climate change, and helped produce many useful declarations and recommendations into the twenty-first century.[[49]](#footnote-49) In the COP21, participating countries collectively affirmed that significant climate action was required to maintain manageable global temperatures and other climate effects. The Paris Agreement established and instituted a series of guidelines and suggestions, where developed countries were encouraged to aid those less endowed and for all involved five year report progress in climate change mitigation. Recently, during the COP26 of 2021, world leaders enhanced the initial progress of the COP21 and produced multiple resolutions along with reinforcing the previous sentiments of the Paris Agreement. Constructed during this conference, the Glasgow Pact contains interest, conditions, and international contradictions of climate change, and calls for doubling finances allocated for developing countries for climate-resilient infrastructure. Moreover, countries acceded to strengthen the Santiago Network, which established connections between vulnerable countries and technical assistance, knowledge and resources for climate risks.[[50]](#footnote-50)

***The Causes and Effects of Climate Change***

Amidst the Industrial Revolution in the late eighteenth century, massive economic gains and technological advances greatly improved standards of living and set forth a series of meaningful reforms that would appreciably alter the international landscape. In 1856 Eunice Foote, a climatologist, identified specific gasses like carbon dioxide have tendencies to trap heat, this monumental period in history concurrently began the troubling complication of the modern day.To illustrate the immediacy of these effects, experts also indicate that the warmest years on global record have occurred within the last 10 years.[[51]](#footnote-51) International and sovereign entities possess a multitude of technologies, policies,as well as other implementations that contain vast potential in combating the causes and effects of climate change and global warming.

Electricity generation, deforestation, manufacturing, transportation, etc are primary causes of anthropogenic climate change.[[52]](#footnote-52) Generating electricity requires the incineration of coal, gas, or other fuels that produce waste emissions, like carbon dioxide and nitrous oxide, which trap heat within the atmosphere. Manufacturing of any kind requires substantial amounts of energy as well, which simultaneously produces harmful emissions and creates products that are mostly nonrenewable. Deforestation limits the proportion of carbon dioxide absorption and, as the trees are cut, release carbon dioxide into the atmosphere themselves. As one can imagine, transportation, food production, and general consumption share these trends and altogether result in exceedingly high emissions along with scores of deleterious environmental and human health effects.[[53]](#footnote-53)

Rare earth metals such as copper, lithium, nickel and cobalt are essential components in many technologies, including those that generate electricity, and require a substantial amount of energy for excavation, procurement, and manufacturing. Increases in demand for these metals and technologies may perpetuate commodity dependence, worsen geopolitical tensions, cause environmental and social challenges, and undermine efforts towards expanding renewable energy infrastructure.[[54]](#footnote-54) On their own, energy transmission and distribution systems are severely under-equipped to sustain future global demands. Thermodynamics alone limits energy production to two-thirds of its initial value due to inefficiencies in transportation through power lines and excess heat emissions. As a result, quadrillions of British thermal units (BTus) are lost yearly from such systems.[[55]](#footnote-55) Because of this, topics such as sustainable energy generation and transmission efficiency remain immediate quandaries that, if adequately addressed, may yield tremendous progress for international climate goals.

Anthropogenic causes of climate change reign a plethora of catastrophic effects upon both the environment and the human species itself. Global temperatures increase proportionately with greenhouse gas concentrations, and induce a range of results from severe weather events to heat-induced illnesses. Effects on weather include severe storms, wildfires, floods, and other extremes that may result in the destruction of environments, casualties, and massive economic losses. Lengthened and intensified droughts, especially in water-stressed regions, impact agricultural practices, desertification, and water shortages. Warming oceans can pose risks to marine life, and melting ice sheets can cause sea levels to rise, which threatens coastal and island communities. Additionally, the ocean absorbs an exorbitant amount of carbon dioxide, and an increase of this gas can add unwanted acidity. Including life outside of the ocean, climate change directly impacts the populations of species, as about one million different species are at risk of becoming extinct within the next few decades. Through a culmination of these effects, countries experience major food shortages, health risks caused by various pollution, and poverty through the destruction of affected jobs and livelihoods. Over the past decade, 23.1 million people were displaced by weather-related events alone, causing mass displacement as well.[[56]](#footnote-56)

***Energy Generation, Transportation, and Transition***

A material quantity of global electricity production is utilized by respective transportation sectors of all countries, of which the energy that is lost within transportation and transmission presents an immediate threat to the global economy and the environment. Importantly, a distinction must be made between energy and electricity, of which the former pertains to a broader capacity to do work, whereas the latter the generation of a usable resource acquired from secondary sources such as fossil fuels and renewable methods.[[57]](#footnote-57) Energy is required to create electricity, and oftentimes electricity aids in the ability to do work. For instance, a group of mechanical machines and employees may work together to function and generate electricity, and in turn, the electricity produced, as a type of energy, may serve to power lights and other operations. With this acknowledgment, a basic understanding of energy grid systems and infrastructure is paramount in formulating conclusions and contributing to meaningful improvements.

According to the International Energy Agency (IEA), the grid includes technologies such as transformers, the very machines that transform voltage levels, substations, the location at which voltage transformations occur, and power lines, which directly supply electricity from producer to consumer.[[58]](#footnote-58) Higher voltage levels are more efficient and effective in transporting electricity through longer routes, whereas lower voltage levels are safer for utilization closer to homes and businesses.[[59]](#footnote-59) In the initial stages of its history, electrical grids, power plants, and utility providers were located nearby cities and other populated regions to satisfy constant electricity demands. Later, these grid systems gradually connected, due to growing electricity demands, and were further tied through purchase agreements from other utilities, power markets, and power producers from wholesale markets.[[60]](#footnote-60) Currently, many different companies buy and sell power, including nonprofit municipal electric utilities, electric cooperatives, and private businesses.[[61]](#footnote-61) In some European countries like the United Kingdom, interconnectors are cables used to share electricity to surrounding countries, and aggregators regulate electricity use for optimal periods.[[62]](#footnote-62)

Following the Oil Embargo of 1973-1974, in which the Organization of Arab Petroleum Exporting Countries (OAPEC) imposed a strict embargo on the exportation of oil resources, the Organization for Economic Cooperation and Development (OECD) formed the International Energy Agency (IEA) in 1974. Presently, the IEA includes 31 member countries, 13 association countries or countries affiliated with the IEA but do not meet membership criteria, and 5 candidate countries that seek to enter the IEA through membership.[[63]](#footnote-63) Initially, this agency was developed to ensure the security of oil supplies through stable prices and consistent supply for member countries. Throughout its existence, however, the IEA has assumed responsibility for an extensive range of energy related matters including energy accessibility, efficiency, investment, innovation, decarbonization, and others.[[64]](#footnote-64) In 2015, the Ministerial Meeting of the IEA approved a modernization strategy, which aimed to expand upon the IEA’s commitment of oil security into the aforementioned energy concerns. As a result of an accompanying Open Door Policy that widened cooperation to several other countries, the IEA achieved the ability to greatly expand its influence in progressing energy technology and policy implementations internationally. In March 2022, another Ministerial Meeting found consensus with further expanding the IEA’s influence in guiding countries to build net-zero energy systems and to comply with internationally accepted standards. In 2021, the IEA published *Net Zero by 2050: A Roadmap for the Global Energy Sector*, which outlined a pathway for the global energy sector to achieve net zero emissions by 2050. These established frameworks, alongside evidence and data reported by the IEA itself, have led the way towards vast improvements in energy architecture and developments.[[65]](#footnote-65)

Electricity generation occurs through numerous methods which typically result in the rotation of a turbine that leads to production. Fossil fuel plants burn coal or oil to generate heat, natural gas plants burn natural gas to move turbines directly, hydroelectric plants store water in reservoirs behind dams, in which the water flows through the turbines, nuclear power reactors use the heat produced from split atoms, biomass plants includes the burning of waste and other substances, and other renewables like wind and solar are fueled by wind currents and the sun, respectively.[[66]](#footnote-66) Solar electricity generation is the only renewable energy on track with *Net Zero Emissions by 2050*, and other renewable energy shares, like wind, hydro, geothermal, and ocean are rising incrementally each year.[[67]](#footnote-67) Fortunately, the global weighted-average levelized cost of electricity from newly commissioned utility-scale solar photovoltaic (PV) projects fell by 85 percent between 2010 and 2020, expanding the affordability of such projects.[[68]](#footnote-68) Notwithstanding these advancements, coal and fossil fuels have remained the dominant fuel for power generation, with annual decreases each year.[[69]](#footnote-69) As such, renewable energy production has continued to expand, and demands more efficient solutions for both transmission and storage.

Concluded from estimates of multiple international sources, the world must add at least 50 millions miles of transmission lines in the next 17 years for countries to meet current climate goals and reach energy security.[[70]](#footnote-70) This tremendous endeavor requires investments of about 600 billion USD in infrastructure annually, along with regulatory policy for energy producers and distributors.[[71]](#footnote-71) Additionally, at least 1,500 gigawatts of renewable clean energy projects are pending for connection to grid systems.[[72]](#footnote-72) For this, countries must replace incremental renewable energy and grid expansion with large-scale, long-term planning along with investments in technological advancement, such as geometrical location of viable land sites, and ambitious policymaking.[[73]](#footnote-73) This process exceeds the effectiveness of individually-based planning, which can lead to suboptimal and more expensive outcomes along with delays in transmission processes and access to human resources. [[74]](#footnote-74) Competition and innovation may be narrowed through such public efforts, but can be revitalized through the establishment of concessions to private transmission firms, like in Brazil, and cost sharing between renewable energy providers and utility, like in Mexico.[[75]](#footnote-75)

Despite its noble intentions, plenty of challenges exist during the global renewable energy transition and require immediate international attention. Construction of these very renewable energy sources poses environmental and financial strain on every participating country, whereby long-term strategic planning and careful investment are needed. In the pursuit to electrify every country, some possess inadequate investment funds for expansion, lack access to electricity at a low cost, require permit reform, risk destroying homes and environments, and other issues.[[76]](#footnote-76) Further, some renewable sources, like wind and solar, are not yet efficient enough and consist of a limited lifespan along with limited energy storage options.[[77]](#footnote-77) In a geopolitical perspective, many countries and regions within the Global South presume that Western culture is coercing them into the adoption of renewable technologies, equipped with the primary argument that they are not mainly responsible for greenhouse gas emissions and climate change.[[78]](#footnote-78) This international polarity conjures apparent skepticism and disagreement between the Global North and South, and must be addressed when formulating feasible geographic solutions. It is therefore pivotal that the international community acknowledge the extensive variety of challenges presented throughout this transition, and to foster collaboration and cooperation to achieve similar goals in renewable energy and combating climate change.

***Current Situation***

Although the various causes of anthropogenic climate change and its effects may illustrate a dismal outlook, sizable progress has been made to mitigate greenhouse gas emissions, improve renewable energy infrastructure, and prevent the rise of global warming. Notwithstanding, current climate and sustainability energy goals remain ambitious in encouraging countries to greatly advance efforts in these areas. It is known that fossil fuels account for 75 and 90 percent of all greenhouse gas and carbon dioxide emissions respectively. With the advent of robust international policies and technological advances in renewable energy generation, many countries have adopted these practices and accomplished reduced emissions and lessened environmental effects. For example, the European Environmental Agency has reported more than 3,000 existing policies and measures that prevent impacts of climate change, and observed a 37 percent decrease in emission levels from 1990 to 2023 in EU Member States due to the European Green Deal.[[79]](#footnote-79) The implementation of climate technology, ranging from drought-resistant crops to solar energy, along with policies and sustainable practices are paramount in ensuring evidential success in reducing climate change. Outlined in the Paris Agreement, members of the UN aim to halve this percentage by 2030, and achieve net-zero emissions by 2050.[[80]](#footnote-80) Moreover, members compliant with the Paris Agreement must submit Nationally Determined Contributions (NDCs) that outline a particular countries’ strategy to reduce emissions and meet global climate goals. NDCs are updated every five years and provide a necessary framework that ensures accountability and effectively doubles as a national investment for countries investing in sustainable infrastructure.[[81]](#footnote-81)

Through fruitful discussion, planning, and consensus, the international community has developed robust solutions for both developed and developing countries. These results are products of conferences coordinated by organizations, such as the UNFCCC, dedicated to objectives like expanding knowledge of climate-related topics and access to climate technologies. As mentioned, the UNFCCC is primarily dedicated towards meeting the demands of the Paris Agreement, and focuses upon expanding access to climate technologies and ethical practices in developing regions. For this, the UNFCCC has formed the Technology Transfer Framework (TTF) and the Expert Group on Technology Transfer (EGTT) to evaluate the requirements of countries and how their existing infrastructure may be improved. Further, these groups draft Technology Needs Assessments (TNAs) which include a set of activities that developing countries are recommended to undertake to evaluate climate technology priorities. Multiple groups contribute information and technology to these efforts, and the Global Environment Facility (GEF) and the Green Climate Fund (GCF) both financially aid the EGTT. In 2010, the UNFCCC sought to expand their efforts and thus established the Technology Mechanism, which includes both the Technology Executive Committee (TEC), which functions as the policy analysis branch, and the CTCN, which functions as the policy implementation branch. In conjunction, these programs allow developing countries to effectively outline climate technology needs and formulate solutions to a range of multifaceted problems.[[82]](#footnote-82)

Fortunately, over the course of combating international climate change and its repercussions, ample research and resources have become available to countries pursuing such goals. Renewable energy, especially in the long-run, proves cheaper than other methods, as the cost of solar has fallen by 85 percent from 2010 to 2020, at which cheap electricity from said sources could provide 65 percent of global electricity supply by 2030 and could help decarbonize 90 percent of the power sector by 2050. Additionally, expanding renewable energy efforts realizes human health benefits in mitigating air and water pollutants, and preventing a variety of harmful environmental consequences like landslides, floods, and droughts. Investing in renewable technologies and infrastructure yields tremendous economic gains as well, with an estimated 2.5 trillion USD difference between current fossil fuel and potential renewable energy expenditures. Despite coal, oil, and gas industries maintaining leverage in many economies, the international community repeatedly finds that investing heavily in renewable energy sources may supply more jobs and income, with every dollar of investment creating three times as many jobs than in the fossil fuel industries.[[83]](#footnote-83)

***Actions Taken by the G20***

With the G20 possessing the power to establish and enforce precedents, it has placed a significant amount of emphasis on energy efficiency and methods to reduce the effects of climate change. After the recent meeting at the G20 Summit in Brazil, the issue of climate change was restated as one of the primary international topics discussed in modern times. In the Ministerial Statement of the G20 Taskforce on a Global Mobilization against Climate Change (TF-CLIMA), it was mentioned that Member States are continuing their efforts to uphold the increase in global temperature below 1.5 degrees Celsius above pre-industrial levels, which is 13.5 degrees Celsius.[[84]](#footnote-84) Out of the 75 separate commitments declared by the G20, 25 have been evaluated with an average compliance at 67 percent, slightly lower than the G20’s overall compliance at 70 percent.[[85]](#footnote-85) In order to combat these issues, the G20 has guaranteed to effectively tackle the issue of climate change through the Paris Agreement and its temperature goal[[86]](#footnote-86), primarily.

As a forum for international change, the G20 has assumed responsibility for diverse progressive initiatives that aim to improve global society. In the Environment and Climate Sustainability Working Group’s (ECSWG) Ministerial Declaration, it was acknowledged that the G20 represents 80% of the world population, 80 percent of global greenhouse gas emissions, and 75 percent of waste generation. As such, the G20 has continually engaged in aggressive climate change efforts since COP15 in 2009, in which the Copenhagen Accord and Green Climate Fund was established and sought to mitigate carbon emissions and address short-term and long-term climate needs.[[87]](#footnote-87) Additionally, at the same conference, developed countries agreed to fund initiatives to reduce greenhouse gas emissions, and to assist developing countries in their advancements towards greener economies.[[88]](#footnote-88) The 2009 G20 Summit in Pittsburgh included the endorsement of the Copenhagen Accord and along with multiple amendments, called upon the World Bank for monetary assistance, the agreement upon the phasing out of fossil fuel subsidies, and inaugurated a focus on the renewable energy transition.[[89]](#footnote-89) The 2010 G20 Summit in Toronto primarily focused on green recovery, sustainable global growth, and creating the Global Marine Environment Protection Initiative (GMEP).[[90]](#footnote-90) In 2011, the G20 Summit held in Cannes, France, promoted low-carbon development strategies to foster sustainable development, operationalized the Green Climate Fund, and created the first study group on climate finance.[[91]](#footnote-91) The Saint Petersburg G20 Summit in Russia centered upon energy security and oil prices, with a commitment to phase down the consumption and production of hydrofluorocarbons.[[92]](#footnote-92)

In continuation of this history, countries in the COP21 in 2015 incorporated the Paris Agreement, a legally binding international treaty that effectively promoted environmental accountability in the global community. With the inclusion of Nationally Determined Contributions (NDCs), reports that outline a countries’ policies and progress, countries maintain a firmer obligation to climate change goals such as the *Net Zero Emissions by 2050* scenario (NZE). At the 2016 G20 Summit in Hangzhou, China, countries achieved progress in reaffirming commitments to phase out fossil fuel subsidies and the US and China announced ratification of the Paris Agreement, despite the committee's failure to materialize numerous other expected goals.[[93]](#footnote-93) The 2017 G20 Summit in Hamburg, Germany, included US withdrawal from the Paris Agreement and the formulation of the G20 Hamburg Climate and Energy Action Plan for Growth, and the COP24 in Katowice, Poland, produced the Katowice Climate Package, which further operationalized the Paris Agreement.[[94]](#footnote-94) The G20 Summit of 2019 in Osaka, Japan, contained a plethora of environmental and economic growth solutions, such as those concerning marine environments, illegal, unreported, and unregulated (IUU) fishing, and circular economy-environment systems. Additionally, the frameworks *Osaka Blue Ocean Vision* and *G20 Implementation Framework for Actions on Marine Plastic Litter* addressed marine and plastic pollution.[[95]](#footnote-95) In June 2019, G20 environment and energy ministers announced commitments to improve energy efficiency and transition, including the push for greener technologies through the *G20 Karuizawa Innovation Action Plan on Energy Transitions and Global Environment for Sustainable Growth*.[[96]](#footnote-96) In the recent COP29, G20 members reaffirmed commitments to the Paris Agreement, restated the significance of the Global Stocktake in Dubai, a detailed and transparent review of climate progress and shortcomings, and concurred in reforming Multilateral Development Banks and increasing climate finance efforts.[[97]](#footnote-97)[[98]](#footnote-98)

Today, the G20 upholds ambitious climate and energy transition goals shared with numerous international organizations and individual G20 countries alike. The Organization for Cooperation and Development (OECD) serves as a strategic advisor of the G20, and aims to further aforesaid initiatives in addition to social inclusion, energy transition efforts, and the reformation of global government institutions.[[99]](#footnote-99) Importantly, particular countries within the G20 are also credited with positive ameliorations in their extensive investments to environmental and energy-related infrastructure. The 2019 Emissions Gap Report, which evaluates NDC performance among the G20, states that six members are projected to achieve climate targets, whereas seven require improvement, three are undetermined, and three are lacking in their respective projections.[[100]](#footnote-100) Thus, there exists much need for a multitude of G20 countries to bolster current objectives and maintain accountability for environmental developments and energy transition efforts.

***Conclusion***

A previously misunderstood and understated phenomenon, global climate change presently resembles the scientific forefront of international efforts. As demonstrated through causes such as deforestation and excessive carbon dioxide emissions, independent countries and institutions must assume environmental accountability for economic and political ventures to mitigate the effects of climate change. Importantly, emphasis regarding further improvements upon energy transmission and relevant technologies are required to sustain future electricity demands, and access to these technologies and knowledge must expand internationally, especially to impoverished countries. Progressive institutions such as the IEA and sovereign entities are responsible for the advancement of such technologies and policies that influence the global direction of energy generation and resource management. To achieve the ambitious targets established by the UN such as *Net Zero by 205*0, countries must foster multilateral collaboration and actively pursue global efforts that will mitigate the deleterious effects of climate change and inspire positive environmental growth for future generations.

A necessary prerequisite to mitigating climate change, improving and expanding renewable energy generation and transmission presents an undeniable objective for the entire global community. As every country rushes to connect and electrify their societies, long-term planning and thoughtful innovation serve as a salient pillar of this transition. The ultimate phase-out of coal and fossil fuels and the expansion of clean renewable energy, if not already, shall become the primary modern concern of the public and private sector alike to meet climate change goals and initiatives. For this, countries have begun to invest in extending and improving transmission lines, storage options, and renewable energy generation to meet ever growing demand and international competition. Therefore, it is the responsibility of participating countries to develop effective methods that heavily consider the numerous inimical consequences of the renewable energy transition, and to ensure its overall success in establishing a desirable, more sustainable future.

***Committee Directive***

Member States in the G20 should recognize the importance of maintaining environmental integrity and search for more sustainable means for efficient and clean energy. It is imperative that Member States place attention to financially sustainable and effective methods toward achieving the mitigation of the effects of climate change, especially for underdeveloped and developing Member States. While searching for a financially viable way forward, it is also ideal to search for a means of agreement with Member States who depend upon their exportation of nonrenewable energy, such as oil, for economic success. Member States that are industrially developed should put precedence on integration into a more energy efficient system and be more economically conscious about how they could potentially make a clean transition. Therefore, it is paramount that Member States of the G20 formulate viable solutions that include concurrent solutions surrounding energy efficient systems, environmental sustainability, climate change mitigation, and similar paths for the future.

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